



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

**BOARD OF DIRECTORS
MEETING
March 15, 2023**

**MEETING LOCATION(S) FOR IN-PERSON ATTENDANCE BY
BOARD MEMBERS AND MEMBERS OF THE PUBLIC**

Main Meeting Location:

**Bay Area Metro Center
1st Floor Board Room
375 Beale Street, San Francisco, CA 94105**

In-Person Remote Teleconference Location(s):

**Office of Contra Costa County Supervisor John Gioia
Conference Room
11780 San Pablo Ave., Suite D, El Cerrito, CA 94530**

THE FOLLOWING STREAMING OPTIONS WILL ALSO BE PROVIDED

These streaming options are provided for convenience only. In the event that streaming connections malfunction for any reason, the Board of Directors reserves the right to conduct the meeting without remote webcast and/or Zoom access.

The public may observe this meeting through the webcast by clicking the link available on the air district's agenda webpage at <http://www.baaqmd.gov/bodagendas>

Members of the public may participate remotely via Zoom at <https://bayareametro.zoom.us/j/85969852889> or may join Zoom by phone by dialing (669) 900-6833 or (408) 638-0968. The Webinar ID for this meeting is: 859 6985 2889

BOARD OF DIRECTORS MEETING

AGENDA

WEDNESDAY, MARCH 15, 2023

9:00 AM

Chairperson, John J. Bauters

1. **Call to Order - Roll Call**
2. **Pledge of Allegiance**
3. **Public Meeting Procedure**

The Board Chair shall call the meeting to order and the Clerk of the Boards shall take roll of the Board members.

This meeting will be webcast. To see the webcast, please visit www.baaqmd.gov/bodagendas at the time of the meeting. Closed captioning may contain errors and omissions and are not certified for their content or form.

Public Comment on Agenda Items: *The public may comment on each item on the agenda as the item is taken up. Members of the public who wish to speak on a matter on the agenda will have one minute each to address the Board on that agenda item, unless a different time limit is established by the Chair. No speaker who has already spoken on an item will be entitled to speak to that item again.*

PUBLIC HEARING(S)

4. **Public Hearing to Consider Adoption of Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces (Rule 9-4) and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6), and Certification of an Environmental Impact Report for the Proposed Amendments to Rule 9-4 and Rule 9-6 Pursuant to the California Environmental Quality Act (CEQA)**

The Board of Directors will consider adoption of proposed amendments to Regulation 9, Rule 4: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces (Rule 9-4) and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6) and Certification of an Environmental Impact Report for the proposed amendments to Rule 9-4 and Rule 9-6 pursuant to the California Environmental Quality Act (CEQA).

CONSENT CALENDAR (Item 5)

5. Referral of the Proposed Budget for Fiscal Year Ending (FYE) 2024 to the Finance and Administration Committee

The Board of Directors will consider referring the proposed budget for the Fiscal Year Ending (FYE) on June 30, 2024, to the Finance and Administration Committee for review and consideration.

OTHER BUSINESS

6. Public Comment on Non-Agenda Matters

Pursuant to Government Code Section 54954.3, members of the public who wish to speak on matters not on the agenda will be given an opportunity to address the Board of Directors. Members of the public will have one minute each to address the Board, unless a different time limit is established by the Chair.

7. Board Member Comments

Any member of the Board, or its staff, on his or her own initiative or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter or take action to direct staff to place a matter of business on a future agenda. (Gov't Code § 54954.2)

8. Report of the Executive Officer/APCO

9. Chairperson's Report

10. Time and Place of Next Meeting

Wednesday, April 5, 2023, at 9:00 a.m. at 375 Beale Street, San Francisco, CA 94105. The meeting will be in-person for the Board members and members of the public will be able to either join in-person or via webcast.

11. Adjournment

The Board meeting shall be adjourned by the Board Chair.

CONTACT:

MANAGER, EXECUTIVE OPERATIONS
375 BEALE STREET, SAN FRANCISCO, CA 94105
vjohnson@baaqmd.gov

(415) 749-4941
FAX: (415) 928-8560
BAAQMD homepage:
www.baaqmd.gov

- Any writing relating to an open session item on this Agenda that is distributed to all, or a majority of all, members of the body to which this Agenda relates shall be made available at the Air District's offices at 375 Beale Street, Suite 600, San Francisco, CA 94105, at the time such writing is made available to all, or a majority of all, members of that body.

Accessibility and Non-Discrimination Policy

The Bay Area Air Quality Management District (Air District) does not discriminate on the basis of race, national origin, ethnic group identification, ancestry, religion, age, sex, sexual orientation, gender identity, gender expression, color, genetic information, medical condition, or mental or physical disability, or any other attribute or belief protected by law.

It is the Air District's policy to provide fair and equal access to the benefits of a program or activity administered by Air District. The Air District will not tolerate discrimination against any person(s) seeking to participate in, or receive the benefits of, any program or activity offered or conducted by the Air District. Members of the public who believe they or others were unlawfully denied full and equal access to an Air District program or activity may file a discrimination complaint under this policy. This non-discrimination policy also applies to other people or entities affiliated with Air District, including contractors or grantees that the Air District utilizes to provide benefits and services to members of the public.

Auxiliary aids and services including, for example, qualified interpreters and/or listening devices, to individuals who are deaf or hard of hearing, and to other individuals as necessary to ensure effective communication or an equal opportunity to participate fully in the benefits, activities, programs, and services will be provided by the Air District in a timely manner and in such a way as to protect the privacy and independence of the individual. Please contact the Non-Discrimination Coordinator identified below at least three days in advance of a meeting so that arrangements can be made accordingly.

If you believe discrimination has occurred with respect to an Air District program or activity, you may contact the Non-Discrimination Coordinator identified below or visit our website at www.baaqmd.gov/accessibility to learn how and where to file a complaint of discrimination.

Questions regarding this Policy should be directed to the Air District's Non-Discrimination Coordinator, Suma Peesapati, at (415) 749-4967 or by email at spesapati@baaqmd.gov.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
375 BEALE STREET, SAN FRANCISCO, CA 94105
FOR QUESTIONS PLEASE CALL (415) 749-4941

EXECUTIVE OFFICE:
MONTHLY CALENDAR OF AIR DISTRICT MEETINGS

MARCH 2023

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Meeting	Wednesday	15	9:00 a.m.	1 st Floor Board Room
Board of Directors Community Equity, Health and Justice Committee – CANCELLED & RESCHEDULED TO WEDNESDAY, MARCH 29, 2023 AT 9:00 A.M.	Wednesday	15	1:00 p.m.	1 st Floor Board Room
Board of Directors Legislative Committee - CANCELLED	Wednesday	15	3:30 p.m.	1 st Floor Board Room
Community Advisory Council Meeting	Thursday	16	6:00 p.m.	1 st Floor Board Room
Path to Clean Air Community Emissions Reduction Plan Steering Committee	Monday	20	5:30 p.m.	1 st Floor Board Room
Board of Directors Community Equity, Health and Justice Committee	Wednesday	29	9:00 a.m.	1 st Floor Board Room
MB 3/9/2023 – 12:21 p.m.				G/Board/Executive Office/Moncal

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson John J. Bauters and Members
of the Board of Directors

From: Philip M. Fine
Executive Officer/APCO

Date: March 15, 2023

Re: Public Hearing to Consider Adoption of Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces (Rule 9-4) and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6), and Certification of an Environmental Impact Report for the Proposed Amendments to Rule 9-4 and Rule 9-6 Pursuant to the California Environmental Quality Act (CEQA)

RECOMMENDED ACTION

Recommend the Board of Directors consider:

- Adoption of proposed amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces (Rule 9-4) and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6), and;
- Certification of an Environmental Impact Report for the proposed amendments to Rule 9-4 and Rule 9-6 pursuant to the California Environmental Quality Act (CEQA), and make a Statement of Overriding Considerations.

BACKGROUND

In 2020, Air District staff began evaluating potential amendments to Regulation 9 Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). These rules govern emissions from small, typically residential and commercial, furnace and water heater appliances. Space- and water-heating appliances generate a large portion of nitrogen oxide (NO_x) emissions from sources in the Bay Area. NO_x is formed during natural gas combustion when ambient nitrogen and oxygen combine at high temperatures. NO_x emissions are a precursor to ozone and secondary particulate matter (PM) formation and negatively impact local and regional air quality. The proposed rule amendments would substantially reduce NO_x emissions from these furnace and water heater appliances and support improvements to regional ambient air quality and health outcomes. These emissions also result in PM exposures in communities throughout the Bay Area, which can contribute to a number of adverse health outcomes, including premature deaths. In addition, the health impact modeling

described in the Staff Report indicates that communities of color are disproportionately impacted by pollution from these appliances.

Staff presented to the Stationary Source and Climate Impacts Committee of the Board of Directors multiple times throughout 2021 and 2022. Feedback has consistently shown support for the draft amendments from the Board and public while noting the importance of balancing complicating factors, such as equity and the availability of funding mechanisms for incentives and subsidies. Staff additionally held four meetings of an external stakeholder working group from May to July of 2021 to receive input on the draft amendments.

Staff held a workshop on the draft amendments in October 2021. Following comments received from this workshop, staff made minor revisions to the draft amendments of Rule 9-4. These updates consist of the addition of Section 9-4-206, a definition for “Natural Gas-Fired Furnace,” and related text updates to clarify its applicability to emission standards. No additional updates were made to the draft amendments to Rule 9-6 since the October workshop.

Air District staff released the proposed amendments to Rule 9-4 and Rule 9-6, Staff Report, Socioeconomic Impact Analysis, Notice of Public Hearing, Notice of Availability of a CEQA Draft Environmental Impact Report (DEIR), and other supporting documents in December 2022 for public review and comment. These materials are available on the Air District’s website at: <https://www.baaqmd.gov/building-appliances>.

The written public comment period for the proposed amendments, Draft EIR, and related materials was open from December 20, 2022, until February 6, 2023. Air District staff received letters from 565 commenters. A total of 29 of the comments were from organizations, companies, manufacturers, utilities, labor unions, government agencies, and advocacy groups. The remainder of the comments were made by members of the public. A total of 404 out of the 565 comments received were in support of the proposed rule amendments. A few of the comment categories in support of the proposed amendments consisted of reducing harmful pollutants in the air, promoting healthier communities and combatting the long-term impacts of climate change. Some of the comment categories in opposition of the proposed amendments consisted of concerns surrounding cost, grid capacity and reliability, and emergency replacements. Air District staff prepared a response to comments document for all comments received during the written comment period and can be referenced in the Appendix section of the Staff Report.

DISCUSSION

Proposed Amendments to Rules 9-4 and 9-6

The proposed amendments to Rules 9-4 and 9-6 include the introduction of a zero NOx emissions standard for natural gas-fired furnaces and water heaters sold and installed in the Bay Area. Zero NOx space and water heating technologies currently exist, but they are limited in availability and can be expensive to install in existing buildings. Equipment availability is projected to increase, and costs are expected to decrease in the coming years. As such, staff is proposing a longer-term compliance date of 2027 to 2031, dependent on equipment type, use and size. Additional updates to the proposed rule amendments include the introduction of an ultra-

low NOx standard for natural gas-fired furnaces starting in 2024, as well as additional updates to definitions, testing and certification requirements and other clarifications. Both Rules 9-4 and 9-6 currently apply only to new devices and only to natural gas-fired devices, and Air District staff is not proposing to change these provisions of the rules. The proposed ultra-low and zero NOx standards would apply to appliance retailers, wholesalers and installers and would affect Bay Area consumers at the point in time when they install a new appliance or replace their existing furnaces and water heaters.

The proposed amendments include a commitment from Air District staff to re-evaluate the availability and accessibility of zero NOx solutions in closer proximity to the compliance date through an interim reporting process. The interim reports are intended to update the Air District Board of Directors on relevant market changes and ensure equitable outcomes in the implementation of the proposed standards. Air District staff intends for this proposed future-effective rule standard to provide manufacturers, suppliers, and consumers with a sufficient planning horizon for the proliferation of zero NOx appliances into the market while realizing emissions reductions and positive health outcomes as soon as practicable. While the proposed rule amendments do not specify emission control methods to meet the zero NOx standards, the appliances currently available on the market that do not emit NOx largely use electric heat pump technology. It is possible that natural gas-fired appliances could also be designed to emit zero NOx in compliance with the proposed rules. However, because electric heat pump technology is the only currently available technology that emits zero NOx in alignment with the proposed rules, staff assumes for purposes of the analysis presented in the associated Staff Report and DEIR that if the proposed rules are adopted, consumers will replace natural gas-fired appliances with electric appliances upon rule implementation.

Implementation Working Group

If the Board of Directors adopts proposed rule amendments to Rules 9-4 and 9-6, Air District staff will convene an Implementation Working Group (IWG) to support implementation of the rules. The purpose of the IWG is to provide input to Air District staff's periodic reports to the Board of Directors on the implementation of the Building Appliances Rules and to provide the Air District staff with insights on the technical readiness of the market and equitable transition to compliant appliances, as to not unduly burden any income class or professional group. As such, the IWG will provide a forum to discuss technical and equity aspects of implementing the Building Appliances Rules.

The IWG will comprise up to approximately 35 members representing a variety of stakeholder segments. To appropriately account for the broad range of subject matters, questions, and concerns that may arise, the IWG will also include the following subcommittees: a Technical Subcommittee and a Community/Equity Subcommittee. The inclusion of a Steering Committee will ensure the goals of the IWG, including both subcommittees, are attained in an effective, efficient, and equitable manner. The IWG will be led by the Air District with the assistance of a contracted facilitator.

Socioeconomic Impacts

The Air District evaluated the socioeconomic impacts of the proposed new rule and amendments, as required by Health and Safety Code Section 40728.5. The Socioeconomic Impact Analysis considers the impacts of the rule or regulation on employment and the economy of the region affected by the adoption of the rule or regulation.

The proposed amendments may result in socioeconomic impacts due to increased consumer appliance replacement costs and resultant shifted spending patterns. The cost effectiveness associated with the proposed rule amendments ranges from \$54,100 per ton of NO_x emissions reduced to \$594,000 per ton of NO_x emissions reduced as multiple emissions standards are included in the proposed rule amendments.

Air Quality and Health Benefits

The proposed rule amendments are expected to have significant emissions benefits. This includes NO_x reductions, which are a direct result of the proposed amendments to emission standards, as well as a variety of co-benefits including reducing peak ozone levels, secondary particulate matter formation, greenhouse gas emission reductions and health benefits from reductions in secondary and primary particulate matter. Potential net NO_x emissions reductions that could result from full implementation of the proposed rule amendments are estimated to be 3,236 tons NO_x per year.

In terms of health benefits, the proposed amendments will result in reductions in NO_x emissions and reductions in secondary fine PM (PM_{2.5}) across the Bay Area. These reductions in secondary PM_{2.5} avoid an estimated 23 to 52 deaths per year and about 71 new cases of asthma per year. Reductions in total PM_{2.5} attributable to the targeted appliances, including reductions in primary PM_{2.5} from adoption of electric appliances, would avoid an estimated 37 to 85 premature deaths per year and about 110 new cases of asthma each year. The valuations of the health impacts from total PM_{2.5} were estimated to be between 400 to 890 million U.S. dollars annually.

As discussed in the Staff Report, the proposed amendments to Rule 9-4 and Rule 9-6 are needed to ensure attainment and maintenance of ambient air quality standards for ozone and particulate matter in the Bay Area. These emissions also result in PM exposures in communities throughout the Bay Area, which can contribute to a number of adverse health outcomes, including premature deaths. In addition, the health impact modeling described in the Staff Report indicates that communities of color are disproportionately impacted by pollution from building appliances. The proposed amendments to Rule 9-4 and Rule 9-6 would achieve these needed reductions in emissions and pollutant exposures and would yield substantial health benefits in these communities and throughout the Bay Area.

Based on evidence presented in the Staff Report, Air District staff believes that the proposed amendments are necessary for achieving its goal to create a healthy breathing environment for every Bay Area resident while protecting and improving public health, air quality and the global climate.

Environmental Impacts

Pursuant to the California Environmental Quality Act (CEQA), the Air District published a Notice of Preparation and Initial Study (NOP/IS) in anticipation of a Draft Environmental Impact Report (DEIR) for proposed amendments to Rule 9-4 and Rule 9-6 on May 19, 2022, and a CEQA scoping meeting was conducted on June 9, 2022. Following the release of the NOP and IS, Air District staff also determined that impacts related to aesthetics and noise should also be further evaluated in the DEIR.

The DEIR for the proposed amendments to Rules 9-4 and 9-6 was published on December 20, 2022 for public review and comment (State Clearinghouse Number 2022050430). The DEIR concluded that impacts associated with Utilities and Service Systems would be potentially significant and unavoidable under the assumption that the replacement of existing natural gas-fired space and water heating appliances over time could result in increased energy demand beyond the existing grid capacity if these existing appliances are replaced with electric appliances. The DEIR also concluded that impacts associated with noise would be potentially significant and unavoidable due to the potential operational noise impacts associated with certain zero NOx equipment. Lastly, the DEIR found that impacts to aesthetics, air quality, and greenhouse gas emissions and climate change would be less than significant.

Staff additionally notes that the EIR finds significant improvements to regional air quality and public health while also achieving co-beneficial greenhouse gas reductions. Should the Board of Directors adopt the proposed rule amendments and certify the Final EIR, it will also adopt a Statement of Overriding Considerations which explains its reasoning as to why the beneficial aspects of the rule outweigh unavoidable environmental impacts.

BUDGET CONSIDERATION/FINANCIAL IMPACT

Staff anticipates that the proposed amendments to Rules 9-4 and 9-6 will require additional staff time and resources in a number of areas.

The enforcement of the zero NOx standard is anticipated to result in increased staffing needs for the Compliance and Enforcement Division. In order to process certifications for compliant equipment and ensure point of sale compliance with the proposed ultra-low NOx requirements, staff anticipates the need to allocate 0.5 full-time equivalent (FTE) starting in 2024. To ensure compliance with the proposed zero NOx requirements, staff anticipates an ongoing need for one additional FTE in the Compliance and Enforcement Division starting in 2027.

Additionally, implementation of the proposed rule amendments will require ongoing support from Rules and Strategic Policy Division and Planning and Climate Protection Division staff to facilitate and participate in the Implementation Working Group and prepare the Interim Reports. Staff anticipates that the combined workload between these two divisions will amount annually to one FTE starting in 2023.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: Jennifer Elwell / Eric Lara
Reviewed by: Elizabeth Yura / Victor Douglas

ATTACHMENTS:

1. Final Staff Report: Proposed Amendments to Building Appliance Rules-Regulation 9, Rule 4 and Rule 6
2. Appendix A: Draft Proposed Amendments to Rule 9-4 - Redlined Version
3. Appendix B: Draft Proposed Amendments to Rule 9-6 - Redlined Version
4. Appendix C: Socioeconomic Impacts Analysis Report of Proposed Amendments to Rule 9-4 and 9-6
5. Appendix D: Electric Infrastructure Impacts from Proposed Zero NOx Standards
6. Appendix E: Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area
7. Appendix F: Exposure and Equity Assessment of Natural Gas Appliances in the San Francisco Bay Area
8. Appendix G: Draft Environment Impact Report - Prepared by Ascent Environmental
9. Appendix H: Appliance Rules Response to Comments
10. Appendix H: Attachment 2: All Comments
11. BAAQMD Rule Amendments: Final Environmental Impact Report
12. Draft Board Resolution for Proposed Amendments to Regulation 9-4 and 9-6
13. Resolution Attachment A: Draft Amendments Rule 9-4
14. Resolution Attachment B: Draft Amendments Rule 9-6
15. Resolution Attachment C: Draft CEQA Findings and Statement of Overriding Considerations



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

FINAL STAFF REPORT

PROPOSED AMENDMENTS TO BUILDING APPLIANCE RULES – REGULATION 9, RULE 4: NITROGEN OXIDES FROM FAN TYPE RESIDENTIAL CENTRAL FURNACES AND RULE 6: NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED BOILERS AND WATER HEATERS

March 2023

Prepared By

**Jennifer Elwell
Senior Air Quality Engineer**

and

**Eric Lara
Senior Air Quality Specialist**

Table of Contents

ACKNOWLEDGEMENTS	2
I. EXECUTIVE SUMMARY.....	3
II. BACKGROUND.....	6
<i>A. Industry Description</i>	7
<i>B. Regulatory History</i>	7
<i>C. Active Rule Development</i>	8
III. PROPOSED RULE AMENDMENTS	8
<i>A. Proposed Amendments to Rule 9-4</i>	9
1. Rule Title and Equipment Scope.....	9
2. Applicability	9
3. Definitions.....	9
4. Standards	9
5. Administrative Requirements	10
6. Manual of Procedures	10
<i>B. Proposed Amendments to Rule 9-6</i>	10
1. Rule Applicability	10
2. Standards	11
3. Administrative Requirements	11
4. Manual of Procedures	11
<i>C. Interim Report and Implementation Working Group</i>	11
IV. TECHNOLOGY EVALUATION	12
<i>A. Zero NOx Natural Gas Systems</i>	12
<i>B. Zero NOx 240 Volt Electric Systems</i>	13
<i>C. Zero NOx Low Voltage Electric Systems</i>	13
<i>D. Compliance Dates</i>	15
V. EMISSIONS AND EMISSION REDUCTIONS	16
<i>A. Emissions Context</i>	16
<i>B. Nitrogen Oxide Emissions</i>	20
<i>C. Ozone Formation</i>	21
<i>D. Ultra-low NOx Emission Control Methods</i>	21
<i>E. Zero NOx Technologies for Space and Water Heating</i>	22
<i>F. Nitrogen Oxides Emissions Reductions</i>	22

G. Greenhouse Gas Emissions Reductions	25
H. Particulate Matter Emissions	27
I. Exposure and Health Impacts	27
VI. ECONOMIC IMPACTS	33
A. Cost Effectiveness	33
B. Incremental Cost Effectiveness	35
1. Proposed Amendments to Rule 9-4	35
2. Proposed Amendments to Rule 9-6	35
C. Socioeconomic Impacts	35
D. Funding and Incentives	37
E. Valuation of Health Impacts	40
F. Air District Impacts	42
VII. REGULATORY IMPACTS	43
VIII. ENVIRONMENTAL IMPACTS	43
A. Notice of Preparation and Initial Study	43
B. Draft Environmental Impact Report	44
C. Final Environmental Impact Report	45
IX. RULE DEVELOPMENT / PUBLIC PARTICIPATION PROCESS	45
A. Public Participation during Rule Development Process	45
B. Considerations to Ensure Equitable Outcomes	47
C. Implementation Working Group	47
D. Overview of Comments Received	48
X. CONCLUSION/RECOMMENDATIONS	49
A. Necessity	49
B. Authority	49
C. Clarity	49
D. Consistency	50
E. Non-Duplication	50
F. Reference	50
G. Recommendations	50

List of Appendices:

Appendix A: Proposed Amendments to Rule 9-4

Appendix B: Proposed Amendments to Rule 9-6

Appendix C: Socioeconomic Impacts Analysis

Appendix D: Electric Infrastructure Impacts from Proposed Zero NOx Standards

Appendix E: Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area

Appendix F: Exposure and Equity Assessment of Natural Gas Appliances in the San Francisco Bay Area

Appendix G: Draft Environmental Impact Report

Appendix H: Response to Comments: Proposed Amendments to Regulation 9, Rule 4 and Rule 6

ACKNOWLEDGEMENTS

District staff members who contributed to the development of this Staff Report and rule proposals:

Abby Young, Manager, Planning and Climate Protection
Amy Dao, Senior Environmental Planner, Planning and Climate Protection
Bonyoung Koo, Senior Atmospheric Modeler, Assessment, Inventory, and Modeling
David Holstius, Senior Advanced Projects Advisor, Assessment, Inventory, and Modeling
David Joe, Assistant Manager, Rules and Strategic Planning
Elizabeth Yura, Director, Rules and Strategic Planning
Henry Hilken, Director, Planning and Climate Protection
Idania Zamora, Assistant Manager, Planning and Climate Protection
Jacob Finkle, Senior Air Quality Specialist, Rules and Strategic Planning
Laura Cackette, Senior Air Quality Specialist, Rules and Strategic Planning
Madeline Stone, Assistant Counsel, Legal
Mark Tang, Principal Environmental Planner, Planning and Climate Protection
Megan Mabry, Administrative Assistant II, Community Engagement
Phil Martien, Director, Assessment, Inventory, and Modeling
Randi Wallach, Assistant Counsel, Legal
Saffet Tanrikulu, Manager, Assessment, Inventory, and Modeling
Song Bai, Manager, Assessment, Inventory, and Modeling
Steve Reid, Senior Advanced Projects Advisor, Assessment, Inventory, and Modeling
Victor Douglas, Manager, Rules and Strategic Planning
Yiqin Jia, Atmospheric Modeler, Assessment, Inventory, and Modeling
Yuanyuan Fang, Statistician, Assessment, Inventory, and Modeling

I. EXECUTIVE SUMMARY

The Bay Area Air Quality Management District (“BAAQMD” or the “Air District”) staff is proposing amendments to two Air District rules: Regulation 9, Rule 4: *Nitrogen Oxides from Fan Type Residential Central Furnaces* (“Rule 9-4”) and Regulation 9, Rule 6: *Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters* (“Rule 9-6”) to support improvements to regional ambient air quality and health outcomes. Rule 9-4 currently applies to the natural gas-fired space-heating furnaces commonly found in single-family homes and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. These sources generate a substantial portion of nitrogen oxides (NO_x) emissions from sources in the Bay Area.

Exposure to NO_x and their atmospheric reaction products can greatly impact health. Breathing air with a high concentration of NO_x can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO_x may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_x.

Nitrogen oxides react with other chemicals in the air to form both fine particulate matter (PM_{2.5}) and ozone (O₃). Both of these pollutants are harmful when inhaled. The Bay Area does not currently attain all state and national ambient air quality standards for particulate matter, and further reductions of particulate matter emissions are needed for attainment and maintenance of the standards. The District-wide health benefits of attaining and maintaining compliance with the PM_{2.5} ambient air standards are significant. PM_{2.5} has been linked to a broad range of health effects, including premature mortality, adverse respiratory health effects, cardiovascular diseases, impacts to cognitive function, and cancer.¹ The Air District's Advisory Council has determined that PM is "the most important health risk driver in Bay Area air quality," and that reductions in PM levels are needed to achieve further clean air and public health benefits.²

The PM_{2.5} from gas-fired building appliances that impacts human health is composed of both directly emitted PM_{2.5} ("primary PM_{2.5}") and PM_{2.5} that later forms in the atmosphere from chemical reactions with NOx ("secondary PM_{2.5}"). Reducing emissions of NOx from these sources would specifically reduce total exposures to the secondary PM_{2.5} component. Replacement of these sources with electric appliances (see below) would also reduce total exposures to the primary component. Modeling indicates that both components disproportionately impact residents of color throughout the nine Bay Area counties. Reducing emissions of NOx from these sources will reduce the formation of and exposure to secondary PM, thus improving health and saving lives, especially those most impacted by air pollution.

The proposed amendments to Rules 9-4 and 9-6 include the introduction of a zero NOx emissions standard for natural gas-fired furnaces and water heaters sold and installed in the Bay Area. Zero NOx space and water heating technologies currently exist, but they are limited in availability and can be expensive to install in existing buildings. Equipment availability is projected to increase, and costs are expected to decrease in the coming years. As such, staff is proposing a longer-term compliance date of 2027 to 2031, dependent on equipment type, use and size.

Other updates to the proposed rule amendments include the introduction of an ultra-low NOx standard to Rule 9-4 starting in 2024 as well as additional updates to definitions, testing and certification requirements and other clarifications. Both Rules 9-4 and 9-6 currently apply only to new devices and only to natural gas-fired devices, and Air District staff is not proposing to change these provisions of the rules. The proposed ultra-low and zero NOx standards would apply to appliance retailers, wholesalers and installers and would affect Bay Area consumers at the point in time when they install a new appliance or replace their existing furnaces and water heaters. The proposed amendments include a commitment from District staff to re-evaluate the availability and accessibility of zero NOx solutions in closer proximity to the compliance date through an interim reporting process. The interim reports are intended to update the Air District Board of Directors on relevant market changes and ensure equitable outcomes in the implementation of the proposed standards.

District staff intends for this proposed future-effective rule standard to provide manufacturers, suppliers, and consumers with a sufficient planning horizon for the proliferation of zero NOx appliances into the market while realizing emissions reductions and positive health outcomes as soon as practicable. While the proposed rule amendments do not specify emission control

¹ US EPA, 2019. Integrated Science Assessment (ISA) for particulate matter (final report, Dec 2019). US Environmental Protection Agency, Washington, DC. Publication No: EPA/600/R-19/188.

² BAAQMD, 2020. [Advisory Council Particulate Matter Reduction Strategy Report](#). December. See also: BAAQMD, 2017. Final 2017 Clean Air Plan: Spare the Air – Cool the Climate. April.

methods to meet the zero NOx standards, the appliances currently available on the market that do not emit NOx largely use electric heat pump technology. Natural gas-fired appliances could also be designed to emit zero NOx in compliance with the proposed rules. However, because electric heat pump technology is the only currently available technology that emits zero NOx in alignment with the proposed rules, staff assumes for purposes of the analysis presented in this Report that if the proposed rules are adopted, consumers will replace natural gas-fired appliances with electric appliances upon rule implementation. The emissions benefits, costs and potential environmental impacts analyzed throughout this Staff Report assume appliance replacement with electric heat pump technology except where otherwise noted. Generally, this assumption provides a “worst case” conservative estimate of emissions reductions, costs, and environmental impacts of the proposed amendments for the Board and public’s consideration.

The proposed rule amendments are expected to have significant emissions benefits. This includes NOx reductions, which are a direct impact of the proposed amendments to emission standards, as well as a variety of co-benefits including reducing peak ozone levels, secondary particulate matter formation, greenhouse gas emission reduction and health benefits from reductions in secondary and primary particulate matter. Potential net NOx emissions reductions that could result from full implementation of the proposed rule amendments are estimated to be 3,236 tons NOx per year.

In terms of health benefits, the proposed amendments will result in reductions in NOx emissions and reductions in secondary PM_{2.5} across the Bay Area. These reductions in secondary PM_{2.5} avoid an estimated 23 to 52 deaths per year and about 71 new cases of asthma per year. Reductions in total PM_{2.5} attributable to the targeted appliances, including reductions in primary PM_{2.5} from adoption of electric appliances, would avoid an estimated 37 to 85 premature deaths per year and about 110 new cases of asthma each year. The valuations of the health impacts from total PM_{2.5} were estimated to be between 400 to 890 million U.S. dollars annually.

The proposed rule amendments may result in potentially significant environmental impacts. There may be a significant impact on utility resources due to potential increases in electricity demand from uptake of electric appliances in response to the proposed zero NOx emissions standard, based on currently available zero NOx technology. The significance of these potential impacts to electric generation and delivery demands were evaluated based on two reference scenarios; the impacts vary depending on what actions the State takes to meet its climate goals. Operation of electric appliances may also cause a significant noise impact in certain areas of the Bay Area, as electric heat pump technology may require outdoor installation of condensing units that make noise similar to air conditioning units. These potential impacts are discussed in the Draft Environmental Impact Report associated with this Staff Report.

The proposed amendments may also result in socioeconomic impacts due to increased consumer appliance replacement costs and resultant shifted spending patterns. The cost effectiveness associated with the proposed rule amendments ranges from \$54,100 per ton of NOx reduced to \$594,000 per ton of NOx reduced as multiple emissions standards are included in the proposed rule amendments.

As discussed above and throughout this Report, the proposed amendments to Rule 9-4 and Rule 9-6 are needed to ensure attainment and maintenance of ambient air quality standards for ozone and particulate matter in the Bay Area. These emissions also result in PM exposures in communities throughout the Bay Area, which can contribute to a number of adverse health outcomes, including premature deaths. In addition, the health impact modeling described in this report indicates that exposures associated with emissions from building appliances are not

distributed equally amongst different communities and race/ethnicity groups. The proposed amendments to Rule 9-4 and Rule 9-6 would achieve these needed reductions in emissions and pollutant exposures throughout the Bay Area and would yield substantial health benefits in these communities and throughout the jurisdiction of the Air District.

Based on evidence presented in this Staff Report, Air District staff believes that the proposed amendments are necessary for achieving its goal to create a healthy breathing environment for every Bay Area resident while protecting and improving public health, air quality and the global climate. This Report presents potential impacts, including potentially significant environmental impacts, for the Board of Director's consideration in adoption of the amendments. Staff believes that the air quality and public health benefits presented demonstrate the value and necessity of the proposed rule amendments despite these potential impacts.

Air District staff recommends adoption of the proposed amendments to Rule 9-4 and Rule 9-6 and certification of the Final Environmental Impacts Report, and adoption of the accompanying CEQA Findings and a Statement of Overriding Considerations. Air District staff released this Staff Report and proposed amendments to Rules 9-4 and 9-6 for public review and comment on December 20, 2022. This release opened a public comment period that ended on February 6, 2023, during which staff received over 500 comment letters representing a wide range of perspectives. Over 400 of the correspondence expressed strong support for the adoption of the proposed amendments. Other comments raised concerns including, but not limited to, the cost of compliance, environmental impacts of the proposal, electric grid capacity and reliability, and the possibility for emergency replacements.

Staff will present a final proposal to the Air District Board of Directors for their consideration at a Public Hearing. At the Public Hearing, the Air District Board of Directors will consider the final proposal and receive public input before taking action.

II. BACKGROUND

The proposed rule amendments would be the first of their kind, introducing zero NOx requirements for furnaces and water heaters installed in buildings. The appliances covered by the proposed standards currently emit more NOx emissions than passenger vehicles in the Bay Area. Through NOx reductions, the Bay Area will also see ozone and secondary particulate matter formation reductions, which will assist in achieving ambient air quality standards and vital health benefits. If electric appliances are installed upon implementation of the proposed rule amendments, the proposal would indirectly achieve greenhouse gas and primary particulate matter reductions as co-benefits.

Nitrogen oxides are compounds that are considered "criteria air pollutants"³ and which contribute to the formation of other air pollutants such as fine particulate matter (PM_{2.5}) and ozone (O₃). Nitrogen oxides are formed during combustion processes. Nitrogen and oxygen present in the ambient air react at the high temperatures of combustion to form nitric oxide (NO) and nitrogen dioxide (NO₂), collectively referred to as NOx. These compounds can further react

³ Criteria pollutants are particulate matter, photochemical oxidants (including ozone), carbon monoxide, sulfur oxides, nitrogen oxides and lead. US EPA calls these pollutants "criteria" air pollutants because it sets national ambient air quality standard (NAAQS) for them based on the criteria, which are characterizations of the latest scientific information regarding their effects on health or welfare.

in the ambient air with other compounds in the presence of sunlight to form other air pollutants. Nitrogen oxides can form fine particulate matter (PM_{2.5}) when reacting with either ammonia to form ammonium nitrate (NH₄NO₃) or with sulfur dioxide to form ammonium sulfate ((NH₄)₂SO₄). Nitrogen oxides can also react with reactive organic gases (ROG) in the atmosphere to form ozone.

Rule 9-4 currently imposes a NOx emission limit on centralized natural gas-fired furnaces that are typically used in single-family homes and some multi-unit dwellings. Rule 9-6 currently sets NOx emission standards for small boilers and water heaters, with existing standards varying based on size and equipment application. Note that larger boilers used in industrial, institutional, and large commercial scenarios are generally subject to Regulation 9, Rule 7: *Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional and Commercial Boilers, Steam Generators and Process Heaters* ("Rule 9-7"). Equipment subject to Rule 9-7 is not impacted by this proposed rule amendment package.

A. Industry Description

Proposed amendments to Rules 9-4 and 9-6 would impact natural gas-fired space and water heating appliances. These include furnaces and water heaters used in single family homes, multifamily residences such as apartment buildings, and commercial spaces such as retail and office buildings. The Air District regulates these sources on an appliance point-of-sale basis, requiring that equipment manufactured after the compliance date and sold or installed within the geographical jurisdiction of the Air District meets the standards contained in the Rules. The proposed amendments would apply to applicable appliances regardless of the type or age of the building in which it will be used.

Appliances covered under the proposed rule amendments are manufactured by a large number of corporations. Some of these companies focus on either space or water heating, while some manufacture appliances for a variety of uses. Similarly, some manufacturers focus on one fuel type, such as natural gas, while many manufacture both natural gas and electric-powered devices. No manufacturing operations for space and water heating appliances take place in the Bay Area. Manufacturers who wish to sell their appliances in the Bay Area must submit compliance certifications for their appliances to the Air District under the current rules and the proposed rule amendments.

Space and water heating appliances are obtained by property owners through either retail locations or distributors that contract directly with construction firms or other installers. Compliance with existing Rule 9-4 and 9-6 is, and will continue to be, enforced through compliance visits at retail and other distribution locations to ensure that all appliances being offered for sale within the Air District meet the standards of the Rules.

B. Regulatory History

The Air District has regulated NOx emissions from space and water heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was first adopted in 1992 and was most recently updated with more stringent NOx emissions standards for certain equipment in 2007. All versions of these rules have included a NOx emissions standard expressed as nanograms (ng) of NOx per joule of useful heat delivered by the appliance. The Air District's 2017 Clean Air Plan identifies the importance of nitrogen oxide emission reductions from residential space heating appliances in measure SS30.

Additionally, the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) have adopted their own regulations that are similar in structure to Rules 9-4 and 9-6. SCAQMD Rule 1111 and SJVUAPCD Rule 4905, which are similar in applicability to Rule 9-4 for furnaces, have been updated within the last 10 years and currently require a NO_x emissions standard of 14 ng/J, the same near-term standard that is included in the proposed amendments. Rule 9-6 for water heaters and small boilers currently contain NO_x emissions standards equivalent to those in SCAQMD Rules 1146.2 and 1121 and SJVUAPCD Rules 4308 and 4902 for similar equipment.

Outside of California Air Districts, local jurisdictions across the country have implemented similar regulation of NO_x emissions from building appliances. For example, the Texas Commission on Environmental Quality implemented water heater NO_x limits in 2000,⁴ and the Utah Department of Environmental Quality introduced them in 2015.⁵

C. Active Rule Development

In addition to historical rule development efforts, Air District staff has been tracking active rule development efforts related to building appliances. In 2022, both the California Air Resources Board (CARB) and SCAQMD have signaled their intent to initiate rule development efforts to impose regulatory standards for building appliances.

In the SCAQMD Draft 2022 Air Quality Management Plan, the SCAQMD describes its intent to initiate rule amendments (or possibly new rules) to introduce zero NO_x emissions standards for space and water heating appliances and potentially other classes of appliances.⁶

CARB is focused on regulating greenhouse gas emissions under its authority granted by Assembly Bill 32. CARB is planning to phase out natural gas-fired appliances entirely, as a way to reduce greenhouse gas emissions from these appliances. In the Draft 2022 Scoping Plan Update, CARB lays out a plan for phasing out the installation of natural gas-fired appliances in new buildings by 2029, existing residential buildings by 2035 and existing commercial buildings by 2045.⁷ Although these regulations do not address NO_x emissions directly, they will have a NO_x-reduction co-benefit by eliminating natural gas combustion as they move the state to all-electric appliances.

Numerous municipalities in the Bay Area are instituting “reach codes” under which new construction must be all electric or electric-ready. State building codes, effective in 2023, that encourage the proliferation of zero emissions solutions, were passed by the California Energy Commission in the summer of 2021. These standards have greatly increased the proliferation of zero NO_x electric solutions over the past five years, a trend that is only expected to accelerate.

Despite the differences in timelines and in regulatory focus of these efforts being explored by SCAQMD, CARB and elsewhere, Air District staff sees these efforts as complementary to the proposed rule amendments, particularly with District goals around affordability and accessibility

⁴ 30 Tex. Admin. Code § 117.3200 to .3215

⁵ Utah Admin. Code R307-230-5

⁶ Draft 2022 Air Quality Management Plan. South Coast Air Quality Management District. <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-residential-and-commercial-buildings-appliance.pdf?sfvrsn=8>

⁷ Draft 2022 Scoping Plan Update. May 10, 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf>

of zero NOx appliances to all consumers. Air District staff will continue to communicate with other agencies on issues related to the proposed rule amendments. The interim reporting process proposed as part of the rule amendments also allows Air District staff to continue to track the progress of these projects and suggest any alignment strategies, as appropriate, for consideration by the Air District's the Board of Directors. See Section III.C for more information on the proposed interim reporting requirements and Section IX.C for more information on the implementation working group.

III. PROPOSED RULE AMENDMENTS

Air District staff is presenting proposed amendments to Rules 9-4 and 9-6 in this Staff Report that staff believes best represents significant achievable NOx emissions reductions from the largest sources within the building sector. These proposed amendments include, for Rule 9-4, introducing an "ultra-low" NOx standard with a compliance date in 2024, and for both Rules 9-4 and 9-6, setting a zero NOx standard with compliance dates ranging from 2027 to 2031 based on equipment type, use and size. The details of these amendments are discussed below.

A. *Proposed Amendments to Rule 9-4*

Proposed amendments to Rule 9-4 are included in this report as Appendix A. The key changes are summarized below.

1. *Rule Title and Equipment Scope*

Rule 9-4 is currently titled "Nitrogen Oxides from Fan-Type Residential Central Furnaces." To expand the applicability of this rule to a larger breadth of space heating appliances, the proposed amendments would change the name to "Nitrogen Oxides from Natural Gas-Fired Furnaces." Existing requirements for residential fan-type furnaces will remain and additional units not historically covered by the rule are only intended to be subject to the zero NO_x emission standard in proposed new Section 9-4-301.3. Staff differentiates this through the addition of a definition for "Natural Gas-Fired Fan Type Central Furnace" and specifying where the standards are more broadly applicable to space heating equipment that does not meet the fan type central specifications. The proposed rule amendments also include a new applicability section to clarify that the rule applies only to natural gas-fired furnaces.

2. *Applicability*

The proposed amendments include a section that addresses to whom this rule would apply. Section 9-4-102 clarifies that the emissions standards of the rule would apply to any person who sells, offers for sale, or installs natural gas-fired furnace in the Air District. The rule also has requirements for manufacturers who intend to sell or distribute for sale or installation a natural gas-fired furnace for use within the Air District. These manufacturers would be subject to certification requirements that would demonstrate the furnaces for use within the Air District meet the emissions standards in Section 9-4-301.

3. *Definitions*

For clarity and enforceability, proposed amendments include the addition of definitions for British Thermal Unit (BTU), Heat Input, Natural Gas, Natural Gas-Fired Fan Type Central Furnace, Natural Gas-Fired Furnace, and Nitrogen Oxides.

4. Standards

The proposed amendments to Section 9-4-301 would clarify emissions standards, including existing requirements for residential fan-type central furnaces in the current version of the Rule (§ 9-4-301.1). Section 9-4-301.2 is added to introduce the “ultra-low NO_x” requirement (14 ng/J) on January 1, 2024, to align with SCAQMD and SJVUAPCD emissions standards and would begin to achieve NO_x reductions and health benefits shortly after rule adoption. As proposed, this requirement would only be applicable to fan-type central furnaces historically covered by Rule 9-4, as defined in the proposed amendments.

The proposed rule amendments include the addition of new Section 9-4-301.3 to introduce the zero NO_x standard and expand the types of equipment subject to the standard. As proposed, the zero NO_x standard is proposed to take effect on January 1, 2029, and would apply to all residential and commercial space heating appliances that meet the definition of a “Natural Gas-Fired Furnace” under proposed Section 9-4-206. This includes wall heating and other direct-vent units. This requirement would not be applicable to furnaces used in mobile homes. The proposed standard is intended to result in significant regional NO_x (and therefore ozone and secondary PM) emission reductions in the long term. The standard is proposed to take effect in 2029 based on staff’s current understanding of available technology, accessibility, and affordability of zero NO_x units and planned industry technology development to reduce these current barriers to an immediate effective date, as discussed in more detail in Section IV.D. The standard would apply when appliances are replaced upon burnout; only appliances that meet the new standard could be sold and installed in the Bay Area upon implementation.

5. Administrative Requirements

The proposed amendments include updates and clarifications to certification and calculation methods. Staff intends for dual-fuel units that can demonstrate compliance with the applicable NO_x standard, on average, to be able to meet the standards and certification requirements of these rule amendments. Rule 9-4 additionally requires the completion of a compliance statement for recordkeeping purposes and the proposed amendments would add a provision to this section to allow for the submission of compliance statements issued by SCAQMD for equivalent emission standards.

The proposed amendments include the addition of an interim report to be brought to the Board of Directors by the Air Pollution Control Officer (APCO) two years prior to the compliance date for the zero NO_x standard. Staff intends for this report to provide information to the Board and the public about the accessibility of zero NO_x appliances to Bay Area residents and to allow the Board of Directors an opportunity to take any necessary action in response to this information. Contents of this report would include information on technology development, market availability of zero NO_x space heating appliances, potential costs of compliance, infrastructure readiness, and availability of incentive programs to decrease these costs.

6. Manual of Procedures

The proposed amendments include the addition of a Manual of Procedures (MOP) section to add further clarity around equipment certification and determination of emissions through source tests conducted in accordance with Environmental Protection Agency (EPA) reference methods.

B. Proposed Amendments to Rule 9-6

Proposed amendments to Rule 9-6 are included in this report as Appendix B. The key changes are summarized below.

1. Rule Applicability

The proposed amendments include a section that addresses to whom this rule would apply. Section 9-6-102 clarifies that the rule would apply to any person who sells, offers for sale, or installs natural gas-fired water heaters in the Air District. The rule also has requirements for manufacturers who intend to sell or distribute for sale or installation a natural gas-fired water heater for use within the Air District. These manufacturers would be subject to certification requirements that would demonstrate the water heaters for use within the Air District meet the emissions standards found in Section 9-6-301.

2. Standards

The proposed amendments to Rule 9-6 include the introduction of a zero NO_x standard for natural gas-fired residential and commercial water heaters and boilers. The proposed compliance dates for these appliances are dependent on equipment size. Units under 75,000 BTU/hour (typically single-family residential) would be required to comply by 2027 and larger units up to 2 million BTU/hour (typically used in multifamily and commercial buildings) would have a 2031 compliance date as proposed. Based on staff's current understanding of available zero NO_x technologies and market development, staff anticipates that zero NO_x solutions for single-family residential applications will be available and affordable on a shorter timeframe than larger boilers used in multifamily and commercial applications, as discussed in more detail in Section IV.D. This includes the development of lower voltage heat-pump water heaters that will lower cost barriers associated with potentially necessary electric upgrades. The standard would apply when appliances are replaced upon burnout; only appliances that meet the new standard could be sold and installed in the Bay Area upon implementation.

The proposed rule amendments also include updates throughout the standards section intended to clarify and streamline the requirements as well as align with similar requirements in rules issued by other air districts and those currently incorporated into the State Implementation Plan. This includes clarifications to how the equipment size standards are framed as well as a focus on weight-based emissions of NO_x over parts per million.

3. Administrative Requirements

Section 9-4-402 of the proposed amendments has been updated to simplify the certification requirements and decrease the amount of APCO discretion allowed in the issuance of a certification under the rule. The new language is intended to align more closely with that in Rule 9-4 and to allow for a more streamlined process of a manufacturer certified compliance statement over an application.

As in Rule 9-4, proposed amendments to Rule 9-6 include an Interim Report to be brought to the Board by the APCO at least two years prior to each of the compliance dates for the zero NO_x standards. Staff intends for these reports to provide information to the Board and the public about the accessibility of zero NO_x appliances to Bay Area residents and to allow the Board of Directors an opportunity to take any necessary action in response to this information. Contents of this report would include information on technology development, market availability of zero

NOx water heating appliances, potential costs of compliance, infrastructure readiness, and availability of incentive programs to decrease these costs.

4. Manual of Procedures

For clarity and consistency with the Air District's Manual of Procedures, references to Test Method ST-13B have been removed from Section 9-6-601.2. As in Rule 9-4, EPA Reference Method 7 should be used to measure emissions of nitrogen oxides from applicable equipment. In order to align with rules present in the State Implementation Plan, reference to South Coast's 1995 protocol has been removed in favor of approved EPA testing methodologies.

C. Interim Report and Implementation Working Group

As described above, the proposed amendments to Rules 9-4 and 9-6 include a requirement for staff to report back to the Air District Board of Directors on key factors associated with accessibility of technologies that are compliant with or do not conflict with the zero NOx standards. These reports are required to take place no later than two years before compliance dates. Therefore, the proposed schedule of zero NOx compliance and associated interim reporting is shown in Table 3-1 below.

Table 3-1
Zero NOx Compliance and Interim Reporting Schedule

Rule	Applicable Equipment	Ultra-low NOx compliance Date	Zero NOx Compliance Date	Interim Report Deadline
9-4	Natural gas-fired fan type central furnaces	Jan. 1, 2024	N/A	N/A
9-6	Water heaters and boilers below 75,000 BTU/hr	N/A	Jan. 1, 2027	Jan. 1, 2025
9-4	All natural gas-fired furnaces (heat input rate less than 175,000 BTU/hr)	N/A	Jan. 1, 2029	Jan. 1, 2027
9-6	Water heaters and boilers between 75,000 and 2 million BTU/hr	N/A	Jan. 1, 2031	Jan. 1, 2029

The content of the interim reports will additionally be informed by an Implementation Working Group of external stakeholders that will be convened and led by Air District staff and facilitated by a third-party consultant. The membership, intent and scope of the Implementation Working Group and their contributions to the interim reporting process is discussed further in Section IX.C.

IV. TECHNOLOGY EVALUATION

As described above, the interim reporting process and Implementation Working Group provides a mechanism for Air District Staff to report back to the Board on technology available to consumers that aligns with the proposed rule amendments. This section serves to provide information on the current state of technology availability, at the time of this report, as a baseline. Other accessibility factors to be addressed in the Interim Reports are also addressed

here including economic impacts (Section VI and Appendix C) and potential infrastructure impacts (Appendix D).

A. Zero NOx Natural Gas Systems

No zero NOx natural gas furnace or water heater systems are currently available, and no residential/commercial systems are being developed, to the knowledge of Air District staff. This assumption and any technology development will be updated through the interim reporting process to the Board of Directors and the Implementation Working Group. While not currently utilized in residential and commercial building appliances, zero NOx burners have been achieved in industrial settings using catalytic heat⁸ and flameless, high air flow burners,⁹ both of which realize zero NOx results by keeping the temperature of the combustion chamber below that at which NOx is formed. Additionally, oxy-combustion in industrial natural gas turbines can achieve zero NOx results by performing combustion without excess air.¹⁰

B. Zero NOx 240 Volt Electric Systems

There are currently a wide variety of zero NOx electric heat pump water heaters¹¹ and heat pump space conditioning (heating and cooling) systems¹² available on the market that operate on a 240-volt circuit. These units begin at low capacities for small apartments and low water usage but are widely commercially available at sizes equivalent to existing natural gas systems on the market for installation in residential and commercial spaces. These appliances can also be supplemented by additional equipment such as circuit sharing devices, smart panels, residential solar,¹³ and thermal heat sharing devices¹⁴ to optimize operation with limited amperage impact or during power outages. The potential costs associated with installing these units, including potential costs associated with electric service upgrades are addressed in the socioeconomic report for the proposed rule amendments, Appendix C.

C. Zero NOx Low Voltage Electric Systems

A key accessibility factor for installation of zero NOx furnaces and water heaters is the ability to install a new appliance without the need for significant additional work. For example, the installation of a 240V heat pump appliance may require electric service upgrades in older homes. Market availability of 120V heat pump systems provides consumers the ability to install heat pump appliances without this additional extra work and expense.

⁸Bruest Natural Gas Line Heaters. June 2020. https://bruestcatalyticheaters.com/wp-content/uploads/2020/07/Bruest_Brochure_HOTCAT-Natural-Gas-Line-Heaters_6-16-20.pdf

⁹ Patent Number 9562683. Accessed October 2022. <https://patents.justia.com/patent/9562683>

¹⁰ Oxy-Fuel Turbines. Accessed November 2022. <https://www.cleanenergysystems.com/oxy-fuel-turbines>

¹¹ Energy Star Certified Water Heaters. Accessed November 2022. <https://www.energystar.gov/productfinder/product/certified-water-heaters/results>

¹² Energy Star Certified Central Heat Pumps. Accessed November 2022. <https://www.energystar.gov/productfinder/product/certified-central-heat-pumps/results>

¹³ Peninsula Clean Energy. Design Guidelines for Home Electrification. Accessed March 2023. <https://www.peninsulacleanenergy.com/wp-content/uploads/2023/02/Design-guidelines-for-home-electrification-v021023.pdf>

¹⁴ Harvest Thermal. Product. Accessed March 2023. <https://www.harvest-thermal.com/product>

Table 4-1, below, contains a subset of commercially available heat pump mini-split systems that operate on a 120-volt or 15-amp circuit, which is common in older homes. Mini split systems that are commonly operable on 120V circuits are sized between 9,000 and 12,000 BTU/hour, which are designed to heat and cool up to 600 square feet. In larger spaces with limited electric circuit capacity, it is typical to install multiple units and run them as needed when different spaces are occupied. These smaller solutions also allow for temporary use while a larger system is being permitted or installed, or, if desired by the building owner, while electric service is being upgraded to the building to accommodate other new electric uses such as onsite solar panels or electric vehicle charging.

Table 4-1
120V Heat Pump Mini Split Systems

Manufacturers	Model	Status
Pioneer	WYT012ALFI19RL, WYT009ALFI19RL (and others)	Commercially available
Hessaire	H12E1	Commercially available
LG	LS120HXV2, LS090HXV2	Commercially available
Mitsubishi	MZ-JP12WA, MZ-JP09WA	Commercially available
Fujitsu	9RL2, 12RL2	Commercially available
General Electric	AS09CRA, AS12CRA	Commercially available
Senville	LETO series	Commercially available
MRCOOL	DIY-12-HP-115B	Commercially available
LBG Products	LBH12ATO, LBH09ATO	Commercially available
AUX	Inverter series	Commercially available
Daizuki	DXTH12C416-20	Commercially available

Low voltage heat pump water heaters are also currently under development, with 4 companies participating in a field study through the Advanced Water Heating Initiative 120-Volt Heat Pump Water Heater Technology Validation and Commercialization program.¹⁵ The 120V heat pump water heater represents a solution for appliance installation in existing buildings without need for other upgrades, which is especially important in emergency water heater replacement scenarios. The Advanced Water Heating Initiative's field study aims to provide data to manufacturers and electricity providers to understand the operation of these units in practice and build confidence in consumer satisfaction with their operation.

The first of these units recently became available on the consumer market, the Rheem ProTerra Plug-In. This unit is a standard footprint tank water heater and requires minimal clearance or additional venting. Nyle Water Heating Systems is also beginning to roll out consumer literature on their E8 unit. The E8 is a split heat pump water heater meaning that it is a separate heating unit that can be hooked up to an existing water heater tank, including tanks that were previously heated by gas. Both units operate on a 120V or 15-amp circuit and include connectivity features to assist in energy savings associated with time-of-use energy rates and other demand

¹⁵ Advanced Water Heating Initiative 120V Field Study, Accessed November 2022.
<https://www.advancedwaterheatinginitiative.org/120v-field-study>

response services. Table 4-2 below summarizes the 120V heat pump water heater systems included in the field study.

Table 4-2
Units in Advanced Water Heating Initiative 120V Field Study

Manufacturers	Model	Status
A.O. Smith	TBD	Active development/Field study (Announced May 2021)
General Electric	TBD	Active development/Field study (Announced May 2021)
Nyle Water Heating Systems	E8	Soon to be released/Field study complete
Rheem	ProTerra (Plug-In)	Commercially available beginning September 2022

With the field study ongoing as well as additional regulatory activity, incentive funding and market development in this space, Air District staff anticipates further development of compliant options prior to the first zero NOx compliance date on January 1, 2027. This development will be reported on in the first interim report to the Board of Directors by January 1, 2025.

D. Compliance Dates

Table 4-3 below outlines the zero NOx compliance dates included in the proposed rule amendments.

Table 4-3
Proposed Zero NOx Compliance Dates

Date	Rule	Applicable Equipment
Jan. 1, 2027	Rule 9-6	Water heaters and boilers below 75,000 BTU/hr
Jan. 1, 2029	Rule 9-4	All commercial and residential furnaces
Jan. 1, 2031	Rule 9-6	Water heaters and boilers between 75,000 and 2 million BTU/hr

Generally, while technology currently exists on the market that aligns with the proposed zero NOx standards today, Air District staff has provided additional time before the proposed compliance dates in order to increase accessibility and decrease costs of newly installed appliances for consumers. Additional time allows for further technology development, market saturation of zero NOx appliances and development of funding mechanisms such as those provided through the Inflation Reduction Act. A larger discussion of these factors can be found in Section VI.D (Economic Impacts: Funding and Incentives).

Water heaters and boilers sized 75,000 BTU/hr and below are typically installed in single family residential and small commercial environments. As outlined above, there are a variety of zero NOx appliances currently available on the market for this type of equipment, including the Rheem 120V ProTerra model and other low voltage options that are concluding field testing. For this reason, Air District staff reasonably expects that additional low voltage solutions will reach the consumer market with sufficient supply for those customers that require them by January 1, 2027.

While low voltage systems exist for space heating on the market currently, they serve mostly very small units or individual rooms. Additionally, unlike water heaters which can frequently be replaced in the footprint of an existing natural gas appliance, heat pump space conditioning equipment may require installation of a condenser or other equipment outdoors. In order to provide the opportunity for development of additional or improved low voltage solutions as well as to allow for local jurisdictions such as cities to consider adjusting their setback and permitting requirements for outdoor installations, Air District staff has proposed a compliance date of January 1, 2029, for zero NO_x furnaces. Air District staff also plans to convene an ongoing Implementation Working Group to further investigate a number of implementation topics, including the status of technology development and availability, as well as actions/activities of local jurisdictions that may pertain to the implementation of the proposed amendments (further details on the Implementation Working Group can be found in Section IX.C. of this report).

Larger water heaters and boilers (75,000 to 2 million BTU/hr) have a proposed zero NO_x compliance date of January 1, 2031. This is due to the complexities of installations in multifamily and larger commercial buildings typically served by these units. To the knowledge of Air District staff, there is still technology development and field testing needed to bring compliant appliances of this size to market. With initial rule drafts published in 2021 and anticipated rule adoption in 2023, Air District staff believes that there is sufficient time for this technology development to occur before 2031 while continuing to prioritize the emission reductions that will be achieved from enacting the proposed rule amendments.

Through the interim reporting process included in Sections 9-4-405 and 9-6-404 of the proposed amendments, Air District staff will report to the Board on technology developments and availability. Staff expects that availability of zero NO_x units will increase and that costs will decrease over time. Should there be a gap in the market for any of the technology categories above such that sufficient zero NO_x technologies are no longer projected to be available to meet the needs of the Bay Area, the Air District's Board of Directors may choose to consider amending any of the compliance dates through a public rulemaking process.

V. EMISSIONS AND EMISSION REDUCTIONS

The following section describes the emissions and expected emission reductions associated with the proposed rule amendments. First, the existing emissions context, based on the 2018 Air District emissions inventory, is presented. Next, the impacts of NO_x emissions, including ozone and secondary PM formation are discussed, followed by the emission control methods expected to be used in response to the proposed rule amendments. Beginning in Section V.F, emission reductions are discussed, beginning with NO_x emission reductions, then potential greenhouse gas co-benefits. This is followed by a discussion of particulate matter emission reductions and the health benefits associated with these reductions.

A. Emissions Context

Table 5-1 below shows the total emissions from all-natural gas combustion in residential and commercial buildings in the Bay Area, as 2018 annual emissions of carbon monoxide, nitrogen oxides, sulfur oxides, reactive organic gases, and fine particulate matter. The rows in bold indicate the equipment covered by the proposed amendments.

Table 5-1
Bay Area Emissions from Commercial and Residential Natural Gas Combustion

Description	2018 Annual Emissions (tons per year)				
	CO	NO _x	SO _x	ROG	PM _{2.5}
Commercial – space heating	237.8	552.8	3.6	28.8	45.2
Commercial – water heating	291.5	475.7	4.4	35.3	55.4
Commercial – other	237.8	552.8	3.6	28.8	45.2
<i>Commercial subtotal</i>	<i>767.0</i>	<i>1,581.3</i>	<i>11.5</i>	<i>92.8</i>	<i>145.7</i>
Residential – space heating	1,036.6	2,410.0	15.5	125.4	196.9
Residential – water heating	847.3	828.3	12.7	102.5	161.0
Residential – cooking	92.0	213.9	1.4	11.1	17.5
Residential – other	83.2	193.5	1.2	10.1	15.8
<i>Residential subtotal</i>	<i>2,059.1</i>	<i>3,645.7</i>	<i>30.9</i>	<i>249.2</i>	<i>391.2</i>
<i>Grand Total^a</i>	<i>2,826.1</i>	<i>5,266.9</i>	<i>42.4</i>	<i>342.0</i>	<i>536.9</i>

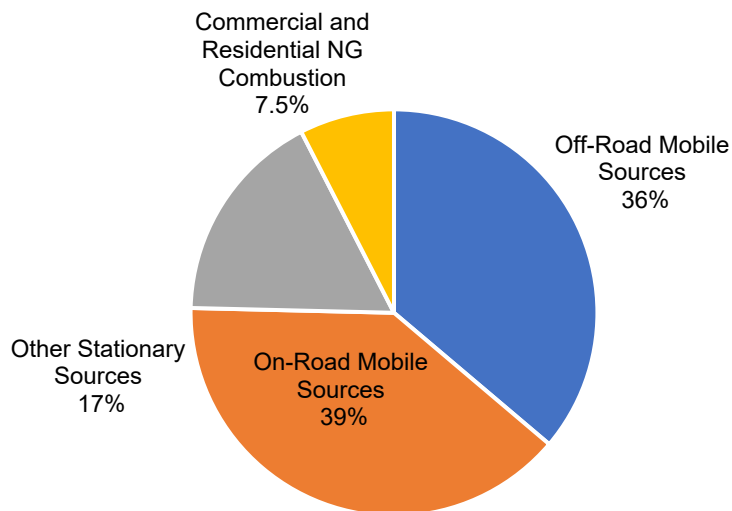
^a The grand total in each case may not match the column summation due to rounding.

Emissions from building appliances in the Bay Area are estimated based on aggregated natural gas usage data from the California Energy Commission and appliance usage data from Pacific Gas and Electric. These data, combined with data and assumptions regarding the age of buildings and their equipment, are used to calculate emissions associated with the building sector.

Note that for 2018, NO_x emissions from these targeted appliances totaled 4,267 tons; however, it is estimated that full implementation of existing Rule 9-6 will reduce NO_x emissions from commercial and residential water heating by 576 tons relative to 2018. That leaves 3,690 tons of NO_x emissions to be addressed by the proposed rule amendments, which is used as the baseline for emission reduction calculations in Section V.F. Additional details on emissions reduction estimates and how emissions were treated in the modeling analyses are provided in Appendix E.

For comparison, Figure 5-1 below shows the total 2018 emissions of nitrogen oxides from natural gas combustion in residential and commercial buildings (5,267 tons) in context with other sources of emissions of nitrogen oxides in the Bay Area.

Figure 5-1
Source Contributions to Total 2018 NO_x emissions in the Bay Area

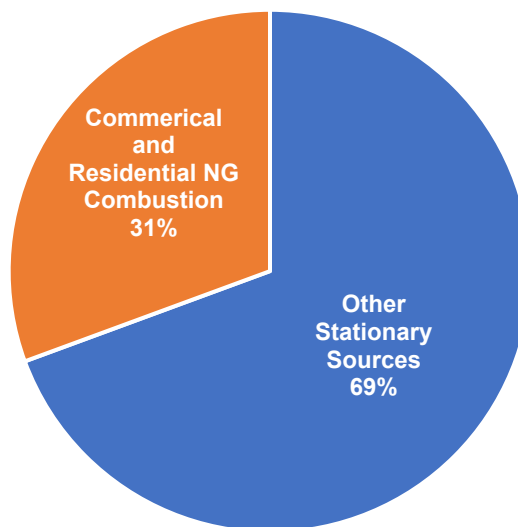


As seen above and in Figure 5-2 below, emissions of nitrogen oxides from commercial and residential natural gas combustion account for roughly one third of nitrogen oxides emissions from stationary sources in the Bay Area. As one of the largest single contributors to District-wide NO_x emissions from stationary sources, Air District staff sees the further regulation of emissions from this sector as a key opportunity to minimize criteria pollutant emissions and achieve related air quality and health benefits across the Bay Area. As stated in the California Air Resources Board 2022 State Strategy for the State Implementation Plan (State SIP), “controlling ozone precursors, in particular oxides of nitrogen (NO_x), is key to attaining the federal ozone standards”.¹⁶ NO_x reductions are also critical for reducing PM, which is discussed in more detail in Section V.H.

Figure 5-2 below shows the breakdown of the total 2018 emissions of NO_x solely from stationary sources. While commercial and residential natural gas combustion accounted for 7.5 percent of overall NO_x emissions in the Bay Area in 2018, this source category accounted for 31 percent of total NO_x emissions from stationary sources which are within the Air District’s regulatory authority.

¹⁶ California Air Resources Board. Proposed 2022 State Strategy for the State Implementation Plan Strategy. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf

Figure 5-2
Total 2018 NO_x Contributions from Stationary Sources in the Bay Area

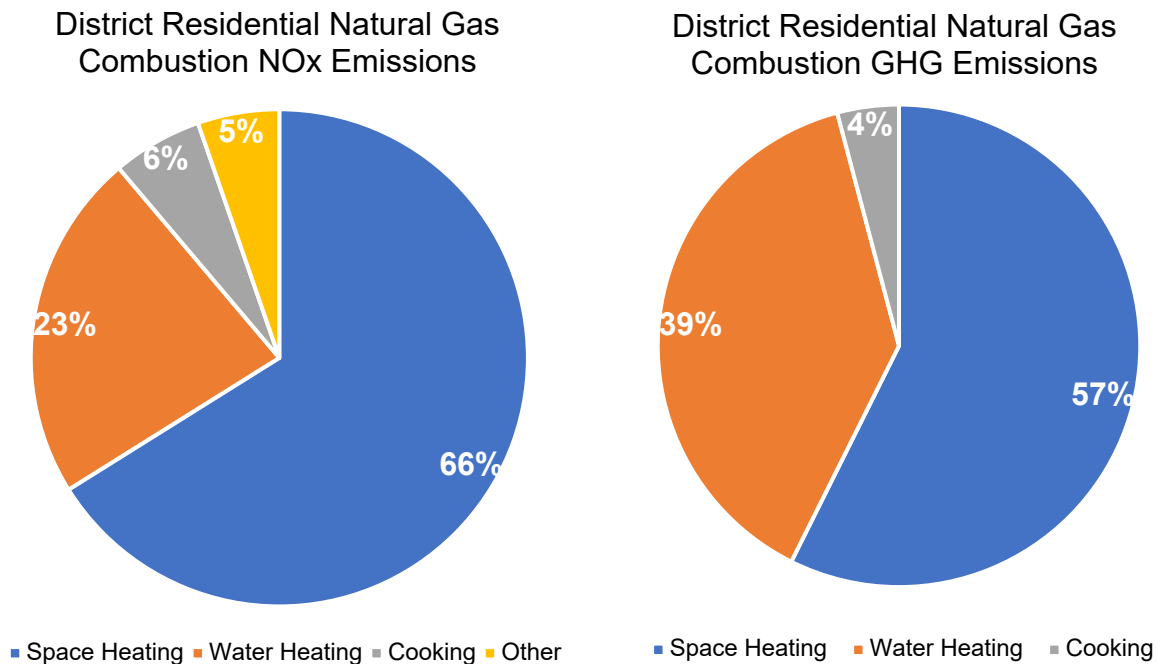


The buildings sector was identified as a significant Bay Area source of emissions in the Air District's 2017 Clean Air Plan, with space and water heating appliances representing roughly 90 percent of the emissions from this sector. The Clean Air Plan identifies all feasible measures that the Air District can take to achieve the ambient air quality standards, in furtherance of the goal set forth in Health and Safety Code section 40914, and all feasible measures that the Air District can take to mitigate the impact of pollution sources within the Bay Area on downwind jurisdictions, as required by Health and Safety Code section 40912. Emissions from building appliances were highlighted in measures SS30 (reduce NO_x and carbon monoxide from residential and commercial furnaces) and BL2 (explore potential Air District rulemaking options to reduce all emissions from fossil fuel-based space and water heating systems for both residential and commercial use). This rulemaking proposal is the first to address the 2017 Clean Air Plan's measures SS30 and BL2.

The proposed rule amendments focus on emissions from natural gas-fired space and water heating appliances in buildings. While space and water heating are not the only natural gas consuming appliances in buildings, they do represent the vast majority of natural gas consumption and therefore NO_x emissions from the buildings sector. Space and water heaters vent outdoors into the ambient air, impacting the local and regional air quality of the Bay Area, which is the focus of the Air District. For comparative purposes, staff also considered greenhouse gas (GHG) emissions associated with the relevant appliances and potential co-benefit of GHG emission reductions. Figure 5-3, below, shows the emissions share by appliance type for residential natural gas combustion.¹⁷ Represented by the blue and orange sections of the charts, space and water heating represent roughly 90 percent of emissions from residential natural gas combustion for both NO_x and greenhouse gases as carbon dioxide equivalent.

¹⁷ Bay Area Air Quality Management District. 2019 Criteria Pollutant inventories.

Figure 5-3
Residential Natural Gas Combustion Emissions by Equipment Type in 2019



B. Nitrogen Oxide Emissions

The proposed rule amendments seek to significantly reduce NOx emissions from space and water heating appliances. As shown above in Table 5-1, these appliances emitted 2,410 and 828 tons of NOx per year, respectively, at residential buildings in the Bay Area in 2018.

Nitrogen oxides are a key criteria pollutant as a precursor to ozone and secondary particulate matter (PM) formation.¹⁸ Secondary PM is formed from the conversion of NOx to ammonium nitrate through atmospheric chemical reactions with ammonia. Particulate matter, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for PM_{2.5} under California Ambient Air Quality Standards (CAAQS) and non-attainment (24-hour standard) and unclassifiable (annual standard) under National Ambient Air Quality Standards (NAAQS) and must strive to meet these standards as soon as possible. Exposure to fine PM, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NOx compounds in the atmosphere contribute to the formation of secondary PM, any NOx emissions reduction would also result in PM_{2.5} reductions. Particulate matter emissions are discussed further in Sections V.H and V.I of this report. Although most NOx emissions are quickly broken down in the atmosphere, emissions of nitrogen oxides can be impactful in their own right, with the Agency

¹⁸ See 40 C.F.R. Part 50 (ambient air quality standards for ozone, carbon monoxide, and PM_{2.5}). EPA treats NOx as both an ozone and PM_{2.5} precursor

for Toxic Substances and Disease Registry finding that “[e]xposure to high levels of nitrogen oxides can damage the respiratory airways.”¹⁹

C. Ozone Formation

Ozone is a regional pollutant for which the Bay Area is also currently in non-attainment under NAAQS and CAAQS. The Air District must strive to meet these standards as soon as possible. Emissions of reactive organic gases (ROG) and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. Therefore, reductions in emissions of ROG and NO_x are needed throughout the region in order to decrease ozone levels. As the air temperature rises, ground-level ozone forms at an accelerated rate. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Exceedances of state or national ozone standards in the Bay Area only occur on hot, relatively stagnant days. Because weather conditions have a strong impact on ozone formation, ozone levels can vary significantly from day-to-day or from one summer to the next. Longer and more severe heat waves expected as a result of climate change may cause more ozone formation, resulting in more frequent exceedances of ozone standards. Ozone, also a key ingredient in smog, is additionally linked to direct health effects such as irritation and damage to lung tissue, worsening asthma, reduced lung function, and worsening of chronic illnesses such as obstructive pulmonary disease.²⁰

The atmospheric chemistry of ozone formation depends on a large number of factors including the concentration of multiple precursor pollutants (including nitrogen oxides) as well as weather patterns. Thus, ozone concentrations can vary widely on a local scale as well as a daily scale. However, overall reductions of nitrogen oxides contribute to long term ozone reductions, both in the Bay Area as well as in neighboring air basins. The California Air Resources Board states in its 2022 State Implementation Plan (SIP) Strategy, adopted in September 2022, that they are “exploring and proposing an unprecedented variety of new measures to reduce emissions [to support attainment of the 70 ppb ozone standard] ...using all mechanisms available. This level of action is needed to ensure federal air quality standards are attained and to deliver on our commitments to protect public health...Controlling ozone precursors, in particular oxides of nitrogen (NO_x), is key to attaining the federal ozone standards.”²¹ The implementation of the proposed rule amendments is necessary to achieve and maintain the ozone NAAQS and CAAQS standards in the region as well as necessary to support similar state-wide emissions reduction efforts and to support attainment in areas downwind of the Bay Area air basin. Staff has estimated that the proposed amendments would result in a mean modeled decrease in 8-hour ozone of -0.021 ppb on peak ozone days in the Bay Area, as detailed in Appendix E. The amendments may have further benefits on downwind air basins. Staff recommends that the Air District submit the proposed amendments to the SIP if they are adopted by the Board.

D. Ultra-low NO_x Emission Control Methods

Emission control methods to meet the proposed 14 ng/J standard for Rule 9-4 are well established and currently required by SCAQMD Rule 1111 and SJVUAPCD Rule 4905. These ultra-low NO_x burners reduce excess air in combustion by pre-mixing the fuel and air and burning the mixture at a lower temperature than older equipment, thus reducing NO_x emissions.

¹⁹ ASTDR, Nitrogen Oxides. <https://www.atsdr.cdc.gov/toxfaqs/tfacts175.pdf>

²⁰ U.S. EPA (2019b). Policy Assessment for the Review of the National Ambient Air Quality Standards for Particulate Matter, External Review Draft

²¹ California Air Resources Board. Proposed 2022 State Strategy for the State Implementation Plan. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf

Potential complications identified in other jurisdictions, such as high altitude and cold weather scenarios, are not applicable in the Bay Area. Staff intends for dual-fuel systems that are able to demonstrate compliance with this new proposed standard to be eligible for certification.

E. Zero NOx Technologies for Space and Water Heating

Current emission control methods that align with the zero NOx emissions standard available on the market consist mainly of electric resistance and electric heat pump systems. Air District staff does not intend to mandate specific zero NOx technology solutions, but for the purpose of this report, including emissions and cost estimates, currently available electric solutions are used to form estimates and projections. While not currently available on the market, other natural gas technologies, such as those with combustion occurring in the absence of nitrogen, may also be able to meet the proposed standards and proposed certification requirements. The use of electric appliances serves as a conservative estimate for NOx reductions due to the additional NOx from natural gas-fired power plants for electricity generation taken into account for estimates as described below.

F. Nitrogen Oxides Emissions Reductions

As the applicable rules function as appliance point-of-sale requirements, emission reductions associated with the proposed rule amendments would occur over time in relation to the lifespan of currently installed equipment. Staff estimated emissions reductions from the proposed amendments as newer equipment is phased in over time due to equipment replacements. To model these predicted emission reductions, staff made the following assumptions:

- While the proposed regulatory amendments would allow for natural gas-fired zero NOx appliances, based on currently available technology, staff assumed that, upon burnout, natural gas-fired appliances would be replaced with electric solutions when the proposed zero NOx standards are in effect. As noted above, this results in a conservative analysis of NOx reductions because other technologies that may be developed could avoid the additional NOx from electricity generation.
- For electric replacements, it is assumed that the electricity provided is from the community choice aggregator local to the customer, or direct from Pacific Gas and Electric. The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load is shown below in Table 5-2. The resulting weighted average is 85 percent carbon and NOx-free electricity generation.

**Table 5-2
Bay Area Electricity Generation Resources**

	Solar, Wind & Geothermal	Hydro	Nuclear	Biomass	System Power	Bay Area Usage²²
Marin Clean Energy²³	53%	38%	1%	6%	2%	14%
Sonoma Clean Power²⁴	38%	41%	1%	11%	9%	6%
East Bay Community Energy²⁵	42%	16%	0%	1%	40%	17%
Peninsula Clean Energy²⁶	40%	51%	0%	9%	0%	9%
Silicon Valley Clean Energy²⁷	36%	64%	0%	0%	0%	9%
SF Clean Power²⁸	54%	39%	0%	0%	7%	8%
San Jose Clean Energy²⁹	50%	23%	23%	3%	1%	10%
PG&E³⁰	43%	6%	39%	4%	8%	27%

- Electricity generated from natural gas-fired power plants is assumed to result in NOx emissions of 5 ppm by dry volume at 15% oxygen. This emission limit represents best available control technology (BACT) for simple-cycle gas turbine power plants over 50 megawatts.³¹ This is a conservative estimate, as most Bay Area power plants are required by Air District permit to meet a 2.5 ppm NOx limit.
- While some Bay Area residents are choosing to install zero NOx solutions at this time, and this is expected to continue and increase over time, modeled emissions reductions do not assume any voluntary uptake of zero NOx technology prior to the proposed compliance dates because voluntary uptake is not expected to be significant.

²² Values calculated via data from California Public Utilities Commission, Integrated Resource Plan.

<https://www.cpuc.ca.gov/irp/>

²³ Marin Clean Energy, Light Green Plan. <https://www.mcccleanenergy.org/60-renewable/>. Accessed November 2022.

²⁴ Sonoma Clean Power, CleanStart Plan. <https://sonomacleanpower.org/uploads/documents/Power-Content-Label-2021-Web.pdf>

²⁵ East Bay Community Energy, Bright Choice Plan. <https://ebce.org/our-power-mix/>. Accessed November 2022.

²⁶ Peninsula Clean Energy, ECOplus Plan. <https://www.peninsulacleanenergy.com/power-mix/>. Accessed November 2022.

²⁷ Silicon Valley Clean Energy, SVP Residential Plan. <https://www.siliconvalleypower.com/svp-and-community/about-svp/power-content-label>. Accessed November 2022.

²⁸ SF Clean Power, Green Plan.

https://static1.squarespace.com/static/5a79fded4c326db242490272/t/632e3e4c508cf816fc26e5d8/1663974989563/CleanPowerSF_Product+Content+Label+2022_Green_All+Languages.pdf

²⁹ San Jose Clean Energy, GreenSource Plan. https://sanjosecleanenergy.org/wp-content/uploads/2022/09/SJCE_2021-Power-Content-Label.pdf

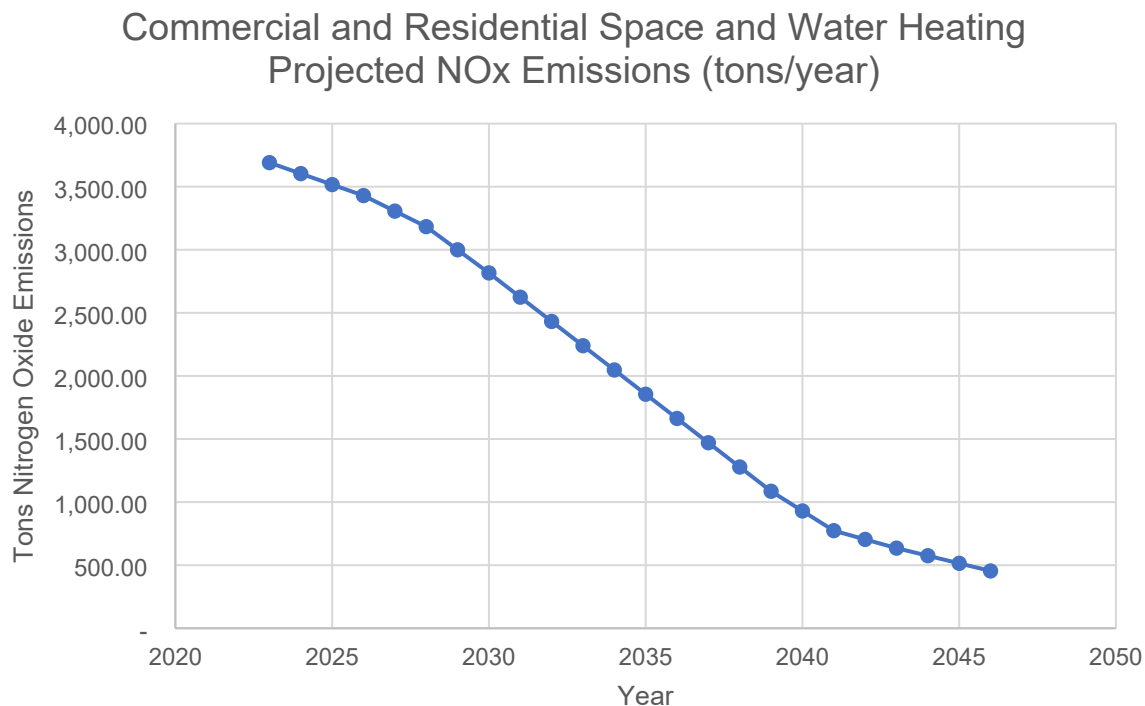
³⁰ Pacific Gas and Electric Power Mix via East Bay Community Energy. <https://ebce.org/our-power-mix/>. Accessed November 2022.

³¹ California Air Resources Board, Stationary Source Division. Report to the Legislature: Gas-Fired Power Plant NOx Emission Controls and Related Environmental Impacts. May 2004. <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/reports/l2069.pdf>.

- Commercial space and water heating is frequently achieved through the use of larger boilers that are covered under the Air District’s Regulation 9, Rule 7. Based on available inventories, staff assumed that 50 percent of commercial space and water heating baseline emissions would not be impacted by the proposed amendments to Rule 9-4 and Rule 9-6.
- As the proposed rule amendments would impact only direct emissions from two types of building appliances and do not impact natural gas distribution, staff did not assume any upstream emission reductions along the natural gas infrastructure. Although reduced use of natural gas may result in less methane leakage, this reduced leakage is not guaranteed because the technologies used to meet the proposed standards may rely on the natural gas grid for energy and the proposed amendments do not impact the existing natural gas distribution system.
- Water heaters were assumed to have an average lifespan of 13 years and space heating equipment are assumed to have an average lifespan of 18 years.³²

Figure 5-3, below, shows the projected NO_x emissions over time based on the assumptions described above and the proposed amendments to Rules 9-4 and 9-6. The 2018 Air District emissions inventory provides the baseline for this projection. Further detail on the development of the emissions inventory can be found in the Draft EIR (Appendix G).

Figure 5-4
Projected NO_x Emissions from Proposed Rule Amendments



Initial reductions would be achieved by the introduction of the ultra-low NO_x requirements (14 ng/J) for residential furnaces. For replacements under this standard between 2024 and 2029,

³² Environmental Energy and Economics. April 2019. “Residential Building Electrification In California: Consumer economics, greenhouse gases and grid impacts”. Page 41.

staff estimates a 65 percent reduction in NO_x emissions on a per unit basis compared to existing standards. Additional significant emission reductions would be achieved starting in 2027 with the zero NO_x compliance date for small water heaters, and additionally in 2029 with the zero NO_x compliance date for all new space heating units.

Yearly emissions reductions would continue, including as zero NO_x technology is introduced for large water heaters in 2031 and units, including ultra-low NO_x space heating units, are changed out over the course of the average assumed appliance lifetimes.

Table 5-3, below, provides values for projected yearly emissions and projected reductions versus the baseline emissions inventory for selected years as represented by the graph in Figure 5-4.

Table 5-3
Projected NO_x Emissions upon Implementation of Proposed Rule Amendments

Year	Projected Yearly NO_x Emissions (tons/year)	Projected NO_x Reduction vs. Baseline (tons/year)
Baseline	3,690	-
2025	3,516	174
2030	2,816	874
2035	1,855	1,835
2040	930	2,761
2045	515	3,176
2046	454	3,236

These NO_x emission reductions over time are significant, with an 88 percent reduction of emissions from the baseline by the projected date of complete equipment changeout in 2046. This date could be realized sooner with voluntary uptake and replacements before burnout both prior to and throughout the compliance period. NO_x emissions are a criteria pollutant of concern for the Bay Area and impact overall regional air quality and ozone formation, as well as secondary particulate matter (PM) formation. The significant NO_x reduction expected from the proposed amendments to the rules would result in meaningful local health benefits through reduced PM formation. These reductions are discussed in Section V.G of this report as well as Appendix E.

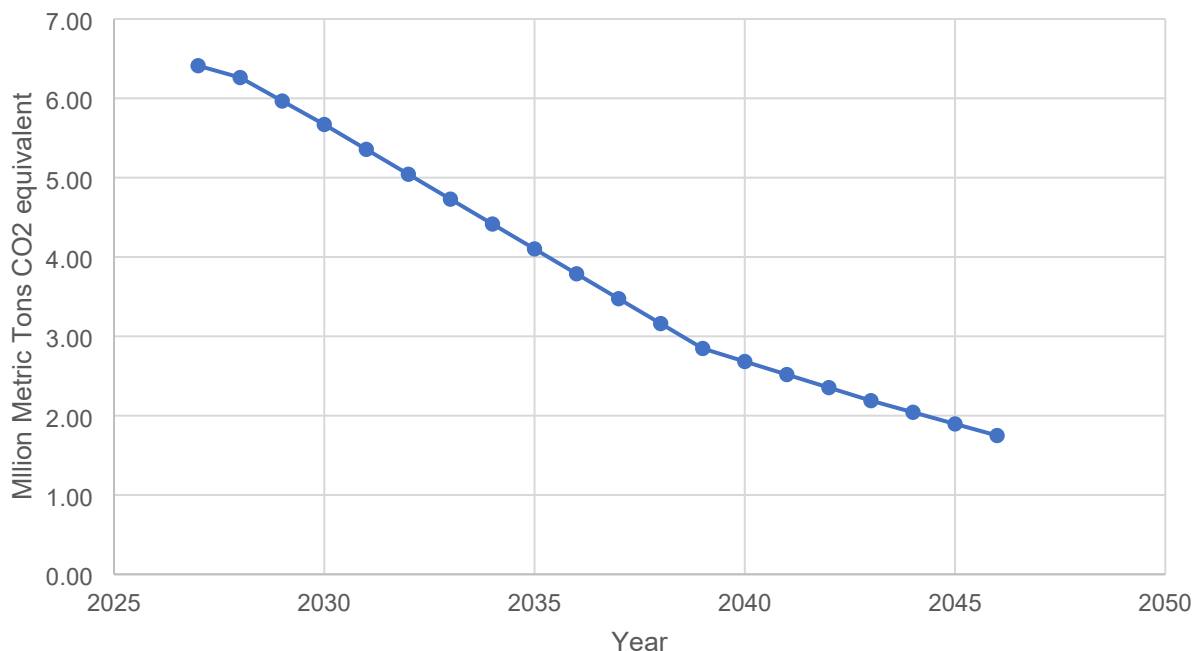
G. Greenhouse Gas Emissions Reductions

Staff additionally estimated potential greenhouse gas emission co-benefits that may result from the proposed rule amendments. Figure 5-5, below, shows the potential GHG emissions reductions over time based on the same set of assumptions listed at the beginning of this section. These assumptions include the proliferation of electric technologies in the absence of other new technology development but do not include potential greenhouse gas savings along the natural gas infrastructure that could result from widespread electric appliance usage. Should zero NO_x natural gas-fired technologies be developed and adopted, consumers would have the opportunity to choose between newly designed natural-gas fired and electric appliances, and the projected greenhouse gas savings depicted below would overestimate

potential GHG reduction co-benefits from the amendments. These estimates should thus be seen as maximum potential co-benefit emissions reductions. For greenhouse gases, 2019 District emissions data serves as the baseline.

Figure 5-5
Potential GHG Emissions under Proposed Rule Amendments

Commercial and Residential Space and Water Heating
Potential GHG Emission Reductions (MMT_{CO2e}/year)



GHG co-benefits are achieved in a fashion similar to the emission reductions described for NO_x. Projected greenhouse gas co-benefits are based largely on the assumption of in-kind electric replacements and low-carbon content power provided by Pacific Gas and Electric and the community choice aggregators in the Bay Area as shown in Table 5-2 above. For natural gas generated electricity, a correction factor is applied to account for GHG emission differences between natural gas appliance and turbine combustion. Further details on and examples of this calculation are provided in Appendix G.

Table 5-4, below, provides values for projected yearly emissions and potential reductions versus the baseline emissions inventory for selected years as represented by the graph in Figure 5-5.

Table 5-4
Potential GHG emissions under Proposed Rule Amendments

Year	Projected Yearly GHG Emissions (MMTCO₂e/yr)	Potential Reduction vs. Baseline (MMTCO₂e/yr)
Baseline	6.56	-
2030	5.67	0.89
2035	4.10	2.46
2040	2.68	3.88
2046	1.75	4.81

H. Particulate Matter Emissions

Emissions of total fine particulate matter from residential and commercial natural gas combustion is represented above in Table 5-1, with a total of 536.9 tons per year emitted in 2018. Fine particulate matter, or PM_{2.5}, can be categorized as “primary” or “secondary” particulates. Primary PM_{2.5} is directly emitted to the atmosphere, while secondary PM_{2.5} is a byproduct of chemical reactions of gaseous pollutants such as NO_x and ammonia (NH₃) in the atmosphere. Secondary particulate matter formation is of significant relevance to these proposed rule amendments due to the significant emissions of nitrogen oxides from this sector, as discussed above. Secondary particulate matter emissions from this source are expected to be reduced in line with NO_x reductions achieved by the proposed rule amendments. Primary particulate matter reductions are a potential co-benefit that would be achieved with consumer installation of electric appliances, which aligns with but is not required by the proposed rule amendments. Further analysis of particulate matter exposure and health impacts associated with these sources is discussed in Section V.I below.

The Bay Area is currently designated as a non-attainment area for the annual PM_{2.5} and 24-hour PM₁₀ CAAQS and as unclassifiable under the annual PM_{2.5} NAAQS and non-attainment for the 24-hour PM_{2.5} NAAQS. The EPA is currently considering a new, more stringent PM_{2.5} ambient air quality standard. Air District staff anticipates the need to submit a PM attainment plan in response to this new standard once it is finalized. These proposed amendments will reduce PM_{2.5} in the Bay Area and help move the Air District towards attainment of both the CAAQS and NAAQS. Staff has estimated through modeling that the amendments may result in a mean modeled decrease in 24-hour PM_{2.5} of -0.68 µg/m³ when observations indicated 24-hour PM_{2.5} was at least 30 µg/m³, as detailed in Appendix E. The importance of zero NO_x appliance standards has been recognized by EPA. On October 5, 2022, citing this Bay Area rule development proposal, EPA found that zero NO_x appliance rules must be evaluated by the San Joaquin Valley Air Pollution Control District in order to show full consideration of all methods of emissions reductions for fine particulate matter. Air District staff thus recommends that the Air District submit the proposed rule amendments to EPA for inclusion in the State Implementation Plan. Staff plans to recommend submittal of all new rules or rule amendments passed by the Board of Directors that reduce PM to be a part of the SIP moving forward, beginning with the proposed rule amendments discussed in this report.

I. Exposure and Health Impacts

The Air District evaluated ambient air quality and health impacts from natural gas fired furnaces and water heaters in commercial and residential buildings in support of the proposed amendments to Rules 9-4 and 9-6. Staff estimated contributions to ambient NO_x levels from the above sources, as well as the contributions to levels of particulate matter and ozone. Staff also estimated the health impacts of simulated fine particulate matter. The results of this analysis are summarized in this section but can be found in more detail in Appendix E.

The modeling analysis included two annual simulations for 2018:

- A base case simulation that included the Air District's latest natural gas combustion emissions estimates, and
- A control case simulation that removed emissions from commercial and residential natural gas combustion emissions associated with space heating and water heating that are covered by the proposed rule amendments. The emissions removed are represented by those in bold in Table 5-1.

Differences between these two simulations provided an estimate of the air quality impacts of this source sector. It is important to note, however, that the current version of Rule 9-6 is expected to reduce 2018 NO_x emissions from commercial and residential water heaters by 576 tons, with proposed rule amendments targeting the remaining emissions from these appliances, as well as all emissions from commercial and residential space heating. Impacts from the expected emissions reductions from the current version of Rule 9-6 (576 tons) were excluded from the health benefits analysis to ensure that the modeling-estimated health benefits account only for NO_x emission reductions associated with the proposed rule amendments (3,690 tons). (See Appendix E for details.)

It is important to clarify the bounds of this analysis and assumptions made as compared to other emission estimates and impact findings throughout this report. The health modeling shows the health impact associated with currently designed natural gas-fired space and water heating appliances located in commercial and residential buildings that are covered by the proposed rule amendments. Due to the nature of the rule amendments, with enforcement of the standards at the point of sale of the equipment, the emission reductions and related health benefits will be realized over the course of time as old equipment is replaced by new equipment that meets the emissions standards in the amendments.

The study population of this analysis includes residents of the portions of the nine-county Bay Area that are under the jurisdiction of the Air District (Figure 5-5). This population was estimated to be approximately 7.7 million residents. A breakdown by county and race/ethnicity, using categories supplied by BenMAP/PopGrid, is given in Table 5-5.

Table 5-5
Modeled residential population

	Asian	Hispanic	Black	White	(all)
Alameda	32.6%	24.3%	11.0%	32.1%	1,668,306
Contra Costa	18.5%	28.7%	9.2%	43.6%	1,180,605
Marin	7.4%	18.3%	3.2%	71.1%	266,439
Napa	8.5%	36.8%	2.3%	52.5%	147,553
San Francisco	34.6%	15.1%	5.2%	45.1%	866,833
San Mateo	31.5%	26.6%	2.7%	39.1%	797,428
Santa Clara	38.3%	27.7%	2.8%	31.2%	1,991,116
Solano	21.7%	27.8%	17.3%	33.2%	311,782
Sonoma	5.6%	30.5%	2.2%	61.7%	461,976
(all)	28.6%	25.6%	6.4%	39.4%	7,692,039

Note: Percentages are row-wise; they indicate shares of that county's population.
Basis: BenMAP/PopGrid projection from 2010 to 2020.

The key findings of this analysis are that NO_x emissions from the sources in question caused production of secondary PM_{2.5} across most residential areas of the Bay Area with an annual average contribution between about 0.04 microgram per cubic meter (µg/m³) to 0.18 µg/m³. Emissions from this source sector also include primary, or directly emitted, PM_{2.5}. The total annual average contribution to PM_{2.5}, including both primary and secondary PM_{2.5}, across most residential areas of the Bay Area varied between 0.10 µg/m³ and 0.42 µg/m³. Maps of emissions reductions in NO_x and primary PM_{2.5} can be seen in Figures 5-6 and 5-7 below.

Figure 5-6
Map of the NO_x emissions difference between the modeled control and base cases

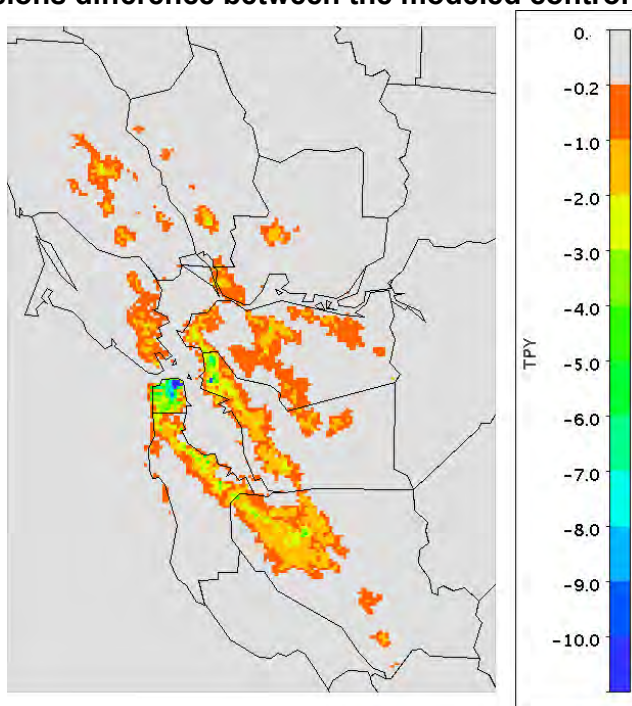
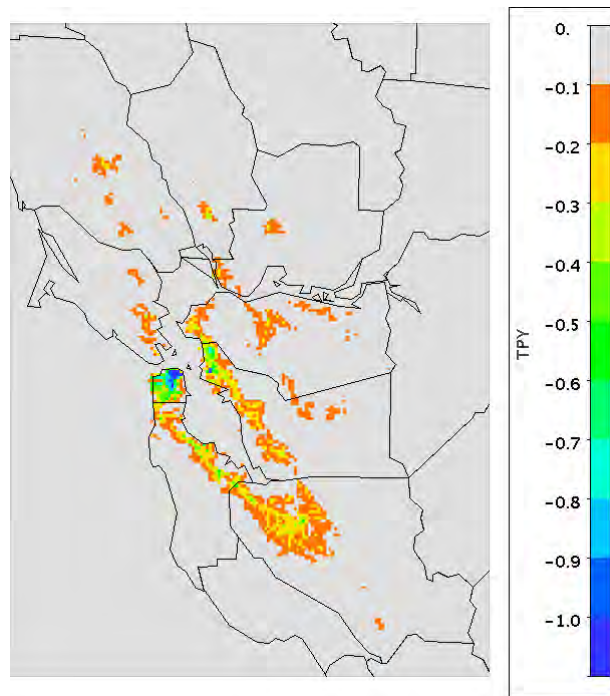


Figure 5-7
Map of the PM_{2.5} emissions difference between the modeled control and base cases



The health benefits from reduced PM_{2.5} achieved by eliminating emissions from the natural gas-fired appliances covered under the proposed rule amendments were estimated using the U.S. EPA's May 2021 version of the Environmental Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE), paired with three additional sets of health impact functions deemed appropriate for use in the Bay Area. Further information about the methodology used and constraints of this modeling can be found in Appendix E. Due to the nature of commercial and residential buildings, these health benefits would be realized across the region, with increased benefits in densely populated areas.

Table 5-6 provides a breakdown of these exposure assessments by the four racial/ethnic groups listed in Table 5-5.

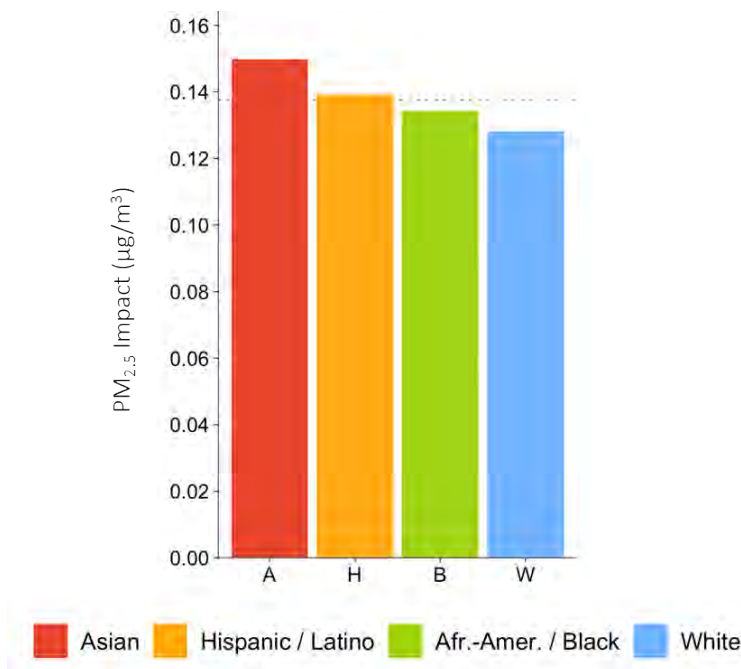
Table 5-6
Modeled exposures (outdoor concentrations, weighted by 2020 Bay Area residential population) under baseline and control scenarios

	Baseline	Control	Reduction
Total PM_{2.5} (µg/m³)			
Asian/Pacific Islander	8.817	8.667	0.150 (1.7%)
Hispanic/Latino	8.826	8.687	0.139 (1.6%)
African-American/Black	8.670	8.536	0.134 (1.5%)
White	8.116	7.988	0.128 (1.6%)
(average)	8.534	8.397	0.138 (1.6%)
Primary PM_{2.5} (µg/m³)			
Asian/Pacific Islander	4.496	4.437	0.059 (1.3%)
Hispanic/Latino	4.558	4.505	0.054 (1.2%)
African-American/Black	4.491	4.436	0.055 (1.2%)
White	4.140	4.091	0.050 (1.2%)
(average)	4.371	4.318	0.054 (1.2%)
Secondary PM_{2.5} (µg/m³)			
Asian/Pacific Islander	4.321	4.230	0.091 (2.1%)
Hispanic/Latino	4.268	4.182	0.086 (2.0%)
African-American/Black	4.179	4.099	0.079 (1.9%)
White	3.976	3.898	0.079 (2.0%)
(average)	4.163	4.079	0.084 (2.0%)
NO_x (ppb)			
Asian/Pacific Islander	10.079	9.324	0.755 (7.5%)
Hispanic/Latino	9.958	9.268	0.690 (6.9%)
African-American/Black	10.930	10.212	0.718 (6.6%)
White	8.113	7.470	0.643 (7.9%)
(average)	9.328	8.636	0.692 (7.4%)

Note: Reductions are expressed relative to baseline exposures.

As depicted in Figure 5-8, if both NO_x and primary PM_{2.5} emissions from the combustion of natural gas by residential and commercial space and water heating appliances were eliminated, modeling indicates that the largest reductions in PM_{2.5} exposure would accrue to the Bay Area's Asian/Pacific Islander population. This would be true in both absolute and relative terms (see Table 5-6, column "Reduction"). Within individual counties (not shown; see Appendix F) the greatest modeled reductions in PM_{2.5} exposure from the proposed rule amendments would accrue either to Hispanic/Latino, African-American/Black, or Asian/Pacific Islander residents, depending on the county.

Figure 5-8
Modeled Total PM_{2.5} Impacts (annual average outdoor concentrations, weighted by residential population) attributed to targeted emissions from space and water heating appliances.



Note: Consistent with Table 5-6, this PM_{2.5} (Total) is the sum of PM_{2.5} (Primary) and PM_{2.5} (Secondary).

The total PM_{2.5} emissions from this sector result in an estimated 37 to 85 premature deaths per year, with 23-52 attributable to secondary PM_{2.5} emissions (which are directly tied to NO_x emissions). These results can be seen in Table 5-7 below.

Table 5-7
Estimated benefits resulting from decreased PM_{2.5} levels due to an assumed case that eliminates space and water heating natural gas combustion emissions in the Bay Area

Health Impact ^a	Avoided Incidence, Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	23–52	37–85
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	2.6–24	4.2–39
Hospital admission, neurological ^c	7.7	13
Incidence, out of hospital cardiac arrest	0.45	0.73
Incidence, stroke	1.5	2.4
Incidence, lung cancer	1.9	3.1
Hospital admissions^d		

Health Impact ^a	Avoided Incidence, Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Respiratory ^e	2.4	3.9
Cardiovascular ^f	3.0	4.9
ER visits		
Respiratory ^g	13	20
Cardiovascular ^h	6.2	10
Other effects		
Restricted activity days	24,000	39,000
Work loss days	4,100	6,700
Hay fever/allergic rhinitis	440	710
Asthma-related effects		
Asthma symptoms/albuterol use	9,200	15,000
Onset of asthma	71	110

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

It is important to note that the secondary PM_{2.5} benefits represented above in the center column would be achieved as a result of NOx emissions reductions. Therefore, the secondary PM_{2.5} benefits captured in this modeling represent the potential direct benefits of the emissions standards set forth in the proposed rule amendments. The righthand column of Table 5-7 represents benefits from total PM_{2.5} emission reductions and therefore includes primary PM_{2.5} emissions from space and water heating appliances. While it is expected that, based on current appliance availability, the amendments will lead to the proliferation of electric space and water heating appliances, the development of natural gas-fired appliances that meet the proposed standards is possible. If zero NOx natural gas-fired appliances are developed, these appliances may, or may not, be designed to eliminate primary PM emissions. Thus, there still may be primary PM_{2.5} emissions from these appliances and the additional benefits represented in the Total PM_{2.5} column of Table 5-7 would not be fully realized, depending on how many consumers choose electric versus natural gas-fired zero NOx appliances.

As discussed in Section VIII: Environmental Impacts and Appendix D, it is expected that all incremental power generation needs will be met with renewable generation resources.

VI. ECONOMIC IMPACTS

A. Cost Effectiveness

In this section staff presents cost effectiveness information for the Board and public's consideration. Cost effectiveness is calculated by dividing the annualized costs (amortized capital costs and operating costs) by the total number of tons of emission reductions expected each year:

$$\text{Cost effectiveness} = \frac{\text{Annualized Cost}}{\text{Annual Emission Reduction}}$$

Air District staff reviewed available data on costs and cost estimation tools and methodologies and developed cost estimates associated with compliance under the proposed amendments. Based on these cost estimates, Air District staff estimated cost effectiveness for the proposed amendments. Staff assumes replacement of currently designed natural gas-fired space and water heating appliances with currently available electric heat pumps for purposes of this analysis. Costs of potential natural gas-fired zero NOx appliances are unknown at this time. Estimates of the net annual costs (including annualized equipment costs, rate savings, and panel upgrades), annual emission reductions and cost effectiveness are shown on a per equipment unit basis in Table 6-1.

Table 6-1
Per Unit Compliance Cost and Cost Effectiveness for Proposed Amendments

	Equipment Cost (\$)	Net Equipment Compliance Cost (\$) ^a	Panel Upgrade Cost (\$)	Annualized Equipment Compliance Cost (\$/year) ^b	Annual Rate Savings (\$/year)	Annualized Panel Upgrade Cost (\$/year) ^c	Annual NOx Reductions (tons/year)	Cost Effectiveness (\$/ton) ^d
Rule 9-4 Amendments for Space Heating								
Ultra-low NOx Standard	\$5,650	\$550	\$0	\$45	\$0	\$0	0.0008	\$54,100
Zero NOx Standard	\$8,030	\$2,900	\$2,630	\$241	(\$150)	\$161	0.0013	\$72,100 - \$199,800
Rule 9-6 Amendments for Water Heating								
Zero NOx Standard	\$2,820	\$850	\$960	\$88	(\$45)	\$59	0.0002	\$250,400 - \$594,000

Notes:

^a Net equipment compliance cost is estimated by calculating the difference in capital cost between equipment meeting the current standard and equipment meeting the applicable proposed standard.

^b Annualized equipment compliance cost is estimated by amortizing the net equipment compliance cost over the lifetime of the equipment.

^c Annualized panel upgrade cost is estimated by amortizing the panel upgrade cost over the lifetime of the panel upgrade.

^d Ranges of cost effectiveness shown for the space heating and water heating zero-NOx standards represent the cost effectiveness for an equipment installation that does not require a panel upgrade (low end of range) and an equipment installation that does require a panel upgrade (high end of range).

Further information and details on the development of the cost estimates are provided in the following Section VI.C. The calculation of the NOx reductions is described in Section V.F. and shown in Figure 5-4 and Table 5-3 of this Report. Further details on the calculation of annualized net costs can be found in Appendix C. Note that cost estimates presented here are

in 2019 and 2018 year dollars, and do not account for potential cost changes since that time due to recent inflation or other factors. Staff notes that between 2019 and 2022, the national construction cost index has increased 7.9%.³³ Staff expects that equipment and construction costs associated with the proposed amendments will continue to change over time, with equipment costs expected to decrease. It is speculative to extend the short-term trends of 2019-2022 out to the compliance dates which begin in 2027. Changes to associated costs and therefore cost-effectiveness of the proposed amendments will be evaluated over time through the Implementation Working Group (see Section IX.C) if the proposed rule amendments are adopted. Staff does not believe it is appropriate to inflate the 2018-2019 cost data to current dollars due to uncertainty related the representativeness and applicability of recent inflation trends, particularly given the long-term compliance timelines under the proposed amendments.

For the zero NOx standards for space heating and water heating, a range of cost effectiveness values are shown in Table 6-1 to reflect installations that may or may not require an electrical panel upgrade; the low end of the range represents equipment installations where a panel upgrade would not be required, while the high end of the range represents equipment installations where a panel upgrade would be required. As shown in Table 6-1, the cost effectiveness can vary widely depending on the need for electrical panel upgrades. As discussed in the Technology Evaluation in Section IV of this report, staff anticipates that the availability and continued development of low voltage zero NOx solutions for space heating and water heating systems will be a key factor in the ability to install zero NOx equipment without electric panel upgrades. In addition, staff plans to convene an ongoing Implementation Working Group to investigate a number of implementation topics, including the accessibility and costs of zero NOx technology (further details on the Implementation Working Group can be found in Section IX.C. of this report). Staff anticipates that topics related to implementation costs will be a focus of the group as the status of low voltage technology development and availability, as well as financing and incentive programs, continues to evolve.

B. Incremental Cost Effectiveness

In this section, Staff presents incremental cost effectiveness information on other potential regulatory options for the Board and public's consideration. Incremental cost effectiveness is calculated by 1) calculating the incremental difference in cost between the different regulatory options, and 2) dividing the incremental difference in cost by the incremental difference in emission reductions between each progressively more stringent regulation:

$$\text{Incremental cost effectiveness} = \frac{\text{Annual cost (B)} - \text{Annual cost (A)}}{\text{Emission reduction (B)} - \text{Emission reduction (A)}}$$

1. Proposed Amendments to Rule 9-4

Air District staff identified a potential regulatory option for comparison that is less stringent than the proposed zero NOx standard for space heating equipment. This potential regulatory option would be to only adopt an ultra-low NOx standard of 14 ng/J instead of a zero NOx standard. (Note that the currently proposed amendments include the implementation of both an ultra-low NOx standard in 2024 and a zero NOx standard in 2029; the purpose of this incremental cost effectiveness analysis is to evaluate an ultra-low NOx standard as a less stringent regulatory option for comparison with the proposed zero NOx standard.)

³³ Engineering News Record 20 City Construction Cost Index. Annual averages 2019-2022. Accessed February 2023.

Air District staff estimated the incremental cost effectiveness of the proposed zero NOx standard compared to this ultra-low NOx option. Estimates of the net annual costs (including annualized equipment costs, rate savings, and panel upgrades), annual emission reductions, and cost effectiveness are shown for both the zero NOx and ultra-low NOx standards in Table 6-1 above. Based on these values, the incremental cost effectiveness of the zero NOx standard compared to the ultra-low NOx standard is estimated to range from \$106,900 to \$480,900 per ton of additional NOx reduction. This range of incremental cost effectiveness is a result of the range in costs associated with the zero NOx standard as described above and in Table 6-1.

2. Proposed Amendments to Rule 9-6

Air District staff did not identify a potential regulatory option for comparison that is less stringent than the proposed zero NOx standard for water heating equipment. As discussed in Section II.B., the existing NOx emission standards in Rule 9-6 are equivalent to those in SCAQMD Rules 1146.2 and 1121 and SJVUAPCD Rules 4308 and 4902 for similar equipment, and there have not been any lower, non-zero NOx emissions limits identified. Staff recognizes that discussions and considerations regarding the potential for other lower NOx emission levels and limits are ongoing, including considerations by the South Coast Air Quality Management District in the development of its 2022 Air Quality Management Plan;³⁴ however, the achievability, feasibility, and costs associated with these emissions levels and types of devices are not currently known and cannot be accurately estimated within the scope of the staff's analysis at this time.

C. Socioeconomic Impacts

The Air District is required to assess and consider potential socioeconomic impacts when adopting or amending regulations.³⁵ Air District staff contracted with an independent consultant, Applied Development Economics (ADE), to develop estimates of potential socioeconomic impacts for the proposed amendments to Rule 9-4 and Rule 9-6. The analysis and findings are summarized in this section, and the full report of the socioeconomic impact analysis is available in Appendix C.

Because the proposed amendments to Rule 9-4 and Rule 9-6 will likely have the greatest potential economic impact on residential consumers, the analysis is focused on consumer spending behavior and how the potential added expenses from appliance upgrades might factor into those spending patterns. In cases such as this, where the cost of compliance is borne by individual property owners, equity considerations must be kept at the forefront. The impact of these rule amendments on interest groups such as renters, affordable housing administrators, and others must also be adequately considered. Staff has discussed equity and cost concerns with stakeholders throughout the rule development process. Assuming no zero-NOx natural gas-fired solutions are developed and/or consumers choose to switch to electric appliances, significant additional costs beyond the capital cost of equipment such as electric service or panel updates could occur. However, improvements in available technology may lessen the cost of equipment as well as related electric service upgrades. For example, heat pump water

³⁴ South Coast AQMD. 2022 Air Quality Management Plan – Policy Brief – Residential and Commercial Building Appliances. <https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-residential-and-commercial-buildings-appliance.pdf?sfvrsn=8>

³⁵ California Health and Safety Code, Section 40728.5

heaters that are compatible with 120-volt electric systems are currently entering the market, removing the need for upgrading electric service in older homes. While improvements in technology availability and costs may continue to occur in the future, ADE's analysis of consumer costs is based on pricing and data for currently available technologies and equipment. As described in Section IX.C of this report, potential socioeconomic impacts may be further informed in the future by the Implementation Working Group and presented to the Board through staff's interim reporting process. However, this current socioeconomic impact analysis represents the most current and best available information at the time of its preparation.

ADE began its analysis by looking at the income distribution patterns in the Bay Area to see how the proposed rule amendments might impact households based on their income, poverty status, and whether they are homeowners or renters. In order to identify household characteristics and accompanying spending patterns, ADE used data from the U.S. Census American Community Survey (ACS) and the Bureau of Labor Statistics Consumer Expenditure Survey (CES). The ACS is an annual survey of households that is used to identify socioeconomic characteristics by geographic area, and how they change on an annual basis. Because the analysis focused on the nine Bay Area counties served by the Air District, all of the data comes from the combined county-level data.

The CES data is an ongoing household survey of consumer spending administered by the Bureau of Labor Statistics in order to calculate the Consumer Price Index (inflation rate). This data includes spending information by category, including housing, transportation, retail goods, services, and investments. For the socioeconomic analysis, the CES data is used to identify the proportion of household spending that goes towards major appliance and household equipment purchases. The data is cross-tabulated based on income range, homeownership status, and other household characteristics. This provides a useful benchmark for comparing existing household spending patterns with the potential cost of compliance for the Rule 9-4 and Rule 9-6 amendments. Note that when analyzing the degree to which socioeconomic impacts are significant or not significant, the Air District has previously used thresholds related to the percent change in return on equity (ROE) for an impacted industry (e.g., a threshold of costs exceeding ten percent of a business' return on equity). This type of threshold is not directly applicable to the impacts on residential consumers, but a discussion comparing the compliance costs and existing household spending patterns is provided below.

ADE's report includes a comparable review of the incremental cost differences between existing gas-fired appliances and electric units that, based on current market availability, are expected to be the most common zero NOx appliance installation. For proposed Rule 9-4 amendments, an incremental cost difference of \$2,931 was used (installed costs of \$8,027 compared to \$5,096). For proposed Rule 9-6 amendments, an incremental cost difference of \$852 was used (installed costs of \$2,824 compared to \$1,972). Additionally, installation costs for electrical panel upgrades that may be necessary were estimated to be \$4,256 for single family homes and \$2,744 for low-rise multi-family homes. The incremental installed cost and panel upgrade costs were amortized over the equipment lifetime and combined with estimates of annual rate savings to develop total annual net costs (as shown previously in Table 6-1). Further details on the calculation of annualized net costs can be found in Appendix C.

It should be noted that these comparisons are based on existing costs using current technologies and volumes of scale. The analysis does not make any assumptions about future cost reductions, nor any rebate programs that often provide incentives for consumers to upgrade to more efficient appliances. Potential future sources of funding and incentive programs are discussed below. These issues are intended to be further evaluated as the

market changes prior to the proposed zero NOx implementation dates through the Implementation Working Group and interim reporting process, which are discussed in Section IX.C of this report.

Detailed socioeconomic impacts of the proposed amendments can be found in the full report as Appendix C. Overall, the level of potential impact will vary considerably by income range. Existing household expenditures on major appliances and other household equipment accounts for 1.1 percent to 5.7 percent of annual income, depending on the income range. The proposed Rule 9-4 and Rule 9-6 amendments will potentially increase this by up to 1.0 percentage points (\$252 per year) for space heaters and 0.4 percentage points (\$102 per year) for water heaters for the lowest income households. Additionally, shifts in consumer expenditures toward higher appliance costs and away from other retail goods and services could result in potential job losses in these sectors. During the highest impact implementation period (when both water heaters and space heaters would be replaced), shifts in consumer spending could result in potential annual losses of approximately 0.02 percent of jobs within the trade and services sectors regionwide (286 losses annually compared to 1.5 million total trade and services jobs).

D. Funding and Incentives

There are a variety of funding and incentive sources that are currently available to Bay Area residents who wish to install zero NOx emission heat pump furnace and water heater systems in their homes and businesses. As discussed above, the socioeconomic impacts for the proposed rule amendments were calculated without taking into account cost mitigations that may be available from financing, rebate, or other incentive programs. This is because these programs are currently small and are not consistently available to all consumers in the region. Through federal and state legislation and budget planning processes, there are also plans to greatly expand the funds and financing available and accessible over the course of the next decade. Air District staff, along with the Implementation Working Group as discussed in Section IX.C, intends to track the development of these programs and work with administrators and other stakeholders to increase consumer awareness of and access to incentive funds. Table 6-2 summarizes significant funding sources that have recently been available to Bay Area residents. Note that these funding sources may be limited to fully zero emission (electric) appliances and may not provide funding for zero NOx emission natural gas-fired appliances if they are developed.

**Table 6-2
Existing Funding Sources**

Name of Funding Source	Amount	Agency/ Funder	Area	Type of applications
TECH (Technology and Equipment for Clean Heating) ³⁶	\$120 million	CEC	California	Jumpstart market for low emissions space and water heating technology/heat pumps (over 4 years)
BUILD (Building Initiative for Low Emissions Development) ³⁷	\$80 million	CEC	California	All electric new housing (new construction) (over 4 years)
Equitable Building Decarbonization - low-income installations ³⁸	\$622.4 million	CEC	California	Direct-install building retrofit program
Equitable Building Decarbonization - consumer rebates ³⁹	\$300 million	CEC	California	Rebates for upgrades and replacement of fossil fuel equipment with electric
Self-Generation Incentive Program (SGIP) ⁴⁰	\$84.7 million	CPUC	California	Demand-response focused HPWH installations. Half of funds reserved for low-income customers
LIFT (Low-income Tenants and Families) Program 2.0 ⁴¹	\$10.6 million	CPUC / Marin Clean Energy	Marin	Whole building multifamily program - energy efficiency and fuel substitution in low-income properties

³⁶Borgeson, Merrian. CA Launches \$200M in Programs to Reduce Building Emissions.

<https://www.nrdc.org/experts/merrian-borgeson/ca-launches-200m-programs-reduce-building-emissions>

³⁷ *Ibid.*

³⁸ California State Budget 2022-2023. Accessed August 2022. <https://www.ebudget.ca.gov/2022-23/pdf/BudgetSummary/ClimateChange.pdf>

³⁹ *Ibid.*

⁴⁰ California Public Utilities Commission. CPUC Provides Additional Incentives and Framework for Electric Heat Pump Water Heater Program. <https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-provides-additional-incentives-and-framework-for-electric-heat-pump-water-heater-program>

⁴¹ California Public Utilities Commission. Fact Sheet: Heat Pump Water Heater Incentive Programs. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/cpuc-hpwh-and-electrification-fact-sheet_q22020.pdf

Name of Funding Source	Amount	Agency/ Funder	Area	Type of applications
Energy Efficiency and Fuel Substitution Measures ⁴²	\$31 million	CPUC	California	Funds distributed for local installations of heat pump water heaters, space conditioning and dryers and induction stoves
Energy Savings Assistance (ESA) Program ⁴³	\$735 million	CPUC	PG&E Territory	Appliance replacements and other energy savings for single family and mobile homes (2021-2026)
Energy Savings Assistance (ESA) Program ⁴⁴	\$263 million	CPUC	PG&E Territory	Appliance replacements and other energy savings for multifamily (2021-2026)
Energy Savings Assistance (ESA) Program ⁴⁵	\$49 million	CPUC	PG&E Territory	Studies, training, workforce education and training, marketing education and outreach (2021-2026)
Wood Smoke Program	\$2 million	BAAQMD	Bay Area	Change out ~322 wood burning devices to heat pumps

Some of the funding identified above, such as the TECH and BUILD programs have exhausted their funding available in Pacific Gas and Electric territory, and therefore the Bay Area. Air District staff anticipates the further expansion of these programs including more distributed administration of these programs across all areas within the Air District's jurisdiction.

In August 2022, the federal government finalized the Inflation Reduction Act (IRA) which designates significant funds for a variety of programs related to reducing emissions related with building appliances. Programs initiated in the IRA include direct rebate programs that will be administrated through states as well as federal tax credits that are available now and will continue through 2032. The IRA includes multiple programs that apply to space and water heating appliances and other sources of energy usage in buildings. One significant program is the allocation of \$4.275 billion over 10 years for point-of-sale rebates to income-qualified entities. These rebates allow for a maximum of \$14,000 for the installation of new electric space and water heating equipment and ancillary costs. This program is focused on low- and middle-income entities in both single and multifamily residences, with 100 percent of project costs covered where annual income is less than 80 percent of the area median income (AMI). Fifty percent of project costs are covered when annual income is 80-150 percent of the AMI. The IRA also extends and increases a blanket tax credit for the installation of compliant appliances for all owners of their primary residence. Previously capped at \$500, this tax credit

⁴² *Ibid.*

⁴³ California Public Utilities Commission. Decision 21-06-015.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M387/K107/387107687.PDF>

⁴⁴ *Ibid.*

⁴⁵ *Ibid.*

will provide \$2,000 per eligible homeowner annually through 2032. State administrative agencies have up to two years to submit programmatic plans in order to receive IRA funds, at which time more details on process and access will become available.

Through the Implementation Working Group and the interim reporting process, Air District staff will continue to track and facilitate accessibility to funds, such as those described in this section, to Bay Area residents. Air District staff will work to ensure necessary and relevant working group membership, including staff from agencies responsible for disbursing state and federal funds. Due to the continuing growth and interest in this space, staff expects the landscape of funding and incentive programs to grow significantly over the next five to ten years and will assess the impact of this growth on costs of compliance in interim reports to the Board of Directors.

E. Valuation of Health Impacts

As previously discussed in Section V.I (Emissions and Emission Reductions; Exposure and Health Impacts), Air District staff modeled the health impacts associated with current NO_x emissions from all space and water heating in residential and commercial buildings. The annual avoided incidences of health impacts listed in Table 5-7 are further analyzed below in Table 6-3, showing the potential valuation of these avoided incidences.

Table 6-3
Valuations of reductions in annual average PM_{2.5} concentrations due to an assumed case that eliminates space and water heating natural gas combustion emissions in the Bay Area

Health Impact ^a	Total Valuation in 2020 U.S. Dollars, Million Dollars Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	230–530	380–870
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	0.23–2.1	0.38–3.5
Hospital admission, neurological ^c	0.11	0.19
Incidence, out of hospital cardiac arrest	0.019	0.03
Incidence, stroke	0.059	0.096
Incidence, lung cancer	0.056	0.091
Hospital admissions^d		
Respiratory ^e	0.028	0.045
Cardiovascular ^f	0.055	0.090
ER visits		
Respiratory ^g	0.013	0.021
Cardiovascular ^h	0.0084	0.014
Other effects		
Restricted activity days	1.9	3.2
Work loss days	1.1	1.8
Hay fever/allergic rhinitis	0.31	0.52

Health Impact ^a	Total Valuation in 2020 U.S. Dollars, Million Dollars Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Asthma-related effects		
Asthma symptoms/albuterol use	0.0037	0.0059
Onset of asthma	3.6	5.8
Sum		
All health impacts included	240–540	400–890

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

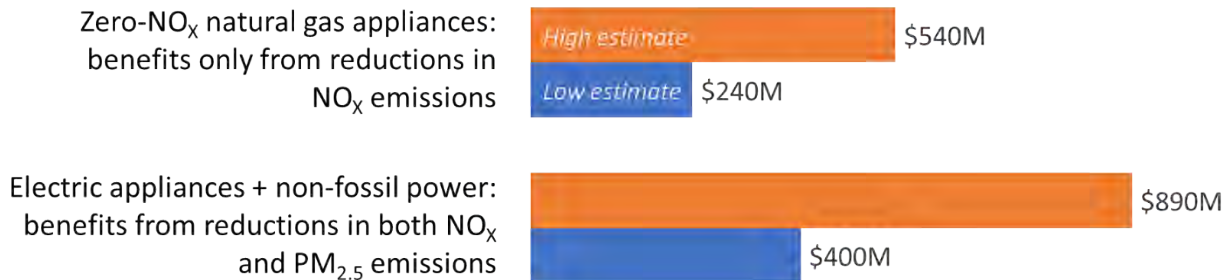
^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

These valuations were determined using EPA's May 2021 version BenMAP-CE paired with three sets of health impact functions deemed appropriate for use in the Bay Area. Further information about the methodology used and constraints of this modeling can be found in Appendix E. BenMAP-CE was designed to estimate changes in human health due to changes in air pollution levels and to estimate conventional valuations of these impacts (in 2020 U.S. dollars). The valuation process considers the direct and indirect costs of illnesses as well as the willingness to pay to avoid premature death. Direct costs include actual medical costs and lost worker hours, while indirect costs reflect willingness to pay to avoid pain and suffering.

As previously discussed, the valuation of secondary PM_{2.5} reductions represented above in the center column is associated with NOx emissions reductions. Therefore, the valuation of secondary PM_{2.5} reductions captured in this modeling represent the potential direct benefits of the emissions standards set forth in the proposed rule amendments. The righthand column of Table 6-3 represents the valuation of total PM_{2.5} reductions and therefore includes primary PM_{2.5} emissions from space and water heating appliances. While it is expected that, based on currently available zero NOx appliances, the amendments will result in the proliferation of electric space and water heating appliances, the development of natural gas-fired appliances that meet the proposed standards are possible. In that case, there still may be primary PM_{2.5} emissions from these appliances, depending on how they are designed, and the additional savings represented in the Total PM_{2.5} column of Table 6-3 would not be fully realized. Figure 6-1 below summarizes the health valuations shown in Table 6-3.

**Figure 6-1
Summary of Health Valuations**



These health outcomes were also attributed to potential valuations, which are reported below in Section VI.E (Economic Impacts; Valuation of Health Impacts) as well as in the full emissions modeling analysis, Appendix E.

F. Air District Impacts

Staff anticipates that the proposed amendments to Rules 9-4 and 9-6 will require additional staff time and resources.

The enforcement of the zero NO_x standard is anticipated to result in increased staffing needs for the Compliance and Enforcement Division. While inspections to ensure continued compliance are ongoing, general compliance with the existing requirements of Rule 9-4 and 9-6 has been established throughout the region. This is supported by the longevity of the existing requirements as well as similar requirements throughout the state. As such, review of certifications has been streamlined and point-of-sale enforcement is not currently resource-intensive for the Air District.

In order to process certifications for compliant equipment and ensure point of sale compliance with the proposed ultra-low NO_x requirement in Section 9-4-301.2, staff anticipates the need to allocate 0.5 FTE time to support the proposed rule amendments from January 1, 2024, through January 1, 2027. This time also includes potential compliance and enforcement involvement in the Implementation Working Group, addressing questions from retailers, distributors and other stakeholders and pre-processing applications for appliances that are compliant with the zero NO_x standard.

Starting on January 1, 2027, which is the first zero NO_x implementation date for small water heaters, staff anticipates an ongoing need for one additional FTE in the Compliance and Enforcement Division to ensure compliance with the requirements of Sections 9-6-301.3, 9-6-301.5 and 9-6-303.5. This includes processing certifications for compliant equipment as well as performing regular inspections at retailers and other appliance distribution locations.

Additionally, implementation of the proposed rule amendments will require ongoing support from Rules and Strategic Policy and Planning and Climate Protection Divisions staff to facilitate and participate in the Implementation Working Group as well as to draft and submit to the Board the Interim Reports as required in Sections 9-4-405 and 9-6-404. Staff anticipates that the

combined workload between these two divisions will amount annually to one FTE from January 1, 2023, to January 1, 2029.

There are no impacts to the Engineering Division of the Air District as equipment covered by Rules 9-4 and 9-6 does not require an Air District permit to operate.

VII. REGULATORY IMPACTS

Section 40727.2 of the California Health and Safety Code requires an air district, in adopting, amending, or repealing an air district regulation, to identify existing federal and air district air pollution control requirements for the equipment or source type affected by a proposed change in air district rules. The air district must then note any differences between these existing requirements and the requirements imposed by the proposed changes.

The proposed rule amendments impose changes to the pollution control requirements for equipment historically subject to Rules 9-4 and 9-6. Air District staff is proposing a lower NOx emission limit of 14 ng/joule in the near term for natural gas-fired fan type central furnaces. The proposed rule amendments also include a zero NOx requirement with compliance dates ranging from 2027 to 2031 for all-natural gas-fired furnaces and water heaters that are subject to the rules.

Additionally, proposed amendments to Rule 9-4 would result in an expanded set of sources being subject to these pollution control requirements. The proposed amendments expand the applicability of the rule to devices used in non-residential settings as well as devices that are not considered “fan-type central furnaces,” including wall furnaces, direct vent units and other natural gas-fired space heating units.

There are currently no state or federal regulations addressing emissions of nitrogen oxides from space and water heating appliances. In August 2022, the Sierra Club petitioned EPA to regulate space and water heating appliances under section 111 of the federal Clean Air Act.⁴⁶ That petition is currently pending EPA’s consideration. In the 2022 State SIP Strategy, the California Air Resources Board signaled its intention to develop zero emission building appliance rules with a draft 2030 implementation date. No draft rulemaking has yet been proposed. The Air District’s proposed rule amendments specifically regulate NOx emissions from furnaces and water heaters, while CARB has indicated that it will pursue zero emission requirements for the same or similar sources. Air District staff sees the proposed rule amendments as complementary to the plan laid out in the CARB SIP Strategy. With the state showing its intent to regulate these sources in a similar manner, Air District staff expects market growth, and therefore accessibility of zero NOx appliances, to accelerate.

⁴⁶ Sierra Club, et al. Petition for Rulemaking to List Heating Appliances as a Source Category Under Section 111(b)(1)(A) of the Clean Air Act and to Issue New Source Performance Standards for that Category under Section 111(b)(1)(B).
<https://www.sierraclub.org/sites/default/files/Sierra%20Club%20Heating%20Appliance%20Rulemaking%20Petition.pdf>

VIII. ENVIRONMENTAL IMPACTS

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., require a government agency that undertakes or approves a discretionary project to consider the potential impacts of that project on all environmental media. The Air District contracts with an independent consultant to conduct a CEQA analysis of potential environmental impacts for rule making projects.

A. Notice of Preparation and Initial Study

The Air District prepared a Notice of Preparation and Initial Study (NOP/IS) in anticipation of a Draft Environmental Impact Report (DEIR) for proposed amendments to Rule 9-4 and Rule 9-6 and the NOP/IS was distributed to responsible agencies and interested parties for a 30-day review on May 19, 2022. A notice of availability of this document was distributed and was published on the Air District's website and in newspapers throughout the area of the Air District's jurisdiction. A CEQA scoping meeting was conducted on June 9, 2022, to solicit public comment regarding the scope and content of the information to be included in the DEIR. The NOP/IS initially identified the following environmental resources as being potentially significant, requiring further analysis in the DEIR:

- Utilities and Service Systems,
- Air Quality, and
- Greenhouse Gas Emissions

Staff received eight written comments in response to this release, which are posted to the Air District website. No verbal or written comments requested that the Air District expand the scope of the planned DEIR.

B. Draft Environmental Impact Report

The Air District prepared a DEIR, which is included as Appendix G of this report, to address the potential environmental impacts associated with the proposed amendments.

Impacts to air quality as well as greenhouse gas emissions and climate change were found to be less than significant and beneficial. The potential emission reductions associated with the proposed rule amendments are discussed in Section V of this Report as well as in the DEIR.

Impacts to utilities and service systems were found to be potentially significant. Air District staff contracted with Energy and Environmental Economics (E3) to perform modeling to determine potential additional electrical need associated with the proposed rule amendments. E3's report is incorporated here in Appendix D. E3 assumed, for purposes of determining the "worst case" potential impact on the electric grid, that upon implementation of the proposed amendments all currently installed natural gas-fired space and water heating appliances in the Bay Area would be replaced with electric appliances upon burnout. E3 considered two potential baselines: a more likely "High Policy" case pursuant to which California moves forward with rules and regulations to meet its climate goals, including required heat pump adoption, and a "Low Policy" case that represents business as usual, with no major policy changes supporting building electrification and heat pump adoption other than currently existing incentives. Under the more conservative Low Policy Reference Scenario evaluated by E3, the proposed rule amendments would, over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero NOx

standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 MW of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts. Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion will likely be developed outside of California. Development of these potential new energy resources is not part of the current project under review, but rather a potential indirect impact of implementation of the proposed amendments. Selection, location, development, review, and approval of any new energy resources is outside of BAAQMD's jurisdiction and would be completed by other agencies. It is not possible to determine any particular energy resource that would be developed to meet growing demand; that determination is outside of BAAQMD's jurisdiction and is unknown and speculative at this time. However, based on E3's report, almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant.

Following the release of the NOP and IS, Air District staff also determined that impacts related to aesthetics and noise should also be further evaluated in the DEIR. As described in Appendix G, aesthetics impacts were found to be less than significant, while noise impacts were found to be potentially significant. The proposed amendments would result in the installation of appliances and equipment, such as heat pump units, inside and outside of existing buildings. While noise from these new appliances would vary depending on size, model, location, and use type, this impact analysis conservatively evaluated the potential noise impacts from some of the loudest commercial equipment that might be installed and found that these impacts may be potentially significant. Lesser impacts may occur with smaller residential units and other installation features, such as equipment enclosures or screenings, but it is likely that some appliances would still exceed applicable standards in some locations and result in potentially significant impacts.

Alternatives considered in the environmental analysis include a no project alternative (where the proposed rule amendments are not adopted), an alternative with expedited compliance dates, and an alternative with delayed compliance dates. The CEQA alternatives analysis is intended to identify the alternative to minimize or avoid a project's impact; as such, the alternative with delayed compliance dates was identified as the "environmentally superior alternative" due to the slight reduction of impacts on utilities and service systems compared to the proposed project. It is important to note that this finding under CEQA is based on the minimization and avoidance of environmental impacts, and the proposed project would result in a greater beneficial effect related to air quality and climate change impacts due to emissions reductions occurring sooner.

C. Final Environmental Impact Report

Thirteen comment letters were received during the comment period that address issues raised in the DEIR, and responses to those comments are included in the proposed Final EIR. No revisions have been made to the content of the DEIR.

Prior to making a decision on the adoption of the proposed amendments to Rule 9-4 and Rule 9-6, the Air District's Board of Directors must review and certify the Final EIR as providing adequate information on the potential adverse environmental impacts of these actions. The proposed Final EIR concludes that there are potentially significant impacts associated with

utilities and service systems (energy resources) as relocation or construction of new or expanded electric facilities may occur in response to the proposed rule amendments. These facilities could result in adverse environmental impacts. The proposed Final EIR also concludes that equipment used to comply with the proposed rule amendments could result in potentially significant noise impacts from long-term operational noise. Because impacts to noise and utilities and service systems remain potentially significant, the Board of Directors must also adopt a Statement of Overriding Considerations in order to move forward with the adoption of the proposed amendments to Rule 9-4 and Rule 9-6. While the potential utility resources and noise impacts warrant close and careful consideration by the Board, Staff believes the air pollution control and public health benefits of the proposed amendments described throughout this Staff Report outweigh the potential adverse impacts related to utility systems and noise.

IX. RULE DEVELOPMENT / PUBLIC PARTICIPATION PROCESS

A. Public Participation during Rule Development Process

Air District staff initially received feedback from the public and the Air District Board of Directors on approaches to addressing emissions from building appliances at a November 2020 presentation to the Climate Protection Committee. Staff presented initial rule development concepts to the Stationary Source and Climate Impacts Committee and public stakeholders in April 2021. The Board and public both expressed general support for staff's proposed concepts and emphasized the need for swift action in this space but also noted the importance of balancing complicating factors, such as equity and the availability of funding mechanisms for incentives and subsidies.

Air District staff has reached out to and met with regulatory, community and industry experts in the space and water heating and building sectors. This includes manufacturers, advocates, community organizers, research organizations, utilities, labor representatives, community choice aggregators, and other regulatory bodies such as Bay Area cities, SCAQMD, the California Air Resources Board and the California Energy Commission. Staff has presented as requested at existing industry working groups convened by groups such as the Building Decarbonization Coalition and Stop Waste.

In addition, staff convened a stakeholder working group to discuss specific issues relating to Rules 9-4 and 9-6 and drafting amendments. This working group included community and environmental advocates, equipment manufacturers, local city staff and representatives from the SCAQMD, the California Air Resources Board, the California Energy Commission and Pacific Gas and Electric, among others. Air District staff has convened four meetings of this group in Q2 and Q3 of 2021. These meetings consisted of:

- A "kickoff" meeting to discuss general direction of the rule amendments and equity concerns;
- Two meetings to discuss technical issues specifically related to space and water heating issues, respectively;
- An equity focused working group meeting.

All meetings of the group were held as interactive webinars including discussion questions for stakeholder response and use of Google Jamboards. Depending on interest in the specific topic, these meetings were attended by approximately 20-40 stakeholders.

On September 30, 2021, staff released draft amendments to Rules 9-4 and 9-6 as well as a workshop report for public review. Staff then held a virtual public workshop on the evening of October 7, 2021, to discuss and receive feedback on the draft amendments. The workshop was attended by over 40 stakeholders and members of the public and staff received valuable feedback for consideration. Staff additionally presented to the Stationary Source and Climate Impacts committee on October 18, 2021, to discuss the draft amendments. The committee directed staff to continue in the current direction of rulemaking, with additional considerations for community and stakeholder involvement following potential rule amendment adoption. Staff updated the Stationary Source and Climate Impacts Committee on November 15, 2021, on public comments received and proposed an alternate schedule to allow for additional stakeholder engagement, environmental review, and cost analysis. Staff presented to the committee in April 2022 and provided updates on project timelines and recent work on this effort.

Staff released the CEQA Notice of Preparation (NOP) of an Environmental Impact Report (EIR) and Initial Study (IS) and held a scoping meeting in May 2022. Staff received eight written comments in response to this release, which are posted to the Air District website. No commenters requested that the Air District expand the scope of the planned DEIR. Staff additionally updated to the Board of Directors and the public on the status and makeup of the implementation working group and presented the health impacts modeling included in this Staff Report, at the October 17, 2022, Stationary Source and Climate Impacts Committee meeting. On February 15, 2023, the Air District Board of Directors discussed funding options for retrofitting low-income homes with cleaner appliances with an emphasis on ensuring accessibility for all consumers.

On December 20, 2022, Air District staff released an initial Staff Report, proposed amendments to Rule 9-4 and Rule 9-6 and a draft Environmental Impact Report for public review and comment. Staff accepted and responded to written comments and will present a final proposal to the Air District Board of Directors for its consideration at a Public Hearing on March 15, 2023. At the Public Hearing, the Air District Board of Directors will consider the final proposal and receive public input before taking any action on the proposed amendments to Rule 9-4 and Rule 9-6.

B. Considerations to Ensure Equitable Outcomes

The proposed rule amendments for both Rules 9-4 and 9-6 include the requirement that interim reports be brought to the Board of Directors by the APCO no later than two years prior to the three compliance dates for the zero NO_x standards. During the 2021 working group meetings, Air District staff discussed guiding principles and factors that should be included in this analysis with stakeholders throughout the rule development process as well as specifically during the most recent stakeholder working group meeting. The following guiding questions have served Air District staff throughout the course of this rule amendment process:

- Who stands to benefit most from the implementation of this policy? Who may be disproportionately burdened by this policy?
- Who is missing from this process and how can we ensure their concerns are represented and addressed?
- What unintended consequences could result from these proposed amendments if they were adopted as envisioned/intended? What steps can be taken to mitigate these adverse impacts?

- What additional barriers might prevent individuals in certain racial/ethnic/socioeconomic groups from benefitting fully from this policy? Are there further ways to maximize equitable outcomes?
- How will impacts and performance be documented and evaluated? What methodologies will be used? How will results be used?

Staff will continue to consider these questions throughout the time frame between rule adoption and the future effective date of the zero NO_x standards. These questions will additionally serve to guide the interim report included in the proposed amendments. Further, staff will report on the status of the following factors at the time of the interim reports:

- Access to economic benefits, including robust market availability and affordability;
- Ease of installation and coordination with local requirements;
- Assurance that policy promotes affordable housing and anti-displacement outcomes;
- Access to health and safety benefits, including resiliency during climate events;
- Potential infrastructure impacts associated with rule compliance.

C. Implementation Working Group

Staff plans to convene a formalized ongoing Implementation Working Group (IWG) to support the proposed rule amendments after potential adoption and leading up to the proposed zero NO_x compliance dates. Air District staff have been working to form this implementation working group along with a third-party facilitator.

The IWG, once formed, is intended to be an information-gathering body and to provide a forum to discuss technical and community/equity aspects and issues pertaining to building appliance rule amendments the Air District adopts. Although the IWG will not be a decision-making body, IWG input will be considered in the implementation process, and feedback may be incorporated into interim reporting materials as deemed appropriate by the Air District. The Air District will retain its independent decision-making role in the interim reporting process.

The IWG is intended to consist of a variety of stakeholders with different areas of expertise in reference to the implementation of the rule amendments. This may include community-based organizations, environmental justice groups, advocacy, and subject matter expert organizations, building technology experts, affordable and market rate housing developers and managers, local and state government staff, funding and financing agencies, equipment manufacturers and distributors, tenant representation organizations and labor organizations. The anticipated makeup and specific organizations represented will be presented at the public hearing for adoption of the proposed rule amendments. Implementation Working Group members will have access to stipends for their work which will be administered, as appropriate, through the Air District's third-party facilitator.

Topics included in the scope of the IWG and that will be investigated through the course of their work include the market availability of compliant technology, projected costs of purchasing and installing compliant technology, incentive programs and other funding and financing available to Bay Area residents, and potential challenges and opportunities for facilitating an equitable implementation. Accessibility of compliant technology as well as funding and financing programs to low-income residents and small businesses will be a focus of the Implementation Working Group.

The IWG will provide critical input and information to staff that staff will consider when preparing interim reports for the Board. This input may include the following:

- Costs, technology/appliance availability, impacts to different stakeholder groups (e.g., renters, homeowners, small businesses, industry, local governments);
- Suggestions on new/enhanced funding/financing streams for lower income households;
- Status of zero NOx technology/appliance development, costs, and economic incentives;
- Potential barriers, including affordability for residents, and interventions needed to meet the compliance deadlines in Air District Rules; and
- Potential adjustments or guardrails to the Rule implementation timeline so that technology readiness, infrastructure readiness, available financing/investments, and cost feasibility are aligned.

The IWG process will consist of a dual focused approach, which will allow the IWG to ensure that both technical considerations as well as equity-based considerations are addressed. This will be achieved through the creation of a technical subcommittee as well as a community/equity subcommittee. The technical subcommittee will focus on appliance development and availability, costs of implementation, and existing economic incentives. The community/equity subcommittee will focus on affordability, equity, and incentives to address the needs and challenges associated with the implementation of these rule amendments.

D. Overview of Comments Received

During the written comment period (December 20, 2022 through February 6, 2023), Air District staff received letters from 565 commenters that represent a variety of stakeholders commenting on the regulatory package. Commenters included a public utility, the California Air Resources Board, local governments, equipment manufacturers, industry groups, environmental groups, community organizations, and individual members of the public. 404 of the correspondence expressed strong support for the adoption of the proposed amendments. Comments received covered a wide range of topics, including support for the proposals, along with concerns including, but not limited to, the cost of compliance, environmental impacts of the proposal, electric grid capacity and reliability, possibility for emergency replacements, and the cost and timeline associated with potentially needed electric panel upgrades.

The Response to Comments document in Appendix H provides a detailed listing of the comments received, the commenters, and the Air District staff's response to the comments received, including comments on the DEIR.

X. CONCLUSION/RECOMMENDATIONS

Pursuant to the California Health and Safety Code Section 40727, before adopting, amending, or repealing a rule the Board of Directors must make findings of necessity, authority, clarity, consistency, non-duplication, and reference. This section addresses each of these findings.

A. Necessity

As stated in California Health and Safety Code Section 40727(b)(1), “‘Necessity’ means that a need exists for the regulation, or for its amendment or repeal, as demonstrated by the record of the rulemaking authority.”

The San Francisco Bay Area does not currently attain all state and national ambient air quality standards for ozone or particulate matter, and further reductions of ozone precursor and particulate matter emissions are needed for attainment and maintenance of the standards. The proposed amendments to Rule 9-4 and Rule 9-6 would reduce nitrogen oxide and secondary particulate matter emissions from space and water heating appliances which are a large area source of these pollutants in the Bay Area. The proposed amendments to Rule 9-4 and Rule 9-6 are needed to ensure attainment and maintenance of these ambient air quality standards and to provide clean air and public health benefits.

Space and water heating appliances generate a substantial portion of NO_x emissions from all sources (including mobile) in the Bay Area, and these emissions contribute to the formation of secondary particulate matter. These emissions result in PM exposures in communities throughout the Bay Area, which can contribute to a number of adverse health outcomes, including premature deaths. In addition, the health impact modeling described in this report indicates that these exposures are not distributed equally amongst different communities and race/ethnicity groups. The proposed amendments to Rule 9-4 and Rule 9-6 are needed to achieve these reductions in emissions and pollutant exposures throughout the Bay Area and would yield substantial health benefits in these communities and throughout the jurisdiction of the Air District.

B. Authority

The California Health and Safety Code Section 40727(b)(2) states that “‘Authority’ means that a provision of law or of a state or federal regulation permits or requires the regional agency to adopt, amend, or repeal the regulation.”

The Air District has the authority to adopt these rule amendments under Sections 40000, 40001, 40702, and 40725 through 40728.5 of the California Health and Safety Code.

C. Clarity

The California Health and Safety Code Section 40727(b)(3) states that “‘Clarity’ means that the regulation is written or displayed so that its meaning can be easily understood by the persons directly affected by it.”

The proposed amendments to Rule 9-4 and 9-6 are written so that their meaning can be easily understood by the persons directly affected by them. Further details in the Staff Report clarify the proposals, delineate the affected industry, compliance options, and administrative requirements for the industries and persons subject to this rule.

D. Consistency

The California Health and Safety Code Section 40727(b)(4) states that “‘Consistency’ means that the regulation is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations.”

The proposed amendments to Rule 9-4 and Rule 9-6 are consistent with other Air District rules and not in conflict with state or federal law.

E. Non-Duplication

The California Health and Safety Code Section 40727(b)(5) states that “‘Nonduplication’ means that a regulation does not impose the same requirements as an existing state or federal regulation unless a district finds that the requirements are necessary or proper to execute the powers and duties granted to, and imposed upon, a district.”

The proposed amendments to Rule 9-4 and Rule 9-6 are non-duplicative of other statutes, rules, or regulations.

F. Reference

The California Health and Safety Code Section 40727(b)(6) states that “‘Reference’ means the statute, court decision, or other provision of law that the district implements, interprets, or makes specific by adopting, amending, or repealing a regulation.”

By adopting the proposed amendments to Rule 9-4 and Rule 9-6, the Air District Board of Directors will be implementing, interpreting or making specific the provisions of California Health and Safety Code Sections 40000, 40001, 40702 and 40727.

The proposed amendments to Rule 9-4 and Rule 9-6 have met all legal noticing requirements, have been discussed with the regulated community and other interested parties, and reflect consideration of the input and comments of many affected and interested stakeholders.

G. Recommendations

Staff prepared a Final EIR and Response to Comments for the Board’s consideration after consideration of comments on the proposed amendments, DEIR, and the initial Staff Report. Following a review of public comments, Air District staff recommends that the Air District Board of Directors (1) certify the Final EIR and adopt of Statement of Overriding Considerations due to the potentially significant noise and utility systems impacts of the proposed amendments; and (2) adopt the proposed amendments to Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters.

Staff also recommends that the Air District submit the proposed rule amendments to EPA for inclusion in the State Implementation Plan. This action will be brought before the Board of Directors separately, if the Board adopts the proposed rule amendments.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX A

Proposed Amendments to Rule 9-4

This page has been intentionally left blank.

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 4
NITROGEN OXIDES FROM NATURAL GAS-FIRED ~~FAN-TYPE RESIDENTIAL~~
~~CENTRAL~~ FURNACES

INDEX

9-4-100 GENERAL

9-4-101 Description
[9-4-102 Applicability](#)

9-4-200 DEFINITIONS

~~9-4-201 Fan-Type Central Furnace~~
9-4-201² Annual Fuel Utilization Efficiency ([AFUE](#))
[9-4-202 BTU](#)
[9-4-203 Furnace](#)
[9-4-204 Heat Input](#)
[9-4-205 Natural Gas](#)
[9-4-206 Nitrogen Oxides \(NO_x\)](#)
9-4-207³ Useful Heat Delivered to the Heated Space

9-4-300 STANDARDS

9-4-301 ~~Residential Central~~ [Natural Gas-Fired F](#)urnace [Emission Standards](#)
9-4-302 Certified Furnaces

9-4-400 ADMINISTRATIVE REQUIREMENTS

9-4-401 Certification
9-4-402 Compliance Statement
9-4-403 Identification
9-4-404 Enforcement
[9-4-405 Interim Report](#)

9-4-500 MONITORING AND RECORDS (NOT INCLUDED)

9-4-600 MANUAL OF PROCEDURES (~~NOT INCLUDED~~)

[9-4-601 Determination of Emissions](#)

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 4
NITROGEN OXIDES FROM NATURAL GAS-FIRED ~~FAN-TYPE RESIDENTIAL~~
~~CENTRAL~~ FURNACES

9-4-100 GENERAL

9-4-101 Description: This Rule limits emissions of nitrogen oxides from natural gas-fired ~~fan type-residential-central~~ furnaces.

(Amended December 7, 1983)

9-4-102 Applicability: This Rule applies to any person who sells, installs, or offers for sale a natural gas-fired furnace for use within the District (Section 9-4-300s Standards) and any manufacturer who intends to sell or distribute for sale or installation a natural gas-fired furnace for use within the District (Section 9-4-400s Administrative Requirements and Section 9-4-600s Manual of Procedures).

9-4-200 DEFINITIONS

~~9-4-201 Fan Type Central Furnace:~~ ~~A self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 25 cm (10 in) in length with an input rate of less than 175,000 BTU/hr, excluding heating/cooling units utilizing three-phase electric current.~~

~~*(Amended December 7, 1983)*~~

9-4-201² Annual Fuel Utilization Efficiency (AFUE): The efficiency as defined by Section 4.2.35 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

(Amended December 7, 1983)

9-4-202 BTU: British thermal unit or units.

9-4-203 Furnace: A product with a heat input rate less than 175,000 BTU/hr which is designed to be a source of interior space heating.

203.1 Natural Gas-Fired Furnace: A furnace that utilizes single-phase, three-phase or direct current in conjunction with natural gas.

203.2 Natural Gas-Fired Fan Type Central Furnace: A self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 25 cm (10 in) in length with a heat input rate of less than 175,000 BTU/hr. This includes combination heating/cooling units with natural gas heating and also an electric cooling rate less than 65,000 BTU/hr.

9-4-204 Heat Input: The heat of combustion based on the gross (higher) heating value of the fuel, excluding the enthalpy of incoming combustion air.

9-4-205 Natural Gas: A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined by ASTM Standard D1945, 2003.

9-4-206 Nitrogen Oxides (NO_x): The sum of nitrogen oxide (NO) and nitrogen dioxide (NO₂), collectively expressed as nitrogen dioxide.

9-4-207³ Useful Heat Delivered to the Heated Space: The Annual Fuel utilization efficiency (expressed as a fraction) multiplied by the heat input.

(Amended December 7, 1983)

9-4-300 STANDARDS

9-4-301 ~~Residential Central~~ Natural Gas-Fired Furnace Emission Standards:—~~A person shall not sell, install or offer for sale within the District any stationary residential natural gas-fired fan type central furnace manufactured after January 1, 1984 that emits more than 40 nanograms of oxides of nitrogen expressed as NO₂ per joule of useful heat delivered to the heated space.~~ A person shall not sell, install or offer for sale within the District:

301.1 Any stationary residential natural gas-fired fan type central furnace manufactured after January 1, 1984, that emits more than 40 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space.

301.2 Any natural gas-fired fan type central furnace manufactured after January 1, 2024, that emits more than 14 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space.

301.3 Any natural gas-fired furnace manufactured after January 1, 2029, that emits more than 0.0 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space. This includes non-central installations such as wall furnaces as well as units installed in non-residential applications.

This section does not apply to furnaces used for mobile homes.

(Amended December 7, 1983)

9-4-302 Certified Furnaces: A person shall not sell, install or offer for sale within the District furnaces subject to the requirements of Section 9-4-301 unless such furnaces are certified in accordance with Sections s 9-4-401, 402, 403, and 404.

(Amended and Renumbered December 7, 1983)

9-4-400 ADMINISTRATIVE REQUIREMENTS

9-4-401 Certification: The manufacturer shall have each appliance model tested in accordance with the following:

401.1 Nitrogen oxides, carbon dioxide and oxygen measurements, test equipment, and other required test procedures shall be in accordance with ~~Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with methods and standards or equivalent procedures approved by the APCO.~~ Section 9-4-601.

401.2 Operation of the furnace shall be in accordance with the procedures specified in Section 3.1 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

401.3 ~~The following calculation~~ One of the two formulas shown below shall be used to determine the ~~nanograms emissions~~ of NO_x in units of nanograms per joule of useful heat delivered to heated space:

$$N = \frac{3.655 \times 10^{10} \times P}{(20.9 - Y) \times Z \times E}$$

or

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

- N = ~~Nanograms~~ Calculated mass emissions of NO_x per unit of useful heat (~~nanograms emitted~~ per joule of useful heat delivered to the heated space).
- P = Measured concentration of NO_x in flue gas (~~P~~parts per million ~~of NO_x~~ by volume).
- Y = Measured concentration ~~Percentage~~ of O₂ in flue gas (percentage by volume).
- Z = Gross Heating value of gas ~~in~~ (joules per cubic (meter)³ at 0.0 degrees Celcius, 1 atm).
- E = AFUE (percentage), as defined in Section 9-4-201.
- U = ~~Volume-percent~~ Concentration of CO₂ in water-free flue gas for stoichiometric combustion (percentage by volume).
- H = Gross heating value of the fuel, (BTU/cu. ft. per cubic foot, (60°F, 30-in Hg.).
- C = Measured ~~volume-percent~~ concentration of CO₂ in ~~water-free~~ flue gas; (percentage by volume) ~~assuming complete combustion and no CO present~~.

(Amended December 7, 1983)

9-4-402 Compliance Statement: The manufacturer shall submit to the APCO a either of the following:

402.1 A statement that each affected furnace the model-meets the standards set forth in Section 301 of this Rule. The statement shall be signed and dated, and shall attest to the accuracy of all information. The statement shall include the brand name and model number as it appears on the furnace rating plate, and be on forms provided by the APCO. or

402.2 A valid South Coast Air Quality Management District (SCAQMD) certification for SCAQMD Rule 1111 for furnaces demonstrating compliance with Section 9-4-301.2.

(Amended December 7, 1983)

9-4-403 Identification: The manufacturer shall display the model number of the furnace complying with this rule on the shipping carton and rating plate.

9-4-404 Enforcement: The APCO may require the emission test results to be provided when deemed necessary to verify compliance and may periodically conduct such tests as are deemed necessary to iensure compliance.

9-4-405 Interim Report: At least two years prior to the compliance date listed in Section 9-4-301.3, the APCO shall present to the Air District Board of Directors for consideration at a public meeting a report that includes the technology options currently (and projected to be) available to be sold, installed or offered for sale that do not conflict with the standard in Section 9-4-301.3; the projected costs of purchase and installation of such technology, including any ancillary costs, as applicable; any incentive programs available to reduce these costs; and infrastructure readiness associated with rule compliance.

9-4-600 MANUAL OF PROCEDURES

9-4-601 Determination of Emissions: Furnaces subject to Sections 9-4-301 and 302 shall be tested in accordance with the following provisions:

601.1 Each furnace model shall receive certification based on emission tests of a randomly selected unit of that furnace model.

601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance US EPA Reference Method RM-7 (40 CFR Part 60, Appendix A, Test Method 7E).

- 601.3 The measurement of carbon dioxide shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST-5 or US EPA Method 3A.
- 601.4 The measurement of oxygen shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST-14 or US EPA Method 3A.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX B

Proposed Amendments to Rule 9-6

This page has been intentionally left blank.

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM
NATURAL GAS-FIRED BOILERS AND WATER HEATERS
INDEX

9-6-100 GENERAL

- 9-6-101 Description
- [9-4-102](#) [Applicability](#)
- 9-6-110 Exemptions

9-6-200 DEFINITIONS

- 9-6-201 Boilers and Water Heaters
- 9-6-202 BTU
- 9-6-203 Direct-Vent Water Heater
- 9-6-204 Heat Input
- 9-6-205 Heat Output
- 9-6-206 Instantaneous Water Heater
- 9-6-207 Mobile Home Water Heater
- 9-6-208 Natural Gas
- 9-6-209 NO_x Emissions
- 9-6-210 Pool/Spa Heater
- 9-6-211 Power Direct-Vent Water Heater
- 9-6-212 Power-Vent Water Heater
- 9-6-213 Rated Heat Input Capacity
- 9-6-214 Storage Tank Water Heater

9-6-300 STANDARDS

- 9-6-301 Natural Gas-Fired Storage Tank Water Heaters with a Rated Heat Input Capacity of 75,000 BTU/Hour or Less
- 9-6-302 Certification of Boilers and Water Heaters
- 9-6-303 Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of 75,001 to 2,000,000 BTU/Hour
- 9-6-304 Natural Gas-Fired Mobile Home Water Heaters
- 9-6-305 Natural Gas-Fired Pool/Spa Heaters

9-6-400 ADMINISTRATIVE REQUIREMENTS

- 9-6-401 Compliance with Emission Standards
- 9-6-402 [Compliance Statement](#) ~~Application for Certification~~
- 9-6-403 Identification
- [9-6-404](#) [Interim Report](#)

9-6-500 MONITORING AND RECORDS (Not Included)

9-6-600 MANUAL OF PROCEDURES

- 9-6-601 Determination of Emissions

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED WATER
HEATERS

(Adopted April 1, 1992)

9-6-100 GENERAL

9-6-101 Description: This rule limits the emissions of nitrogen oxides from natural gas-fired water heaters and boilers.

(Amended November 7, 2007)

9-6-102 Applicability: This Rule applies to any person who sells, installs, or offers for sale a natural gas-fired water heater for use within the District (Section 9-6-300s Standards) and any manufacturer who intends to sell or distribute for sale or installation a natural gas-fired water heater for use within the District (Section 9-6-400s Administrative Requirements and Section 9-6-600s Manual of Procedures).

9-6-110 Exemptions: The requirements of Section 9-6-301 shall not apply to the following:

- 110.1 Natural gas-fired boilers and water heaters with a rated heat input capacity of greater than 2,000,000 BTU/Hour.
- 110.2 Natural gas-fired water heaters used in recreational vehicles.
- 110.3 Water heaters using a fuel other than natural gas.
- 110.4 Natural gas-fired pool/spa heaters with less than 400,000 Btu/Hour rated heat input capacity used exclusively to heat swimming pools, hot tubs or spas.

(Amended November 7, 2007)

9-6-200 DEFINITIONS

9-6-201 Boilers and Water Heaters: Any combustion equipment used to heat water or produce steam and that is not exclusively used to produce electricity for sale. For the purposes of this Rule, a boiler does not include any waste heat recovery boiler that is used to recover sensible heat from the exhaust of a combustion turbine or any unfired waste heat recovery boiler that is used to recover sensible from the exhaust of any combustion equipment.

(Adopted November 7, 2007)

9-6-202 BTU: British thermal unit or units.

(Adopted November 7, 2007)

9-6-203 Direct-Vent Water Heater: A storage tank water heater with air intake and exhaust ducts that use a gravity system to collect air from outside a building for combustion and exhaust combustion byproducts to the outside of a building.

(Adopted November 7, 2007)

9-6-204 Heat Input: The heat of combustion released by fuels burned in a unit based on the higher heating value of fuel. This does not include the enthalpy of incoming combustion air.

(Adopted November 7, 2007)

9-6-205 Heat Output: The product obtained by multiplying the recovery efficiency, as defined by Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E, by the input rating of the water heater.

(Renumbered November 7, 2007)

- 9-6-206 **Instantaneous Water Heater:**** A device in which water is heated only when the water flows through a heat exchanger.
(Adopted November 7, 2007)
- 9-6-207 **Mobile Home Water Heater:**** A closed vessel manufactured exclusively for mobile home use in which water is heated and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F (99°C).
(Adopted November 7, 2007)
- 9-6-208 **Natural Gas:**** A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined according to Standard Method ASTM D1945-64.
(Renumbered November 7, 2007)
- 9-6-209 **NO_x Emissions:**** The sum of nitric oxide and nitrogen dioxide in the flue gas, collectively expressed as nitrogen dioxide.
(Adopted November 7, 2007)
- 9-6-210 **Pool/Spa Heater:**** A device in which water is heated when pool or spa water circulates through a heat exchanger.
(Adopted November 7, 2007)
- 9-6-211 **Power Direct-Vent Water Heater:**** A storage tank water heater with an air intake duct outside of a building with a blower installed to assist in the expulsion of exhaust gases.
(Adopted November 7, 2007)
- 9-6-212 **Power-Vent Water Heater:**** A storage tank water heater with an air intake duct outside of a building with a blower installed to assist in the expulsion of exhaust gases.
(Adopted November 7, 2007)
- 9-6-213 **Rated Heat Input Capacity:**** The heat input capacity specified on the nameplate of the combustion unit.
(Renumbered November 7, 2007)
- 9-6-214 **Storage Tank Water Heater:**** A closed vessel, in which water is heated and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F.
(Renumbered November 7, 2007)
- 9-6-300 **STANDARDS****
- 9-6-301 **Natural Gas-Fired Storage Tank Water Heaters with a Rated Heat Input Capacity of 75,000 BTU/Hour or Less:****
- 301.1 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater, manufactured after July 1, 1992, with a rated heat input capacity of 75,000 BTU/Hour or less, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 301.2 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater less than or equal to 50 gallons capacity that is manufactured after January 1, 2009, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to direct-vent, power-vent, power direct-vent water storage tank heaters and water heaters used for mobile homes.

301.3 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater greater than 50 gallons capacity that is manufactured after January 1, 2010, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to direct-vent, power-vent, power direct-vent storage tank water heaters and water heaters used for mobile homes.

301.4 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater that is manufactured after January 1, 2011, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to water heaters used for mobile homes.

301.5 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater that is manufactured after January 1, 2027, with a rated heat input rating of 75,000 BTU/hour or less, that emits more than 0 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to mobile home water heaters.

(Amended November 7, 2007)

9-6-302 Certification of Boilers and Water Heaters: No person shall sell, install, or offer for sale within the District any water heaters subject to Section 9-6-301, 303, 304, or 305 unless the water heater manufacturer brand name and model is certified in accordance with Sections 9-6-401 and 402.

(Amended November 7, 2007)

9-6-303 Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of 75,001 to 2,000,000 BTU/Hour:

303.1 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

303.2 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

303.3 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 20 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 30 ppm NO_x at 3% O₂, dry.

303.4 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.

303.5 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2031, that emits more than 0.0 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

(Adopted November 7, 2007)

9-6-304 Natural Gas-Fired Mobile Home Water Heaters: No person shall sell, install, or offer for sale within the District any natural gas-fired mobile home water heater

manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

(Adopted November 7, 2007)

9-6-305 Natural Gas-Fired Pool/Spa Heaters:

- 305.1 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 55 ppm NO_x at 3% O₂, dry.
- 305.2 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.

(Adopted November 7, 2007)

9-6-400 ADMINISTRATIVE REQUIREMENTS

- 9-6-401 Compliance with Emissions Standards:** The manufacturer shall obtain confirmation from an independent testing laboratory that each boiler or water heater model it intends to sell or distribute for sale into the District that is subject to the requirements of Sections 9-6-301, 303, 304, or 305 has been tested in accordance with the procedures in [Section 9-6-601](#).

(Amended November 7, 2007)

9-6-402 Compliance Statement: Application for Certification:—The manufacturer shall submit to the APCO either of the following:

- 402.1 ~~The Each~~ manufacturer shall submit ~~an application a statement~~ to the APCO ~~that each boiler or water heater model meets the emission standard set forth in Section 9-6-301 or 9-6-303. for certification of their compliant boiler or water heater model.~~ The compliance statement application must:
- 402.1.1 Provide the following general information: name and address of manufacturer, brand name, trade name, model number and heat input rating as it appears on the water heater rating plate.
- 402.1.2 Provide a description of the model being certified
- 402.1.3 Include a complete certification source test report demonstrating that the boiler or water heater model was tested in accordance with procedures in Section 9-6-601 and a written statement that the model complies with Section 9-6-301, 303, 304, or 305 ~~and is tested in accordance with procedures in Section 9-6-601.~~
- 402.1.4 Be submitted to the ~~District~~ APCO no more than 90 days after the date of the emissions compliance test conducted in accordance with Section 9-6-401.
- 402.1.5 Be submitted to the ~~District~~ APCO no less than 90 days before the intention to sell or distribute a new water heater model within the District, or no less than 90 days before the effective dates in Section 9-6-301, 303, 304, 305.
- ~~402.2 After completing review of the application for certification and source test report, the APCO will approve, or will deny approval of, the device.~~
- ~~402.3 Certification status shall be valid for three years from the date of approval by the APCO. After the third year, recertification shall be required according to the requirements in 9-6-402.~~
- 402.24 ~~In lieu of submitting an application as provided in Section 9-6-402.1, t~~The manufacturer ~~may~~ shall submit to the ~~District~~ APCO an approved South Coast Air Quality Management District (SCAQMD) certification issued pursuant to SCAQMD Rules 1121 and 1146.2 to demonstrate compliance that complies

with Section 9-6-301.1 through 301.4, 303.1 through 303.4, 304, or 305. This option does not apply to units demonstrating compliance with Sections 9-6-301.5 and 303.5.

(Amended November 7, 2007)

- 9-6-403 Identification:** The water heater manufacturer shall display the model number and the certification status of a water heater complying with this rule on the shipping carton and on the rating plate of each unit.

(Amended November 7, 2007)

- 9-6-404 Interim Report:** At least two years prior to the compliance date listed in Sections 9-6-301.5 and 303.5, the APCO shall present to the Air District Board of Directors for consideration at a public meeting a report that includes the technology options currently (and projected to be) available to be sold, installed or offered for sale that do not conflict with the standard in Section 301.3; the projected costs of purchase and installation of such technology, including any ancillary costs, as applicable; any incentive programs available to reduce these costs; and infrastructure readiness associated with rule compliance.

9-6-600 MANUAL OF PROCEDURES

- 9-6-601 Determination of Emissions:** Emissions of oxides of nitrogen from water heaters subject to Section 9-6-301, 303, 304, or 305 shall be tested in ~~accordance with the South Coast Air Quality Management District Protocol: "Nitrogen Oxides Emission Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers, January 1995", or in~~ accordance with the following provisions:

- 601.1 Each water heater model shall receive certification ~~Confirmation shall be~~ based on emission tests of a randomly selected unit of that ~~each~~ water heater model.
- 601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance with ~~the Manual of Procedures, Volume IV, Method ST-13B or~~ EPA Reference Method 7, including 7A-7E.
- 601.3 Each tested water heater shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1990 at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emissions tests.
- 601.4 The following procedure shall be used to calculate the NO_x emission rate in nanograms of NO_x per joule of heat output:

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

N = NO_x Emission Rate in nanograms of NO_x emitted per joule of heat output

P = Concentration of NO_x in the flue gas in parts per million (volume)

U = Dry volume percent of CO₂ in flue gas necessary for stoichiometric combustion

H = Gross heating value of the gas, BTU/ft³ (at 60°F and 30"Hg)

C = Dry volume percent of CO₂ in flue gas

E = Recovery efficiency, percentage, as defined in Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E.

(Amended November 7, 2007)



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX C

Socioeconomic Impacts Analysis of Proposed Amendments to Rules 9-4 and 9-6

This page has been intentionally left blank.

Socioeconomic Impact Analysis of Proposed Amendments to Regulation 9, Rule 4: Residential Central Furnaces; and Regulation 9, Rule 6: Natural Gas-Fired Boilers and Water Heaters

Prepared for:

Bay Area Air Quality Management District

Prepared by:

Applied Development Economics, Inc.

3527 Mt. Diablo Blvd. #248 ■ Lafayette, CA 94549 ■ 925.934.8712

www.adeusa.com



TABLE OF CONTENTS

1. Introduction	1
Introduction	1
Report Organization	2
2. Background and Overview of Proposed Rule 9-4 and Rule 9-6 Amendments	3
Overview	3
Natural Gas Use.....	3
Emission Control Methods	3
3. Methodology.....	5
4. Economic and Demographic Trends	7
Regional Population Trends.....	7
Regional Economic Trends	7
Trends for Households Subject to Proposed Rule Amendments	8
5. Socioeconomic Impact Analysis of proposed Rule 9-4 and Rule 9-6 Amendments	15
Costs of Rule Compliance	15
Impact of Average Costs on Households	21
Impacts of Shifts In Consumer Spending	26
Utility Costs.....	31
Impact Findings	31

LIST OF TABLES

Table 4-1: Population Trends: Bay Area Counties, Region, and California, 2008-2021	7
Table 4-2: San Francisco Bay Area Employment Trends By Sector: 2008 - 2020	8
Table 4-3: Income Distribution for Bay Area Region and Counties, 2019	9
Table 4-4: San Francisco Bay Area Household Income Growth by Housing Tenure	10
Table 4-5: Income Designations by County, 2019 to 2021	11
Table 4-6: San Francisco Bay Area Families with Income Below Poverty Level, 2010 to 2019	12
Table 4-7: Federal Poverty Levels by Number of Persons in Family or Household, 2019 to 2021	12
Table 4-8: San Francisco Bay Area Households by Housing Tenure, 2019	13
Table 4-9: Housing Costs as Percentage of Income for San Francisco Bay Area Counties, 2019	14
Table 4-10: Source of Heating Fuel for San Francisco Bay Area Households, 2019	14
Table 5-1: Comparison of Project Costs for Electric Heat Pump and Gas Furnace	16
Table 5-2: Comparison of Project Costs for Water Heaters by Type.....	18

Table 5-3: Age of Housing Units by County, 2015-2020 Average	18
Table 5-4: Average Annualized Installed Costs for Space Heating Appliances and Water Heaters	19
Table 5-5: Total Household Expenditures and Appliance/Household Equipment Expenditure by Income Group, 2019	22
Table 5-6: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures	23
Table 5-7: Total Household Expenditures and Appliance/Household Equipment Expenditure by Housing Tenure, 2019	24
Table 5-8: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures	24
Table 5-9: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Monthly Median Rents by County	25
Table 5-10: Total Household Expenditures and Appliance/Household Equipment Expenditure for Families at Poverty Level, 2019	25
Table 5-11: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures for Families at Poverty Level	26
Table 5-13: Aggregate Cost Estimates for HVAC Conversion by County	27
Table 5-14: Compliance Cost Impacts for Water Heater Conversions.....	28
Table 5-15: Electric Panel Upgrade Costs by County	28
Table 5-16: Estimated Utility Rate Savings from Conversion to Electric Appliances (\$Millions)	29
Table 5-17: Total Net Annual Costs by Time Period.....	30
Table 5-18: Potential Job Losses Due to Shifted Consumer Spending	30

1. INTRODUCTION

INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD or Air District) has proposed amendments to Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4); and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). Rule 9-4 primarily applies to gas-fired space-heating furnaces that are primarily found in single-family residences, while Rule 9-6 applies to natural-gas-fired water heaters that have residential and commercial applications. Larger commercial boilers are regulated under Rule 9-7, and thus not applicable to the proposed amendments. The 2017 Clean Air Plan identified the importance of reducing NOx emissions from residential space heaters.

Both Rule 9-4 and Rule 9-6 currently regulate nitrogen oxide (NOx) emissions, and set emission limits for the applicable appliance categories governed by those rules. The proposed rule amendments seek to significantly reduce NOx emissions, and natural gas-fired furnaces and water heaters constitute a major source of those pollutants.

The proposed amendments to Rule 9-4 include a near-term reduction in the emission limit from 40 nanograms (ng) of NOx per joule to 14 ng/joule. Products meeting this standard are widely available and can generally be fitted into existing installations without substantial upgrades.

However, over the longer-term the primary change that the Rule 9-4 and 9-6 amendments will introduce is a zero-NOx emissions standard for both furnaces and water heaters. Currently, while technologies exist that do not emit NOx, these technologies are largely electric appliances, rather than natural gas-fired appliances. If natural gas-fired appliances that meet the zero-NOx standard are not developed before it is implemented, retailers would be expected to sell, and consumers would be expected to purchase and install, electric appliances that do not emit NOx. This would entail a broad change to the market for those types of appliances, because while zero-NOx appliances are available today, they have had limited market adoption. In addition, they can incur greater costs than existing appliances because in addition to the higher appliance costs, the transition to those technologies may also include necessary electric panel upgrades. Because the market has not yet seen the large-scale introduction of appliances that would meet the zero-NOx emissions standard, BAAQMD is considering a timeline that would see the introduction of this standard from 2027 to 2031.

Rule 9-4 and Rule 9-6 currently apply to new devices, and do not mandate retrofitting of existing appliance installations. The proposed amendments do not change this part of the rules. While the regulation applies to wholesalers, retailers, and installers, its potential impact will primarily affect consumers at the time that they need to replace an existing natural gas-fired furnace or water heater at the end of its useful life.

REPORT ORGANIZATION

After this introduction, the report discusses the proposed rule amendments in Section 2. Section 3 describes the socioeconomic impact analysis methodology and data sources. Section 4 goes over the population and economic trends within the nine-county San Francisco Bay Area, and provides context for the BAAQMD rule amendments. Lastly, the socioeconomic impacts from the proposed rule amendments are discussed in Section 5.

The report is prepared pursuant to Section 40728.5 of the California Health and Safety Code, which requires an assessment of socioeconomic impacts of proposed air quality rules and amendments. The findings in this report can assist BAAQMD in understanding the socioeconomic impacts of the proposed requirements, and can assist staff in preparing refined versions of the rule amendments, if needed.

2. BACKGROUND AND OVERVIEW OF PROPOSED RULE 9-4 AND RULE 9-6 AMENDMENTS

OVERVIEW

The proposed amendments to Rule 9-4 and Rule 9-6 aim to substantially reduce NOx emissions in the Bay Area. Residential natural gas-fired furnaces and water heaters make up a substantial source for these emissions. The types of appliances covered under Rule 9-4 and 9-6 are primarily installed in residences. The proposed rule amendments would not mandate retroactive appliance upgrades, and would only apply for new installations and replacement units.

The proposed amendments to Rule 9-4 would first introduce a new “ultra-low-NOx” requirement for central furnaces in 2024. This would lower the allowable NOx emissions from 40 ng/joule to 14 ng/joule, and only apply to residential installations. This would align the BAAQMD with emission standards already enforced by the SCAQMD in the Southern California region and SJVUAPCD in the Central Valley region.

The Rule 9-4 amendments, as currently proposed, would introduce a zero-NOx standard to take effect in 2029. This would apply to residential and commercial space heating appliances.

The Rule 9-6 amendments, as currently proposed, would introduce a zero-NOx standard to take effect between 2027 - 2031. This would apply to residential and commercial water heating devices.

NATURAL GAS USE

Natural gas is the most frequently used heating fuel for Bay Area homes. The 2017 Clean Air Plan found that natural gas appliances in residential buildings represent the primary source of NOx emissions, with a greater tonnage of emissions than passenger vehicles. While other building appliances can also consume natural gas and generate NOx emissions, about 89 percent of the residential NOx emissions come from furnaces and water heaters.

The Bay Area is currently designated a non-attainment area for particulate matter and ozone pollution. NOx emissions are considered a precursor to the formation of both secondary particulate matter and ozone. Therefore, reductions in NOx levels can also help reduce particulate matter and ozone. While the focus of Rule 9-4 and Rule 9-6 is NOx emissions reduction, natural gas-fired furnaces and water heaters also represent 96 percent of the greenhouse gas (GHG) emissions originating from residential buildings.

EMISSION CONTROL METHODS

The substantial NOx emission reductions entailed by the proposed rule amendments will largely occur through a transition from currently designed natural gas-fired appliances to appliances that will have

zero-NOx emissions at the source. Existing natural gas-fired appliances currently have a direct impact on regional air quality because they vent the NOx emissions outside from point sources inside places of residence.

Rule 9-4 includes an initial reduction in the allowable NOx emissions from furnaces from 40 ng/joule to 14 ng/joule. This mandate for ultra-low NOx emission furnaces would follow similar rules already enacted by the SCAQMD and SJVUAPCD, and can be met using technologies and products that are widely used and available in volume.

The proposed zero-NOx standard would begin to phase-in starting in 2027 for small water heaters and 2029 for space heating appliances. While the proposed rule amendments do not specify technologies or emission control methods to meet the zero-NOx standard, the appliances currently available on the market that do not emit NOx mainly consist of electric-powered appliances. The proposed rule amendments would allow the use of natural gas and other technologies if appliances that meet the zero-NOx standard become available.

Initial emission reductions projected by the Air District show that the mandate for ultra-low NOx furnaces will result in a 65 percent reduction in per-unit NOx emissions as older units are replaced between 2024 and 2029. The introduction of the zero-NOx standards will further reduce the NOx emissions with an overall reduction of 95 percent by 2046, when complete equipment changeout is reached.

Additional reductions in GHGs will also occur, as some natural gas-fired appliances will be replaced by electric appliances. However, the overall reduction will vary depending on whether zero-NOx appliances in future also include natural gas-fired units that are designed to meet this standard, and if so, how many consumers choose to purchase those units versus electric appliances.

3. METHODOLOGY

Because the proposed amendments to Rule 9-4 and Rule 9-6 will likely have the greatest potential economic impact on residential consumers, the analysis is focused on consumer spending behavior and how the potential added expenses from appliance upgrades might factor into those spending patterns. Applied Development Economics (ADE) began this analysis by looking at the income distribution patterns in the Bay Area to see how the proposed rule amendments might impact households based on their income, poverty status, and whether they are homeowners or renters.

In order to identify household characteristics and accompanying spending patterns, ADE used data from the U.S. Census American Community Survey (ACS) and the Bureau of Labor Statistics Consumer Expenditure Survey (CES). The ACS is an annual survey of households that is used to identify socioeconomic characteristics by geographic area, and how they change on an annual basis. Because the analysis focused on the nine Bay Area counties served by the Air District, all of the data comes from the combined county-level data.

The analysis used the one-year sample ACS data for 2019, because the 2020 ACS data had data collection issues from the COVID-19 pandemic. The reported data for 2020 is considered experimental by the Census Bureau, and might not be comparable to previous years. The median incomes used in the analysis come directly from the ACS data. Because the Bay Area combines data from the nine counties, the median income was estimated by proportionally weighting the number of households within the income range where the midpoint of total households stands.

The CES data is an ongoing household survey of consumer spending administered by the Bureau of Labor Statistics in order to calculate the Consumer Price Index (inflation rate). This data includes spending information by category, including housing, transportation, retail goods, services, and investments. For the socioeconomic analysis, the CES data is used to identify the proportion of household spending that goes towards major appliance and household equipment purchases. The data is cross-tabulated based on income range, homeownership status, and other household characteristics. This provides a useful benchmark for comparing existing household spending patterns with the potential cost of compliance for the Rule 9-4 and Rule 9-6 amendments.

Because the CES data is a national survey, some of the household spending patterns had to be scaled to Bay Area household incomes, which are generally higher than the national averages. For the renter and homeowner spending patterns, the analysis took the national averages and scaled the spending to the Bay Area median incomes using the CES cross-tabulations by income range.

In order to determine potential impacts on household consumers, the analysis considers the costs of zero-NOx upgrades for both water heaters and central space heaters. Because the only currently available zero-NOx appliances are electric-powered, this analysis assumes for purposes of a conservative “worst case” estimate of costs that consumers will purchase electric appliances as well as incur additional ancillary installation costs (including potential electric panel upgrades) that would be associated only with switching from natural gas-fired to electric appliances.

Households already need to account for potential space heating and water heater replacement costs. Because of this, the analysis focuses on the incremental difference in household costs that would result from the proposed rule amendments. The Energy Information Administration uses an assumed equipment lifetime of 13 years for water heaters and 18 years for space heating appliances, and those benchmarks were used to annualize the compliance costs.

The compliance costs used in the analysis are primarily from a study completed in 2021 by Lawrence Berkeley National Laboratory. The data from this study was used because it includes the project costs for current gas-fired appliances, as well as electric appliances. This allows for a more comparable review of the incremental cost differences between existing gas-fired appliances and zero-NOx emission models that would be required under the Rule 9-4 and Rule 9-6 amendments. It should be noted that these comparisons are based on existing costs using current technologies and volumes of scale. The analysis does not make any assumptions about future cost reductions, nor any rebate programs that may be available to provide incentives for consumers to upgrade appliances.

4. ECONOMIC AND DEMOGRAPHIC TRENDS

This section of the report discusses the larger context of the Air District region within which the proposed Rule 9-4 and Rule 9-6 amendments would apply. This section includes a broad overview of demographic and economic trends, and discussion of households potentially affected by the proposed rule amendments.

REGIONAL POPULATION TRENDS

Table 4-1 tracks population growth in the nine-county San Francisco Bay Area between 2008 and 2021, including data for the year 2015. Between 2008 and 2015, the region grew by 0.6 per year, compared to 0.3 percent for the state as a whole. Since 2015, the Bay Area region has had a lower growth rate than the state. Overall, there are about 7,703,000 people in the region. At 1,934,200, Santa Clara County has the most people, while Napa has the least, at 137,600. Contra Costa grew the fastest between 2008 and 2021, at 0.7 percent a year, while Marin and Sonoma lost population.

Table 4-1: Population Trends: Bay Area Counties, Region, and California, 2008-2021

JURISDICTION	2008	2015	2021	08-15 CAGR	15-21 CAGR	08-21 CAGR
California	38,292,687	39,131,307	39,782,870	0.3%	0.3%	0.3%
SF Bay Area	7,375,678	7,671,279	7,703,016	0.6%	0.1%	0.3%
Alameda	1,556,657	1,632,599	1,656,591	0.7%	0.2%	0.5%
Contra Costa	1,060,435	1,128,405	1,153,854	0.9%	0.4%	0.7%
Marin	258,618	263,327	257,774	0.3%	-0.4%	0.0%
Napa	137,571	141,607	137,637	0.4%	-0.5%	0.0%
San Francisco	845,559	872,723	875,010	0.5%	0.0%	0.3%
San Mateo	745,858	767,921	765,245	0.4%	-0.1%	0.2%
Santa Clara	1,857,621	1,931,565	1,934,171	0.6%	0.0%	0.3%
Solano	426,729	430,530	438,527	0.1%	0.3%	0.2%
Sonoma	486,630	502,602	484,207	0.5%	-0.6%	0.0%

Source: ADE, Inc., based on California Dept. of Finance E-5 Reports (note: CAGR = compound annual growth rate)

REGIONAL ECONOMIC TRENDS

Data in Table 4-2 describe the larger economic context within which officials are contemplating the proposed amendments to Rules 9-4 and 9-6. Employers in the region employ 3.7 million workers. The number of jobs in the region grew annually by 1.3 percent between 2008 and 2015, the period that included the Great Recession. This was almost twice the rate of job growth statewide during this period. Since 2015, the region's job growth showed no growth, as the COVID-19 pandemic had a devastating impact on the leisure and hospitality sectors. By comparison, the state had a modest 0.2 percent job growth.

The economic sectors in Table 4-2 are sorted by the share of total employment in 2020. The top-five sectors in the Bay Area in terms of total number of workers are Professional and Business Services (NAICS 54-55) (745,400 workers); Educational and Health Services (NAICS 61-62) (575,300 workers); Trade, Transportation and Utilities (523,500 workers); Government (443,600 workers), which also includes public sector health and education jobs; and Manufacturing (NAICS 31-33) (352,700).

Table 4-2: San Francisco Bay Area Employment Trends By Sector: 2008 - 2020

INDUSTRY SECTOR		2008	2015	2020	2020 % OF TOTAL	2020 CA % OF TOTAL	SFBA CAGR* 08-15	SFBA CAGR 15-20	CA CAGR 08-15	CA CAGR 15-20
Total, All Industries		3,377,300	3,692,400	3,693,500	100.0%	100.0%	1.3%	0.0%	0.7%	0.2%
54-56	Professional and Business Services	593,200	699,300	745,400	20.2%	15.9%	2.4%	1.3%	1.5%	0.9%
61-62	Educational and Health Services	455,600	550,500	575,300	15.6%	16.2%	2.7%	0.9%	5.1%	2.2%
42, 44-45, 48-49, 22	Trade, Transportation, and Utilities	552,400	566,300	523,500	14.2%	17.6%	0.4%	-1.6%	0.4%	-0.1%
	Government	478,400	466,200	443,600	12.0%	14.7%	-0.4%	-1.0%	-0.5%	0.3%
31-33	Manufacturing	342,900	334,300	352,700	9.5%	7.7%	-0.4%	1.1%	-1.4%	-0.3%
71-72	Leisure and Hospitality	336,300	405,700	297,400	8.1%	9.1%	2.7%	-6.0%	2.2%	-4.0%
51	Information	118,100	166,000	240,100	6.5%	3.2%	5.0%	7.7%	0.4%	1.8%
11, 21, 23	Natural Resources and Construction	199,600	194,200	219,900	6.0%	7.8%	-0.4%	2.5%	-0.3%	1.8%
52-53	Financial Activities	188,100	187,400	191,600	5.2%	5.0%	-0.1%	0.4%	-0.9%	0.6%
81	Other Services	112,900	122,900	104,000	2.8%	2.8%	1.2%	-3.3%	-5.1%	-2.4%

Source: Applied Development Economics, based on State of California, Employment Development Department Labor Market Information Division, "Quarterly Census of Employment and Wages" *Note: CAGR = compound annual growth rate; **Note: Public sector education and public sector health included in government.

The fastest job growth rates since 2015 have been in Information Services, which includes many internet businesses, followed by Natural Resources and Construction; Professional and Business Services; and Educational and Health Services.

The table demonstrates the advanced nature of the regional economy, as over 26 percent of all jobs are in the combined Professional, Business, and Information services categories, compared to 19.1 percent for the state. In addition, manufacturing in the Bay Area grew at an average annual rate of 1.1 percent between 2015 and 2020, while the sector declined by 0.3 percent during this period statewide. This is due in large part to the many technology-driven industries that are concentrated in that category in the Bay Area.

TRENDS FOR HOUSEHOLDS SUBJECT TO PROPOSED RULE AMENDMENTS

INCOME DISTRIBUTION

As shown in Table 4-3, the income distribution for the nine Bay Area counties shows a very high proportion of households (25.4 percent) with an annual income above \$200,000. San Francisco, San Mateo, and Santa Clara counties each have over 30 percent of households in this high-income range.

Solano (10.1 percent) and Sonoma (13.3 percent) have the lowest concentration of households with over \$200,000 in annual income.

Table 4-3: Income Distribution for Bay Area Region and Counties, 2019

HOUSEHOLDS BY INCOME RANGE	BAY AREA REGION	ALAMEDA COUNTY	CONTRA COSTA COUNTY	MARIN COUNTY	NAPA COUNTY
Total Households	2,733,300	574,700	393,700	105,100	48,800
Less than \$15,000	172,700	43,500	24,300	6,200	3,200
\$15,000 to \$29,999	178,300	41,800	23,900	7,400	2,900
\$30,000 to \$39,999	127,100	25,100	20,700	5,700	2,300
\$40,000 to \$49,999	125,600	25,800	17,100	5,800	3,900
\$50,000 to \$69,999	256,700	53,900	38,200	8,800	5,600
\$70,000 to \$99,999	360,400	74,100	59,000	13,800	8,200
\$100,000 to \$149,999	481,400	109,400	74,400	16,800	8,500
\$150,000 to \$199,999	336,700	73,500	47,900	10,600	5,500
\$200,000 and more	698,900	127,600	88,200	30,000	8,700
Median Income (Bay Area Estimated)	\$115,400	\$108,300	\$107,100	\$110,800	\$92,800
HOUSEHOLDS BY INCOME RANGE	SAN FRANCISCO COUNTY	SAN MATEO COUNTY	SANTA CLARA COUNTY	SOLANO COUNTY	SONOMA COUNTY
Total Households	368,100	263,800	640,400	151,100	187,700
Less than \$15,000	33,300	11,100	30,700	9,800	10,600
\$15,000 to \$29,999	26,800	15,400	35,700	11,400	13,100
\$30,000 to \$39,999	13,900	10,600	28,400	9,200	11,200
\$40,000 to \$49,999	13,700	11,300	24,300	9,900	13,700
\$50,000 to \$69,999	29,600	21,200	55,500	19,100	24,800
\$70,000 to \$99,999	37,600	28,900	74,800	28,500	35,600
\$100,000 to \$149,999	54,900	44,700	105,900	30,900	35,800
\$150,000 to \$199,999	43,700	33,600	85,000	16,400	20,500
\$200,000 and more	112,400	88,100	203,400	15,200	25,300
Median Income	\$123,900	\$138,500	\$133,100	\$86,700	\$87,800
PERCENT OF TOTAL	BAY AREA REGION	ALAMEDA COUNTY	CONTRA COSTA COUNTY	MARIN COUNTY	NAPA COUNTY
Less than \$15,000	6.3%	7.4%	6.1%	5.9%	6.7%
\$15,000 to \$29,999	6.5%	7.1%	6.0%	7.0%	5.9%
\$30,000 to \$39,999	4.6%	4.3%	5.2%	5.4%	4.7%
\$40,000 to \$49,999	4.6%	4.4%	4.3%	5.5%	8.2%
\$50,000 to \$69,999	9.3%	9.2%	9.6%	8.4%	11.6%
\$70,000 to \$99,999	13.1%	12.7%	14.8%	13.1%	17.0%
\$100,000 to \$149,999	17.5%	18.7%	18.6%	15.9%	17.8%
\$150,000 to \$199,999	12.2%	12.6%	12.0%	10.0%	11.4%
\$200,000 and more	25.4%	21.8%	22.1%	28.5%	18.1%
PERCENT OF TOTAL	SAN FRANCISCO COUNTY	SAN MATEO COUNTY	SANTA CLARA COUNTY	SOLANO COUNTY	SONOMA COUNTY
Less than \$15,000	9.1%	4.2%	4.8%	6.5%	5.6%
\$15,000 to \$29,999	7.3%	5.8%	5.5%	7.6%	6.9%
\$30,000 to \$39,999	3.8%	4.0%	4.4%	6.1%	5.9%
\$40,000 to \$49,999	3.8%	4.3%	3.8%	6.6%	7.2%
\$50,000 to \$69,999	8.1%	8.0%	8.6%	12.7%	13.0%
\$70,000 to \$99,999	10.3%	10.9%	11.6%	18.9%	18.7%
\$100,000 to \$149,999	15.0%	16.9%	16.5%	20.5%	18.8%
\$150,000 to \$199,999	11.9%	12.7%	13.2%	10.9%	10.7%
\$200,000 and more	30.7%	33.3%	31.6%	10.1%	13.3%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.
Note: Median income for the Bay Area is a computed average using the combined household counts for the nine Bay Area counties.

In the lower range, about 12.8 percent of Bay Area households have an annual income below \$30,000. San Francisco (16.4 percent) has the highest concentration of households in this lower income range, while San Mateo (10.0 percent) and Santa Clara (10.3 percent) counties have the lowest concentration.

Using data from the ACS, the nine-county Bay Area region had an estimated median household income of approximately \$115,400 in 2019 (Table 4-4). San Mateo (\$138,500) and Santa Clara (\$133,100) counties had the highest median incomes, while Sonoma (\$86,700) and Solano (\$87,800) had the lowest.

INCOME GROWTH BY HOUSING TENURE

Since 2010, the Bay Area has had relatively modest household growth, increasing from 2.61 million households in 2010 to 2.73 million households in 2019 (Table 4-4). However, during this time, the income levels have increased significantly in real dollar terms, as shown in Table 4-4. In 2019, the estimated median income for Bay Area households was \$115,400. This represents a compounded annual growth rate (CAGR) of 4.7 percent compared to 2015 (\$96,100), and 3.3 percent compared to 2010 (\$86,300). The median income for renter households grew at a faster rate than for homeowners, with 5.5 percent CAGR between 2015 and 2019, and a 5.1 percent CAGR between 2010 and 2019. The median income for homeowners grew at a CAGR of 3.2 percent going back to 2015 and a 2.3 percent CAGR from 2010 to 2019.

Table 4-4: San Francisco Bay Area Household Income Growth by Housing Tenure

INCOME BY HOUSING TENURE	TOTAL BAY AREA HOUSEHOLDS (2019)	OWNER-OCCUPIED (2019)	RENTER-OCCUPIED (2019)	TOTAL BAY AREA HOUSEHOLDS (2015)	OWNER-OCCUPIED (2015)	RENTER-OCCUPIED (2015)	TOTAL BAY AREA HOUSEHOLDS (2010)	OWNER-OCCUPIED (2010)	RENTER-OCCUPIED (2010)
Total Households	2,733,300	1,515,100	1,218,200	2,664,600	1,466,100	1,198,500	2,606,300	1,459,900	1,146,400
Less than \$5,000	56,300	18,000	38,300	59,100	18,900	40,300	68,400	18,600	49,800
\$5,000 to \$9,999	34,500	10,100	24,500	54,900	14,100	40,800	61,200	14,900	46,300
\$10,000 to \$14,999	81,800	18,900	62,900	97,600	23,000	74,500	111,200	28,000	83,200
\$15,000 to \$19,999	55,400	20,400	35,000	78,100	27,600	50,500	96,800	31,300	65,500
\$20,000 to \$24,999	61,300	23,700	37,600	89,200	33,300	55,900	107,300	37,700	69,700
\$25,000 to \$34,999	127,000	52,400	74,600	162,100	63,800	98,400	185,300	74,600	110,700
\$35,000 to \$49,999	186,500	77,900	108,700	242,200	105,200	136,900	282,100	122,200	159,900
\$50,000 to \$74,999	320,900	148,700	172,200	372,100	180,200	191,900	414,000	215,400	198,500
\$75,000 to \$99,999	295,000	148,800	146,200	313,200	169,900	143,300	324,200	194,700	129,500
\$100,000 to \$149,999	480,600	278,000	202,600	467,200	292,400	174,700	449,000	310,000	139,000
\$150,000 or more	1,034,100	718,400	315,700	729,000	537,600	191,400	507,000	412,600	94,300
Estimated Median Income (2019 Dollars)	\$115,400	\$142,900	\$84,500	\$96,100	\$125,800	\$68,300	\$86,300	\$116,100	\$54,200

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

Note: Median income for the Bay Area is a computed average using the combined household counts for the nine Bay Area counties.

INCOME DESIGNATIONS

The U.S. Department of Housing and Urban Development (HUD) designates an upper limit for different income classifications. These thresholds are based on the percentage of the median household income for a particular geographic region. The base income definitions include low-income (80 percent of median income), very low-income (50 percent of median income), and extremely low-income (30

percent of median income). The upper limits are adjusted based on regional housing costs and other factors.

For the nine-county Bay Area region, there are six different metro areas as shown below.¹ Each of these metro areas has a different definition for low, very low, and extremely low income.

- Oakland-Fremont, CA HUD Metro FMR Area (Alameda and Contra Costa)
- San Francisco, CA HUD Metro FMR Area (San Francisco, San Mateo, and Marin)
- Napa, CA MSA (Napa County)
- San Jose-Sunnyvale-Santa Clara, CA HUD Metro FMR Area (Santa Clara County)
- Vallejo-Fairfield CA MSA (Solano County)
- Santa Rosa, CA MSA (Sonoma County)

In 2021, the upper limit of what HUD classified as low-income for a family of four in the Bay Area ranged from \$77,600 in Solano County to \$146,350 in San Francisco, San Mateo, and Marin counties. The incomes considered very low for a family of four ranged from \$48,550 to \$91,350, while the extremely low-income limit ranged from \$29,150 to \$54,800, as shown in Table 4-5.

Table 4-5: Income Designations by County, 2019 to 2021

INCOME LEVELS BY COUNTY FOR FAMILY OF FOUR	2021 LOW INCOME (80%)	2021 VERY LOW INCOME (50%)	2021 EXTREMELY LOW INCOME	2019 LOW INCOME (80%)	2019 VERY LOW INCOME (50%)	2019 EXTREMELY LOW INCOME
Alameda County	\$109,600	\$68,500	\$41,100	\$98,550	\$61,650	\$37,150
Contra Costa County	\$109,600	\$68,500	\$41,100	\$98,550	\$61,650	\$37,150
Marin County	\$146,350	\$91,350	\$54,800	\$129,150	\$80,600	\$48,350
Napa County	\$90,050	\$56,850	\$34,100	\$79,500	\$50,200	\$30,100
San Francisco County	\$146,350	\$91,350	\$54,800	\$129,150	\$80,600	\$48,350
San Mateo County	\$146,350	\$91,350	\$54,800	\$129,150	\$80,600	\$48,350
Santa Clara County	\$117,750	\$82,850	\$49,700	\$103,900	\$73,150	\$43,900
Solano County	\$77,600	\$48,550	\$29,150	\$68,550	\$42,850	\$25,750
Sonoma County	\$93,050	\$58,150	\$34,900	\$86,400	\$54,000	\$32,400

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

¹ The metropolitan statistical area (MSA) definitions are maintained by the Office of Management and Budget (OMB). However, HUD will use a custom geographic area for purposes of calculating the fair market rent used to adjust the income group definitions.

POVERTY

In 2019, the Bay Area had a combined 79,100 families living in poverty (Table 4-6). This represents 4.4 percent of the total families in the Bay Area (this does not include non-family households that comprised 35 percent of the total Bay Area households), as shown in Table 4-6. Compared to 2010 and 2015, the proportion of families living under the federal poverty line has gone down.

Table 4-6: San Francisco Bay Area Families with Income Below Poverty Level, 2010 to 2019

BAY AREA COUNTY	FAMILIES (2019)	INCOME BELOW POVERTY LEVEL (2019)	PERCENT BELOW POVERTY LEVEL	FAMILIES (2015)	INCOME BELOW POVERTY LEVEL (2015)	PERCENT BELOW POVERTY LEVEL	FAMILIES (2010)	INCOME BELOW POVERTY LEVEL (2010)	PERCENT BELOW POVERTY LEVEL
Bay Area Region	1,790,600	79,100	4.4%	1,792,900	119,200	6.6%	1,669,800	123,100	7.4%
Alameda	381,900	20,300	5.3%	383,300	28,700	7.5%	350,200	32,400	9.3%
Contra Costa	283,800	15,800	5.6%	280,500	21,100	7.5%	261,700	17,700	6.8%
Marin	64,600	2,400	3.7%	66,100	2,800	4.2%	64,700	3,400	5.3%
Napa	31,600	1,500	4.7%	33,100	2,400	7.3%	32,600	3,200	9.8%
San Francisco	167,900	8,200	4.9%	164,200	11,800	7.2%	149,600	11,400	7.6%
San Mateo	180,900	5,700	3.2%	185,700	9,400	5.1%	171,200	7,500	4.4%
Santa Clara	452,200	14,800	3.3%	456,200	24,500	5.4%	424,900	29,100	6.8%
Solano	105,500	6,600	6.3%	103,100	9,900	9.6%	99,100	9,400	9.5%
Sonoma	122,300	3,800	3.1%	120,800	8,500	7.0%	115,900	9,000	7.8%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

As shown in Table 4-7, the federal poverty thresholds will vary depending on the size of the household/family, ranging from \$12,490 for a single-resident household/family to \$43,430 for a family/household of eight residents in 2019. This increased to a range of \$12,880 (one person) to \$44,660 (eight persons) in 2021. A family of four had a poverty line of \$26,500 in 2021 and \$25,750 in 2019.

Table 4-7: Federal Poverty Levels by Number of Persons in Family or Household, 2019 to 2021

PERSONS IN FAMILY OR HOUSEHOLD	2021 FEDERAL POVERTY GUIDELINES	2019 FEDERAL POVERTY GUIDELINES
1	\$12,880	\$12,490
2	\$17,420	\$16,910
3	\$21,960	\$21,330
4	\$26,500	\$25,750
5	\$31,040	\$30,170
6	\$35,580	\$34,590
7	\$40,120	\$39,010
8	\$44,660	\$43,430

Source: Applied Development Economics, based on U.S. Department of Health and Human Services "Poverty Guidelines Computations Page."

RENTERS

In the Bay Area, renters represent about 44.6 percent of all households, as shown in Table 4-8. This ranges from a low of 33.9 percent in Napa County to a high of 62.9 percent in San Francisco. No other county has renters as a majority of all households. In 2019, the median income for renters ranged from a low of about \$63,400 in Sonoma County to a high of more than \$105,300 in San Francisco County.

Table 4-8: San Francisco Bay Area Households by Housing Tenure, 2019

HOUSING TENURE BY COUNTY	TOTAL HOUSEHOLDS	HOUSEHOLDS (OWNER-OCCUPIED)	HOUSEHOLDS (RENTER-OCCUPIED)	RENTERS AS PERCENT OF TOTAL HOUSEHOLDS
Bay Area Region	2,733,300	1,515,100	1,218,200	44.6%
Alameda	574,700	304,700	270,000	47.0%
Contra Costa	393,700	257,500	136,100	34.6%
Marin	105,100	65,200	39,900	38.0%
Napa	48,800	32,300	16,500	33.9%
San Francisco	368,100	136,700	231,400	62.9%
San Mateo	263,800	156,300	107,500	40.7%
Santa Clara	640,400	351,800	288,600	45.1%
Solano	151,100	94,000	57,100	37.8%
Sonoma	187,700	116,600	71,000	37.8%
MEDIAN INCOME BY HOUSING TENURE AND COUNTY	MEDIAN INCOME (ALL HOUSEHOLDS)	MEDIAN INCOME (OWNER-OCCUPIED HOUSEHOLDS)	MEDIAN INCOME (RENTER-OCCUPIED HOUSEHOLDS)	RENTER INCOME AS PERCENT OF OVERALL MEDIAN INC.
Bay Area Region (Estimated)	\$115,400	\$142,900	\$84,500	73.2%
Alameda	\$108,300	\$145,100	\$76,500	70.6%
Contra Costa	\$107,100	\$130,800	\$72,700	67.9%
Marin	\$110,800	\$146,800	\$73,700	66.5%
Napa	\$92,800	\$110,700	\$73,200	78.9%
San Francisco	\$123,900	\$151,700	\$105,300	85.0%
San Mateo	\$138,500	\$164,800	\$101,200	73.1%
Santa Clara	\$133,100	\$167,100	\$97,300	73.1%
Solano	\$86,700	\$102,000	\$64,200	74.0%
Sonoma	\$87,800	\$106,800	\$63,400	72.2%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

Table 4-9 shows that the median monthly rent in the Bay Area ranged from just over \$1,700 in Solano County to a high of nearly \$2,500 in San Mateo County in 2019. The median housing costs as a percentage of median monthly household income ranges from 22.3 percent in San Francisco to 34.4 percent in Marin County. Dedicating 30 percent or more of income towards housing is considered “cost-burdened.” This indicates that median housing costs for renters in Alameda, Contra Costa, Marin, Napa, Solano, and Sonoma counties are already considered cost-burdened for average wage earners. Median housing costs for renters in San Mateo (29.8 percent) and Santa Clara (29.5 percent) are just below the threshold for cost-burdened.

Table 4-9: Housing Costs as Percentage of Income for San Francisco Bay Area Counties, 2019

COUNTY	MEDIAN MONTHLY HOUSEHOLD INCOME	MEDIAN MONTHLY HOUSING COSTS	HOUSING COSTS AS PERCENT OF INCOME	MEDIAN MONTHLY HOUSEHOLD INCOME (OWNER-OCCUPIED)	MEDIAN MONTHLY HOUSING COSTS (OWNER-OCCUPIED)	HOUSING COSTS AS PERCENT OF INCOME	MEDIAN MONTHLY HOUSEHOLD INCOME (RENTER)	MEDIAN MONTHLY HOUSING COSTS (RENTER)	HOUSING COSTS AS PERCENT OF INCOME
Alameda	\$9,000	\$2,160	24.0%	\$12,100	\$2,470	20.4%	\$6,400	\$1,980	30.9%
Contra Costa	\$8,900	\$2,100	23.6%	\$10,900	\$2,250	20.6%	\$6,100	\$1,950	32.0%
Marin	\$9,200	\$2,400	26.1%	\$12,200	\$2,830	23.2%	\$6,100	\$2,100	34.4%
Napa	\$7,700	\$1,840	23.9%	\$9,200	\$1,850	20.1%	\$6,100	\$1,840	30.2%
San Francisco	\$10,300	\$2,150	20.9%	\$12,600	\$2,700	21.4%	\$8,800	\$1,960	22.3%
San Mateo	\$11,500	\$2,590	22.5%	\$13,700	\$2,730	19.9%	\$8,400	\$2,500	29.8%
Santa Clara	\$11,100	\$2,480	22.3%	\$13,900	\$2,640	19.0%	\$8,100	\$2,390	29.5%
Solano	\$7,200	\$1,780	24.7%	\$8,500	\$1,860	21.9%	\$5,400	\$1,720	31.9%
Sonoma	\$7,300	\$1,840	25.2%	\$8,900	\$1,930	21.7%	\$5,300	\$1,760	33.2%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

HEATING FUEL SOURCE

For heating fuel, about a two-thirds majority of Bay Area households use utility-provided gas, as shown in Table 4-10. However, owner-occupied housing units have a higher utilization of utility gas for home heating, with 76.5 percent. Households in rental housing have a lower proportion of utility gas utilization at 53.5 percent. About 18.5 percent of owner-occupied housing units use electricity for home heating, compared to 40.6 percent of renter-occupied units. This likely reflects the generally higher utilization of electric space heating in multifamily housing units and apartments.

Table 4-10: Source of Heating Fuel for San Francisco Bay Area Households, 2019

HEATING FUEL SOURCE	BAY AREA HOUSEHOLDS	PERCENT OF TOTAL
Total Households	2,733,300	
Utility Gas	1,809,900	66.2%
Electricity	775,100	28.4%
Solar Energy	23,700	0.9%
No Fuel Used	50,500	1.8%
All Other Heating Fuels	74,100	2.7%
Owner-Occupied Housing Units	1,510,800	
Utility Gas	1,156,100	76.5%
Electricity	278,800	18.5%
Solar Energy	20,500	1.4%
No Fuel Used	8,600	0.6%
All Other Heating Fuels	46,900	3.1%
Renter-Occupied Housing Units	1,222,500	
Utility Gas	653,800	53.5%
Electricity	496,300	40.6%
Solar Energy	3,300	0.3%
No Fuel Used	41,900	3.4%
All Other Heating Fuels	27,200	2.2%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample.

5. SOCIOECONOMIC IMPACT ANALYSIS OF PROPOSED RULE 9-4 AND RULE 9-6 AMENDMENTS

COSTS OF RULE COMPLIANCE

This section of the report analyzes the socioeconomic impacts resulting from implementation of the Rule 9-4 and 9-6 amendments. This analysis assumes, based on technology available today and to provide a conservative estimate of potential costs, that compliance with the proposed rule amendments will see costs incurred primarily through gas-to-electric conversions of existing water heaters and space heaters by end users and accompanying ancillary costs. Because the proposed rule amendments do not require retrofitting of existing appliances, the costs of compliance will only take effect at the time that the appliances require replacement or when the consumer chooses to upgrade.

The costs of compliance do not affect consumers that already use electric appliances for water heating and/or space heating, since those appliances already comply with the zero-NOx emissions standard. Because these appliances are typically already installed in housing units and require periodic replacement, the cost of compliance used in the analysis assumes that the cost of compliance represents the cost difference between purchase and installation of a currently designed natural gas-powered appliance and an electrical one. The analysis does not make any assumptions about future zero-NOx appliance cost reductions and rebate program availability.

In addition to the direct costs to consumers to purchase and install new equipment, there are a number of indirect cost and revenue impacts from the proposed rule amendments.

- Heat pump water heaters are cheaper to operate in terms of monthly household energy bills. The same is true for air source heat pumps that heat and cool indoor air as compared to a building with a natural gas fired furnace and a traditional air conditioning system. Note that in cases where an air source heat pump may introduce new cooling functionality (i.e., an installation in a household without existing air conditioning), consumers may elect to increase their heat pump usage for these new functions. However, this analysis only focuses on the usage of this new equipment that is comparable to the existing usage of the equipment being replaced.
- Despite the potential energy cost savings, the net cost to consumers will shift their spending away from other retail goods and services, which may result in incremental loss of jobs in those sectors.
- The wholesale appliance distributors and construction trades will see an increase in the cost of doing business for the higher priced appliances, but this will be offset by higher prices to consumers for the equipment.

- Manufacturers of the equipment, of which there are none of the Bay Area, will have to invest in new technologies and manufacturing processes to supply the new equipment to the Bay Area market. If the manufacturers choose not to make investments in the new designs, they will lose market share from the Bay Area.
- PG&E will likely need to invest in increased electricity generation, transmission and distribution to meet the increased demand for electricity from the new appliances. This may result in higher electricity rates for consumers.

In the discussion below, the direct consumer costs and the effects of the first two bullet points above are addressed quantitatively for households at various income levels and also in aggregate across the Bay Area region. Impacts to the supply chain for the new appliances are addressed qualitatively. In terms of impacts to the electric grid, the discussion presents estimated costs for PG&E under two background scenarios. However, it is not clear at this time if or how the costs may affect consumer electricity rates. Air District staff may report on rate changes as part of its Implementation Working Group and interim reporting process to the Board of Directors.

RULE 9-4 COST OF COMPLIANCE

For Rule 9-4, the analyzed cost of compliance will largely stem from the difference between a gas-fired furnace and an electric heat pump. According to a 2021 study from Lawrence Berkeley National Laboratory, the median installed cost for a gas-fired furnace is about \$5,100, while the median cost for an electric heat pump is \$8,000, as shown in Table 5-1.² This cost includes the cost of the appliance unit and the installation, but not potential electric service upgrades which are discussed later. The cost does not factor in any rebates or performance differences. The difference between the cost of a gas-fired furnace compared to an electric heat pump is approximately \$2,900 and this represents the major portion of the cost of compliance used in this socioeconomic analysis.

However, heat pump units can also incorporate cooling functionality similar to a central air conditioning unit. So, the costs are not always directly comparable strictly as a gas-fired furnace replacement. In addition, the appliance costs can vary considerably depending on the performance characteristics of the particular model chosen by the consumer (and in the gas-fired appliances, whether the unit is a standard or Ultra-low NOx emission model). In general, electric heat pumps operate with a lower heating capacity than comparably priced gas-fired furnaces.

² Less, Brennan, Iain Walker, Nuria Casquero-Modrego, and Leo Rainier; Lawrence Berkeley National Laboratory, Building Technologies & Urban Systems Division; *The Cost of Decarbonization and Energy Upgrade Retrofits for US Homes*; 2021; pp.70-81.

Table 5-1: Comparison of Project Costs for Electric Heat Pump and Gas Furnace

LAWRENCE BERKELEY NATIONAL LAB STUDY MEDIAN COSTS BY SPACE HEATER TYPE	PROJECT COSTS
Electric Heat Pump	\$8,027
Gas Furnace	\$5,096
E3 STUDY COST ASSUMPTIONS	PROJECT COSTS
Gas Furnace + Central AC (Existing)	\$12,000 to \$24,000
Packaged Terminal Heat Pump	\$7,000 to \$8,000
Minisplit Heat Pump	\$18,000 to \$20,000
Ducted Split Heat Pump	\$9,000 to \$17,000

Source: Lawrence Berkeley National Laboratory, and Energy and Environmental Economics, Inc.

When comparing the cost scenarios for a gas-fired furnace and an electric heat pump, a 2019 study from Energy and Environmental Economics, Inc. (E3) combined the costs for a gas furnace with a central air conditioning unit, and used that combined project to compare against the cost of electric heat pumps that combines both functions.³ Using that comparison, the study used a cost assumption ranging from \$12,000 to \$24,000 for the furnace/central air conditioning system. The heat pump would cost between \$7,000 and \$20,000, depending on the type of heat pump and its level of performance. Under this scenario, where the installation accounts for both heating and cooling functions, the heat pump installation would cost less in many cases.

In the short-term, there is also a cost difference between the standard gas-fired furnaces and those gas-fired models that meet the ultra-low NOx emission standard. In a brief comparison of retail pricing for models with equivalent performance, the ultra-low NOx emission models generally cost between \$400 and \$700 more.⁴ This cost difference would apply from 2024 until the zero-NOx emissions standard takes effect. Note that for the purposes of the socioeconomic impact analysis, the compliance cost associated with the zero-NOx standard reflects the highest potential cost and socioeconomic impacts from the proposed amendments to Rule 9-4. Therefore, the costs associated with the zero-NOx standard are used in the subsequent impact analysis (see "Compliance Costs Used in Impact Analysis" section below).

RULE 9-6 COST OF COMPLIANCE

For water heaters under Rule 9-6, costs for compliance for the proposed rule amendments are highly variable when comparing different options. In addition, the compliance costs have to consider the full cost of both the appliance and the installation. For example, according to a study from Lawrence Berkeley National Laboratory, the lowest cost water heater option is an electric tank water heater, while the most expensive options are tankless gas-fired water heaters. However, the resistive electric tank water heaters are generally small capacity units for point-of-use rather than whole-home installations, compared to the more common 50 to 80-gallon gas-fired tank water heaters. Tankless

³ Energy and Environmental Economics, Inc.; *Residential Building Electrification in California*; April 2019; pp.29-31. Note: While the dollar values referenced in this study have likely increased with inflation since 2019, they are presented here for comparison only. The socioeconomic impact analysis is based on the more recent LBL figures.

⁴ Retail pricing data for space heating and water heater appliances was collected by BAAQMD staff in 2020 and 2022. This pricing only reflects the unit costs and does not include any rebate programs that might offset the costs of upgrading to a lower emission option.

water heaters allow for on-demand water heating; and while they use less natural gas, the models currently available do not meet the zero-NOx emission standard.

The zero-NOx option that is available today and is most comparable to the commonly used gas-fired water tank heaters would be an electric heat pump attached to a similarly sized water tank. As shown in Table 5-2, the median cost of a conventional natural gas-fired tank water heater is about \$1,970.

By comparison, the LBNL study indicates that an electric heat pump water heater has a median cost of about \$2,820, with the cost difference of around \$850 representing the cost of compliance used in the socioeconomic analysis. It should be noted that the electric heat pump water heater costs in this dataset could also include some direct replacements of existing electric heat pump water heater units rather than gas-to-electric conversions.

Other cost data from the Sacramento Municipal Utilities District (SMUD) shows a cost range of approximately \$4,150 to \$4,400 for gas-to-electric conversions to heat pump water heaters between 2018 and 2020. The data includes the cost for the appliance unit as well as installation and other costs. These cost averages are higher than the median costs from the LBNL study. However, the SMUD gas-to-electric water heater conversion costs were balanced out by a rebate program for gas-to-electric conversions that reduced the consumer costs by up to \$3,000.

Table 5-2: Comparison of Project Costs for Water Heaters by Type

LAWRENCE BERKELEY NATIONAL LAB STUDY MEDIAN COSTS BY WATER HEATER TYPE	PROJECT COSTS
Tankless Gas	\$4,004
Electric Heat Pump	\$2,824
Storage Gas Power Vent	\$1,972
Storage Electric	\$888
SMUD AVERAGE COST DATA FOR GAS-TO- ELECTRIC HEAT PUMP WATER HEATER CONVERSION	PROJECT COSTS
50-Gallon	\$4,155
65/80-Gallon	\$4,374
E3 STUDY COST ASSUMPTIONS	PROJECT COSTS
Gas-Fired Water Heater (Existing)	\$2,000 to \$2,600
Tankless Gas Water Heater	\$3,700 to \$5,700
Electric Heat Pump	\$3,000 to \$4,700

Source: Lawrence Berkeley National Laboratory, Sacramento Municipal Utilities District, and Energy and Environmental Economics, Inc.

THE NEED FOR ELECTRIC PANEL UPGRADES

In older homes, if both the HVAC and water heater systems are converted from gas to electric at the same time, it is possible that the electric panel in the home will also need to be upgraded. The E3 study assumed this would happen in homes built in 1978 or earlier and that the cost would be \$4,256 for single family homes and \$2,744 for low-rise multi-family homes. The census provides data on housing units constructed in 1979 or earlier, which includes about 65 percent of all units in the Bay Area (Table 5-3).

Table 5-3: Age of Housing Units by County, 2015-2020 Average

COUNTY	OCCUPIED HOUSING UNITS	BUILT IN 1979 OR EARLIER	PERCENT
Alameda	573,174	387,959	67.7%
Contra Costa	398,299	220,707	55.4%
Marin	104,900	80,534	76.8%
Napa	48,484	28,550	58.9%
San Francisco	362,141	288,834	79.8%
San Mateo	263,351	198,374	75.3%
Santa Clara	635,314	399,737	62.9%
Solano	151,191	71,043	47.0%
Sonoma	188,958	100,572	53.2%
TOTAL	2,725,812	1,776,310	65.2%

Source: ACS, 5 Year Sample, 2015-2020.

COMPLIANCE COSTS USED IN IMPACT ANALYSIS

The combined cost of equipment to comply with both Rule 9-4 and 9-6 is estimated at \$10,851, of which \$8,027 is for space heating and \$2,824 is for water heating. This is about \$3,783 more expensive than equivalent gas powered appliances. In addition, older homes would need to upgrade their electric service, at a cost of \$4,256 for single family units and \$2,744 for multi-family units. It is likely these costs can be financed, but that may not always be possible.

The replacement schedule for a water heater is typically 13 years, while the replacement schedule for a space heating appliance is 18 years.⁵ We also assume electric panels have a lifespan of 30 years. Since households do not all replace heating appliances at the same time and the proposed rule amendments do not apply until the time that the appliances are replaced, this means that the aggregate cost of compliance across all households will be spread out over time. In order to annualize the costs per household, we have applied a capital recovery factor pursuant to Best Available Control Technology (BACT) guidelines.⁶

Using this approach, the annualized cost of compliance used in the socioeconomic analysis comes out to \$241 for space heaters and \$88 for water heaters when looking at gas-to-electric conversions, as shown in Table 5-4. This added cost only applies to those households that currently use gas as the fuel source for powering the appliances.

The annualized costs of installation of electric panels are \$261 for single family homes and \$168 for multi-family homes, with a weighted average for all units of \$220. These figures are used in the analysis of impacts to average households and contribute to the total compliance costs of \$402 for space heaters and \$147 for water heaters (Table 5-4). Further below in the analysis of aggregate

⁵ Environmental Energy and Economics, Inc.; p.41.

⁶ (<https://www.baaqmd.gov/~media/files/engineering/bact-tbact-workshop/bact-tbact-policy-and-implementation/policy-and-implementation-procedure.pdf?la=en>). The calculation uses a discount rate of 4.5%.

regionwide costs, we also adjust for the fact that only 65 percent of households are likely to need a panel upgrade.

Table 5-4: Average Annualized Installed Costs for Space Heating Appliances and Water Heaters

ANNUALIZED INSTALLED COST	GAS	ELECTRIC	ANNUALIZED DIFFERENCE	ELECTRIC PANEL	TOTAL COST DIFFERENCE
Space Heating	\$419	\$660	\$241	\$161	\$402
Water Heater	\$204	\$292	\$88	\$59	\$147

Source: Lawrence Berkeley National Laboratory

Notes: The annualized costs represent the median costs for space heating appliance and water heater installations, assuming an 18-year lifespan for a space heating appliance and a 13-year lifespan for a water heater. The gas option for water heaters is a gas-fired tank water heater, while the electric options for both space heating and water heaters are electric heat pumps.

The costs presented in this table do not account for potential savings associated with funding or financing programs, which are growing in availability and accessibility to Bay Area consumers. Current programs are discussed in the Staff Report to which this analysis is an Appendix. Additionally, Air District staff will track the development of these programs through their Implementation Working Group and interim reporting process.

RATE SAVINGS DUE TO ELECTRIC CONVERSION

In addition to differences in the appliance costs, another key potential difference is with the potential utility costs. In shifting from utility gas-powered appliances to electrical models, the power source and associated utility costs also change. The E3 study found that an all-electric home would likely see significant utility cost savings when compared to homes that use a combination of natural gas and electricity to power household appliances.

For HVAC gas-to-electric conversions, the E3 study found that converting to an electric heat pump would potentially result in an average annual savings of about \$600 in utility bills. It should be noted that this cost savings considers the combined effect of converting to an electric heat pump system that replaces both a gas-fired furnace and a central air conditioning, which would not be a direct result of the proposed rule amendments, but could present an indirect benefit. In addition to replacing the natural gas usage for space heating, electric heat pumps would also reduce electricity usage for cooling compared to a central air conditioning unit. The utility bill savings could be substantial when considering the 18-year service life for these HVAC appliances.⁷ Note that in cases where an air source heat pump may introduce new cooling functionality (i.e., an installation in a household without existing air conditioning), consumers may elect to increase their heat pump usage for these new functions. However, this analysis only focuses on the usage of this new equipment that is comparable to the existing usage of the equipment being replaced.

Also, the cost savings can vary considerably depending on the utility service pricing. For example, the E3 study projected that households in the SMUD utility service area would save up to \$600 in utility

⁷ Environmental Energy and Economics, Inc.; pp. 59-60.

costs by converting to an HVAC heat pump, while households in other utility service territories were projected to save up to \$400 annually. Households in Bay Area utility service areas would see savings of between \$100 and \$400 for single-family homes and \$10 to \$90 for multi-family homes. The study also indicated that if gas rates increase faster than electric rates over the long-term, then that would further increase the utility cost savings. Since 2019 when the E3 analysis was done, PG&E has raised both electric and gas rates, but gas rates have had higher percentage increases. For purposes of this analysis, we have assumed an average rate savings of \$250 for single family homes and \$50 per year for multi-family homes, which is lower than the maximum possible but acknowledges the uncertainty of the changing utility rate environment.

For water heaters, the E3 study indicated that retrofitting a heat pump water heater into a home that currently uses a gas-fired tank water heater would generate utility cost savings. For Bay Area single-family homes, replacing a gas-fired tank model with a heat pump water heater could result in annual utility cost savings of about \$50 for single family homes and \$40 for multi-family units.

Based on this analysis, the combined rate savings would range from \$300 for single family homes to \$90 for multi-family units. It has been reported recently that the average PG&E residential customer bill is \$166 per month, or \$1,992 per year.⁸ The rate savings from the electric appliances would represent 4.5 to 15 percent of the average bill.

ADJUSTMENT TO COST OF COMPLIANCE

In analyzing the cost impacts to individual households, we have deducted the average rate savings from the average costs in Table 5-4 above. The cost of compliance for space heaters of \$402 is reduced by \$150 $[(\$250 + \$50)/2]$, equaling \$252. The cost for water heaters of \$147 is reduced by average rates savings of \$45, to equal \$102.

IMPACT OF AVERAGE COSTS ON HOUSEHOLDS

As discussed in Section 4, the income distribution in the San Francisco Bay Area is concentrated towards households earning over \$100,000 annually, with over one-quarter of households earning over \$200,000. As shown on Table 4-3, the overall median income for Bay Area households is approximately \$115,400. However, with 79,100 families living below the poverty line, and nearly 13 percent of households earning less than \$30,000 annually, the incremental costs have a disproportionately higher potential impact on more economically vulnerable populations.

EXPENDITURES AND COSTS BY INCOME GROUP

Data from the Consumer Expenditure Survey (CES), which is administered by the Bureau of Labor Statistics (BLS) to track cost-of-living data and estimate the Consumer Price Index (CPI), shows that expenditures do not change at the same rate as income.

As shown in Table 5-5, lower income households will still have to make expenditures to maintain a household, and those expenditures can exceed the household income, as defined by the Census. For

⁸ George Avalos, "PG&E Monthly Bills are Set to Jump Again This Year, Jolting Customers." San Jose Mercury News, February 10, 2022.

example, households that earn less than \$15,000 annually make an average of \$25,240 in expenditures annually. The expenditures include housing, food, transportation, and all other expenses. Some of these expenses are potentially covered by public assistance or other non-income sources, such as debt or family support. By comparison, those households earning between \$150,000 and \$199,999 annually make an average of \$107,900 in annual expenditures.

The expense category that covers water heaters and space heating appliances combines major appliances and miscellaneous household equipment. The average expenditures in this category will range from \$430 for households earning less than \$15,000 to \$3,700 for households earning more than \$200,000.

Spending for major appliances/household equipment ranges from 5.7 percent of the total annual income for households earning less than \$15,000 to 1.1 percent for households earning more than \$200,000. However, when looking at the major appliance/ miscellaneous household equipment spending as a percentage of the actual expenditures (rather than income), the trends are very similar from income group to income group. Overall, the spending in this category ranges from 1.8 to 2.3 percent of total annual expenditures.

Table 5-5: Total Household Expenditures and Appliance/Household Equipment Expenditure by Income Group, 2019

ANNUAL HOUSEHOLD INCOME	BAY AREA PERCENT OF TOTAL HOUSEHOLDS	AVERAGE HOUSEHOLD INCOME (CES)	ANNUAL HOUSEHOLD EXPENDITURE (CES)	APPLIANCE AND HOUSEHOLD EQUIPMENT EXPENDITURE (CES)	APPLIANCE AND HOUSEHOLD EQUIP. PERCENT OF INCOME	APPLIANCE AND HOUSEHOLD EQUIPMENT PERCENT OF EXPENDITURE
Less than \$15,000	6.3%	\$7,600	\$25,200	\$430	5.7%	1.7%
\$15,000 to \$29,999	6.5%	\$22,200	\$34,000	\$710	3.2%	2.1%
\$30,000 to \$39,999	4.6%	\$34,800	\$40,400	\$750	2.2%	1.9%
\$40,000 to \$49,999	4.6%	\$44,800	\$47,600	\$920	2.0%	1.9%
\$50,000 to \$69,999	9.4%	\$59,300	\$54,900	\$1,200	2.0%	2.2%
\$70,000 to \$99,999	13.2%	\$83,600	\$67,100	\$1,300	1.6%	1.9%
\$100,000 to \$149,999	17.6%	\$121,400	\$86,000	\$1,800	1.5%	2.1%
\$150,000 to \$199,999	12.3%	\$171,100	\$107,900	\$2,100	1.3%	2.0%
\$200,000 and more	25.5%	\$343,500	\$161,100	\$3,700	1.1%	2.3%
Overall Total	2,754,400					

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES).

As shown in Table 5-6, under the proposed Rule 9-4 amendments, the annualized cost difference for converting to a zero-NOx space heating with a gas-to-electric conversion of \$252 represents nearly a 60 percent increase in such costs for the lowest income households. This represents 3.3 percent of annual income and 1.0 percent of annual expenditures for households earning less than \$15,000 annually. For households earning the median income of \$115,000, the increased expenditures represent a 13.8 percent increase in appliance expenditures, but only a 0.3 percent increase in total expenditures and 0.2 percent of total income.

Under the proposed Rule 9-6 amendments, the annualized cost difference of \$102 to convert a natural gas-fired water heater to a zero-NOx appliance would increase appliance expenditures for the lowest income households by about 23 percent, and represent 1.3 percent of total income. At the median income level, the compliance cost would increase appliance expenditures by less than five percent and represent 0.1 percent of annual income.

Table 5-6: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures

ANNUAL HOUSEHOLD INCOME	ANNUALIZED GAS-TO-ELECTRIC COST INCREASE OF \$252 FOR SPACE HEATING			ANNUALIZED GAS-TO-ELECTRIC COST INCREASE OF \$102 FOR WATER HEATER		
	INCREMENTAL PERCENT OF APPLIANCE EXPENDITURES	INCREMENTAL PERCENT OF INCOME	INCREMENTAL PERCENT OF EXPENDITURE	INCREMENTAL PERCENT OF APPLIANCE EXPENDITURES	INCREMENTAL PERCENT OF INCOME	INCREMENTAL PERCENT OF EXPENDITURE
Less than \$15,000	58.0%	3.3%	1.0%	23.4%	1.3%	0.4%
\$15,000 to \$29,999	35.5%	1.1%	0.7%	14.3%	0.5%	0.3%
\$30,000 to \$39,999	33.7%	0.7%	0.6%	13.6%	0.3%	0.3%
\$40,000 to \$49,999	27.5%	0.6%	0.5%	11.1%	0.2%	0.2%
\$50,000 to \$69,999	21.3%	0.4%	0.5%	8.6%	0.2%	0.2%
\$70,000 to \$99,999	19.4%	0.3%	0.4%	7.8%	0.1%	0.2%
\$100,000 to \$149,999	13.8%	0.2%	0.3%	5.6%	0.1%	0.1%
\$150,000 to \$199,999	11.8%	0.1%	0.2%	4.8%	0.1%	0.1%
\$200,000 and more	6.8%	0.1%	0.2%	2.7%	0.0%	0.1%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES).

EXPENDITURES AND COSTS BY HOUSING TENURE

One potential cost difference comes between homeowners and renters. Presumably, the cost of compliance would fall upon the property owner. If the property owner rents the housing unit to a renter, then presumably at least some portion of the appliance upgrade costs will be passed along to the tenant through rent increases.

Reviewing the CES data, owner-occupied housing units will generally see a higher proportion of overall expenditures go towards major appliance/other household equipment expenses than renter-occupied units. While the overall median income for Bay Area households is approximately \$115,400, the estimated median income for Bay Area households living in owner-occupied housing units was about \$142,000 in 2019, compared to \$84,400 for Bay Area households residing in rental units. Normalizing the expenditures to the median household income for Bay Area households, the total expenditures for owner-occupied households average about \$95,500, and \$67,500 for renters.

The annual major appliance/miscellaneous household equipment expenditures average out to \$2,200 for a median income owner-occupied housing unit, and \$900 for a median income renter-occupied housing unit. For homeowners, this represents 1.5 percent of total household income, and 1.0 percent of total income for renters (Table 5-7). This would indicate that many of these expenses are paid for by the property owners of rental housing, and recouped through rent payments.

Table 5-7: Total Household Expenditures and Appliance/Household Equipment Expenditure by Housing Tenure, 2019

HOUSING TENURE	BAY AREA MEDIAN INCOME (ESTIMATED)	ANNUAL EXPENDITURE (ESTIMATED)	ANNUAL APPLIANCE AND HH EQUIP EXPENDITURE (ESTIMATED)	ANNUAL APPLIANCE AND HH EQUIP EXPENDITURE (ADJUSTED)	APPLIANCE AND HH EQUIP. PERCENT OF INCOME	APPLIANCE AND HH EQUIP. PERCENT OF EXPENDITURE
All Housing Units	\$115,400	\$82,900	\$63,200	\$1,700	1.5%	2.1%
Owner Occupied	\$142,900	\$95,500	\$73,200	\$2,200	1.5%	2.3%
Renter Occupied	\$84,400	\$67,500	\$63,200	\$900	1.0%	1.3%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES).

In Table 5-8, the annualized cost increase is differentiated by housing tenure. The \$252 annualized cost of compliance for space heating represents 0.2 percent of the median income for all Bay Area households. The \$271 cost for owner-occupied single-family homes is also 0.2 percent of income for those households while the \$229 cost for renter occupied multi-family homes is 0.3 percent of income for typical renter households.⁹ The costs for the water heater conversion, ranging from \$92 for renters to \$109 for home owners, is 0.1 percent of income for both groups.

Table 5-8: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures

HOUSING TENURE	ANNUALIZED GAS-TO- ELECTRIC COST INCREASE (HVAC)	ANNUALIZED GAS-TO- ELECTRIC COST INCREASE (WATER HEATER)	INCREMENTAL PERCENT OF INCOME (HVAC)	INCREMENTAL PERCENT OF EXPENDITURE (HVAC)	INCREMENTAL PERCENT OF INCOME (WATER HEATER)	INCREMENTAL PERCENT OF EXPENDITURE (WATER HEATER)
All Housing Units	\$252	\$102	0.2%	0.3%	0.1%	0.1%
Owner Occupied	\$271	\$109	0.2%	0.3%	0.1%	0.1%
Renter Occupied	\$229	\$92	0.3%	0.3%	0.1%	0.2%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES).

Renters typically do not directly absorb the costs for central furnace and/or water heater replacements. Rather, these expenses are often made by the property owners. Applying the same upgrade schedule assumption for homeowners to rental properties, the incremental cost difference averages out to \$19.04 for central heating and \$7.69 for water heaters when calculated on a monthly basis. These costs can be potentially passed along to tenants in the form of rent increases. As shown in Table 5-9, the cost differences for a gas-to-electric conversion with central heating represent between 0.8 percent to 1.1 percent of the median monthly rents in the Bay Area counties, under the

⁹ The homeowner and renter costs reflect single family vs. multi-family costs, with the utility rate savings prorated from the regionwide average.

proposed Rule 9-4 amendments. Under the proposed Rule 9-6 amendments, a gas-to-electric conversion for water heaters would represent between 0.3 to 0.4 percent of the median monthly rent.

Table 5-9: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Monthly Median Rents by County

LOCATION	MEDIAN HOUSEHOLD INCOME (RENTERS)	MEDIAN MONTHLY RENT	INCREMENTAL MONTHLY COST (HVAC)	INCREMENTAL MONTHLY COST (WATER HEATER)	INCREMENTAL PERCENT OF MONTHLY RENT (HVAC)	INCREMENTAL PERCENT OF MONTHLY RENT (WATER HEATER)
Alameda County	\$76,500	\$2,000	\$19.04	\$7.69	1.0%	0.4%
Contra Costa County	\$72,700	\$1,900	\$19.04	\$7.69	1.0%	0.4%
Marin County	\$73,700	\$2,100	\$19.04	\$7.69	0.9%	0.4%
Napa County	\$73,200	\$1,800	\$19.04	\$7.69	1.0%	0.4%
San Francisco County	\$105,300	\$2,000	\$19.04	\$7.69	1.0%	0.4%
San Mateo County	\$101,200	\$2,500	\$19.04	\$7.69	0.8%	0.3%
Santa Clara County	\$97,300	\$2,400	\$19.04	\$7.69	0.8%	0.3%
Solano County	\$64,200	\$1,700	\$19.04	\$7.69	1.1%	0.4%
Sonoma County	\$63,400	\$1,800	\$19.04	\$7.69	1.1%	0.4%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES).

EXPENDITURES AND COSTS BY POVERTY STATUS

The poverty line will vary by family/household size. As indicated in Section 4, about 79,100 families in the Bay Area were below the poverty line (not including non-family households). For a family of four, an annual household income of \$25,750 represented the federal poverty threshold in 2019 (Table 5-10). At that income level, the marginal annualized expenditure increase (based on renter costs) from the proposed Rule 9-4 amendments would be 0.9 percent of total income and 0.6 percent of total expenditures for a household at that income level, as shown in Table 5-11. Increased expenses for water heaters from the proposed Rule 9-6 amendments would total about 0.4 percent of total income and 0.3 percent of total expenditures for a family of four at the federal poverty threshold. The combined annual expenditure increase from both rule amendments would, as a worst case, constitute a 45 percent increase in average appliance expenditures for these households.

Table 5-10: Total Household Expenditures and Appliance/Household Equipment Expenditure for Families at Poverty Level, 2019

	POVERTY LEVEL INCOME	ANNUAL EXPENDITURE (EXTRAPOLATED FROM CES)	ANNUAL APPLIANCE AND HH EQUIP EXPENDITURE	APPLIANCE AND HH EQUIP. PERCENT OF INCOME	APPLIANCE AND HH EQUIP. PERCENT OF EXPENDITURE
Federal Poverty Level for Family of Four (2019)	\$25,750	\$35,810	\$710	2.8%	2.0%

Source: Applied Development Economics, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES), and U.S. Department of Health and Human Services "Poverty Guidelines Computations Page."

Table 5-11: Incremental Costs for Gas-to-Electric Heating Appliance Conversion as Percentage of Annual Income and Expenditures for Families at Poverty Level

	ANNUALIZED GAS-TO- ELECTRIC COST INCREASE (HVAC)	ANNUALIZED GAS-TO- ELECTRIC COST INCREASE (WATER HEATER)	INCREMENTAL PERCENT OF INCOME (HVAC)	INCREMENTAL PERCENT OF EXPENDITURE (HVAC)	INCREMENTAL PERCENT OF INCOME (WATER HEATER)	INCREMENTAL PERCENT OF EXPENDITURE (WATER HEATER)
Federal Poverty Level for Family of Four (2019)	\$229	\$92	0.9%	0.6%	0.4%	0.3%

Source: *Applied Development Economics*, based on U.S. Census American Community Survey, One-Year Sample, and U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES), and U.S. Department of Health and Human Services "Poverty Guidelines Computations Page."

IMPACTS OF SHIFTS IN CONSUMER SPENDING

The higher net costs for space and water heating will have the effect of shifting discretionary household spending away from other retail products and services, including items such as food service, personal services, education, social assistance and recreation and amusement expenditures. Lower expenditures in these categories could lead to reduced job growth from businesses providing the products and services, a number of whom may be small businesses. In order to estimate the magnitude of these jobs changes, it is necessary to estimate the aggregate expenditures that the proposed rule amendments would entail in the Bay Area region for space and water heating. The following section discusses the estimates of total affected households and related compliance cost net expenditures.

Table 4-10 earlier in the report shows the source of space heating fuel for households in the Bay Area. For Rule 9-4, we assume that households that use electricity or solar for heating are already in compliance with the rule and would not need to convert their HVAC systems. Therefore, households subject to costs for Rule 9-4 would be those currently using Utility Gas or Other Fuels for heating, which would be 79.6 percent of owner-occupied homes and 55.7 percent of renter-occupied homes. In contrast, for lack of other data, we assume all households would need to convert their water heaters to electric. This is a conservative assumption that could potentially overestimate the true costs of compliance for the Rule 9-6 amendments.

Table 5-12 below reproduces data from Table 4-8 showing the distribution of owner and renter-occupied housing by county. Based on the useful life of HVAC systems of 18 years, we assume 5.6% (1/18) of affected households will convert their HVAC systems per year. Combining the data from Table 4-1 and Table 5-12, with the cost data in the previous section, Table 5-13 shows the estimated annual aggregate costs for Rule 9-4 (excluding electric panel upgrades) of \$25.2 million.

Table 5-12: Distribution of Owner Occupied and Renter Occupied Households in the Bay Area, 2019

COUNTY	TOTAL HOUSEHOLDS	HOUSEHOLDS (OWNER-OCCUPIED)	HOUSEHOLDS (RENTER-OCCUPIED)	RENTERS AS PERCENT OF TOTAL HOUSEHOLDS
Bay Area Region	2,733,300	1,515,100	1,218,200	44.6%
Alameda	574,700	304,700	270,000	47.0%
Contra Costa	393,700	257,500	136,100	34.6%
Marin	105,100	65,200	39,900	38.0%
Napa	48,800	32,300	16,500	33.9%
San Francisco	368,100	136,700	231,400	62.9%
San Mateo	263,800	156,300	107,500	40.7%
Santa Clara	640,400	351,800	288,600	45.1%
Solano	151,100	94,000	57,100	37.8%
Sonoma	187,700	116,600	71,000	37.8%

Source: ACS 1 Year estimates, 2019.

Table 5-13: Aggregate Cost Estimates for HVAC Conversion by County

COUNTY	OWNER OCCUPIED SUBJECT TO HVAC RULE	RENTER OCCUPIED SUBJECT TO HVAC RULE	TOTAL	ANNUALIZED	HVAC CONVERSION COST (\$MIL)
Bay Area Region	1,206,424	678,549	1,884,973	104,721	\$25.24
Alameda	242,623	150,405	393,027	21,835	\$5.26
Contra Costa	205,039	75,815	280,854	15,603	\$3.76
Marin	51,917	22,227	74,143	4,119	\$0.99
Napa	25,719	9,191	34,911	1,939	\$0.47
San Francisco	108,850	128,903	237,752	13,208	\$3.18
San Mateo	124,457	59,883	184,340	10,241	\$2.47
Santa Clara	280,127	160,766	440,893	24,494	\$5.90
Solano	74,849	31,808	106,657	5,925	\$1.43
Sonoma	92,845	39,551	132,396	7,355	\$1.77

Source: ADE, Inc.

As noted above, we assume all households would require a water heater conversion. With a useful life of 13 years, we estimate 7.7% of households (1/13) would convert annually. Table 5-14 shows the resulting annualized cost impacts for water heater conversion (\$18.5 million).

Table 5-14: Compliance Cost Impacts for Water Heater Conversions

COUNTY	TOTAL HOUSEHOLDS	ANNUAL HOUSEHOLDS SUBJECT TO WATER HEATER RULE	WATER HEATER CONVERSION COST (\$MIL.)
Bay Area Region	2,733,300	210,254	\$18.50
Alameda	574,700	44,208	\$3.89
Contra Costa	393,700	30,285	\$2.66
Marin	105,100	8,085	\$0.71
Napa	48,800	3,754	\$0.33
San Francisco	368,100	28,315	\$2.49
San Mateo	263,800	20,292	\$1.79
Santa Clara	640,400	49,262	\$4.33
Solano	151,100	11,623	\$1.02
Sonoma	187,700	14,438	\$1.27

Source: ADE, Inc.

Following the E3 analysis, electric panel upgrades are assumed to be needed for all houses built before 1980 and which require both an HVAC and water heater conversion. Table 5-4 above shows the census estimate of housing built in 1979 or earlier by county in the Bay Area.

For purposes of this analysis, we apply the percentages in Table 5-4 to both single family and multi-family housing subject to HVAC conversion. The resulting number of units and electric panel upgrade costs are shown in Table 5-15 (\$15.98 million).

Table 5-15: Electric Panel Upgrade Costs by County

COUNTY	ANNUAL SINGLE FAMILY UNITS SUBJECT TO ELECTRIC PANEL UPGRADE	COST (\$MIL)	ANNUAL MULTI- FAMILY UNITS SUBJECT TO ELECTRIC PANEL UPGRADE	COST (\$MIL)	TOTAL ELECTRIC PANEL COSTS (\$MIL)
Bay Area Region	46,616	\$12.18	22,559	\$3.80	\$15.98
Alameda	10,383	\$2.71	4,775	\$0.80	\$3.52
Contra Costa	7,095	\$1.85	1,788	\$0.30	\$2.15
Marin	2,427	\$0.63	799	\$0.13	\$0.77
Napa	908	\$0.24	254	\$0.04	\$0.28
San Francisco	3,878	\$1.01	6,373	\$1.07	\$2.09
San Mateo	5,487	\$1.43	2,311	\$0.39	\$1.82
Santa Clara	10,830	\$2.83	4,893	\$0.82	\$3.65
Solano	2,332	\$0.61	566	\$0.10	\$0.70
Sonoma	3,277	\$0.86	799	\$0.13	\$0.99

Source: ADE, Inc.

UTILITY RATE SAVINGS

As discussed above on pp. 20-21, households that convert from gas powered appliances to electric appliances may experience lower monthly utility rate costs for space and water heating. Based on the data in Table 4-10 above, we have estimated how many households would make this conversion. Applying the annual utility rate savings by type of unit and type of appliance conversion from the discussion above to the numbers of units making the conversion annually, suggests that nearly \$30 million in annual costs for rule compliance would be offset by lower utility bills for space and water heating (Table 5-16).

Table 5-16: Estimated Utility Rate Savings from Conversion to Electric Appliances (\$Millions)

COUNTY	SINGLE FAMILY RATE SAVINGS FOR HVAC	MULTI-FAMILY RATE SAVINGS FOR HVAC	SINGLE FAMILY RATE SAVINGS FOR WATER HEATER	MULTI-FAMILY RATE SAVINGS FOR WATER HEATER	TOTAL RATE SAVINGS
Rates Savings per Unit	-\$250	-\$50	-\$50	-\$40	
Bay Area Region	-\$18.33	-\$1.66	-\$6.38	-\$3.31	-\$29.68
Alameda	-\$3.83	-\$0.35	-\$1.33	-\$0.70	-\$6.22
Contra Costa	-\$3.20	-\$0.16	-\$1.11	-\$0.32	-\$4.80
Marin	-\$0.79	-\$0.05	-\$0.27	-\$0.10	-\$1.22
Napa	-\$0.39	-\$0.02	-\$0.13	-\$0.04	-\$0.58
San Francisco	-\$1.22	-\$0.40	-\$0.42	-\$0.79	-\$2.83
San Mateo	-\$1.82	-\$0.15	-\$0.63	-\$0.31	-\$2.91
Santa Clara	-\$4.30	-\$0.39	-\$1.50	-\$0.77	-\$6.96
Solano	-\$1.24	-\$0.06	-\$0.43	-\$0.12	-\$1.85
Sonoma	-\$1.54	-\$0.08	-\$0.54	-\$0.15	-\$2.30

Source: ADE, Inc.

TOTAL ANNUALIZED COMPLIANCE COSTS

The annualized compliance costs and rate savings are summarized in Table 5-17. The aggregate cost analysis is divided into three time periods: 1) the 2027-2028 period when households begin converting their water heaters, 2) the subsequent eleven years (2029 through 2039) when households are converting both their water heaters and their HVAC systems, and 3) the seven years (2040-2046) when the remaining households are converting their HVAC systems. During the initial period, total annualized net compliance costs would be nearly \$9 million per year, and they increase to about \$30 million during the middle period. In the third period, total net annualized costs are about \$21 million across the region (although presumably some households would be replacing their water heaters for a second time under a normal lifecycle). These net costs subtract the estimated rate savings from the compliance costs in each period.

Table 5-17: Total Net Annual Costs by Time Period (\$Millions)

COUNTY	NET ANNUAL COSTS FOR WATER HEATERS 2027-2028	COMBINED NET ANNUAL COSTS 2029 - 2039	NET ANNUAL COSTS FOR HVAC 2040- 2046
Bay Area Region	\$8.81	\$30.04	\$21.23
Alameda	\$1.85	\$6.45	\$4.59
Contra Costa	\$1.23	\$3.78	\$2.55
Marin	\$0.33	\$1.25	\$0.92
Napa	\$0.15	\$0.49	\$0.34
San Francisco	\$1.27	\$4.93	\$3.66
San Mateo	\$0.85	\$3.16	\$2.32
Santa Clara	\$2.06	\$6.93	\$4.87
Solano	\$0.47	\$1.30	\$0.83
Sonoma	\$0.59	\$1.74	\$1.15

Source: ADE, Inc.

During the 2029-2039 period when both water heaters and space heaters are being replaced, the shift in consumer spending could lead to a direct loss of 196 jobs in retail, personal services, entertainment and education across the entire region (Table 5-18). Economic multiplier effects could increase the total job loss to 286 jobs. As shown in Table 4-2 above, the Bay Area had nearly 3.7 million total jobs in 2020, of which 1.5 million are in sectors whose market could be affected by these shifts in consumer spending. The potential job losses shown in Table 5-18 are about 2 one-hundredths of a percent of jobs within the trade and services sectors directly affected.

Table 5-18: Potential Job Losses Due to Shifted Consumer Spending

LOCATION	2027-2028			2029-39			2040-46		
	DIRECT EFFECT	INDIRECT & INDUCED	TOTAL EFFECT	DIRECT EFFECT	INDIRECT & INDUCED	TOTAL EFFECT	DIRECT EFFECT	INDIRECT & INDUCED	TOTAL EFFECT
Bay Area	58	26	84	196	90	286	139	63	202
Alameda County	12	6	18	42	19	61	30	14	44
Contra Costa County	8	4	12	25	11	36	17	8	24
Marin County	2	1	3	8	4	12	6	3	9
Napa County	1	0	1	3	1	5	2	1	3
San Francisco County	8	4	12	32	15	47	24	11	35
San Mateo County	6	3	8	21	9	30	15	7	22
Santa Clara County	13	6	20	45	21	66	32	15	46
Solano County	3	1	4	8	4	12	5	2	8
Sonoma County	4	2	6	11	5	17	8	3	11

Source: ADE, Inc.; data from IMPLAN input-output model

UTILITY COSTS

In order to meet the potential increased demand for electricity under the likely scenario that households will choose to replace gas fired appliances with electric appliances to meet the zero-NOx standards, PG&E will need to expand its electricity generation, distribution and transmission infrastructure. BAAQMD commissioned E3, Inc. to analyze the electric grid impacts associated with the widespread adoption of heat pumps to comply with the proposed amendments to Rules 9-4 and 9-6. E3 determined that over the next 28 years PG&E would need to spend \$100 million on transmission capacity increases and \$384 million to upgrade its distribution capacity. In addition, 2,180 MW of utility scale solar generation capacity would need to be added along with 680 MW of new battery storage, at a combined cost of \$1.95 billion.

PG&E and other statewide power providers are planning major expansions of electrical capacity over the next 20-30 years. The CA Independent System Operator (CAISO) is planning \$11 billion in transmission capacity projects over the next 20 years, which covers 80 percent of the entire state service area, and PG&E is planning to spend \$400 million per year on distribution projects. The incremental costs for capacity increases associated with the amendments to Rules 9-4 and 9-6 represent about 2.4 percent of transmission investments prorated within PG&E's service area and 3.2 percent of PG&E planned distribution capacity projects.

E3 has modeled a scenario in which the state's utilities make major investments in electric system capacity to meet the needs of the full range of climate change policies (high policy scenario), vs. a scenario in which such investments are not forthcoming and the added capacity needed to support the amendments to Rules 9-4 and 9-6 stand alone for the Bay Area (low policy scenario). In addition, the overall investments are discounted to net present value for the scenarios. The results indicate that under the high policy scenario, the net effect of the proposed rule amendments would be a 2021 NPV of \$243 million, while under the low policy scenario the NPV of incremental costs would be about \$1 billion. It is not clear to what extent these costs fit within PG&E's existing rate structure and what impact to rates may occur in the future, although utilities across California are planning for significantly increased electric uptake in the coming years. It is possible that these investments will result in some future rate increases, which would reduce the cost savings to households from converting to all electric appliances. However, these planned investments are spread out over a large base of rate-payers and electric rate increases associated with infrastructure build-out may be outpaced by natural gas rate increases associated with maintaining existing infrastructure for a shrinking rate base. Air District staff may report on rate changes as part of its Implementation Working Group and interim reporting process to the Board of Directors.

IMPACT FINDINGS

For consumers, the level of potential impact will vary considerably by income range. For most households in the Bay Area, the added costs combined from both rule amendments would increase average annual appliance costs by about 25 percent or less, but this represents less than 0.3 percent of annual income. However, for families below the poverty line, the costs represent a 45 percent increase in annual appliance expenditures and 1.3 percent of annual income.

Also, the analysis assumes that households can finance the conversion and would experience the cost impact over time. However, if emergency replacements are needed due to existing equipment failure, or if financing is not available at the time replacements need to occur, the upfront capital cost of the conversion could be a significant burden to many households.

Potential impacts to renters from the proposed rule amendments are particularly complex and will continue to be evaluated throughout the implementation timeline including during a working group process. Renters generally have a lower average annual income and a greater cost burden associated with housing expenses than homeowners. While renters are not directly impacted by the upfront costs of heating appliance expenses, there is the potential for pass through costs, evictions as the result of renovations, and rent increases due to capital improvements. Air District staff intends to gather further information on these potential impacts through the Implementation Working Group, and will continue to evaluate and report on these impacts as part of the first interim report to the Board of Directors, as required in the proposed rule amendments.

The analysis did not account for any rebate programs; however, programs for electric appliance conversions are commonplace and can help to mitigate potential impacts from the added cost of gas-to-electric conversions, particularly if targeted to lower income households. As the market for zero-NOx appliances increases, there are also potential future economies of scale and technological advances that could also lower costs.

The shift in consumer expenditures toward higher appliance costs and away from other retail goods and services would have a measurable but not significant effect on jobs in those sectors. However many retail and personal services businesses are classified as small businesses and could experience some reduction in sales, estimated at a maximum of \$30 million per year across the entire Bay Area during the initial conversion period between 2027 and 2046.

There would be some disruption and increased costs in the space and water heater supply chain, including wholesalers and construction trades who sell and install the equipment in new and existing homes. Workers in both sectors would require additional training on the new equipment and would face higher costs for inventory for the more expensive appliance units. However, these costs would ultimately be passed on to consumers. A study for space heating conversion by the South Coast Air Quality Management District concluded that there would be job gains in the wholesale sector, but these would be offset by job losses in the construction and real estate sectors.¹⁰

In addition, manufacturers of the appliances, which are located outside the Bay Area, would need to increase production of compliant units and would see a reduction in demand for currently designed gas-fired units. This could involve costs for additional product development, retooling production lines, retraining personnel and possibly reconfiguring supply chains. Incurring these costs to supply the Bay Area market alone may not make financial sense for some companies and they may lose market share

¹⁰ South Coast Air Quality Management District, *Socioeconomic Report For Proposed Amended Rule 1111□NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*, October 2009. P. 6.

as a result. However, if the overall market for these appliances expands nationally and globally, these product development costs would be recouped over time.

The proposed amendments would increase the demand for electricity, requiring infrastructure expansions from PG&E. The Air District has commissioned studies that suggest the cost for these expansions would range from \$243 million to \$1 billion (net present value 2021 dollars). These costs would likely have some impact on future electricity rates, which is undetermined at this time.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX D

Electric Infrastructure Impacts from Proposed Zero NO_x Standards

This page has been intentionally left blank.

Bay Area Air Quality Management District

Electric Infrastructure Impacts from Proposed Zero NOx Standards

November 3, 2022

Ari Gold-Parker
John de Villier
Amber Mahone

44 Montgomery Street, Suite 1500
San Francisco, CA 94104

amber@ethree.com



Energy+Environmental Economics

Table of Contents

Table of Figures	i
Table of Tables	ii
Acronyms	iii
1. Executive Summary	4
2. Background	6
3. Heat Pump Adoption Scenarios	7
Technology Assumptions	7
Zero NOx Standard Dates and Coverage	7
Reference Scenarios and Proposed Standards Scenario	7
Reference Scenarios	8
Proposed Zero NOx Standards Scenario	8
Residential Heat Pump Space Heating Sales and Adoption	8
4. Electric Load Impacts and Solar Energy Needs	11
Load Impact Methodology	11
Space Heating and Water Heating Loads	11
Air Conditioning Loads	11
Electric Load Impacts	12
Utility-Scale Solar Modeled to Meet Incremental Loads	13
Zero-carbon Electricity to Meet New Loads	13
Utility-scale Solar as the Marginal Zero-carbon Generation Resource	14
Utility-scale Solar Impacts	15
5. Capacity-Related Impacts and Infrastructure Needs	18
Capacity Impact Methodology	18
County-level Load Disaggregation	18
End-Use Load Profiles	18
Evaluating Capacity Impacts	18
Hourly Load Impacts	19
Capacity-Related Infrastructure Needs	20
Generation Capacity	20
Transmission Capacity	21
Distribution Capacity	23
6. Conclusion	25

7. Appendix: Sensitivities on Implementation Year	26
Sensitivity 1: Zero NOx standards take effect in 2026	26
Sensitivity 2: Zero NOx standards take effect in 2035.	27
8. Appendix: Detailed Methodology	29
Technology Assumptions	29
Reference Scenarios	29
Air Conditioning Loads	32
Solar Technology Modeling	32
County-level Load Disaggregation	33
End Use Load Profiles	34

Table of Figures

Figure 1: Potential residential heat pump space heating sales share (left) and stock share (right).....	9
Figure 2: Potential annual load impact relative to reference scenarios.....	12
Figure 3: Potential incremental utility-scale solar capacity relative to Low Policy Reference	15
Figure 4: Heat map showing the distribution of potential 2050 load impacts relative to Low Policy Reference	19
Figure 5: Potential annual load impact relative to reference scenarios (sensitivity 1).....	26
Figure 6: Potential annual load impact relative to reference scenarios (sensitivity 2).....	27
Figure 7: Potential sales share (left) and stock share (right) for residential heat pump water heating.....	30
Figure 8: Potential sales share (left) and stock share (right) for commercial heat pump space heating ...	31
Figure 9: Potential sales share (left) and stock share (right) for commercial heat pump water heating ...	31
Figure 10: Solar LCOE and capacity factor over time, from NREL ATB	33

Table of Tables

Table 1: Summary of potential 2050 electric grid impacts of proposed zero NOx standards	5
Table 2: Zero NOx standard implementation dates and assumed coverage.....	7
Table 3: Potential impact of proposed standards on statewide electric load in 2020 and 2045.	13
Table 4: Potential utility-scale solar impacts from proposed standards	16
Table 5: Potential generation capacity impacts from proposed standards.....	20
Table 6: Potential transmission capacity impacts from proposed standards.....	21
Table 7: Potential distribution capacity impacts from proposed standards.....	23
Table 8: Summary of potential 2050 electric grid impacts of zero NOx standards (sensitivity 1)	27
Table 9: Summary of potential 2050 electric grid impacts of zero NOx standards (sensitivity 2)	28
Table 10: Baseline gas technologies modeled for each end use	29
Table 11: Number of gas-heated households per county in BAAQMD territory and assigned climate zones	34

Acronyms

Acronym	Definition
AC	Air Conditioning
ACC	(CPUC) Avoided Cost Calculator
ACS	American Community Survey
ATB	(NREL) Annual Technology Baseline
BAAQMD	Bay Area Air Quality Management District
BAU	Business as Usual
CA	California
CARB	California Air Resources Board
CAISO	California Independent System Operator
CCA	Community Choice Aggregator
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
GHG	Greenhouse Gas
HP	Heat Pump
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilation, and Air Conditioning
IRP	(CPUC) Integrated Resource Planning
LCOE	Levelized Cost Of Electricity
NREL	National Renewable Energy Laboratory
NOx	Nitrogen Oxides
PCAF	Peak Capacity Allocation Factor
PG&E	Pacific Gas & Electric
PV	Photovoltaic

1. Executive Summary

The Bay Area Air Quality Management District (BAAQMD) is evaluating proposed zero NOx standards for residential and commercial space and water heating devices. Today, the only technologies that meet zero NOx standards for these end uses are electric devices, although gas-fired technologies that meet zero NOx standards could be developed in the future. For the purposes of this study, E3 has assumed that electric heat pump devices are used to comply with the proposed standards. E3 has analyzed the potential electric load increases from space heating, water heating, and air conditioning as well as the associated electric grid impacts. This analysis will be used to support an assessment of the potential conservative (upper end) impacts of the proposed standards on electric infrastructure under the California Environmental Quality Act (CEQA). If gas-fired technologies are developed that meet the proposed zero NOx standards and these devices are adopted by some customers, the overall impacts on electric infrastructure would be smaller than estimated here.

All potential electric grid impacts were evaluated relative to two reference scenarios: a Low Policy Reference, which assumes no major state policy changes in support of building electrification, and a High Policy Reference, which assumes major state policy support for building electrification by the 2030s.

There are two broad results from this study:

- + The potential electric grid impacts of the proposed zero NOx standards are highly dependent on what other policies California enacts around building electrification to meet the state’s climate goals.
 - + Relative to the Low Policy Reference, the zero NOx standards would result in incremental load impacts, capacity impacts, and infrastructure needs by 2050.
 - + Relative to the High Policy Reference, the zero NOx standards would result in load, capacity, and infrastructure impacts occurring earlier than would otherwise be expected, but there would be very small net impacts by 2050.
- + The largest potential impacts of the proposed standards would be from increased electric loads and the associated need for additional zero-carbon generation, assumed in this study to be utility-scale solar, to meet these electric loads.
 - + There would also be some incremental peak loads, leading to additional impacts for generation capacity, transmission capacity, and distribution capacity.

Table 1 summarizes the potential electric grid impacts that were determined in this study. While the distribution capacity impacts described in the table would occur within the BAAQMD’s geographic region, the transmission capacity impacts may occur outside the Bay Area and the utility-scale solar and battery storage impacts would be spread across California and the Western United States.

Table 1: Summary of potential 2050 electric grid impacts of proposed zero NOx standards

	Impact relative to Low Policy Reference	Impact relative to High Policy Reference
Utility-scale solar <i>to serve electric loads</i>	2,180 MW new solar by 2050	70 MW new solar by 2050 <i>+ accelerated build in 2030s & 2040s</i>
4-hour battery storage <i>for generation capacity</i>	680 MW new batteries by 2050	< 10 MW new batteries by 2050 <i>+ accelerated build in 2030s & 2040s</i>
Transmission Capacity	460 MW impact by 2050	< 10 MW impact by 2050 <i>+ accelerated build in 2030s & 2040s</i>
Distribution Capacity	420 MW impact by 2050	< 10 MW impact by 2050 <i>+ accelerated build in 2030s & 2040s</i>

2. Background

The BAAQMD is evaluating amendments to rules 9-4 and 9-6, which govern nitrogen oxide (NO_x) emissions from residential and commercial space and water heating systems. The proposed amendments would introduce zero NO_x standards for devices covered under these rules. Today, the only technologies that meet zero NO_x standards for these end uses are electric space and water heating devices. In the future, gas-fired technologies that meet the proposed standards could be developed. In this study, to determine potential conservative (upper end) impacts on electric infrastructure, it is assumed that gas space heating and water heating devices would be replaced by electric heat pump devices upon burnout.

The following rule changes were proposed:

- + Rule 9-4 governs emissions from gas-fired furnaces.
 - + BAAQMD proposes zero NO_x standards for all residential and commercial gas-fired furnaces, applicable on January 1, 2029.
- + Rule 9-6 governs emissions from gas-fired water heaters and boilers with heat input capacity less than 2,000,000 Btu/hr.
 - + BAAQMD proposes zero NO_x standards for water heaters and boilers with heat input capacity less than 75,000 Btu/hr, applicable on January 1, 2027.
 - + BAAQMD proposes zero NO_x standards for water heaters and boilers with heat input capacity between 75,000 Btu/hr and 2,000,000 Btu/hr, applicable on January 1, 2031.

In this study, E3 has analyzed the electric grid impacts of the proposed standards, assuming that covered gas devices would be replaced by electric heat pumps at device retirement. A widespread shift to electric heat pumps would result in electric load growth, requiring new infrastructure to support these loads.

Electric grid impacts have been considered in four categories:

- + **Electric load:** generation resources to serve new electric loads, not necessarily during peak hours
- + **Generation capacity:** resources to serve new electricity needs at times of peak demand
- + **Transmission capacity:** new electric transmission infrastructure to deliver electricity from generators to the distribution system, associated with new peak loads
- + **Distribution capacity:** new electric distribution infrastructure to deliver electricity from the transmission system to retail customers, associated with new peak loads

3. Heat Pump Adoption Scenarios

Technology Assumptions

This modeling assumed a baseline gas technology for each end use: residential space heating, residential water heating, commercial space heating, and commercial water heating. The modeling also includes assumptions regarding the heat pumps that would replace gas devices under the proposed zero NOx standards. Details on the technology assumptions are provided in the section [Appendix: Detailed Methodology](#).

Zero NOx Standard Dates and Coverage

Table 2 illustrates key modeling assumptions regarding the proposed zero NOx standards. The implementation dates for the proposed standards are based on the proposed rule amendments, as described above in the section [Background](#). Coverage reflects the share of natural gas usage assumed to be covered by the amendments. This analysis assumes that 50% of commercial water heating would be served by large water heaters with capacity greater than 2 MMBtu/hr and thus would not be covered under these standards.

Table 2: Zero NOx standard implementation dates and assumed coverage

End use	Zero NOx standard implementation date	Coverage (%)
Residential Space Heating	Jan 1, 2029	100%
Residential Water Heating	Jan 1, 2027	100%
Commercial Space Heating	Jan 1, 2029	100%
Commercial Water Heating	Jan 1, 2031	50%

Sensitivities were also performed considering implementing the standards in 2026 or in 2035. Results of these sensitivities are included in the section [Appendix: Sensitivities on Implementation Year](#).

Reference Scenarios and Proposed Standards Scenario

The impact of the proposed zero NOx standard should be evaluated relative to a reference scenario in which the proposed standards were not implemented. Absent the zero NOx standards, some level of heat pump adoption would nevertheless occur, driven by economics, customer preferences, and/or other policy changes. E3 measured the impact of the proposed zero NOx standards as the *incremental* impact on electric load, infrastructure development, and land use above what would otherwise have occurred.

Reference Scenarios

Due to uncertainty regarding future state policies to support building electrification, there is a wide range of plausible heat pump adoption levels absent the proposed zero NO_x standards. To reflect this uncertainty, this study considered two reference scenarios of heat pump adoption for space and water heating. Both scenarios come from the California Air Resource Board (CARB) 2022 Draft Scoping Plan Update.¹

- + The **Low Policy Reference** assumes heat pump adoption consistent with the 2022 Draft Scoping Plan BAU Reference Scenario. This case represents a business-as-usual (BAU) future in which California does not meet its 2030 or 2045 greenhouse gas (GHG) emissions targets. Regarding heat pumps, this case reflects existing and planned levels of incentives for heat pumps and no major policy changes supporting building electrification, resulting in relatively low heat pump adoption through 2045.
- + The **High Policy Reference** assumes heat pump adoption consistent with the 2022 Draft Scoping Plan Proposed Scenario.² This case reflects major policy changes to decarbonize all sectors of California's economy aligned with achieving the state's GHG emissions targets. State-level policies drive a fast pace of heat pump adoption in the High Policy Reference.

While the Low Policy Reference sees significant levels of gas devices sold through 2045, the High Policy Reference reflects the goal that "all new appliances sold in California would be zero-emission by 2035 for installation in residential buildings and by 2045 for installation in commercial buildings." More details on these sales targets, including policy considerations, are provided in the Scoping Plan Appendix on Building Decarbonization.³

Proposed Zero NO_x Standards Scenario

Heat pump adoption under the proposed standards was assumed to follow the Low Policy Reference until the implementation year for the relevant zero NO_x standard, after which it would grow following a simplified linear adoption trajectory over the number of years of the corresponding gas device lifetime. As an example, residential gas furnaces were modeled to have a 16-year lifetime and a proposed zero NO_x standard taking effect on January 1, 2029. Thus, residential heat pump adoption for space heating in the Proposed Standards scenario follows a linear trajectory from 5.9% in 2028 (the level of the Low Policy Reference) to 100% by 2044 (16 years later).

Residential Heat Pump Space Heating Sales and Adoption

Figure 1 illustrates the annual *sales share* and *stock share* of heat pumps for residential space heating over time. The sales share indicates how many heat pumps are sold every year as a share of all residential space

¹ <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

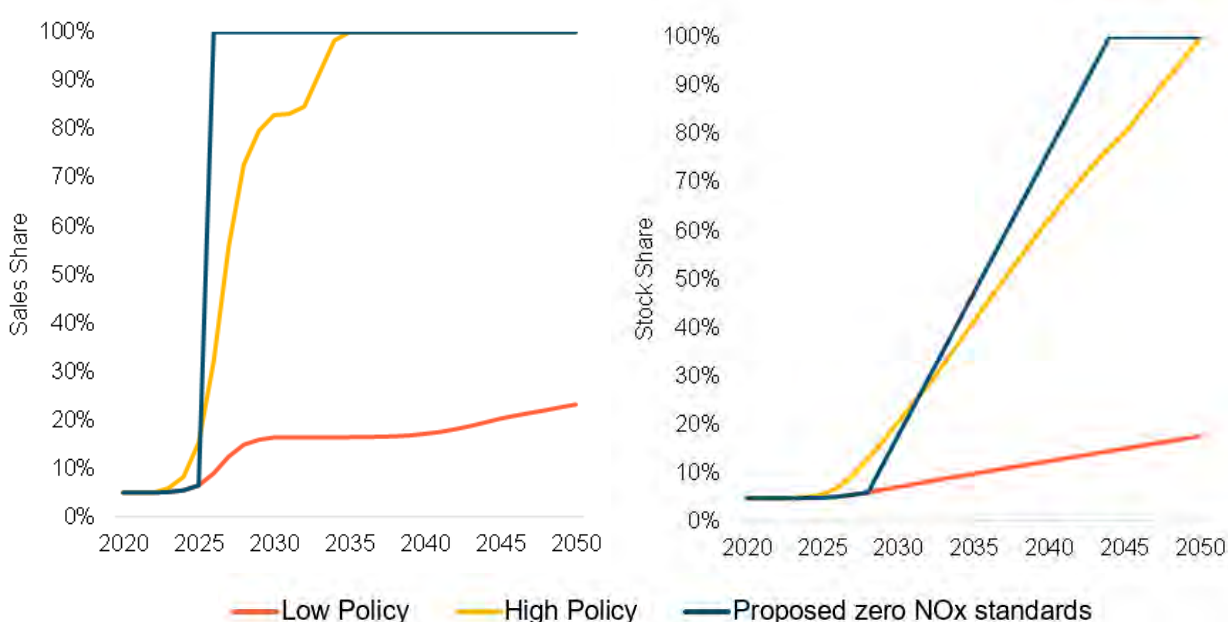
² The Proposed Scenario was formerly known as "Alternative 3." Policy measures are outlined here: <https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-c-ab-197-measure-analysis.pdf>

³ <https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-f-building-decarbonization.pdf>

heating devices sold. The stock share indicates the annual level of adoption of heat pumps among residential space heating devices installed in buildings, measured at the end of the year.

Assuming that heat pumps are installed to comply with the zero NOx standards, there would be a direct impact on the sales share of heat pumps once the proposed standards are implemented. However, it is the stock share that determines electric system impacts, as it describes the physical adoption levels of heat pumps in buildings. The stock share of heat pumps lags the sales share, as building devices have a relatively long lifetime and are assumed to be replaced at the end of this lifetime. This means that, after the implementation of zero NOx standards, it would take years for heat pumps to reach high adoption levels and cause corresponding electric system impacts.

Figure 1: Potential residential heat pump space heating sales share (left) and stock share (right)



In the Low Policy Reference, heat pump sales reach 16% of sales of residential spaces heating devices by 2030 and grow to 23% of sales by 2050. Adoption levels reach 7% of residential space heating devices by 2030, increasing to 18% by 2050. In the High Policy Reference, heat pumps sales make up 83% of residential space heating devices sold in 2030, increasing to 100% of sales by 2050. This rapid sales trajectory results in heat pump adoption levels growing to 20% of residential space heating devices by 2030 and achieving 100% saturation by 2050. Under the proposed zero NOx standards and assuming that heat pumps are used to comply with the proposed standards, heat pump sales follow the Low Policy scenario and then shift to 100% of space heating devices sold in 2029 and after. Heat pump adoption then increases linearly over the next 16 years, reaching 100% by the end of 2044.

The linear adoption trajectory used here is a simplification and neglects that device lifetime distributions are generally “long-tailed,” meaning that a small percentage of gas devices will last significantly longer than the average lifetime. Thus, our analysis using a linear adoption trajectory can be seen as a conservative (upper end) estimate of potential grid impacts associated with heat pump adoption by 2050.

More details on the reference scenarios, as well as sales shares and stock shares for residential water heating, commercial space heating, and commercial water heating, are provided in the section **Appendix: Detailed Methodology**.

4. Electric Load Impacts and Solar Energy Needs

Load Impact Methodology

Space Heating and Water Heating Loads

Maximum potential space heating and water heating load impacts are calculated based on gas usage data provided to BAAQMD by Pacific Gas and Electric (PG&E). These data include annual gas usage in BAAQMD's territory for four end uses: residential space heating, residential water heating, commercial space heating, and commercial water heating. For each end use, the maximum potential load impact assumes that 100% of gas demand for that end use shifts to heat pumps and is adjusted for the device performance characteristics of gas devices and heat pumps, as described in the section **Appendix: Detailed Methodology**. Annual load impacts are then calculated for each end use as a percentage of the maximum potential load impact, based on the incremental heat pump adoption relative to a reference scenario in that year.

As the maximum potential load impacts are based on existing data on gas usage, the modeling only reflects existing buildings. Excluding the impact of the proposed zero NO_x standards on new buildings is a simplification that reflects the trend toward all-electric reach codes in many Bay Area municipalities and the potential for an all-electric building code in the next CEC code cycle, as the proposed zero NO_x standards would not have any impact on buildings that are already all-electric.

Air Conditioning Loads

Air conditioning (AC) is a major source of electric load and a key driver of system peaks in warm climates. Heat pump HVAC units provide both space heating and space cooling in a single device. Some homes in the Bay Area do not currently have AC. Since customers who install a heat pump are assumed to make use of the cooling function, heat pump adoption is modeled to result in new air conditioning load for these households.

Conversely, heat pumps installed in residential buildings that currently have air conditioning may decrease cooling loads for the building, as new heat pump technologies generally perform better than existing air conditioners. More details are provided in the section **Appendix: Detailed Methodology**.

Current levels of AC adoption and estimates of future adoption are based on data from the CEC's 2019 Residential Appliance Saturation Survey (RASS).⁴ Average per-building air conditioning loads were calculated from the National Renewable Energy Laboratory (NREL) ResStock and ComStock databases⁵. More details are provided in the section **Appendix: Detailed Methodology**.

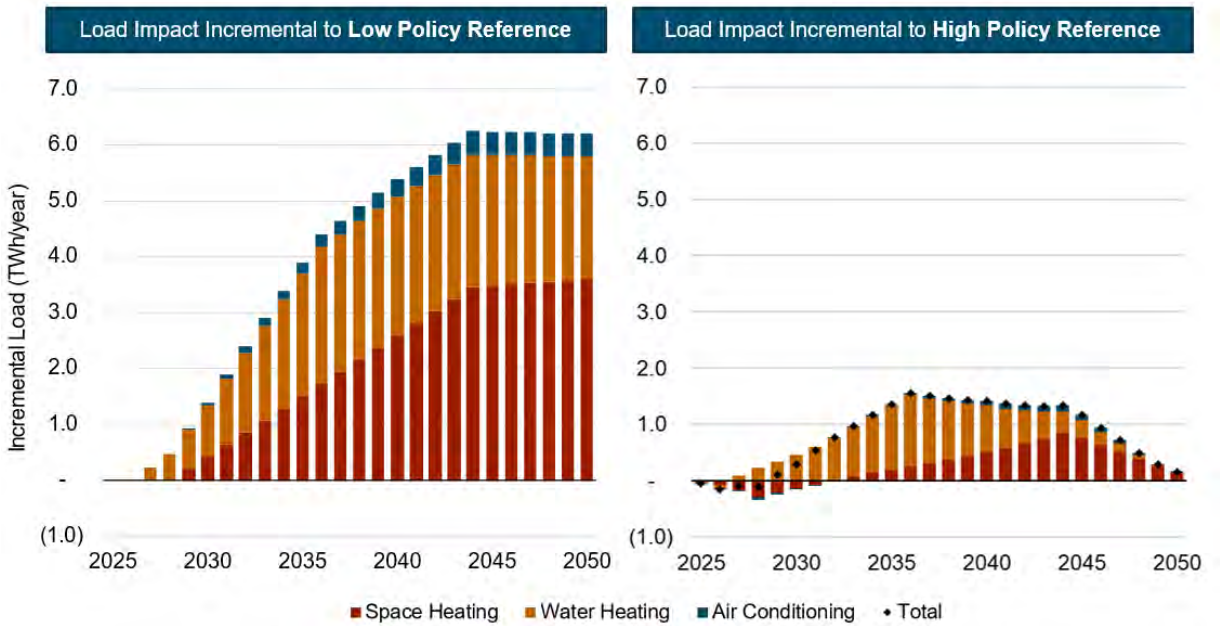
⁴ <https://www.energy.ca.gov/sites/default/files/2021-08/CEC-200-2021-005-ES.pdf>

⁵ <https://resstock.nrel.gov/>, <https://comstock.nrel.gov/>

Electric Load Impacts

Figure 2 depicts the potential annual load impact of the proposed zero NOx standards by end use, relative to each reference scenario. This analysis considers loads from residential and commercial space heating, water heating, and air conditioning for buildings within BAAQMD’s boundaries. The figure shows incremental loads for these end uses, *i.e.*, the difference between potential loads under the proposed zero NOx standards versus loads in each reference scenario. These incremental loads drive incremental infrastructure needs, as described in later sections of this document.

Figure 2: Potential annual load impact relative to reference scenarios



Relative to the Low Policy Reference, the proposed zero NOx standards could result in 6.2 TWh (terawatt-hours) per year of additional electric load by 2050. For comparison, California’s 2020 electric load was approximately 280 TWh/year⁶ and is modeled to grow to 338 TWh/year by 2045 in the Low Policy Reference.⁷ Table 3 illustrates the potential impact of this additional load on statewide electric loads in 2020 and 2045.

Space heating has the largest contribution to these load impacts, with water heating also contributing a large share and air conditioning representing a small share of the load impact. The air conditioning load impact is much smaller than the other two end uses because air conditioning is already widespread in the warmest Bay Area counties.

⁶ <https://ecdms.energy.ca.gov/elecbycounty.aspx>
⁷ <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

Table 3: Potential impact of proposed standards on statewide electric load in 2020 and 2045.

Statewide Load	Low Policy Reference	Low Policy Reference + BAAQMD Proposed Standards
2020	280 TWh/year	280 TWh/year
2045	338 TWh/year (21% growth from 2020)	344 TWh/year (23% growth from 2020)

The impacts are different when considering the High Policy Reference. Relative to the High Policy Reference, the zero NOx standards result in *earlier* load growth, seeing 1.5 TWh/year of incremental load in the 2030s. However, the incremental load falls to near zero load impact by 2050 as heat pump adoption reaches high levels in the reference. Note that *negative* incremental load occurs in some years, meaning that the High Policy Reference scenario has higher loads in those years than loads modeled from the zero NOx standards.

Utility-Scale Solar Modeled to Meet Incremental Loads

Studies indicate that solar generation will be the predominant generation resource built to serve electric energy needs in California, although other zero-carbon resources are likely to be developed as well, potentially including land-based wind, offshore wind, geothermal, biomass, or other resources. This study modeled the impacts associated with the procurement of new utility-scale solar to meet all incremental heat pump loads. The following subsections provide more detail for this assumption.

Significant battery storage is also likely to be developed to meet generation capacity needs, as described below in the section **Generation Capacity**.

Zero-carbon Electricity to Meet New Loads

Although there is no state law requiring that new loads be met exclusively by zero-carbon electricity, the current resource planning paradigm requires electric utilities to procure zero-carbon electricity on an annual basis corresponding to all new loads that can be reasonably forecast.

In California, utility resource planning occurs in the California Public Utilities Commission's (CPUC) Integrated Resource Planning process (IRP), where the CPUC reviews resource plans for both investor-owned utilities and community choice aggregators (CCAs).⁸ In IRP, utilities and CCAs submit resource plans for how they will meet their load forecasts. Importantly, these resource plans are subject to a fixed GHG emissions cap. In the most recent phase of IRP, utilities submitted plans aligned with a 2030 electric-sector emissions cap of 38 million metric tons CO₂, which is understood to be aligned with the state's

⁸ CCAs are local nonprofit public agencies that procure power on behalf of customers, with the incumbent utility (e.g., PG&E) retaining responsibility for transmission and distribution infrastructure and for customer metering and billing. CCAs are widespread in the Bay Area, where they serve the majority of customer load.¹¹

economywide emissions targets. Importantly, the same emissions cap was assumed across different sensitivities on load levels.⁹ The IRP base case is planned to have some level of gas-powered generation that exactly meets the GHG emissions cap. Thus, any additional electric load from heat pumps would require incremental procurement of zero-carbon electricity so as not to increase gas generation and exceed the emissions cap.

More evidence that electrification loads will be met by zero-carbon resources comes from utility and CCA voluntary emissions targets. PG&E as well as many CCAs have committed to achieving certain emissions targets or 100% decarbonized portfolios regardless of load growth.¹⁰ Although these targets may be for different years, they are aligned with the IRP planning paradigm that zero-carbon resources should be procured to serve new loads.

Municipal utilities such as the City of Palo Alto and Alameda Municipal Power are not subject to CPUC oversight in resource planning. However, these utilities make up less than 5% of electric load in the Bay Area.¹¹

Utility-scale Solar as the Marginal Zero-carbon Generation Resource

Resource planning studies have considered the mix of new electric generation resources that will be developed in California. The IRP developed a Preferred System Plan that describes the optimal resource build through 2032. This plan includes the development of the following energy resources: 19 GW of utility-scale solar, 5 GW of land-based wind (including 1.5 GW out of state), 2 GW of offshore wind, 1 GW of geothermal, and 0.1 GW of biomass.¹² In addition, battery storage, pumped hydro storage, and demand response are developed to provide generation capacity.

While the IRP is focused on resource needs over the next decade, the 2021 “SB100 Joint Agency Report” considers resource needs through 2045.¹³ This report documents a joint study by the California Energy Commission (CEC), CPUC, and CARB, investigating electric generation resource needs to meet the SB100 requirement that 100% of electric retail sales be from zero-carbon resources by 2045. Results of this study indicate that energy needs will be met through a mix of utility-scale solar, customer solar, land-based wind, and offshore wind, with utility-scale solar representing the majority of resource additions.¹⁴

Together, these studies indicate that utility-scale solar will be the predominant generation resource built to serve new loads in California, although some amount of land-based wind, offshore wind, geothermal, biomass, and/or other resources may also be developed. As a simplifying assumption, this study models

⁹ Figure 4 (p91) shows different load sensitivities modeled using the 38 million metric tons GHG cap in 2030. Other emission caps (46 MMT, 30 MMT) were considered but not adopted in this decision (Section 4.1, p72).

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF>

¹⁰ See targets for [PG&E](#), [East Bay Community Energy \(Alameda County\)](#), [MCE \(Marin, Napa, Solano, Contra Costa\)](#), [Clean Power SF \(San Francisco County\)](#), and [Peninsula Clean Energy \(San Mateo County\)](#).

¹¹ See for example Form 1.1c of the California Energy Commission’s Integrated Energy Policy Report.

<https://efiling.energy.ca.gov/GetDocument.aspx?tn=241383&DocumentContentId=75340>

¹² <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF>

¹³ <https://efiling.energy.ca.gov/Efiling/GetFile.aspx?tn=237167&DocumentContentId=70349>

¹⁴ See ref. 13, Figure 3

the impacts of utility-scale solar as the sole generation resource developed to serve potential new loads resulting from the proposed zero NOx standards.

Utility-scale Solar Impacts

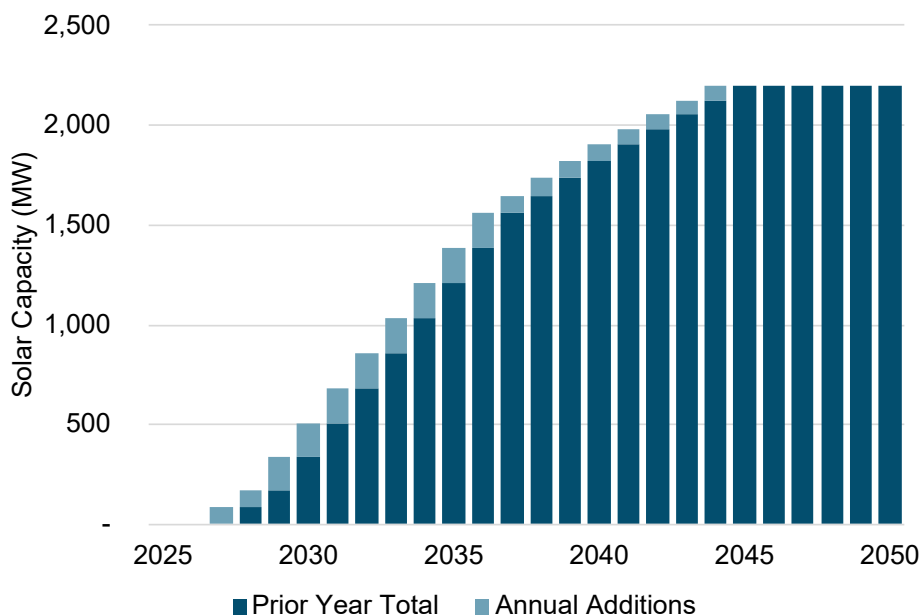
Note that this study does not aim to assess the total amount of solar generation needed to meet all customer loads. Rather, it aims to determine the additional solar generation needed to meet potential incremental loads from the proposed zero NOx standards beyond what would already be required in the reference scenarios.

The size of a solar power plant is described by its *nameplate capacity* and measured in MW (megawatts). The nameplate capacity describes the maximum potential output of the plant under optimal conditions. The average output from a solar plant is lower than the nameplate capacity and will depend on the plant's location and the technologies used. Solar technology characteristics used in the analysis are discussed in the section [Appendix: Detailed Methodology](#).

Figure 3 shows the cumulative incremental solar capacity relative to the Low Policy Reference over time, breaking out the annual additions in each year. Relative to the Low Policy Counterfactual, 2,180 MW of incremental utility-scale solar capacity would be required by 2050. This amount of new solar capacity would generate 6.2 TWh/year of electricity, corresponding to the incremental loads relative to the Low Policy Reference (see Figure 2).

Relative to the High Policy Reference, 70 MW of incremental solar capacity would be needed by 2050.

Figure 3: Potential incremental utility-scale solar capacity relative to Low Policy Reference



As context for these incremental solar needs, the 2021 SB100 Joint Agency Report, described above, found that 70,000 MW of utility-scale solar capacity would be developed by 2045 in an optimal portfolio.¹³

Table 4 describes the potential 2050 utility-scale solar impacts from the proposed zero NOx standards. In addition to showing the potential impacts on solar capacity needs, Table 4 also describes the potential cost and land use impacts.

Table 4: Potential utility-scale solar impacts from proposed standards

	2050 impact relative to Low Policy Reference	2050 impact relative to High Policy Reference
Utility-Scale Solar (MW)	2180 MW	70 MW impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Cumulative Cost (Real \$2021 Million)	\$1,860	\$390 <i>Due to accelerated build</i>
Land Use (acres)	19,500	700

The costs in this table are calculated based on annual incremental load impacts and the levelized cost of energy (LCOE) of utility-scale solar, as described in the section **Appendix: Detailed Methodology**. Costs reported here reflect cumulative costs through 2050, incremental to the Reference.

To evaluate the land use impacts associated with utility-scale solar, E3 drew on an NREL report that evaluated the direct land use impacts of solar, *i.e.*, the land directly occupied by solar project infrastructure.¹⁵ The study found the direct land-use impact of utility-scale solar to be 9.0 acres per MW. The incremental utility-scale solar needs described above correspond to direct land use impacts of 79 km² (19,500 acres) relative to the Low Policy Reference, and 3 km² (700 acres) relative to the High Policy Reference. For more details on NREL report, see the section **Appendix: Detailed Methodology**.

The land requirements of renewable generation resources are well understood, and environmental restrictions on renewable project siting are an active topic of discussion among policymakers and stakeholders. In 2019, The Nature Conservancy published a report called “The Power of Place,” which considered the land impacts of renewable generation needed to achieve California’s climate goals and evaluated scenarios with different environmental exclusions for renewable development.¹⁶ Across the scenarios evaluated, the study found 1.6 million to 3.1 million acres of land would be developed by 2050 for solar and wind generation.¹⁷

The report also explored where in-state resources may be developed, indicating that utility-scale solar development would likely focus in areas of high solar resource quality in the Central Valley, Inland Empire, and Mojave Desert, with little to no utility-scale solar development within the Bay Area.¹⁸ The CPUC has also evaluated where new resources are likely to be developed on a ten-year timeframe, indicating similar

¹⁵ <https://www.nrel.gov/docs/fy13osti/56290.pdf>

¹⁶ <https://www.scienceforconservation.org/products/power-of-place>

¹⁷ See p6, https://www.scienceforconservation.org/assets/downloads/Executive_Summary_Power_of_Place.pdf

¹⁸ See figure 9, https://www.scienceforconservation.org/assets/downloads/Technical_Report_Power_of_Place.pdf

in-state locations for utility-scale development as well as some out-of-state locations in Arizona and Nevada.¹⁹

¹⁹ See figure 1, https://files.cpuc.ca.gov/energy/modeling/Modeling_Assumptions_2022-2023_TPP_V.2022-2-7.pdf

5. Capacity-Related Impacts and Infrastructure Needs

Capacity Impact Methodology

County-level Load Disaggregation

For this section of the analysis, annual load impacts were disaggregated to the nine Bay Area counties. There are two reasons why this disaggregation was done:

- + Different hourly load shapes were used for each county, as described in more detail in the section **End-Use Load Profiles**.
- + Different distribution capacity avoided costs were used for each county based on the corresponding CEC climate zone, as described in more detail in the section **Evaluating Capacity Impacts**.

More details of this load disaggregation are provided in the section **Appendix: Detailed Methodology**. County-level impacts have not been calculated in this study. All results are provided for the full BAAQMD territory, with the county-level loads used as an intermediate step to reflect the distinctions in load shapes and distribution capacity avoided costs across the Bay Area counties.

End-Use Load Profiles

Hourly end-use load profiles were developed based on building simulations from the NREL ResStock and ComStock databases.²⁰ These databases contain building energy simulation data for the entire US, evaluated with county-level weather data and broken out by census tract. The goal of the databases is to approximately represent the entire US building stock through hourly simulations of building loads.

More details on the load profiles are provided in the section **Appendix: Detailed Methodology**.

Evaluating Capacity Impacts

E3 leveraged the California Public Utility Commission's (CPUC's) 2021 Avoided Cost Calculator (ACC) to calculate the potential impacts of incremental heat pump loads on generation capacity, transmission capacity, and distribution capacity. The Avoided Cost Calculator (ACC) is a spreadsheet model designed to evaluate the impacts of distributed energy resources on the grid.²¹ Although initially developed to evaluate programs that reduce load, the ACC is increasingly being used to evaluate the marginal costs and benefits of load growth measures, including building and vehicle electrification. E3 maintains the ACC on behalf of the CPUC.

The ACC provides hourly marginal costs for generation capacity, transmission capacity, and distribution capacity, reflecting how capacity costs in each category are allocated over peak hours where load growth

²⁰ <https://resstock.nrel.gov/>, <https://comstock.nrel.gov/>

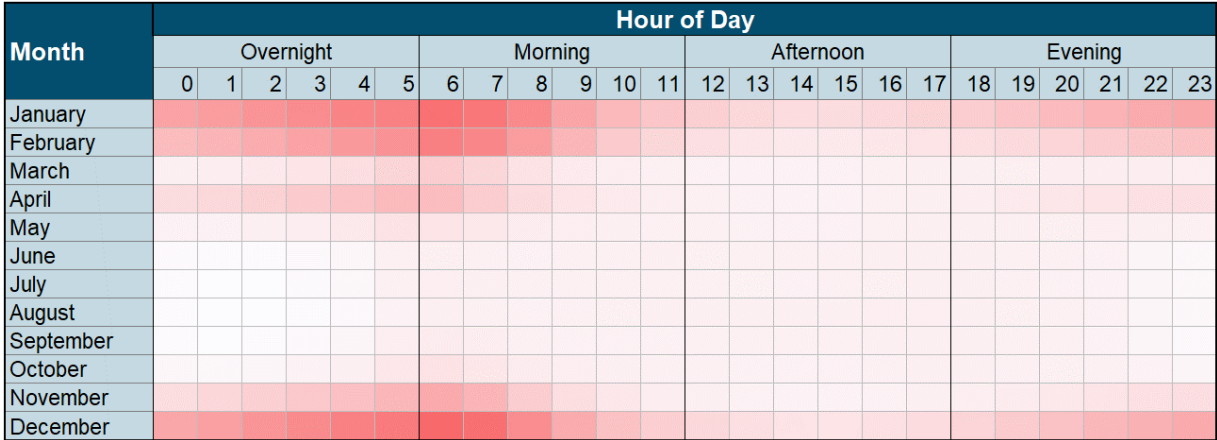
²¹ <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/idsm>

would drive a need for new investment. The ACC reflects distinct peak hours for generation capacity, transmission capacity, and distribution capacity, with distribution capacity further differentiated among climate zones within California.

Hourly Load Impacts

Figure 4 shows the hourly distribution of potential load impacts by 2050 relative to the Low Policy Reference. This figure shows how the 6.2 TWh/year of additional loads would be distributed over the months of the year (vertical) and hours of the day (horizontal). Due to the timing of space heating loads, the largest potential load impacts are calculated to be in winter night and morning hours.

Figure 4: Heat map showing the distribution of potential 2050 load impacts relative to Low Policy Reference



Capacity-Related Infrastructure Needs

Generation Capacity

Table 5: Potential generation capacity impacts from proposed standards

	2050 impact relative to Low Policy Reference	2050 impact relative to High Policy Reference
Generation Capacity (MW)	410 MW	< 10 MW impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
4-Hour Battery Storage (MW)	680 MW	< 10 MW impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Cumulative Cost (Real \$2021 Million)	\$90	\$30 <i>Due to accelerated build</i>
Land Use (acres)	8	< 0.1

Table 5 describes the potential 2050 generation capacity impacts associated with the proposed zero NO_x standards. Generation capacity describes the need for generation resources to serve electricity needs at times of peak demand. Because California’s electric system peaks in summer afternoons and evenings, only load impacts in those hours contribute to generation capacity needs.

Relative to the Low Policy Reference, potential heat pump adoption under the proposed standards would lead to 410 MW of additional generation capacity need by 2050. This describes the need for “perfect capacity,” *i.e.*, capacity of an idealized perfectly firm resource that never suffers outages. The ACC assumes that 4-hour batteries will be the marginal resource to provide generation capacity, but forecasts that the capacity contribution of these batteries will fall to 60% by 2050.²² As a result, 680 MW (nameplate capacity) of 4-hour batteries would be required to provide 410 MW of (perfect) generation capacity.

Battery storage costs are also estimated based on the ACC. Battery costs in the ACC reflect that investments in utility-scale batteries would be financed over the lifetime of the assets. Costs reported here reflect cumulative payments through 2050 on financed battery storage systems, incremental to the Reference.

Utility-scale batteries are containerized systems and have much smaller land impacts than utility-scale solar. Using specifications for the Tesla Megapack battery,²³ 680 MW of battery storage would have an 8-acre footprint.

²² Details in the 2021 ACC documentation (<https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/demand-side-management/acc-models-latest-version/2021-acc-documentation-v1b.pdf>) and model (<https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/demand-side-management/acc-models-latest-version/2021-acc-electric-model-v1b.xlsb>)

²³ <https://www.tesla.com/blog/introducing-megapack-utility-scale-energy-storage>

Relative to the High Policy Reference, there is an accelerated need for generation capacity in the 2030s and 2040s but only a negligible capacity impact (< 10 MW) and land impact (<0.1 acres) by 2050.

As context for these battery storage needs, the SB100 Joint Agency Report indicates that 49,000 MW of battery storage capacity would be built in California by 2045 as part of an optimal resource portfolio.²⁴

Transmission Capacity

Table 6: Potential transmission capacity impacts from proposed standards

	2050 impact relative to Low Policy Reference	2050 impact relative to High Policy Reference
Transmission Capacity (MW)	460 MW	< 1 MW impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Cumulative Cost (Real \$2021 Million)	\$100	\$25 <i>Due to accelerated build</i>
Associated infrastructure	Costs reflect one transformer upgrade or 10-20% of a 100-mile transmission project	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>

Table 6 describes the potential 2050 transmission capacity impacts associated with the proposed zero NOx standards. Transmission capacity describes the need for new transmission investments to support increased peak loads on the transmission system. Because California's electric system peaks in summer afternoons and evenings, only load impacts in those hours contribute to transmission capacity needs.

This analysis finds that, relative to the Low Policy Reference, potential heat pump adoption under the proposed standards would require infrastructure to support 460 MW of incremental transmission capacity need by 2050. Relative to the High Policy Reference, there is an accelerated need for transmission capacity in the 2030s and 2040s but only a negligible capacity impact (< 1 MW) and infrastructure impact by 2050.

Transmission costs are also estimated based on the ACC. Transmission costs in the ACC reflect that utility investments in transmission would be financed by an electric utility and recovered from ratepayers over the lifetime of the asset. Costs reported here reflect cumulative ratepayer costs through 2050, incremental to the Reference.

There is not a simple picture of what infrastructure would be required to provide 460 MW of transmission capacity (incremental to the Low Policy Reference). As shown in Table 6, this transmission capacity would come at a cumulative cost of \$100 million in real (inflation-adjusted) 2021 dollars. This cost estimate can be used to understand the scope of investment needed to provide this level of transmission capacity.

²⁴ <https://www.energy.ca.gov/publications/2021/2021-sb-100-joint-agency-report-achieving-100-percent-clean-electricity>

Projects to increase transmission capacity are generally expensive large-scale projects and may cost hundreds of millions or billions of dollars. Thus, the transmission capacity impacts described here may reflect the need for only a fraction of a transmission project. To understand these infrastructure impacts, E3 considered the CA Independent System Operator (CAISO) 20-Year Transmission Outlook, a document that considers transmission needs over the next 20 years to meet load and renewable energy growth aligned with state policy.²⁵ This plan describes \$11 billion in upgrades to the existing CAISO transmission footprint over the 20-year timeframe. Based on the project details included in the study, the \$100 million additional transmission system costs relative to the Low Policy Reference would correspond to a single transformer upgrade or 10-20% of the project cost associated with a 100-mile transmission project.

The \$11 billion figure also provides a reference point to understand the scale of transmission investments that are forecast over the next two decades in the CAISO footprint, which covers ~80% of California's electric load.

²⁵ <http://www.caiso.com/InitiativeDocuments/20-YearTransmissionOutlook-May2022.pdf>

Distribution Capacity

Table 7: Potential distribution capacity impacts from proposed standards

	2050 impact relative to Low Policy Reference	2050 impact relative to High Policy Reference
Distribution Capacity (MW)	420 MW	< 10 MW impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Cumulative Cost (Real \$2021 Million)	\$380	\$100 <i>Due to accelerated build</i>
Estimated Banks (New, by 2050)	6 New Banks	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Estimated Feeders (New, by 2050)	45 New Feeders	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Estimated Line Sections (New, by 2050)	10 New Line Section	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Estimated Banks (Upgrades, by 2050)	31 Bank Upgrades	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Estimated Feeders (Upgrades, by 2050)	42 Feeder Upgrades	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>
Estimated Line Sections (Upgrades, by 2050)	35 Line Section Upgrades	Negligible impact by 2050 <i>Accelerated impact in 2030s, 2040s</i>

Table 7 summarizes the potential distribution infrastructure needs estimated to result from the proposed zero NOx standards from 2026 through 2050. Distribution capacity describes the need for investments to support increased peak loads on the distribution system. While generation capacity and transmission capacity needs are only triggered by summer afternoon and evening loads, the ACC indicates that distribution capacity needs may be affected by loads across a broader set of hours in all four seasons. In addition, distribution capacity costs and peak hours used in this study are differentiated by CEC climate zone.

This analysis finds that potential growth from heat pump adoption would result in incremental distribution capacity requirements of 420 MW by 2050 relative to the Low Policy Reference. As with transmission capacity, the associated infrastructure needs can be evaluated by considering the associated cost of distribution capacity. The 420 MW of distribution capacity needs reflect a cumulative (simple sum) cost of \$380 million by 2050 (real 2021 dollars).

Relative to the High Policy Reference, there is an accelerated need for distribution capacity in the 2030s and 2040s but only a negligible capacity impact (< 10 MW) and cost impact by 2050.

Distribution costs are also estimated based on the ACC. Distribution costs in the ACC reflect that utility investments in distribution would be financed by an electric utility and recovered from ratepayers over

the lifetime of the asset. Costs reported here reflect cumulative ratepayer costs through 2050, incremental to the Reference.

Utility spending on distribution capacity reflects various infrastructure projects to accommodate increased peak loads on the system. Distribution infrastructure projects range from upgrades or replacements of existing equipment, which occur in existing rights of way, to greenfield construction of new line sections, distribution feeders, or substations, which may have a more significant environmental impact. For this study, E3 used the planned investments in PG&E’s 2021 Distribution Deferral Opportunities Report (DDOR) filing²⁶ to evaluate how distribution capacity costs may be invested into distribution infrastructure projects. The list of projects in the DDOR was categorized according to whether projects represented new build or upgrades, and then further divided into three general project categories: distribution banks, feeders, and line sections. The costs of these projects were used to estimate the number and type of projects built per million dollars of distribution-system investment. The project counts shown in Table 7 reflect, in aggregate, an estimate of how \$380 million may be spent on distribution-system infrastructure.

As a point of reference for these distribution-system cost estimates, the 2021 DDOR reflects \$400 million *per year* in distribution capacity-related costs in PG&E’s service territory, covering ~30% of statewide load.

²⁶ <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M400/K593/400593924.PDF>

6. Conclusion

This study evaluated the electric grid impacts of heat pump adoption that could result from the proposed zero NOx standards. The results indicate that the potential electric grid impacts of the proposed zero NOx standards are highly dependent on what other policies California enacts around building electrification to meet the state's climate goals.

Relative to the Low Policy Reference, a scenario where the state's climate goals are not met, the proposed standards would result in incremental load impacts, capacity impacts, and infrastructure impacts by 2050. The Low Policy Reference only assumes existing policies and incentives to support building electrification and reflects a future in which California fails to meet our climate targets. Thus, these results provide a conservative upper-bound estimate of the impacts that could be attributed to the proposed zero NOx standards.

Conversely, relative to the High Policy Reference, a scenario in line with achieving the state's climate goals, the proposed standards would result in some acceleration of grid impacts, but almost no net impacts by 2050. This reflects future state policies assumed in the High Policy Reference would result in near-100% heat pump adoption as well as significant electric grid impacts by 2050, even without the proposed zero NOx standards.

7. Appendix: Sensitivities on Implementation Year

Sensitivity 1: Zero NOx standards take effect in 2026

In this sensitivity, all zero NOx standards are assumed to take effect January 1, 2026. As in the main analysis, this sensitivity assumes that only 50% of gas used for commercial water heating would be covered by the zero NOx standards.

Figure 5 illustrates the load impacts for this sensitivity. Compared to the main analysis (Figure 2), load impacts begin earlier due to the earlier implementation of the zero NOx standards.

Figure 5: Potential annual load impact relative to reference scenarios (sensitivity 1)

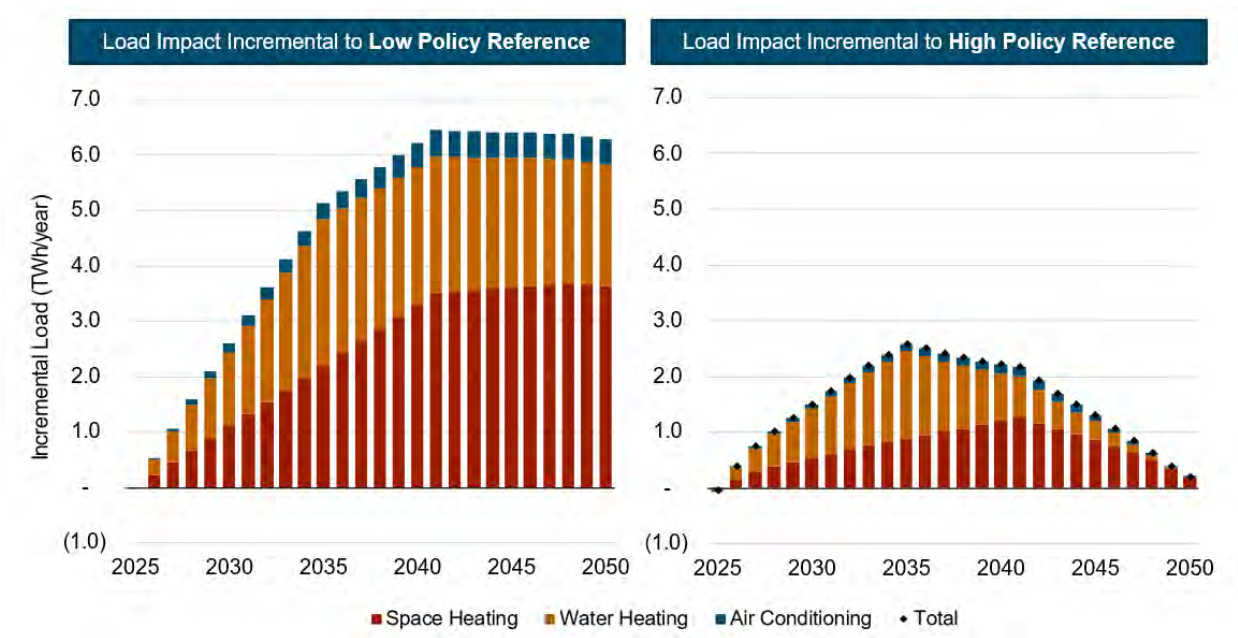


Table 8 provides a summary of 2050 electric grid impacts in this sensitivity. Compared to the main analysis (Table 1), implementing the zero NOx standards in 2026 would accelerate electric grid impacts but would result in similar overall impacts by the year 2050. This is because, even with the proposed zero NOx standard applicable dates from 2027-2031, nearly 100% of customers would have heat pumps installed by 2050.

Table 8: Summary of potential 2050 electric grid impacts of zero NOx standards (sensitivity 1)

	Impact relative to Low Policy Reference	Impact relative to High Policy Reference
Utility-scale solar to serve electric loads	2,240 MW new solar by 2050	120 MW new solar by 2050 + accelerated build in 2030s & 2040s
4-hour battery storage for generation capacity	700 MW new batteries by 2050	< 10 MW new batteries by 2050 + accelerated build in 2030s & 2040s
Transmission Capacity	460 MW impact by 2050	< 10 MW impact by 2050 + accelerated build in 2030s & 2040s
Distribution Capacity	440 MW impact by 2050	< 10 MW impact by 2050 + accelerated build in 2030s & 2040s

Sensitivity 2: Zero NOx standards take effect in 2035.

In this sensitivity, all zero NOx standards are assumed to take effect January 1, 2035. As in the main analysis, this sensitivity assumes that only 50% of gas used for commercial water heating would be covered by the zero NOx standards.

Figure 6 illustrates the load impacts for this sensitivity. Compared to the main analysis (Figure 2), load impacts begin later due to the later implementation of the zero NOx standards.

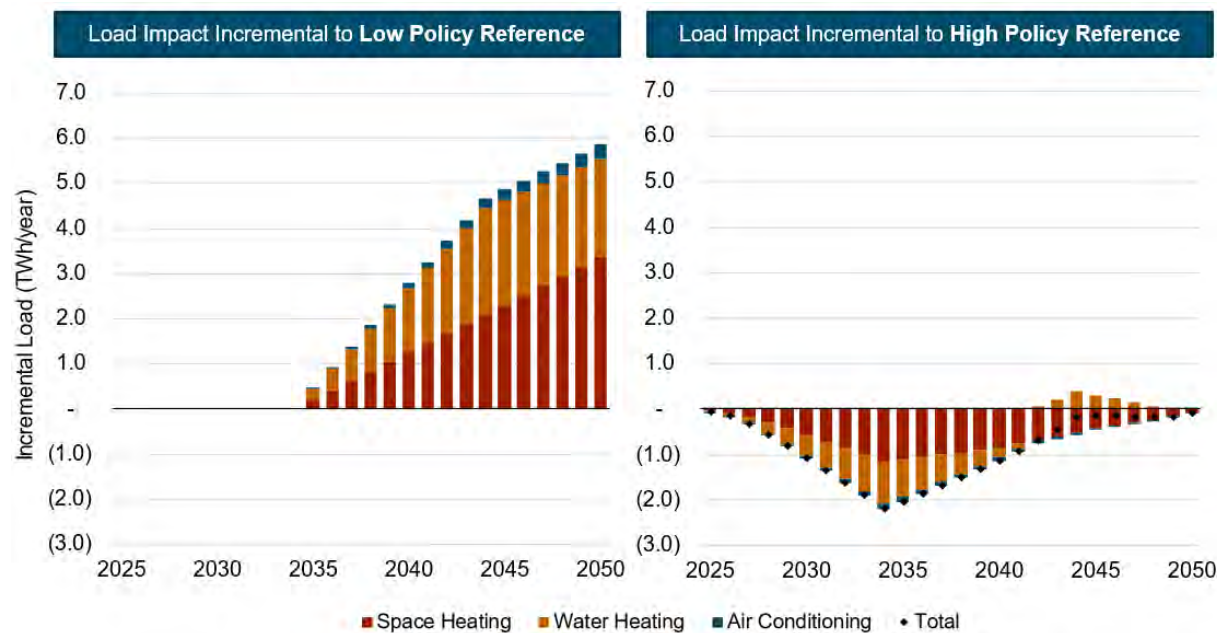
Figure 6: Potential annual load impact relative to reference scenarios (sensitivity 2)

Table 9 provides a summary of 2050 electric grid impacts in this sensitivity. Compared to the main analysis (Table 1), implementing the zero NOx standards in 2035 would delay electric grid impacts and would result

in 5-10% smaller impacts by the year 2050. Based on the device lifetimes used in this analysis, implementing the standards in 2035 would still result in 100% adoption levels for residential heat pumps as well as commercial heat pump water heaters by 2050, with only commercial space heating not achieving 100% adoption by 2050.

Table 9: Summary of potential 2050 electric grid impacts of zero NOx standards (sensitivity 2)

	Impact relative to Low Policy Reference	Impact relative to High Policy Reference
Utility-scale solar <i>to serve electric loads</i>	2,010 MW new solar by 2050	-60 MW new solar by 2050 <i>(less need than in reference)</i>
4-hour battery storage <i>for generation capacity</i>	650 MW new batteries by 2050	~0 new batteries by 2050 <i>(less need than in reference)</i>
Transmission Capacity	420 MW impact by 2050	~0 MW impact by 2050 <i>(less need than in reference)</i>
Distribution Capacity	390 MW impact by 2050	~0 MW impact by 2050 <i>(less need than in reference)</i>

8. Appendix: Detailed Methodology

Technology Assumptions

Table 10 illustrates modeling assumptions for baseline gas technologies. Device lifetime and performance metrics are based on representative building equipment data from the Energy Information Administration (EIA).²⁷ Where lifetime ranges were provided by EIA, E3 selected a conservative (short) lifetime from within the range.

Table 10: Baseline gas technologies modeled for each end use

End use	Representative technology	Device Lifetime (years)
Residential Space Heating	Gas furnace	16
Residential Water Heating	Gas storage water heater	10
Commercial Space Heating	Gas furnace or rooftop unit	23
Commercial Water Heating	Gas storage water heater	10

For the heat pumps that could replace these gas devices, assumptions regarding performance for water heating and air conditioning are also based on EIA data.²⁷ For space heating performance, E3 modeled high-end heat pumps in today's market, which are meant to reflect representative technologies that would be installed in the late 2020s and beyond.

Reference Scenarios

Although the CARB scenarios reflect statewide adoption, they were used as-is for this work due to the lack of available forecasts specifically for the Bay Area. The electric load impacts developed in this study are based on the adoption *trajectories* rather than *absolute adoption levels* and are benchmarked to 2019 gas usage data for BAAQMD's territory. Thus, the load impacts developed in this study should be reflective of the Bay Area even if CARB's statewide scenarios do not reflect the absolute levels of heat pump adoption in the region.

²⁷ <https://www.eia.gov/analysis/studies/buildings/equipcosts/>

In addition, the CARB scenarios were only provided through 2045. As this analysis was performed through 2050, the Low Policy and High Policy Reference scenarios were extrapolated through 2050 using an exponential smoothing algorithm.

Sales share and stock share trajectories for residential heat pump space heating is presented in the section **Reference Scenarios and Proposed Standards Scenario**. The following figures present the potential sales share and stock share for residential heat pump water heating (Figure 7), commercial heat pump space heating (Figure 8), and commercial heat pump water heating (Figure 9).

Figure 7: Potential sales share (left) and stock share (right) for residential heat pump water heating

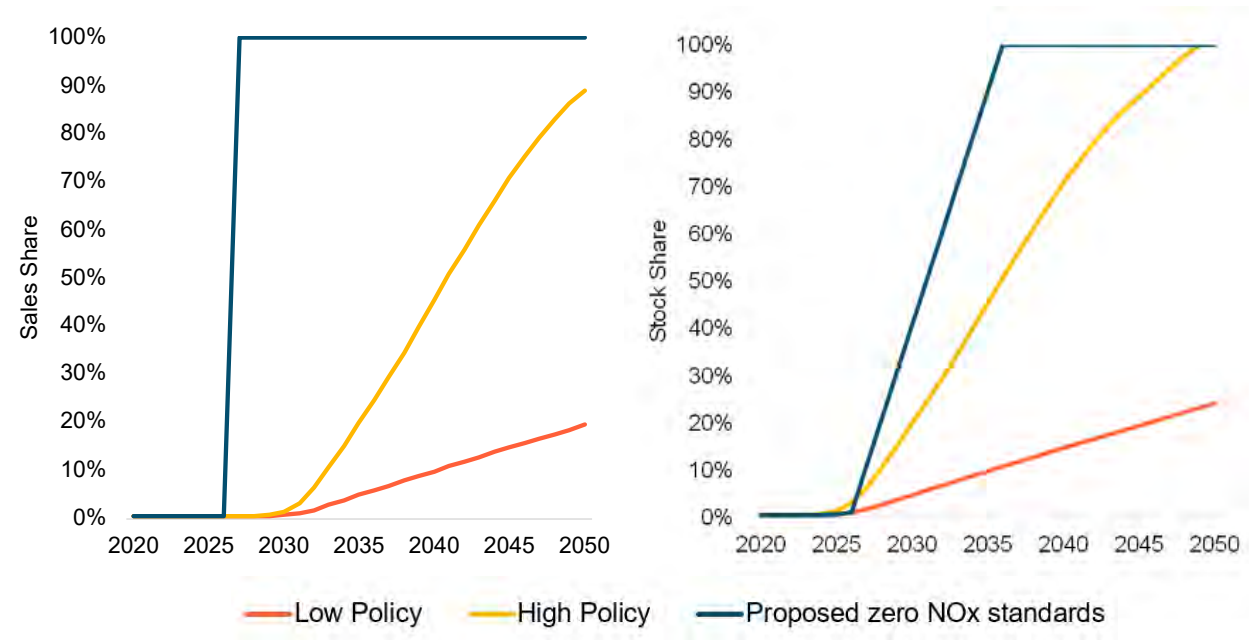


Figure 8: Potential sales share (left) and stock share (right) for commercial heat pump space heating

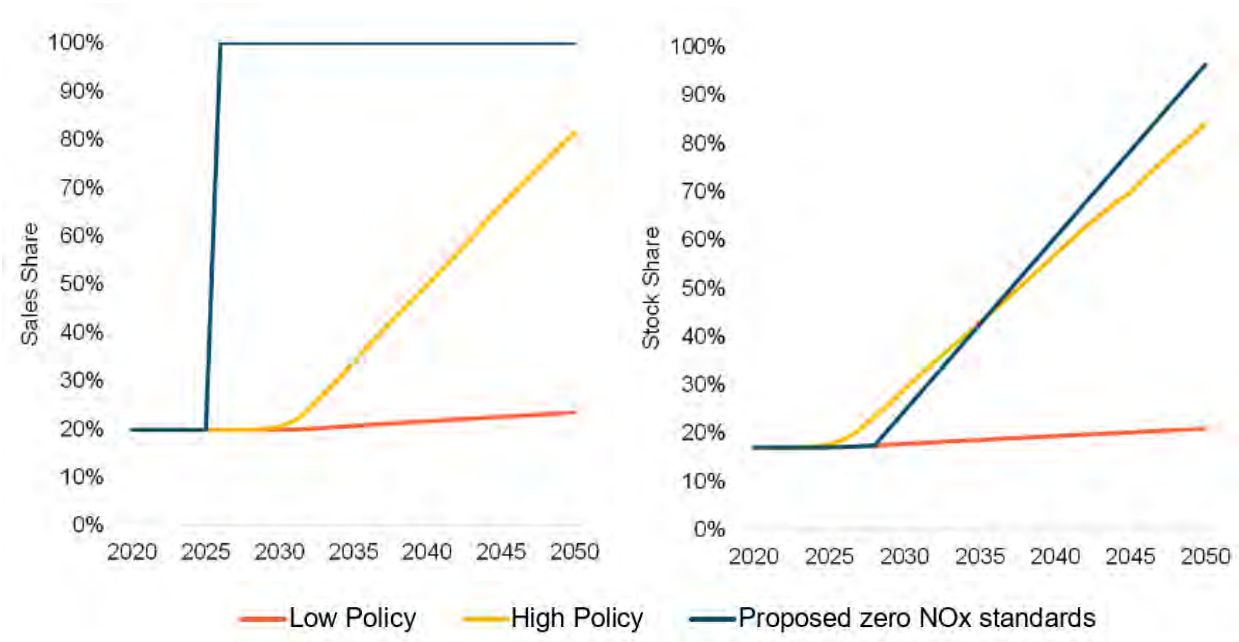
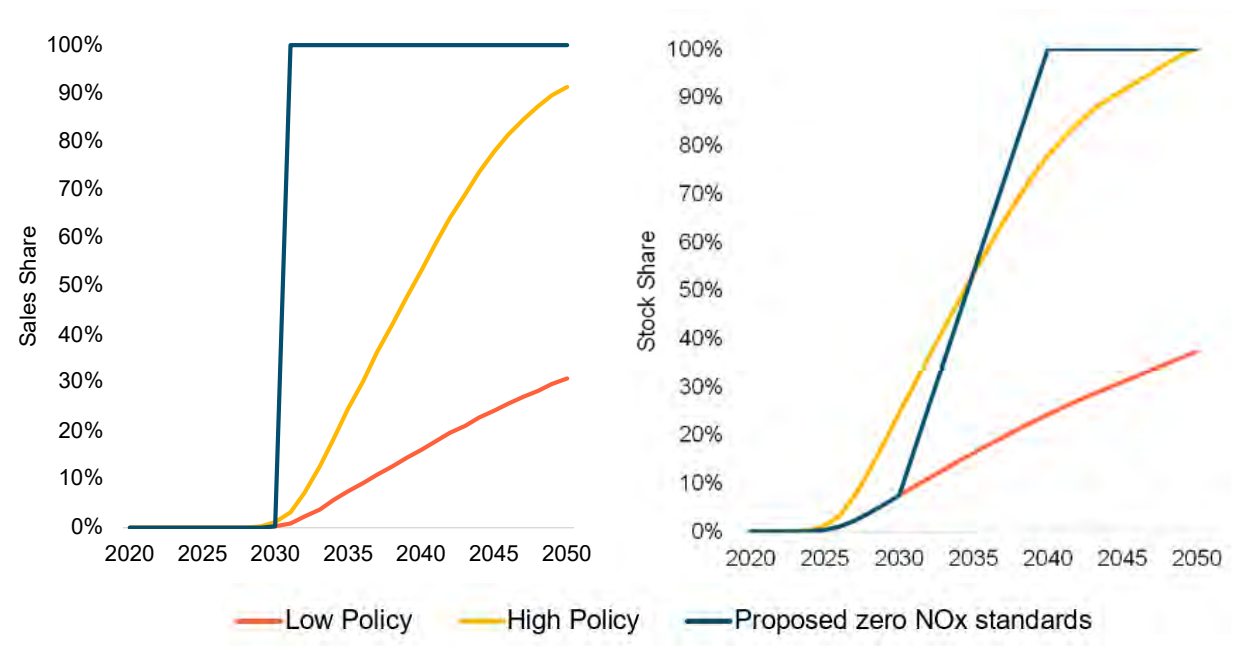


Figure 9: Potential sales share (left) and stock share (right) for commercial heat pump water heating



Air Conditioning Loads

To estimate current levels of residential AC adoption, E3 used data from the CEC's 2019 Residential Appliance Saturation Survey²⁸ (RASS) on AC adoption by CEC climate zone among homes in PG&E's gas service territory. Each of the nine Bay Area counties was assigned to one CA climate zone as illustrated in Table 11 above.

To estimate future residential AC adoption in the reference scenarios, E3 compared AC saturation data for the same set of buildings (pre-2000 vintage) between the 2009 and 2019 vintages of the RASS.²⁹ This enabled the development of a decadal AC adoption rate for each climate zone. Note that this does not reflect potential for the acceleration of AC adoption due to climate change or other factors. However, this does reflect a conservative (upper end) assumption for the potential for AC load growth due specifically to heat pump adoption.

Commercial buildings were assumed to already have 100% AC adoption. Although some smaller commercial building may not have air conditioning, this assumption reflects that the largest energy users among commercial buildings are likely to already have air conditioning.

Finally, average per-building air conditioning loads were calculated from the National Renewable Energy Laboratory (NREL) ResStock and Comstock databases.³⁰ Average annual AC load was calculated among residential buildings and commercial buildings that currently have AC in each Bay Area county. Residential buildings without AC that install a heat pump were assumed to add slightly less than the average per-building AC load. Residential buildings with AC that install a heat pump were assumed to slightly reduce their AC load.

Solar Technology Modeling

In this modeling, cost and performance data for solar generation come from the National Renewable Energy Laboratory's 2021 Annual Technology Baseline (NREL ATB), which provides standardized forecasts of energy technology development over time.³¹ The modeling uses the "Moderate" technology development trajectory for "Class 3 Utility-Scale PV." (PV, or photovoltaic, reflects the main technology used in solar electricity generation). The specific data used are Levelized Cost Of Electricity (LCOE), which reflects the cost of solar energy, and capacity factor, which reflect the average amount of energy produced by 1 MW of solar capacity. These data are shown in Figure 10.

Both cost and capacity factor are forecast to steadily improve, with LCOE falling and capacity factor increasing over time. Our modeling assumes that new solar is built to serve incremental energy needs in every year, using each year's solar cost and capacity factor. As a result, some amount of incremental

²⁸ <https://www.energy.ca.gov/sites/default/files/2021-08/CEC-200-2021-005-ES.pdf>

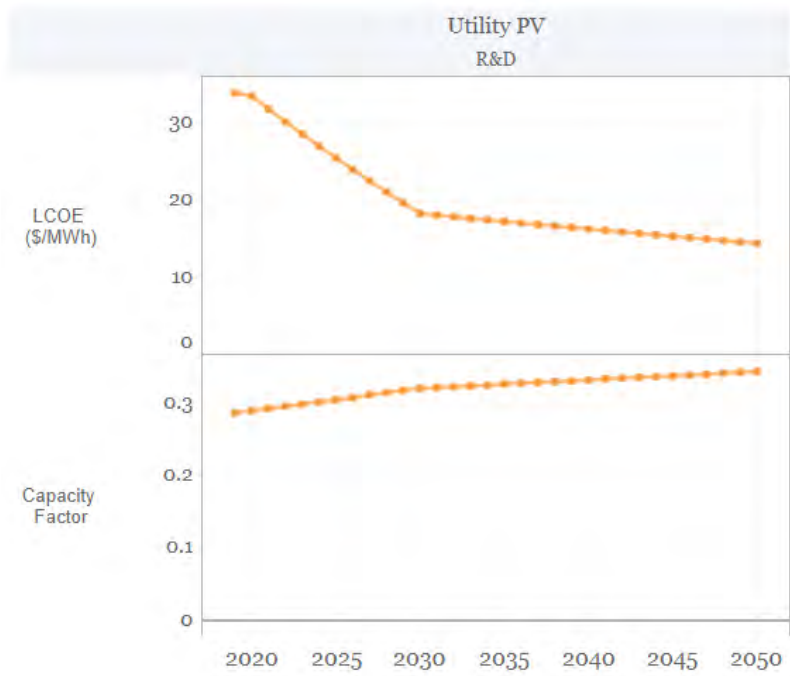
²⁹ https://webtools.dnv.com/CA_RASS/Default.aspx

³⁰ <https://resstock.nrel.gov/>, <https://comstock.nrel.gov/>

³¹ https://atb.nrel.gov/electricity/2021/utility-scale_pv

energy need in 2030 would result in greater solar capacity impacts and greater cost impacts (in real dollars) than a need for the same amount of energy in 2040.

Figure 10: Solar LCOE and capacity factor over time, from NREL ATB



Land density for utility-scale solar is modeled as 27.5 MW / km² based on the 2013 NREL report “Land-Use Requirements for Solar Power Plants in the United States.”³² This report estimates both the *total* and *direct* land area required for solar generation projects in the US, explaining: “The total area corresponds to all land enclosed by the site boundary. The direct area comprises land directly occupied by solar arrays, access roads, substations, service buildings, and other infrastructure.” This study uses the *direct* area required for “Large PV” (*i.e.*, utility-scale) and assumes that 1-axis tracking systems are used.³³ The report’s figure of 9.0 acres / MW corresponds to 27.5 MW / km².

County-level Load Disaggregation

County-level loads were disaggregated using data from the 2019 American Community Survey (ACS),³⁴ which reports the number of households with gas space heating for each census tract in California. E3 considered census tracts subject to the proposed standards if the centroid of the census tract fell within the boundaries of the BAAQMD territory, as delineated in a shapefile provided to E3 by BAAQMD. Covered

³² <https://www.nrel.gov/docs/fy13osti/56290.pdf>

³³ Based on the 2021 early release data from EIA-860, 76% of utility-scale solar generation capacity in CA currently uses 1-axis tracking. <https://www.eia.gov/electricity/data/eia860/>

³⁴ See <https://www.census.gov/programs-surveys/acs/data.html>

census tracts were aggregated to the county level to determine the number of gas-heated residential buildings in each county that would be covered by the proposed standards.

Table 11 shows the numbers of gas-heated households covered by BAAQMD. These figures were used to allocate the total load impacts for residential and commercial space and water heating over the nine Bay Area counties. In addition, each county was assigned to a single CEC Title 24 Climate Zone meant to reflect most of the buildings within that county.

This is a coarse methodology for load disaggregation and county-level results have not been calculated. All results are provided for the full BAAQMD territory, with the county-level loads used as an intermediate step to reflect the distinctions in load shapes and distribution capacity avoided costs across the Bay Area counties.

Table 11: Number of gas-heated households per county in BAAQMD territory and assigned climate zones

County	Gas-Heated Households	Climate Zone
Alameda	397,155	3
Contra Costa	270,465	12
Marin	73,325	2
Napa	31,191	2
San Francisco	214,061	3
San Mateo	174,341	3
Santa Clara	295,819	4
Solano	72,262	12
Sonoma	113,004	2

End Use Load Profiles

A five-step approach was used to develop heat pump load profiles for this study.

1. Space heating, water heating, and space cooling load profiles from ResStock and ComStock were aggregated for each of the nine Bay Area counties. To reflect energy demands for buildings that currently use gas for space and water heating, E3 utilized hourly load profiles corresponding to natural gas usage for those end uses.
2. To maintain accurate correlation between weather and energy usage, E3 developed a random forest regression model to map load simulations from the NREL databases onto the standardized weather data used in the Avoided Cost Calculator. Random forest models are popular for regression

modelling of electric loads as they provide reasonable results with minimal parameter tuning.^{35,36}

The model was validated using ResStock and ComStock simulations performed on two different sets of weather data.

3. Heat pump performance varies as a function of outdoor air temperature. E3 considered a high-end heat pump in today's market and reflective of representative technologies that would be installed in the 2030s. Using this technology and associated weather data, the hourly natural gas load profiles were converted into corresponding heat pump electric load profiles.
4. Load profiles were normalized by dividing by the sum of loads over the year. This results in normalized load profiles for each end use and each county, aligned with the weather data used in the Avoided Cost Calculator.
5. For each end use, normalized load profiles were multiplied by the annual load impacts allocated to each county. This results in county-level hourly load impacts for each end use and year.

³⁵ https://www.researchgate.net/publication/280555451_Random_forests_model_for_one_day_ahead_load_forecasting

³⁶ https://res.mdpi.com/d_attachment/algorithms/algorithms-13-00274/article_deploy/algorithms-13-00274.pdf



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX E

Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area

This page has been intentionally left blank.



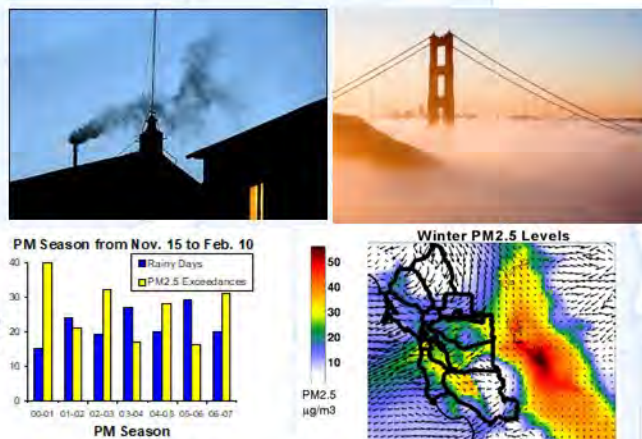
BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

375 Beale Street, San Francisco, CA 94105

Air Quality Modeling and Analysis Section Publication No. 202212-025-PM

Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area: Supplemental Information for Proposed Amendments to Regulation 9, Rule 4 and Rule 6

December 2022



Prepared by:

Saffet Tanrikulu, Air Quality Modeling and Analysis Manager
Stephen Reid, Senior Advanced Projects Advisor
Bonyoung Koo, Senior Atmospheric Modeler
Yuanyuan Fang, Statistician
Andrea Baird, Technical Editor
Yiqin Jia, Atmospheric Modeler
James Cordova, Air Quality Meteorologist
Jeff Matsuoka, Research Analyst

Contributors:

David Holstius, Senior Advanced Projects Advisor
Sukarn Claire, Air Quality Engineer
Song Bai, Emissions and Community Exposure Assessment Manager

Table of Contents

Executive Summary.....	3
Introduction.....	3
Analysis Methods	3
Emissions from the Appliances Covered by Proposed Rule Amendments	4
Simulated PM _{2.5} Impacts	5
Estimated Health Impacts	6
Simulated Changes in 24-hour PM _{2.5} and 8-hour Ozone Levels	9
List of Acronyms.....	10
1. Introduction	11
1.1 Background and Purpose	11
1.2 Analysis Methods	12
1.3 Study Setting	13
2. Emissions Inventory Preparation	14
3. Simulations	18
3.1 Formation of Secondary PM _{2.5}	18
3.2 Simulated NO _x Concentrations.....	19
3.3 Simulated PM _{2.5} Concentrations.....	20
4. Health Impacts of PM _{2.5}	22
4.1 Preparation of Population Data	23
4.2 Application of BenMAP-CE.....	25
5. Simulated Changes in 24-hour PM _{2.5} and 8-hour Ozone Levels.....	28
6. Summary and Key Findings.....	32
7. References	34
Appendix A	36
A.1 Bay Area Natural Gas Emissions.....	36
A.2 BenMAP-CE Computer Program.....	38
A.3 Discount Rates.....	39

Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area: Supplemental Information for Proposed Amendments to Regulation 9, Rule 4 and Rule 6

Executive Summary

Introduction

This assessment evaluates ambient air quality and health impacts from commercial and residential natural gas combustion emissions to provide supplemental information for proposed amendments to Bay Area Air Quality Management District (Air District or BAAQMD) Rules 9-4 and 9-6. These proposed rule amendments (Elwell, 2022) limit emissions of oxides of nitrogen (NO and NO_2 , together referred to as NO_x) from natural gas-fired furnaces (9-4) and water heaters and boilers (9-6). They impose a zero- NO_x standard on natural gas-fired commercial and residential building space and water heating appliances.

Natural gas-fired furnaces, water heaters, and boilers emit NO_x , fine particulate matter ($\text{PM}_{2.5}$), and other pollutants directly into the air. Once emitted to the atmosphere, NO_x further reacts with other pollutants to form *secondary* $\text{PM}_{2.5}$. *Total* $\text{PM}_{2.5}$ is the combination of directly emitted, or *primary* $\text{PM}_{2.5}$, and secondary $\text{PM}_{2.5}$.

This assessment focuses on the impact of reductions in emissions from natural gas-fired building appliances to be expected should the proposed rule amendments be fully implemented, with emissions reductions from current versions of the rules being excluded from benefit analyses. The proposed amendments do not specify what technology to use, but one way to meet the zero- NO_x requirement is with electric appliances, which are currently available on the market. Because the adoption of electric equipment would eliminate all combustion-related emissions, this assessment evaluates reduced impacts with electric appliances that emit no NO_x —and so contribute no secondary $\text{PM}_{2.5}$ —and also emit no primary $\text{PM}_{2.5}$.

Should zero- NO_x natural-gas fired appliances be developed in response to the proposed rules, the rules would achieve the described reductions in secondary $\text{PM}_{2.5}$ but may or may not achieve the reduction in impacts ascribed to reductions in primary $\text{PM}_{2.5}$, depending on how the appliances are designed and how many consumers choose to purchase natural-gas fired versus electric appliances.

Analysis Methods

Using the U.S. EPA's Community Multiscale Air Quality (CMAQ) model, staff conducted a year-long simulation to estimate ambient NO_x and $\text{PM}_{2.5}$ contributions from commercial and residential building appliances. Using the U.S. EPA's Environmental Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE), staff also estimated the health impacts of simulated $\text{PM}_{2.5}$. BenMAP-CE provides many health impact functions to estimate health impacts of $\text{PM}_{2.5}$ and ozone. This assessment focused on estimating the health impacts of $\text{PM}_{2.5}$. Numerous scientific studies (U.S. EPA, 2019) have linked $\text{PM}_{2.5}$ exposure to adverse human health effects, including but not limited to premature death, non-fatal heart attacks, and asthma. The contribution of NO_x emissions to ambient ozone levels in this context is relatively small, and the health effects of these small changes in ozone levels are minimal.

This modeling analysis featured two annual simulations for 2018: (1) a baseline scenario that included the Air District's latest emissions estimates from all inventoried sources and (2) a control scenario that removed emissions from space heating and water heating appliances subject to the proposed rules. Differences between these two simulations provided an estimate of the air quality impacts of these *targeted building appliances*. Because these modeled impacts include post-2018 NO_x emission reductions associated with the current version of Rule 9-6, modeling results were adjusted so that the control scenario is representative solely of emissions reductions resulting from full implementation of the proposed updates to Rules 9-4 and 9-6, under the scenario that no zero-NO_x natural-gas fired appliances are developed. Should zero-NO_x natural-gas fired appliances be developed in response to the proposed rules, the rules would achieve the described reductions in secondary PM_{2.5} but may or may not achieve the reductions ascribed to reductions in primary PM_{2.5}.

CMAQ simulation results were analyzed for two cases: (1) an estimate of chemically produced (secondary) PM_{2.5} impact from the targeted building appliances and (2) an estimate of total PM_{2.5} impact from the targeted building appliances. Changes in secondary PM_{2.5} level were attributed to NO_x emissions from the targeted building appliances. The estimated total PM_{2.5} impact includes impacts from both the secondary PM_{2.5} and from primary PM_{2.5} that is directly emitted from the targeted building appliances. BenMAP-CE was applied for changes in both secondary and total PM_{2.5} levels.

In addition to an evaluation of air quality and health impacts of PM_{2.5}, this assessment also includes an examination of modeled changes to levels of 24-hour-average PM_{2.5} and 8-hour-average ozone at air quality monitoring stations when observed concentrations were near the level of the national ambient air quality standards. Understanding how peak air pollution levels are influenced by reduction in emissions from targeted building appliances provides insight into how proposed amendments to Rules 9-4 and 9-6 might influence achieving and maintaining state and federal ambient air quality standards should the proposed rules be fully implemented.

Emissions from the Appliances Covered by Proposed Rule Amendments

Table E.1 summarizes emissions from applicable commercial and residential natural gas combustion in the Bay Area from the 2018 baseline scenario that would be targeted by the proposed rule amendments.¹ Air quality and health impacts were evaluated based on a 3,690 tons per year (ton/yr) reduction in NO_x emissions and a 458 ton/yr reduction in primary PM_{2.5} emissions, along with reductions in emissions of other pollutants shown in Table E.1. Note that for 2018, NO_x emissions from these targeted appliances totaled 4,267 tons; however, it is estimated that full implementation of existing Rule 9-6 will reduce NO_x emissions from commercial and residential water heating by 576 tons relative to 2018. That leaves 3,690 tons of NO_x emissions to be addressed by the proposed rule amendments. For the remaining pollutants, all emissions reductions from 2018 levels are associated only with the proposed rule amendments. Additional details on emissions reduction estimates and how emissions were treated in the modeling analyses are provided in Appendix A.1.

¹ Natural gas combustion emissions represent the Air District's latest estimates for residential (2019) and commercial (2018) sources. These estimates are considered representative of 2018 conditions for modeling purposes.

Table E.1: Bay Area emissions targeted by proposed rule amendments.

Description	Annual Emissions (ton/yr)				
	NO _x	PM _{2.5}	SO _x	ROG	CO
Commercial – space heating	553	45	4	29	238
Commercial – water heating	240	55	4	35	291
Residential – space heating	2,410	197	16	125	1,037
Residential – water heating	487	161	13	103	847
Total^a	3,690	458	36	292	2,413

^a Totals may not match column summations due to rounding. Values rounded to nearest ton per year.

Simulated PM_{2.5} Impacts

Figure E.1 shows secondary and total PM_{2.5} contributions from targeted building appliance emissions to ambient PM_{2.5} concentrations. Secondary PM_{2.5} contributions are the highest (exceeding 0.15 µg/m³) in southwestern San José, Figure E.1 (left panel). Secondary PM_{2.5} contributions between 0.12 µg/m³ and 0.15 µg/m³ are seen over the entire metropolitan San José region surrounding the highest PM_{2.5} reduction areas and over relatively small areas in downtown San Francisco and downtown Oakland. Contributions between 0.09 µg/m³ and 0.12 µg/m³ extend from Oakland to Gilroy and from San Mateo to San José following the Interstate 880 and 101 corridors. The same level of contributions also extends from San Ramon to Livermore following the Interstate 680 and 580 corridors, respectively. Contributions between 0.04 µg/m³ and 0.09 µg/m³ extend over much of the residential areas of the Bay Area and beyond. This spread of contributions across a wide area is due to diffusion and dispersion of pollutants in the atmosphere while forming secondary PM_{2.5}.

Total PM_{2.5} contributions from targeted building appliance emissions to annual average PM_{2.5} concentrations exceed 0.30 µg/m³ in San Francisco and Oakland, Figure E.1 (right panel). Contributions between 0.21 µg/m³ and 0.30 µg/m³ are seen in areas surrounding those with concentrations above 0.30 µg/m³ as well as in San José. PM_{2.5} contributions between 0.09 µg/m³ and 0.21 µg/m³ cover residential areas along the major freeways of the Bay Area from Richmond/San Pablo to Gilroy, from San José to San Francisco, and from Concord to Livermore. The same level of PM_{2.5} contributions is found over Napa, Santa Rosa, and Brentwood. The rest of the Bay Area has contributions less than 0.09 µg/m³.

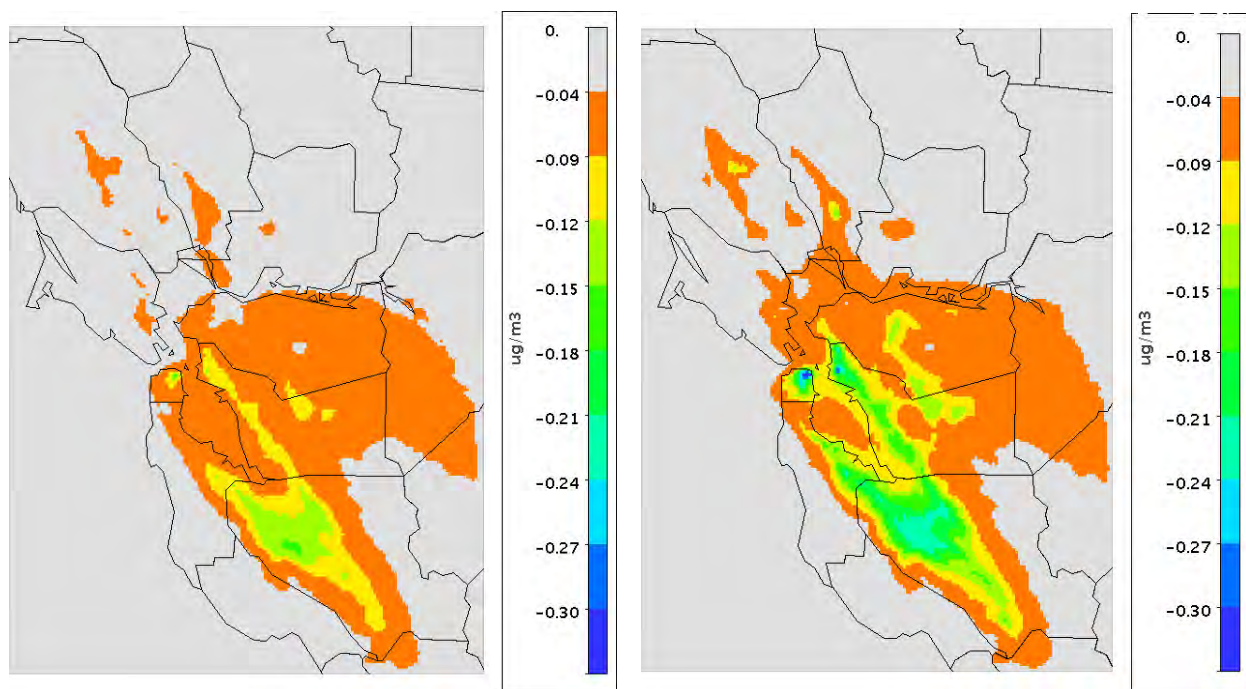


Figure E.1: Simulated reductions in annual average ambient secondary (left) and total (right) PM_{2.5} concentrations with controlled emissions from building appliances covered by proposed amendments to Rules 9-4 and 9-6.

Estimated Health Impacts

Aggregated BenMAP-CE results (Tables E.2 and E.3) show that reductions in secondary PM_{2.5} would reduce the incidence of premature mortality within the Air District's jurisdiction by 23 to 52 cases per year. Similarly, reductions in total PM_{2.5} concentrations would reduce the incidence of premature mortality by 37 to 85 cases per year. The ranges in these estimates reflect different epidemiological studies. The valuations² assigned to premature death cases range from 230 to 530 million U.S. dollars for secondary PM_{2.5} and from 380 to 870 million U.S. dollars for total PM_{2.5}.

The other health impacts in the EPA's recommended BenMAP-CE configuration include selected chronic/severe illnesses, hospital admissions/emergency room visits due to respiratory and cardiovascular diseases, selected minor health effects, and asthma-related effects. The health impacts evaluated showed decreased annual incidence as a result of reductions in PM_{2.5} levels with elimination of emissions from applicable commercial and residential space and water heating appliances. For example, for a 2020 population, 2.6 to 24 non-fatal heart attacks would be prevented with the modeled reductions in secondary PM_{2.5} and 4.2 to 39 non-fatal heart attacks would be prevented with the modeled reductions in total PM_{2.5}. The associated valuations are estimated to be 0.23 to 2.1 million U.S. dollars and 0.38 to 3.5 million U.S. dollars, respectively. Another example is the benefit of 4,100 and 6,700 fewer lost days of work, valued at 1.1 million U.S. dollars and 1.8 million U.S. dollars, respectively.

² Valuations are not identical to cost savings. Some valuations are based on cost savings, but the most highly valued component (mortality) is based on an estimate of willingness-to-pay (WTP).

Table E.2: Estimated health impacts avoided with decreased PM_{2.5} from elimination of emissions from applicable commercial and residential space and water heating appliances in the Bay Area.

Health Impact ^a	Avoided Incidence, Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	23–52	37–85
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	2.6–24	4.2–39
Hospital admission, neurological ^c	7.7	13
Incidence, out of hospital cardiac arrest	0.45	0.73
Incidence, stroke	1.5	2.4
Incidence, lung cancer	1.9	3.1
Hospital admissions^d		
Respiratory ^e	2.4	3.9
Cardiovascular ^f	3.0	4.9
ER visits		
Respiratory ^g	13	20
Cardiovascular ^h	6.2	10
Other effects		
Restricted activity days	24,000	39,000
Work loss days	4,100	6,700
Hay fever/allergic rhinitis	440	710
Asthma-related effects		
Asthma symptoms/albuterol use	9,200	15,000
Onset of asthma	71	110

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

Table E.3: Valuations of avoided health impacts with decreased PM_{2.5} from elimination of emissions from applicable commercial and residential space and water heating appliances in the Bay Area.

Health Impact ^a	Total Valuation in 2020 U.S. Dollars, Million Dollars Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	230–530	380–870
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	0.23–2.1	0.38–3.5
Hospital admission, neurological ^c	0.11	0.19
Incidence, out of hospital cardiac arrest	0.019	0.03
Incidence, stroke	0.059	0.096
Incidence, lung cancer	0.056	0.091
Hospital admissions^d		
Respiratory ^e	0.028	0.045
Cardiovascular ^f	0.055	0.090
ER visits		
Respiratory ^g	0.013	0.021
Cardiovascular ^h	0.0084	0.014
Other effects		
Restricted activity days	1.9	3.2
Work loss days	1.1	1.8
Hay fever/allergic rhinitis	0.31	0.52
Asthma-related effects		
Asthma symptoms/albuterol use	0.0037	0.0059
Onset of asthma	3.6	5.8
Sum		
All health impacts included	240–540	400–890

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

Simulated Changes in 24-hour PM_{2.5} and 8-hour Ozone Levels

In addition to evaluating air quality and health impacts from contributions to annual average PM_{2.5}, in this assessment staff also examined modeled changes to levels of 24-hour-average PM_{2.5} and 8-hour-average ozone at air quality monitoring stations when observed concentrations were near the level of the national ambient air quality standards. While this assessment did not include a formal modeling attainment demonstration for these pollutants, it did include an examination of how peak levels are influenced by reduced emissions from commercial and residential space and water heating emissions, providing insights into how proposed amendments to Rules 9-4 and 9-6 might influence achieving and maintaining state and federal ambient air quality standards should the proposed rule amendments be fully implemented.

For 24-hour PM_{2.5}, comparison of the control scenario to the baseline scenario showed a mean modeled reduction of about 0.7 µg/m³ for peak levels at the locations of monitoring sites when levels of at least 30 µg/m³ were observed. For 8-hour ozone, the mean modeled reduction was less than 0.1 ppb for peak levels when levels of at least 65 ppb were observed.³

³ For context, the current federal standard for 24-hour PM_{2.5} is 35 µg/m³ and the federal standard for 8-hour ozone is 70 ppb.

List of Acronyms

AB 617	Assembly Bill 617
BAAQMD	Bay Area Air Quality Management District
BenMAP-CE	Environmental Benefits Mapping and Analysis Program – Community Edition
CARB	California Air Resources Board
CDC	Centers for Disease Control and Prevention
CEC	California Energy Commission
CEIDARS	California Emission Inventory Development and Reporting System
CEPAM	California Emission Projection and Analysis Model
CMAQ	Community Multiscale Air Quality (model)
CO	Carbon monoxide
E&CEA	Emissions and Community Exposure Assessment (Section)
EGU	Electric generating unit
EIC	Emission Inventory Codes
EMFAC2017	Emission FAcT or 2017
ICD-9-CM	International Classification of Diseases-9-Clinical Modification
mscf	Million standard cubic feet
NAICS	North American Industrial Classification System
NO	Nitrogen oxide
NO₂	Nitrogen dioxide
NO_x	Oxides of nitrogen (NO and NO ₂)
PG&E	Pacific Gas and Electricity (Company)
PM_{2.5}	Particulate matter ≤2.5 μm in aerodynamic diameter
ppb	Parts per billion
ROG	Reactive organic gases
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions (model)
SO_x	Oxides of sulfur
ton/yr-km²	Tons per year per 1-km grid square
tpd	Tons per day
Ton/yr	Tons per year
U.S. EPA	United States Environmental Protection Agency
WRF	Weather Research and Forecasting (model)
WTP	Willingness to pay (to avoid risk)

Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area: Supplemental Information for Proposed Amendments to Regulation 9, Rule 4 and Rule 6

1. Introduction

1.1 Background and Purpose

This assessment evaluates ambient air quality and health impacts from commercial and residential natural gas combustion emissions to provide supplemental information for proposed amendments to Bay Area Air Quality Management District (Air District or BAAQMD) Rules 9-4 and 9-6. These proposed rule amendments (Elwell, 2022) limit emissions of oxides of nitrogen (NO and NO_2 , together referred to as NO_x) from natural gas-fired furnaces (9-4) and water heaters and boilers (9-6). They impose a zero- NO_x standard on natural gas-fired commercial and residential building space and water heating appliances.

Natural gas-fired furnaces, water heaters, and boilers emit NO_x , fine particulate matter ($\text{PM}_{2.5}$), and other pollutants directly into the air. NO_x forms when fuels like natural gas are burned at high temperatures. Once emitted to the atmosphere, NO_x further reacts with other pollutants to form *secondary* $\text{PM}_{2.5}$. *Total* $\text{PM}_{2.5}$ is the combination of directly emitted, or *primary* $\text{PM}_{2.5}$, and secondary $\text{PM}_{2.5}$.

Numerous scientific studies (U.S. EPA, 2019) have linked $\text{PM}_{2.5}$ exposure, to many adverse human health effects, including premature death, non-fatal heart attacks, and asthma.⁴ NO has no known adverse health effects, but NO_2 can cause a range of harmful effects and is one of six criteria pollutants for which national ambient air quality standards are set.

This assessment focuses on the difference between current emissions from natural gas-fired building appliances and the emissions to be expected should the proposed rule amendments be fully implemented. The proposed amendments do not specify what technology to use, but one way to meet the zero- NO_x requirement is with electric appliances, which are currently available on the market. Because the adoption of electric equipment would eliminate all combustion-related emissions, this assessment evaluates reduced impacts with electric appliances that emit no NO_x —and so contribute no secondary $\text{PM}_{2.5}$ —and also emit no primary $\text{PM}_{2.5}$.

Should zero- NO_x natural-gas fired appliances be developed in response to the proposed rules, the rules would achieve the described reductions in secondary $\text{PM}_{2.5}$ but may or may not achieve the reduction in impacts ascribed to reductions in primary $\text{PM}_{2.5}$, depending on how the appliances are designed and how many consumers choose to purchase natural-gas fired versus electric appliances.

The rest of this document provides an overview of the analysis methods (Sections 1.2 and 1.3) and emissions inputs (Section 2), modeled air quality (Section 3), $\text{PM}_{2.5}$ health impacts findings

⁴ Natural gas combustion is also a significant contributor to ultrafine PM (UFP) emissions in the Bay Area (Yu et al., 2019). Current regulations do not specifically target UFP, though evidence of health effects associated with UFP exposures is growing (Tanrikulu et al., 2014).

(Section 4), modeled changes to peak air pollution levels (Section 5), and a summary of key findings (Section 6).

1.2 Analysis Methods

The analysis method applied for this assessment parallels that of prior studies on the effects of natural gas appliances on outdoor PM_{2.5} and health for the U.S. (Dennison et al., 2021) and for California (Zhu et al., 2020). This Bay Area assessment, however, applied a full-chemistry model to estimate PM_{2.5} concentration increments, residential exposures, and health impacts.

For years, staff have been applying the U.S. EPA's Community Multiscale Air Quality (CMAQ) modeling platform to estimate regional ambient levels of PM_{2.5} in the Bay Area. The CMAQ model includes detailed atmospheric chemical reactions to estimate ambient levels of particle concentrations and other pollutants, such as ozone. Staff initially applied the CMAQ model to simulate PM_{2.5} concentrations at a one kilometer (1-km) horizontal resolution over the entire Bay Area for 2016 (Tanrikulu et al., 2019). This work supported the Air District's activities under Assembly Bill 617 (AB 617), providing assessments of PM_{2.5} concentrations in the West Oakland AB 617 community. Subsequently, annual simulations were conducted for three years (2016–2018) using updated emissions inventories and other model improvements. Results from these simulations are being used to support the Air District's ongoing AB 617 and rulemaking efforts.

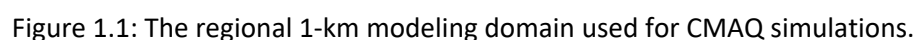
For this assessment, staff employed the same modeling platform to complete a year-long CMAQ simulation for 2018 and estimate PM_{2.5}-related air quality and health impacts from commercial and residential space and water heating emissions. Meteorological inputs to the CMAQ modeling were prepared using the Weather Research and Forecasting (WRF) model. The application and performance of this model were documented by Tanrikulu et al., 2019.

This modeling analysis featured two annual simulations for 2018: (1) a baseline scenario that included the Air District's latest emissions estimates for all inventoried sources, and (2) a control scenario that removed commercial and residential natural gas combustion emissions associated with space heating and water heating equipment subject to the proposed rules. Differences between these two simulations provided an estimate of the air quality impacts of these *targeted building appliances*. Because the modeled impacts include post-2018 NO_x emission reductions associated with the current version of Rule 9-6, modeling results were adjusted so that the control scenario is representative solely of emissions reductions resulting from full implementation of the proposed updates to Rules 9-4 and 9-6, under the scenario that no zero-NO_x natural-gas fired appliances are developed. Should zero-NO_x natural-gas fired appliances be developed in response to the proposed rules, the rules would achieve the described reductions in secondary PM_{2.5} but may or may not achieve the reductions ascribed to reductions in primary PM_{2.5}.

CMAQ simulations were analyzed to produce two main results: (1) an estimate of chemically produced (secondary) PM_{2.5} impact from the targeted building appliances and (2) an estimate of total PM_{2.5} impact from the targeted building appliances. The secondary PM_{2.5} consists of ammonium nitrate (originating from NO_x emissions), ammonium sulfate, and organic particles. The contributions of oxides of sulfur (SO_x) and reactive organic gases (ROG) to secondary PM_{2.5} in this context are minimal because their emissions from the targeted building appliances are relatively small. Changes in secondary PM_{2.5} level are therefore attributed to NO_x emissions from

Using the U.S. EPA's Environmental Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE), staff also estimated the health impacts of simulated PM_{2.5}. BenMAP-CE received inputs from the CMAQ control and baseline simulation results to estimate the health impacts associated with the simulated changes in ambient pollutant levels. BenMAP-CE provides many health impact functions to estimate health impacts of PM_{2.5} and ozone. This assessment focused on estimating the health impacts of PM_{2.5}. The contribution of NO_x emissions to ambient ozone levels in this context is relatively small, and the health effects of small changes in ozone levels are minimal. There are no known readily available methods or tools for estimating the health impacts of NO₂. BenMAP-CE was applied for changes in both secondary and total (secondary plus directly emitted) PM_{2.5} levels. In addition to determining health impacts, BenMAP-CE was also used to determine conventional health impact valuations, expressed in 2020 U.S. dollars.

Two nested domains were used in the CMAQ simulations. The outer domain covered the Bay Area, San Joaquin Valley, and Sacramento Valley, as well as portions of the Pacific Ocean and the Sierra Nevada Mountains at 4-km horizontal resolution. The inner domain covered the Bay Area and surrounding regions at 1-km horizontal resolution, as shown in Figure 1.1. The outer domain provided initial conditions and hourly boundary conditions to the 1-km inner domain.



2. Emissions Inventory Preparation

Emissions inputs for the 2018 CMAQ simulations were prepared using the U.S. EPA's Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system, which ingests annualized county- or facility-level emissions data and performs several processing steps to convert the data to the spatial, temporal, and chemical resolution required by CMAQ. The anthropogenic emissions data used in SMOKE cover four main source sectors (point, area, on-road mobile, and off-road mobile) and were assembled from a variety of data sources, as described below:

- **Point (permitted stationary sources)** – emissions data from the Air District's California Emission Inventory Development and Reporting System (CEIDARS), which is updated annually and submitted to the California Air Resources Board (CARB).
- **Area (non-permitted stationary sources)** – emissions data from CARB's California Emission Projection and Analysis Model (CEPAM). Specifically, county-level emissions for 2018 were downloaded from the CEPAM 2016 State Implementation Plan (SIP) Inventory, version 1.05.
- **On-road mobile sources** – emissions data by county and month were developed using outputs from CARB's Emission FACtor 2017 (EMFAC2017) model, which reports emissions by vehicle type and emissions process (e.g., idling, running exhaust, brake wear, tire wear).
- **Off-road mobile sources** – county-level emissions data from the CEPAM 2016 SIP Inventory, version 1.05 (same as area sources).

Commercial and residential natural gas combustion sources covered by Rules 9-4 and 9-6 are included in the area source portion of the inventory, and staff have recently prepared updated emission estimates for those sources. These estimates were based on natural gas consumption data from the California Energy Commission (CEC; California Energy Commission, 2019), which are reported by county and end use (e.g., industrial, commercial, and residential). For industrial and commercial sources, these data are reconciled against the Air District's point source inventory to avoid double-counting, and the fraction of natural gas consumption not covered by the point source inventory is assigned to the area source inventory. Emission factors that represent the mass of a pollutant released per million standard cubic feet (mscf) of natural gas burned were then applied to the activity data to develop county-level emissions estimates. These emission estimates were then disaggregated to subsectors (space heating, water heating, other) based on information from the Pacific Gas and Electricity (PG&E) Company (Dickerson, 2003). Additional details on emission estimation methods are provided in Appendix A.1.

Table 2.1 summarizes emissions from area-source commercial and residential natural gas-fired appliances in the Bay Area for the 2018 baseline scenario.⁵ These area source emissions are categorized by CARB-assigned emission inventory codes (EIC). They do not include emissions from larger appliances that require registration or permits from the Air District.

⁵ Natural gas combustion emissions represent the Air District's latest estimates for residential (2019) and commercial (2017) sources. These estimates were considered representative of 2018 conditions for modeling purposes.

Emissions values shown in bold font in Table 2.1 are covered by the proposed rule amendments. It is estimated that these amendments would reduce baseline NO_x emissions by 3,690 tons per year (ton/yr) and baseline PM_{2.5} emissions by 458 ton/yr. Note that baseline NO_x emission levels are also impacted by the existing form of Rule 9-6, which, when fully implemented, is anticipated to reduce NO_x emissions from commercial and residential water heating by 235 tpy and 341 tpy, respectively (see Table 2.1). As a result, NO_x emissions from targeted appliances will be reduced by 4,267 ton/yr relative to the 2018 baseline scenario, representing a reduction of about 6% of total annual NO_x emissions in the Bay Area (69,740 ton/yr) as shown in Figure 2.1. However, for the air quality and health impacts analyses described in this report, only the portion of the NO_x reduction attributable to the proposed rule amendments are evaluated. This reduction of 3,690 ton/yr represents a 5.3% decrease in total annual NO_x emissions in the Bay Area.

If electric appliances are adopted to meet the zero-NO_x requirement, PM_{2.5} emissions from targeted appliances will be reduced by 458 ton/yr, which represents a reduction of about 4% of total PM_{2.5} emissions in the Bay Area (12,530 ton/yr). Similarly, if electric appliances are adopted, other pollutants (in addition to NO_x and PM_{2.5}) shown in bold in Table 2.1 will be reduced as well. For pollutants other than NO_x, emissions reductions are entirely associated with the proposed rule amendments (under the assumption of electric appliances) rather than the existing forms of Rules 9-4 and 9-6. Appendix A.1 provides emissions estimates for more pollutants and from all sources of natural gas combustion in the Bay Area.

Table 2.1: Bay Area emissions (2018) from area-source building appliances. Emissions targeted by proposed amendments to Rules 9-4 and 9-6 are shown in bold font. Baseline emissions estimated to be addressed by existing Rule 9-6 are shown in italicized font.

Emission Inventory Codes	Description	Annual Emissions (ton/yr)				
		NO _x	PM _{2.5}	SO _x	ROG	CO
060-020-0110-0000	Commercial – space heating	553	45	4	29	238
060-030-0110-0000	Commercial – water heating	240	55	4	35	291
610-606-0110-0000	Residential – space heating	2,410	197	16	125	1,037
610-608-0110-0000	Residential – water heating	487	161	13	103	847
	Total – targeted emissions^a	3,690	458	36	292	2,413
<i>060-030-0110-0000</i>	<i>Commercial – water heating (covered by existing Rule 9-6)</i>	<i>235</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>610-608-0110-0000</i>	<i>Residential – water heating (covered by existing Rule 9-6)</i>	<i>341</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
060-995-0110-0000	Commercial – other	553	45	4	29	238
610-610-0110-0000	Residential – cooking	214	17	1	11	92
610-995-0110-0000	Residential – other	193	16	1	10	83
	Total – other area source appliances ^a	960	78	6	50	413

^a Totals may not match the column summation due to rounding. Values rounded to nearest ton per year.

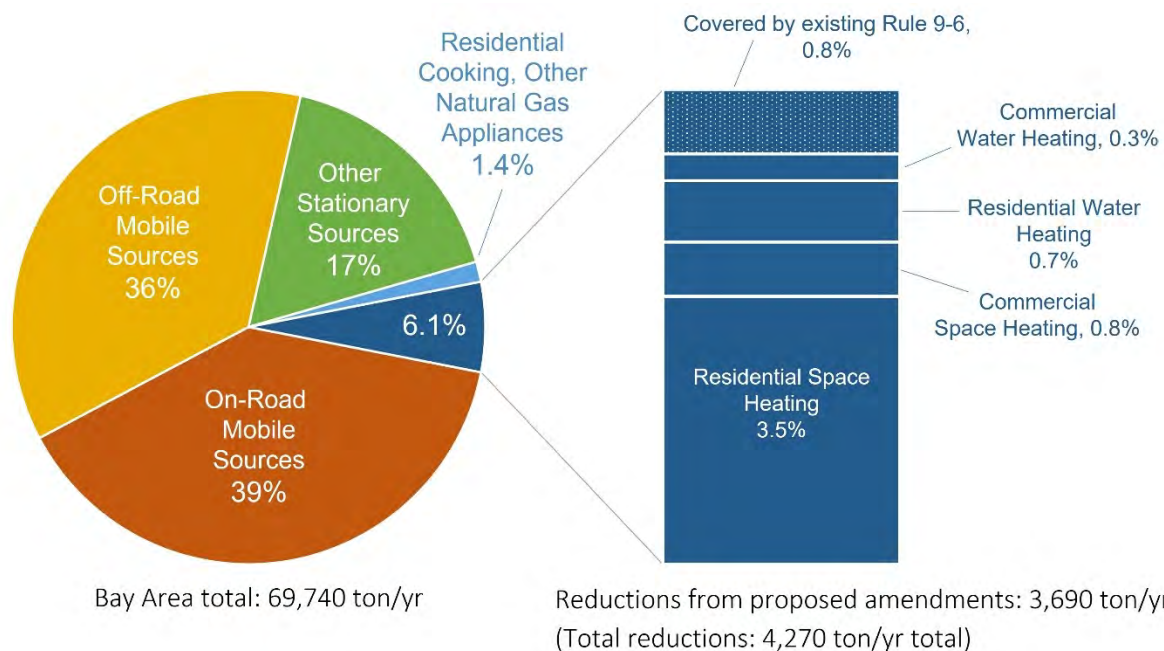


Figure 2.1. The pie chart (left) shows source contributions to total 2018 NO_x emissions in the Bay Area. The bar chart (right) shows NO_x emissions associated with targeted appliances.

Maps of NO_x emissions for the baseline scenario and the difference between the control and baseline scenarios are shown in Figure 2.2. The difference map (right panel) plots NO_x emissions from commercial and residential space and water heating appliances covered by proposed amendments to Rules 9-4 and 9-6.

The largest decrease in NO_x emissions (more than 10 tons per year per 1-km grid square, ton/yr-km²) is in downtown areas of San Francisco and Oakland, surrounded by areas with a decrease between 6 ton/yr-km² and 10 ton/yr-km² (right panel). Areas with a decrease between 1 ton/yr-km² and 6 ton/yr-km² are seen over most of the rest of the San Francisco Peninsula and along a corridor from Richmond/San Pablo to San Leandro, following the Interstate 580 and 80 corridors in the north and the Interstate 880 corridor in the south. Areas with a similar decrease are also seen from the San Francisco Airport to San José, following the Interstate 101 corridor. Most other residential areas of the Bay Area show a decrease between 0.2 ton/yr-km² and 1 ton/yr-km². Grid squares with a decrease in NO_x emissions less than 0.2 ton/yr-km² are not shown.

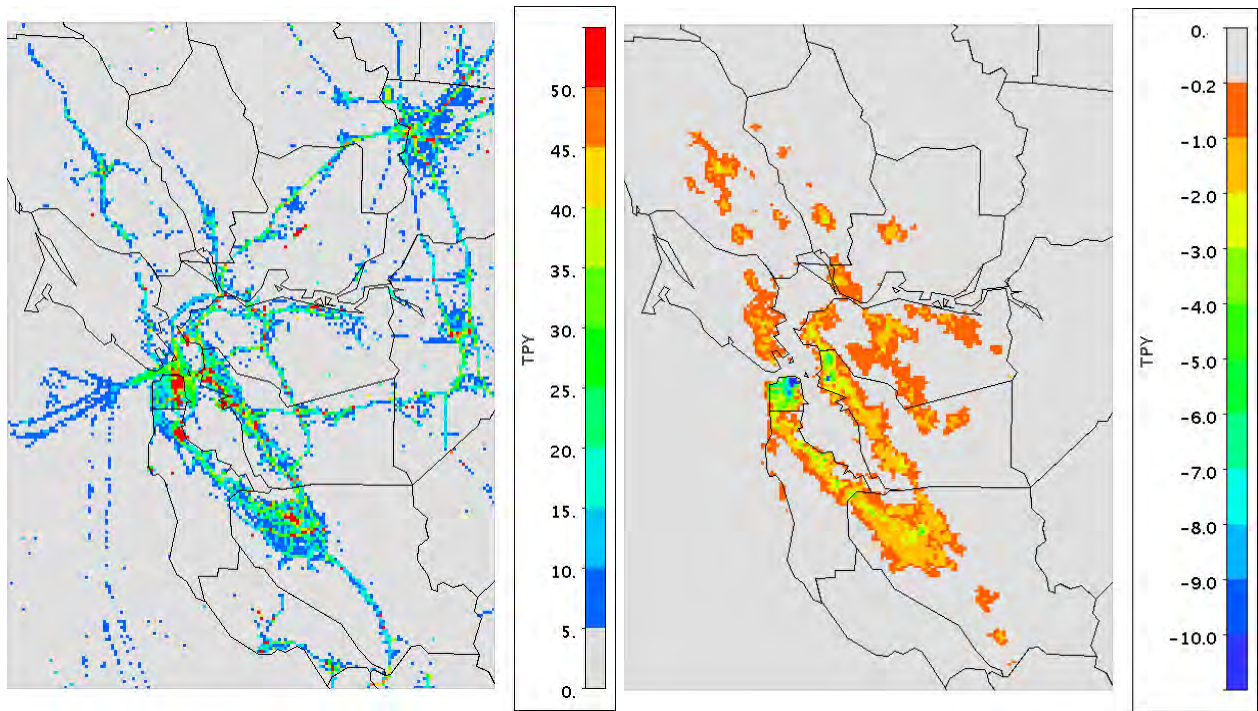


Figure 2.2: NO_x emissions for 2018 baseline scenario (left) and reductions in NO_x emissions (control – baseline) from targeted building appliances with full implementation of proposed rule amendments (right).

Maps of PM_{2.5} emissions for the baseline scenario and the difference between the control and baseline scenarios are shown in Figure 2.3. The difference map (right panel) plots PM_{2.5} emissions from commercial and residential space and water heating appliances covered by proposed amendments to Rules 9-4 and 9-6.

The largest decrease in PM_{2.5} emissions (more than 1.0 ton/yr-km²) is in downtown San Francisco, surrounded by areas with a decrease between 0.6 ton/yr-km² and 1.0 ton/yr-km² (right panel). A decrease between 0.6 ton/yr-km² and 1.0 ton/yr-km² is also in downtown Oakland. A decrease between 0.3 ton/yr-km² and 0.6 ton/yr-km² is in El Cerrito, downtown San José and at several small towns between the San Francisco Airport and San José, mostly in the vicinity of Interstate 101. A decrease between 0.1 ton/yr-km² and 0.3 ton/yr-km² is seen at residential areas along many freeways in other parts of the Bay Area, in a pattern similar to the one for NO_x emissions.

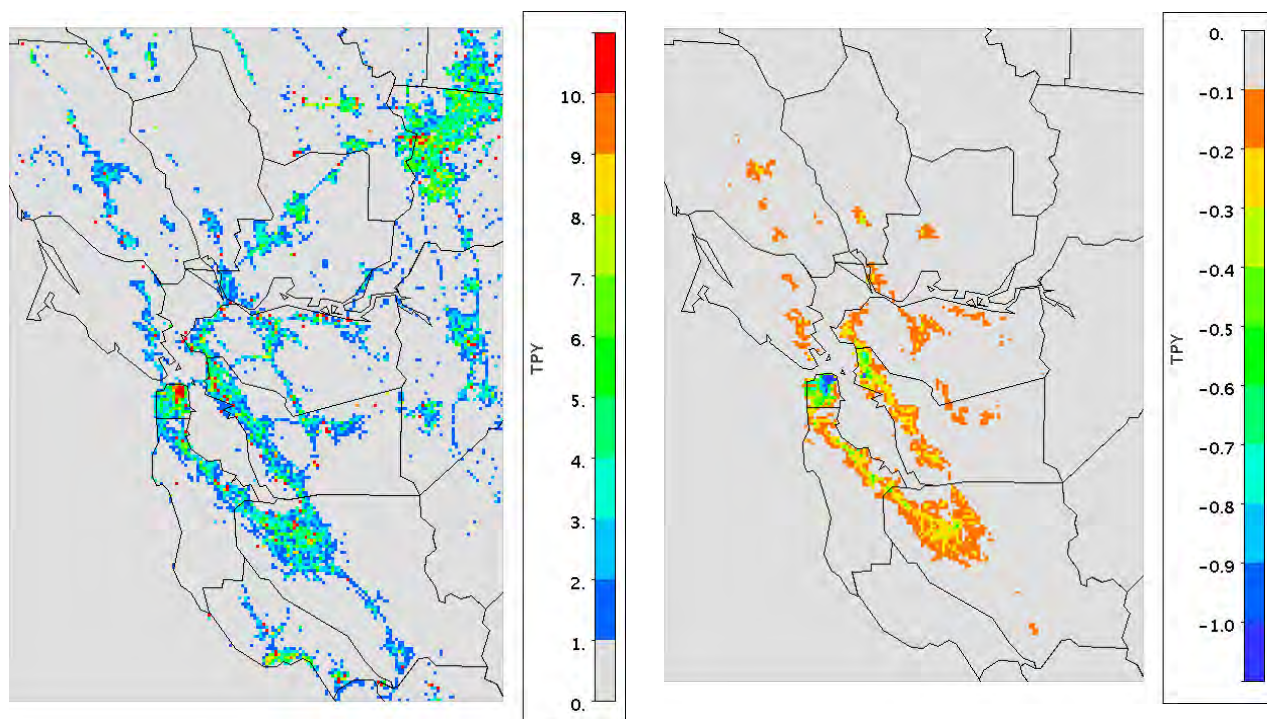


Figure 2.3: PM_{2.5} emissions for 2018 baseline scenario (left) and reductions in PM_{2.5} emissions (control – baseline) from targeted building appliances with full implementation of proposed rule amendments (right).

3. Simulations

As noted in Section 1, results from CMAQ modeling simulations conducted for the year 2018 were used to develop a control scenario that estimated the benefits of proposed amendments to Rules 9-4 and 9-6, which would reduce commercial and residential natural gas combustion emissions from space and water heating appliances.

The CMAQ model provides hourly average concentrations, which were used to estimate annual average concentrations. In the next subsections, we briefly discuss the formation of secondary PM_{2.5} (Section 3.1), Bay Area annual average concentrations, and the contributions of commercial and residential natural gas combustion emissions to ambient NO_x and PM_{2.5} levels (Sections 3.2 and 3.3, respectively).

3.1 Formation of Secondary PM_{2.5}

PM_{2.5} consists of two major components: primary and secondary. Primary PM_{2.5} is directly emitted to the atmosphere, while secondary PM_{2.5} is a byproduct of chemical reactions of gaseous pollutants such as NO_x and ammonia (NH₃) in the atmosphere.

NO_x emitted from commercial and residential natural gas combustion, along with NO_x emitted from other sources, contributes to the formation of ammonium nitrate (NH₄NO₃). To form ammonium nitrate, oxides of nitrogen go through an atmospheric oxidation cycle several times, become aged NO_x, and then convert to nitric acid. Nitric acid is a relatively heavy and sticky gas, one that remains near the ground and can combine with ammonia, forming ammonium nitrate.

Conversion of NO_x to nitric acid is a time-consuming process and can take 2 hours to 10 hours in the Bay Area, largely depending on the rate of atmospheric oxidation processes. During this time, oxides of nitrogen diffuse and disperse in the atmosphere and travel away from the original emission sources.

In the Bay Area, key sources of ammonia emissions include agricultural operations, gas-powered automobiles, domestic sources (e.g., household products and pet waste), and some industrial facilities. Ammonia emitted from these sources also diffuses, disperses, and travels in the atmosphere, encountering nitric acid in some locations, depending upon meteorological conditions. As a result, the formation of secondary PM_{2.5} depends on both time and location (i.e., higher levels can occur at locations away from the sources).

Ammonium nitrate can exist in particulate or gaseous form depending on the ambient temperature. For example, at 60 degrees Fahrenheit, ammonium nitrate can be roughly equally divided between particulate (secondary PM_{2.5}) and gaseous forms under most Bay Area conditions. As the temperature decreases, the percentage in particulate form increases, and the opposite happens as the temperature increases. Because of this property of ammonium nitrate, even though the atmospheric oxidation cycle is slow during winter months, production of ammonium nitrate in particulate form can be higher than in the summer.

SO_x and ROG emissions from the applicable commercial and residential space and water heating appliances also contribute to secondary PM_{2.5}, as ammonium sulfate and secondary organic aerosols, respectively. Their contribution is included in the model output but is much smaller than the contribution from NO_x emissions, and not provided separately by the model.

3.2 Simulated NO_x Concentrations

In this section, we present Bay Area maps of simulated annual average NO_x concentrations (baseline) and the difference between the control scenario and the baseline scenario, as shown in Figure 3.1. The baseline scenario (left panel) includes emissions from all inventoried sources. The control scenario (not shown) eliminates emissions from applicable commercial and residential space and water heating appliances. The difference between the two scenarios (right panel) shows NO_x contributions attributed to emissions from the targeted building appliances.

For the baseline scenario, the highest annual average NO_x concentrations (over 20 parts per billion, ppb) are evident in downtown San Francisco and downtown Oakland, along the Bay Bridge, and at the San Francisco, Oakland, and San José airports, as shown in Figure 3.1 (left panel). Concentrations between 14 ppb and 20 ppb are found mostly in the areas surrounding those with concentrations above 20 ppb. Concentrations between 8 ppb and 14 ppb cover an area from the Interstate 101 corridor in the west to the Interstate 880 corridor in the east and from the San Mateo–Hayward Bridge in the north to San José in the south. Similar NO_x concentrations are also evident along the Delta and portions of the Interstate 680 corridor.

In the difference plot, annual average NO_x increments over 1.0 ppb from commercial and residential space and water heating emissions are evident in San Francisco, Oakland, Berkeley, El Cerrito, Fremont, and San José, and along the corridor between San Mateo and to San José (Figure 3.1, right panel). Increments between 0.5 ppb and 1.0 ppb are mostly found in areas surrounding those with increments above 1.0 ppb. Increments between 0.3 ppb and 0.5 ppb are

seen in the residential areas surrounding major freeways of the Bay Area, as well as over the towns of Napa and Brentwood.

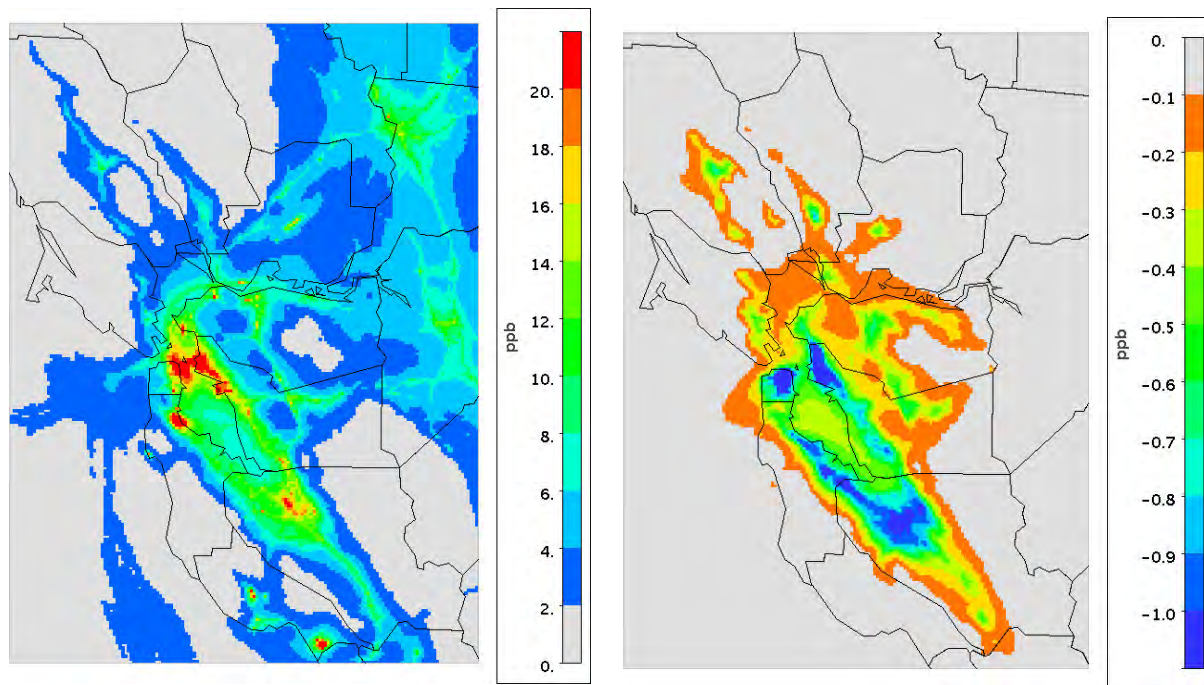


Figure 3.1: Simulated annual average NO_x concentrations for the baseline scenario (left) and the difference between the control and baseline scenarios (right). The difference between the two scenarios (control – base) shows the NO_x contribution from building appliances covered by proposed rule amendments.

3.3 Simulated $\text{PM}_{2.5}$ Concentrations

In this section, we present maps of annual average $\text{PM}_{2.5}$ concentrations for the baseline scenario (Figure 3.2) and the difference between the control and baseline scenarios (Figure 3.3). The differences shown between the control and baseline scenarios reflect $\text{PM}_{2.5}$ contributions attributed to commercial and residential space and water heating emissions covered by proposed amendments to Rules 9-4 and 9-6. Note that the existing form of Rule 9-6 would reduce 2018 NO_x emissions from commercial and residential water heating when fully implemented; however, in the treatment of modeling results, the control case reflects pollutant concentration differences associated with the proposed amendments only, as discussed in Appendix A.1. For $\text{PM}_{2.5}$, these differences are presented in two parts: (1) secondary $\text{PM}_{2.5}$ contributions from applicable commercial and residential space and water heating emissions, and (2) total $\text{PM}_{2.5}$ contributions from these emissions.

Baseline $\text{PM}_{2.5}$ Simulation

Figure 3.2 shows annual average $\text{PM}_{2.5}$ concentrations for the simulated baseline scenario. In the Bay Area, annual average $\text{PM}_{2.5}$ concentrations over $12 \mu\text{g}/\text{m}^3$ are evident in San José and east of Martinez. The same concentration level is also found in relatively small areas in Oakland, Richmond, Mountain View, and Livermore. Concentrations between $9 \mu\text{g}/\text{m}^3$ and $12 \mu\text{g}/\text{m}^3$ are mostly seen in the areas surrounding those with concentrations above $12 \mu\text{g}/\text{m}^3$ and along major freeways from Oakland to Gilroy and from San José to Mountain View.

Annual average simulated PM_{2.5} concentrations were compared against observations and model performance was evaluated (Koo et al., 2022). Simulated annual average PM_{2.5} concentrations were generally within ten percent of the annual average observations at most Bay Area air monitoring locations. The model tends to slightly overestimate PM_{2.5} in the South Bay (e.g., San José) and underestimate in the North Bay (e.g., Napa).

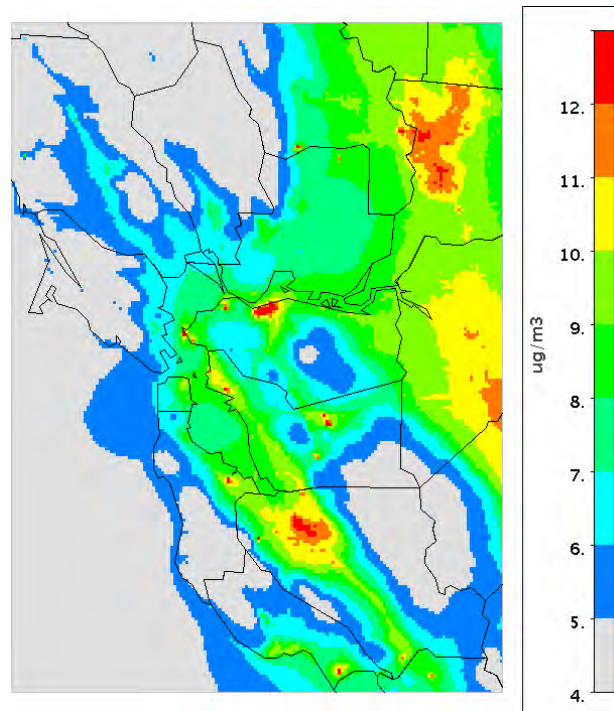


Figure 3.2: Simulated annual average PM_{2.5} concentrations for the baseline scenario.

Difference in PM_{2.5} Between Control and Baseline Scenarios

Figure 3.3 shows secondary and total annual average PM_{2.5} contributions from applicable commercial and residential space and water heating appliances. Secondary PM_{2.5} contributions are the highest (between 0.15 µg/m³ and 0.18 µg/m³) over San José, coinciding with areas where the highest NO_x reductions occur in this region (Figure 3.3, left panel). Contributions between 0.12 µg/m³ and 0.15 µg/m³ are seen over the entire metropolitan San José region, surrounding the highest reduction areas, and over relatively small areas in downtown San Francisco and downtown Oakland. Contributions between 0.09 µg/m³ and 0.12 µg/m³ extend from Oakland to Gilroy and from San Mateo to San José following the Interstate 880 and 101 corridors. Comparable contributions also extend from San Ramon to Livermore following the Interstate 680 and 580 corridors, respectively. Contributions between 0.04 µg/m³ and 0.09 µg/m³ extend over much of the residential areas of the Bay Area and beyond. This wide area of contributions is due to diffusion and dispersion of pollutants in the atmosphere while forming secondary PM_{2.5}.

Note that while the areal distribution of secondary PM_{2.5} matches well with the areal distribution of ambient NO_x reductions (Figure 3.1, right panel) from commercial and residential space and water heating emissions in San José, it does not match in San Francisco and Oakland. This is because San Francisco and Oakland are relatively windy, especially during summer months, compared to San José and, as a result, experience less secondary PM_{2.5}.

Total annual average PM_{2.5} contributions from applicable commercial and residential space and water heating appliances exceed 0.30 µg/m³ in San Francisco and Oakland (Figure 3.3, right panel). Contributions between 0.21 µg/m³ and 0.30 µg/m³ are seen in areas surrounding those with contributions above 0.30 µg/m³. Contributions between 0.09 µg/m³ and 0.21 µg/m³ cover residential areas along the major freeways of the Bay Area from Richmond/San Pablo to Gilroy, from San José to San Francisco, and from Concord to Livermore. The same total PM_{2.5} contribution level is found over Napa, Santa Rosa, and Brentwood. In the rest of the Bay Area, contributions are less than 0.09 µg/m³.

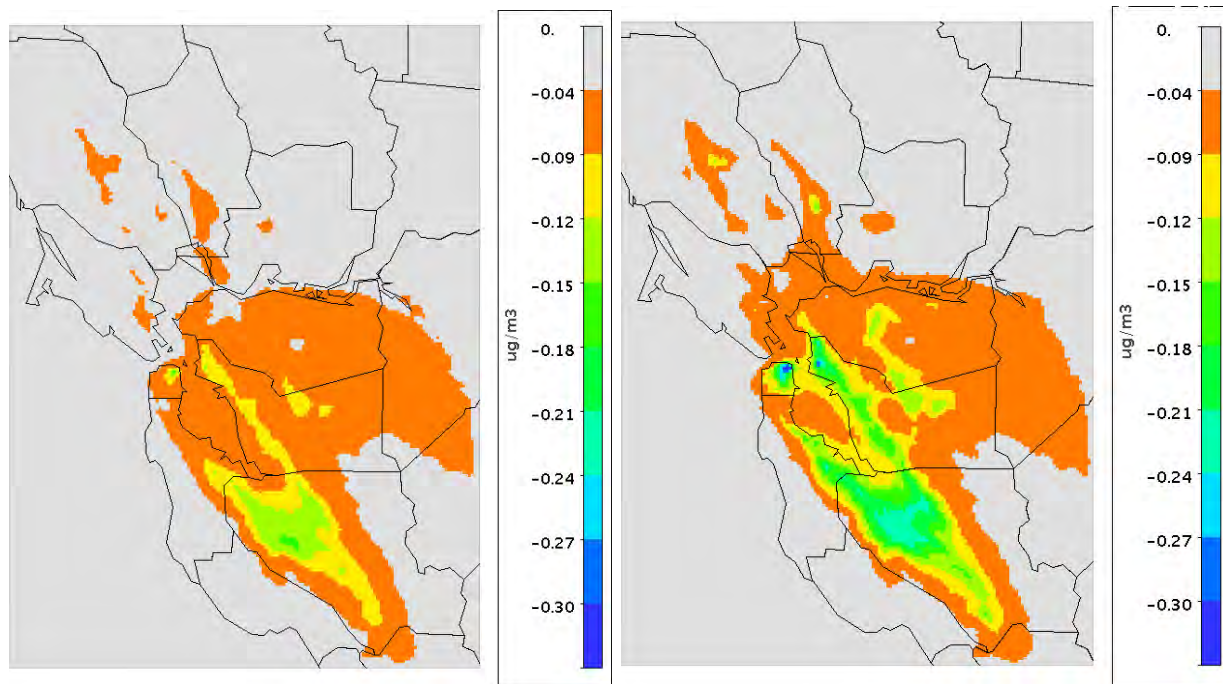


Figure 3.3: Simulated reductions in annual average ambient secondary (left) and total (right) PM_{2.5} concentrations with controlled emissions from building appliances covered by proposed amendments to Rules 9-4 and 9-6. The maximum difference in total PM_{2.5} is -0.42 µg/m³ near downtown San Francisco.

4. Health Impacts of PM_{2.5}

BenMAP-CE version 1.5.8.11 (EPA, 2021) was used to evaluate the health impacts of PM_{2.5} from emissions of targeted building appliances. BenMAP-CE was designed to estimate changes in human health due to changes in ambient air quality for specific populations and to estimate conventional valuations of these impacts (in 2020 U.S. dollars). The valuation process considers the direct and indirect costs of illnesses and the willingness to pay (WTP) to avoid premature death. Direct costs include actual medical costs and lost worker hours, while indirect costs reflect WTP to avoid pain and suffering. Additional information on the BenMAP-CE computer program is provided in Appendix A.2 and A.3.

Changes in air quality evaluated in BenMAP-CE were the differences in secondary and total PM_{2.5} levels with and without emissions contributed by targeted building appliances at 1-km grid resolution over the entire Bay Area (left and right panels of Figure 3.3, respectively). In other

words, health impacts were estimated for secondary and total PM_{2.5} contributions due to emissions from these sources.

4.1 Preparation of Population Data

In addition to information about air pollutants contributions, BenMAP-CE requires population data to be grouped in a specific way to apply the available health impact functions. Using modules accompanying BenMAP-CE, we regrouped age and race/ethnicity classifications in the 2010 U.S. Census Bureau's population data for 2010 (the most recent comprehensive U.S. Census data available supported by BenMAP-CE) and estimated the grouped population in each 1-km grid square of the modeling domain. We then used BenMAP-CE to project the 2010 gridded population to 2020. Figure 4.1 shows a map of the gridded residential population for the Bay Area in 2020 used in this assessment. Even though BenMAP-CE estimates PM_{2.5}-related health impacts for each group, for the purposes of this evaluation, we focused on health impacts for the general population. Appendix A.2 provides additional information about the population groups used in BenMAP-CE.

Downtown San Francisco is the most densely populated area (over 10,000 people per 1-km grid square) of the Bay Area (Figure 4.1). Areas with populations between 8,000 and 10,000 people per 1-km grid square are located mostly in areas surrounding those with more than 10,000 people per 1-km grid square and at some grid cells in downtown Richmond, El Cerrito, Oakland, and San José. Areas with populations between 4,000 and 8,000 people per 1-km grid square are located in residential areas surrounding Interstates 80, 580, and 880, as well as a portion of Interstate 101. In other residential areas, there are fewer than 4,000 people per 1-km grid square.

Figure 4.2 shows residential population exposure to secondary PM_{2.5} concentrations (left panel) and total PM_{2.5} concentrations (right panel) attributed to emissions from applicable commercial and residential space and water heating appliances. Residential exposures were estimated by multiplying residential population in each grid cell by the simulated annual average PM_{2.5} concentration of that cell. Mapping the estimated exposure brings those areas with relatively smaller population but elevated PM_{2.5} levels to the forefront. Similarly, it also highlights those areas that are densely populated but have relatively lower PM_{2.5} levels.

The effect of population weighting can be seen in Figure 4.2. The grid cell population itself is the highest in downtown San Francisco. However, the exposure to total PM_{2.5} is the highest in San Francisco, Oakland, Berkeley, San José, and several areas surrounding the Interstate 880 and 101 corridors. Outside of San Francisco, these relatively less densely populated areas are also highlighted in the exposure maps.

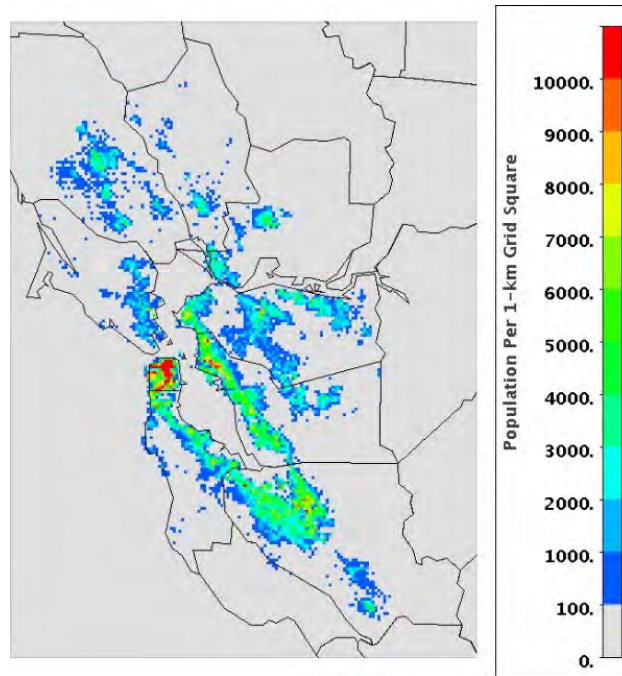


Figure 4.1: The 2020 population of CMAQ 1-km grids as projected by BenMAP-CE.

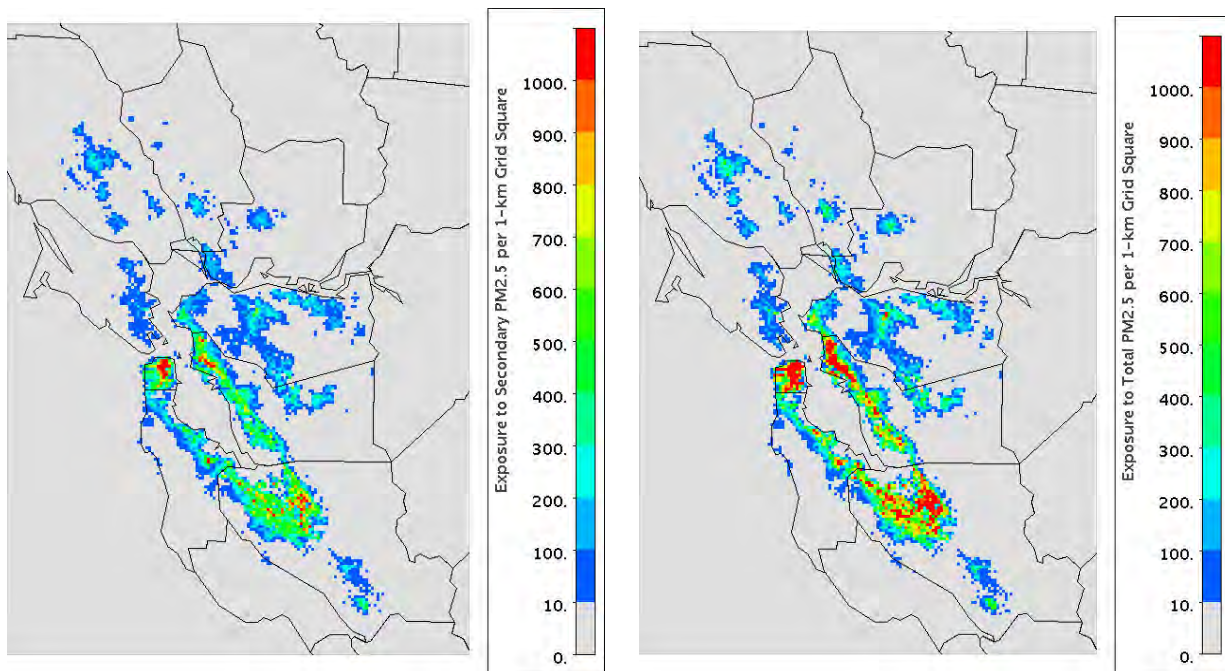


Figure 4.2: Simulated residential exposures to secondary PM_{2.5} (left panel) and total PM_{2.5} (right panel) from natural gas combustion emissions of building appliances covered by proposed amendments to Rules 9-4 and 9-6.

4.2 Application of BenMAP-CE

Staff downloaded the U.S. EPA's latest released version of BenMAP-CE (EPA, 2021) and added three health impact functions to the U.S. EPA-recommended set of health impacts functions available in BenMAP-CE to ensure that the premature mortality endpoint in the Bay Area was evaluated rigorously. Two of the added functions are based on California-wide and nationwide analyses of a 1980–2000 cohort (Jerrett et al., 2013). The third added function is a meta-analysis summarizing 53 single studies, 17 of which have been published since 2015 (Vodonos et al., 2018).

Staff ran BenMAP-CE and aggregated its 1-km grid results to the Air District's jurisdiction. The aggregated results (Tables 4.1 and 4.2) show that reductions in secondary and total $PM_{2.5}$ concentrations would reduce incidence of premature mortality within the Air District's jurisdiction by 23 to 52 cases and by 37 to 85 cases per year, respectively. The ranges reflect different epidemiological studies. The valuations⁶ assigned to these are 230 to 530 million U.S. dollars and from 380 to 870 million U.S. dollars, respectively. Among the set of health impacts evaluated, avoided mortality accounts for about 95% of the total valuation of reduced total $PM_{2.5}$ levels.

The other health impacts in the EPA's recommended BenMAP-CE configuration include selected chronic/severe illnesses, hospital admissions/emergency room visits due to respiratory and cardiovascular diseases, selected minor health effects, and asthma-related effects. The health impacts evaluated showed decreased annual incidence as a result of reductions in $PM_{2.5}$ levels with elimination of emissions from applicable commercial and residential space and water heating appliances. For example, for non-fatal acute myocardial infarction (heart attack), 2.6 to 24 non-fatal heart attacks would have been prevented 2020 with the modeled reductions in secondary $PM_{2.5}$ and 4.2 to 39 non-fatal heart attacks would be prevented with the modeled reductions in total $PM_{2.5}$. (Again, the ranges reflect different epidemiological studies.) The associated valuations are estimated to be 0.23 to 2.1 million U.S. dollars and 0.38 to 3.5 million U.S. dollars, respectively. Another example is the benefit of 4,100 and 6,700 fewer lost days of work, valued at 1.1 million U.S. dollars and 1.8 million U.S. dollars, respectively.

⁶ Valuations are not identical to cost savings. Some valuations are based on cost savings, but the most highly valued component (mortality) is based on an estimate of willingness to pay (WTP).

Table 4.1: Estimated health impacts avoided with decreased PM_{2.5} from elimination of emissions from applicable commercial and residential space and water heating appliances in the Bay Area.

Health Impact ^a	Avoided Incidence, Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	23–52	37–85
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	2.6–24	4.2–39
Hospital admission, neurological ^c	7.7	13
Incidence, out of hospital cardiac arrest	0.45	0.73
Incidence, stroke	1.5	2.4
Incidence, lung cancer	1.9	3.1
Hospital admissions^d		
Respiratory ^e	2.4	3.9
Cardiovascular ^f	3.0	4.9
ER visits		
Respiratory ^g	13	20
Cardiovascular ^h	6.2	10
Other effects		
Restricted activity days	24,000	39,000
Work loss days	4,100	6,700
Hay fever/allergic rhinitis	440	710
Asthma-related effects		
Asthma symptoms/albuterol use	9,200	15,000
Onset of asthma	71	110

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

Table 4.2: Valuations of avoided health impacts with decreased PM_{2.5} from elimination of emissions from applicable commercial and residential space and water heating appliances in the Bay Area.

Health Impact ^a	Total Valuation in 2020 U.S. Dollars, Million Dollars Per Year	
	Secondary PM _{2.5}	Total PM _{2.5}
Premature mortality		
All causes ^b	230–530	380–870
Chronic/severe illness		
Non-fatal acute myocardial infarction (heart attack)	0.23–2.1	0.38–3.5
Hospital admission, neurological ^c	0.11	0.19
Incidence, out of hospital cardiac arrest	0.019	0.03
Incidence, stroke	0.059	0.096
Incidence, lung cancer	0.056	0.091
Hospital admissions^d		
Respiratory ^e	0.028	0.045
Cardiovascular ^f	0.055	0.090
ER visits		
Respiratory ^g	0.013	0.021
Cardiovascular ^h	0.0084	0.014
Other effects		
Restricted activity days	1.9	3.2
Work loss days	1.1	1.8
Hay fever/allergic rhinitis	0.31	0.52
Asthma-related effects		
Asthma symptoms/albuterol use	0.0037	0.0059
Onset of asthma	3.6	5.8
Sum		
All health impacts included	240–540	400–890

^a Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).

^b Includes all ICD-9 codes.

^c First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.

^d Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.

^e Includes all respiratory diseases (ICD-9 codes 460–519).

^f Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).

^g Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).

^h Includes all cardiac outcomes (ICD-9 codes 390–549).

5. Simulated Changes in 24-hour PM_{2.5} and 8-hour Ozone Levels

In addition to evaluating air quality and health impacts of annual average PM_{2.5}, in this assessment staff also examined modeled changes to levels of 24-hour-average PM_{2.5} and 8-hour-average ozone at air quality monitoring stations. These quantities are relevant to determining compliance with state and federal ambient air quality standards.⁷ While this assessment did not include a formal modeling attainment demonstration for these pollutants (for example as described by EPA guidance, EPA 2018), it did examine how peak levels are influenced by reduction in emissions from commercial and residential space and water heating emissions, providing insights into how proposed amendments to Rules 9-4 and 9-6 might influence achieving and maintaining state and federal ambient air quality standards should the proposed rules be fully implemented.⁸

To assess the effects that the elimination of NO_x and PM_{2.5} emissions from modeled appliances might have on the likelihoods of short-term PM_{2.5} and/or ozone exceedances, we analyzed modeled differences on high-PM_{2.5} and high-ozone days. Specifically, we extracted modeled predictions from monitored locations on dates when observations indicated a 24-hour average of at least 30 µg/m³ for PM_{2.5} or an 8-hour average of at least 65 ppb for ozone at that location on that date (Tables 5.1 and 5.2). For 24-hour PM_{2.5}, using this subset of the data, the mean difference between this scenario and the baseline scenario was -0.68 µg/m³, and the control scenario was lower than the baseline scenario in all cases (Figure 5.1). The level of 8-hour ozone was sometimes higher in the control scenario, but there was an overall decrease of -0.021 ppb on average (Figure 5.2).

⁷ For PM_{2.5}, the metric is determined using the 98th percentile of measurements, averaged over 3 years. For ozone, the metric is determined using the annual, fourth-highest daily maximum 8-hour measured concentration, also averaged over 3 years.

⁸ For context, the current federal standard for 24-hour PM_{2.5} is 35 µg/m³ and the federal standard for 8-hour ozone is 70 ppb. For PM_{2.5}, the metric is determined using the 98th percentile of measurements, averaged over 3 years. For ozone, the metric is determined using the annual, fourth-highest daily maximum 8-hour measured concentration, also averaged over 3 years.

Table 5.1: Pairwise comparison of modeled baseline versus control when and where observed 24-hour PM_{2.5} concentrations were at least 30 µg/m³. The mean difference is -0.68 µg/m³.

Date	Site	Observed	Modeled		
			Baseline	Control	Difference
2018-01-04	Concord	53.3	38.92	38.55	-0.376
2018-01-03	Concord	52.0	41.10	40.82	-0.280
2018-01-03	Vallejo	48.0	15.66	15.58	-0.081
2018-01-01	SJ Knox	45.0	33.93	32.63	-1.297
2018-01-03	San Rafael	44.3	22.89	22.69	-0.207
2018-01-03	San Francisco	39.5	24.74	23.96	-0.785
2018-01-03	Livermore	39.0	36.67	36.17	-0.497
2018-01-03	Laney College	38.2	33.18	32.53	-0.658
2018-01-01	SJ Jackson	38.0	32.47	31.44	-1.026
2018-01-03	San Pablo	36.6	19.06	18.84	-0.223
2018-01-02	SJ Knox	36.2	59.99	57.23	-2.754
2018-01-03	Oakland West	35.6	30.75	29.97	-0.782
2018-01-04	Vallejo	34.2	18.49	18.35	-0.142
2018-01-02	SJ Jackson	33.2	63.85	61.46	-2.385
2018-01-02	Oakland West	33.0	26.14	25.70	-0.439
2018-01-02	Concord	32.4	27.86	27.62	-0.237
2018-01-04	San Pablo	32.2	21.93	21.41	-0.521
2018-01-02	Laney College	31.9	31.09	30.57	-0.522
2018-01-03	Berkeley AP	31.9	25.04	24.57	-0.474
2018-01-14	San Rafael	31.0	20.32	20.00	-0.319
2018-01-15	San Rafael	31.0	7.92	7.87	-0.056
2018-01-03	Oakland	30.4	20.59	20.15	-0.443
2018-12-09	San Francisco	30.3	34.90	33.57	-1.334
2018-01-03	Napa	30.2	11.54	11.18	-0.362

Table 5.2: Pairwise comparison of modeled baseline versus control when and where observed 8-hour ozone concentrations were at least 65 ppb. The mean difference is -0.021 ppb.

Date	Site	Observed	Modeled		
			Baseline	Control	Difference
2018-08-09	San Martin	80	78.70	78.64	-0.062
2018-08-09	Livermore	78	74.12	74.21	+0.093
2018-08-09	Bethel Island	78	59.94	59.75	-0.197
2018-08-18	Livermore	76	58.94	58.76	-0.180
2018-08-09	San Ramon	76	71.45	71.63	+0.180
2018-08-18	San Ramon	72	53.13	53.12	-0.005
2018-08-03	Livermore	71	63.75	63.53	-0.221
2018-06-22	Livermore	69	67.66	67.37	-0.292
2018-08-08	Livermore	69	57.68	57.57	-0.104
2018-09-21	Bethel Island	68	51.84	51.93	+0.088
2018-10-19	Napa	68	46.90	46.82	-0.082
2018-10-20	Bethel Island	67	62.23	62.26	+0.025
2018-08-09	Los Gatos	67	63.35	64.32	+0.975
2018-08-03	San Martin	67	62.18	62.19	+0.012
2018-09-20	Napa	66	44.62	44.78	+0.162
2018-06-02	San Martin	66	65.77	64.65	-1.113
2018-10-19	San Martin	66	52.03	52.43	+0.402
2018-09-20	Fairfield	66	53.93	53.87	-0.058

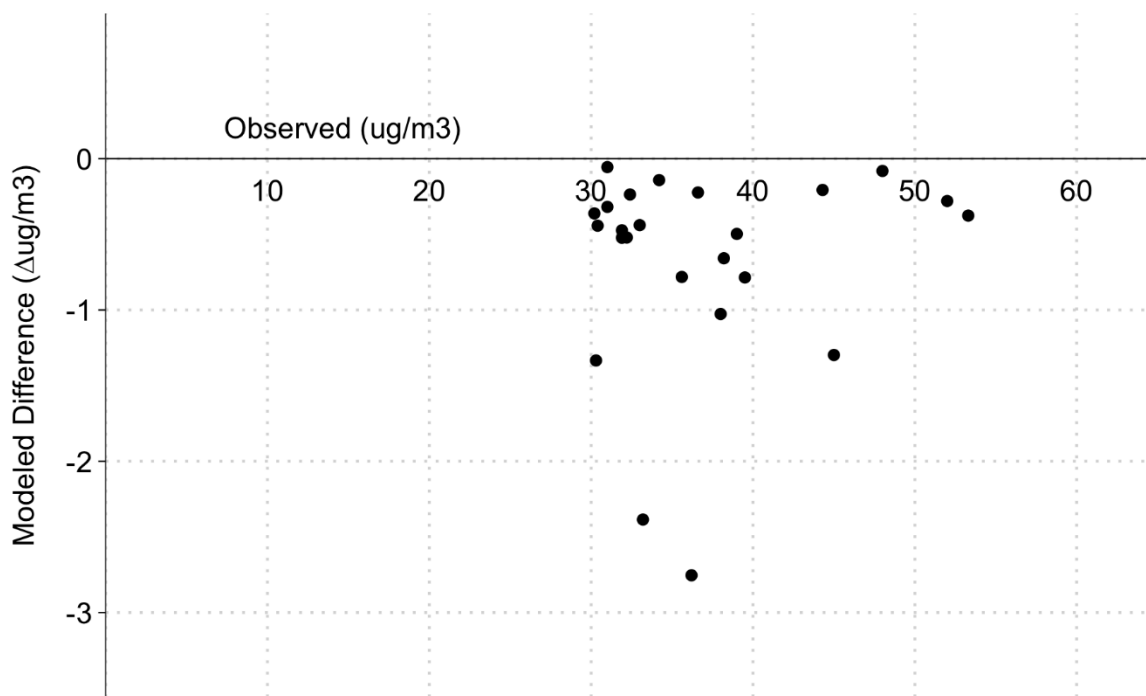


Figure 5.1: Differences between modeled baseline vs. control when and where observed 24-hr PM_{2.5} concentrations were at least 30 µg/m³. The mean difference is -0.68 µg/m³.

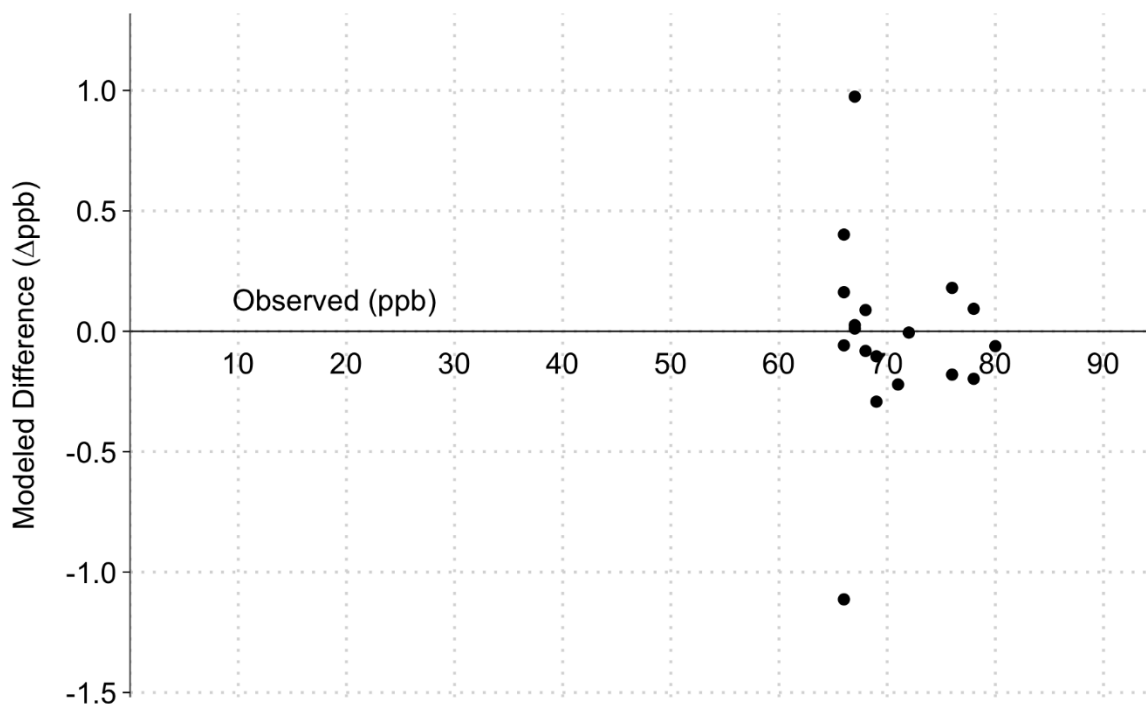


Figure 5.2: Differences between modeled baseline vs. control when and where observed 8-hr ozone concentrations were at least 65 ppb. The mean difference is -0.021 ppb.

When assessing modeled differences for all modeled dates, rather than just “high concentration” dates, the mean difference for $PM_{2.5}$ at monitored locations was $-0.30 \mu\text{g}/\text{m}^3$, with a pairwise bootstrapped 95% confidence interval of $(-0.32, -0.29) \mu\text{g}/\text{m}^3$, based on 16 dates modeled ($n = 62$) at 17 sites ($p = 17$).

6. Summary and Key Findings

Staff evaluated ambient air quality and health impacts from commercial and residential space and water heating emissions as supplemental information to support proposed amendments to Air District Rules 9-4 and 9-6, which limit NO_x emissions from natural gas-fired furnaces, water heaters, and boilers.

Using the CMAQ model, staff estimated ambient NO_x levels from the appliances covered by the proposed rule amendments, as well as the levels of particles and ozone caused by NO_x . Using the BenMAP-CE model, staff also estimated the health impacts of simulated fine particulate matter and the associated valuations of those impacts in U.S. dollars.

This modeling-based assessment featured results from CMAQ simulations conducted for the year 2018, which were used to develop a control scenario that estimated the benefits of proposed rule amendments that would reduce emissions from commercial and residential natural gas combustion emissions associated with space heating and water heating.

The methodological approach developed for this project was carefully evaluated. Options were weighed and discussed among the modeling team, and the strategy that was anticipated to provide the best modeling results was adopted. In addition, consideration was given to providing results that would support the needs of anticipated end users.

The key findings of this assessment are listed below:

- NO_x emissions from the targeted building appliances caused production of **secondary PM_{2.5}** across most residential areas of the Bay Area with an annual average contribution between 0.04 µg/m³ and 0.18 µg/m³, resulting in an estimated **23 to 52 deaths per year** (Table 4.1).
- Emissions from the targeted building appliances produce increments of **total PM_{2.5}** across most residential areas of the Bay Area, with an annual average contribution between 0.10 µg/m³ and 0.42 µg/m³, resulting in an estimated **37 to 85 premature deaths per year** (Table 4.1).
- The valuations of the health impacts from **secondary PM_{2.5}** were estimated to be between **240 to 540 million U.S. dollars annually** (Table 4.2).
- The valuations of the health impacts from **total PM_{2.5}** were estimated to be between **400 to 890 million U.S. dollars annually** (Table 4.2).
- For the modeled control scenario at monitored locations on dates when observations indicated 24-hour PM_{2.5} was at least 30 µg/m³, the mean modeled decrease in **24-hour PM_{2.5} was -0.68 µg/m³** (Figure 5.1).
- For the modeled control scenario at monitored locations on dates when observations indicated 8-hour ozone was at least 65 ppb, the mean modeled decrease in **8-hour ozone was -0.021 µg/m³** with overall results indicating no significant change in ozone. (Figure 5.2).

7. References

- CEC, 2019: California Energy Consumption Data, California Energy Commission. <https://ecdms.energy.ca.gov/>
- Dennison, J., Louis-Prescott, L., Gruenwald, T., 2021: How Air Agencies Can Help End Fossil Fuel Pollution from Buildings, RMI. <https://rmi.org/insight/outdoor-air-quality-brief/>
- Dickerson, C.A., 2003: California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study. Final Report, Volume 1 and Volume 2. Prepared for Pacific Gas & Electric Company, San Francisco, CA, Study ID # SW061. http://www.calmac.org/publications/Commercial_Gas_EE_Report_Vol%201.pdf
- Elwell, J., 2022: BAAQMD Staff Report, Proposed Amendments to Building Appliance Rules—Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters. <https://www.baaqmd.gov/rules-and-compliance/rule-development/building-appliances>
- EPA, 2018: Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze. 454/R-18-009. November 2018. <https://www.epa.gov/scram/state-implementation-plan-sip-attainment-demonstration-guidance>
- EPA, 2019: “Integrated Science Assessment (ISA) for Particulate Matter (Final Report, Dec. 2019).” U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188, 219. <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534>
- EPA, 2021: Environmental Benefits Mapping and Analysis Program – Community Edition. User’s Manual <https://www.epa.gov/benmap>. Configuration materials released May 2021. https://www.epa.gov/sites/default/files/2021-04/u.s._epa_approach_for_quantifying_and_valuing_pm_effects_0.zip
- Jerrett, M., Burnett, R.T., Beckerman, B.S., Turner, M.C., Krewski, D., Thurston, G., et al., 2013: Spatial Analysis of Air Pollution and Mortality in California. *Am J Respir Crit Care Med* 188(5):593-59. <https://doi.org/10.1164/rccm.201303-0609OC>
- Koo, B., Jia, Y., Cordova, J., Matsuoka, J., Reid, S., Fang, Y., Tanrikulu, S., 2022: Fine Particulate Modeling Update in the San Francisco Bay Area. In preparation.
- Medicode (Firm), 1996: ICD-9-CM: International Classification of Diseases, 9th Revision, Clinical Modification. Salt Lake City, Utah: Medicode.
- Tanrikulu, S., Tran, C., Fairley, D., Ostro, B., and Broadwin, R., 2014: Ultrafine Particulate Matter in the San Francisco Bay Area. BAAQMD Air Quality Modeling and Data Analysis Section Publication No: 201412-015-UFP.
- Tanrikulu, S., Reid, S., Koo, B., Jia, Y., Cordova, J., Matsuoka, J., and Fang, Y., 2019: Fine Particulate Matter Data Analysis and Regional Modeling in the San Francisco Bay Area to Support AB 617. BAAQMD Air Quality Modeling and Data Analysis Section Publication No: 201901-017-PM.
- Vodanos, A., Awad, Y.A., and Schwartz, J., 2018: The Concentration-response between Long-term PM_{2.5} Exposure and Mortality; A Meta-regression Approach. *Environmental Research* 166:677-89. <https://doi.org/10.1016/j.envres.2018.06.021>
- Yu, X., Venecek, M., Kumar, A., Hu, J., Tanrikulu, S., Soon, S-T, Tran, C., Fairley, D., and Kleeman, M.J., 2019: Regional Sources of Airborne Ultrafine Particle Number and Mass Concentrations in California. *Atmos Chem Phys* 19, 14677-702. <https://doi.org/10.5194/acp-19-14677-2019>

Zhu, Y., Connolly, R., Lin, Y., Mathews, T., Wang, Z., 2020: Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California. UCLA Fielding School of Public Health.
<https://ucla.app.box.com/s/xyzt8jc1ixnetiv0269qe704wu0ihif7>

Appendix A

A.1 Bay Area Natural Gas Emissions

Modeled emissions estimates for natural gas combustion were based on residential and non-residential natural gas consumption data for the Bay Area obtained from the California Energy Commission (CEC, 2019). The consumption data were provided by county in units of therms and converted to units of cubic feet using natural gas heat content values. For residential usage, natural gas consumption data for 2019 were further divided into four emissions inventory categories: space heating, water heating, cooking, and other (e.g., appliances such as pool water heating, spa and hot tub heating, clothes dryers, and barbeque grills). This categorization was based on information from CEC, 2019 and the Pacific Gas and Electric Company (PG&E) by Dickerson, 2003.

For commercial and industrial sources, CEC end-use consumption data by sector was used to apportion non-residential natural gas usage (excluding power generation consumption) for Bay Area counties into commercial and industrial usage. The resulting estimates represent natural gas consumption for permitted (or “point”) sources and non-permitted (or “area”) sources such as small-scale shops and businesses. To avoid double-counting, facilities in the Air District’s point source inventory that use natural gas were assigned to commercial or industrial categories using each facility’s Standard Industrial Classification (SIC) code. In addition, commercial and industrial natural gas throughputs reported by the point sources were subtracted from the total throughput for those sectors to generate area source consumption values. For commercial area sources, natural gas consumption was further split by application (space heating, water heating, and other) using information from PG&E (Dickerson, 2003).

Once natural gas consumption data were categorized and reconciled, emission factors that represent the mass (lb) of a pollutant released per million standard cubic feet (mscf) of natural gas burned were applied to develop county-level emissions estimates. In general, emission factors were taken from EPA’s AP-42 Compilation of Emission Factors.⁹ For NO_x, a base emission factor of 93 lb/mscf, or 40 nanograms per joule (ng/joule) was used, which is the pre-2009 NO_x emission limit established by the current version of Rule 9-6 and is also consistent with AP-42.

Beginning in 2009, the current Rule 9-6 requires residential water heaters to meet a 10 ng/joule limit (or 23 lb/mscf), which is achieved over time as the appliance fleet turns over. Assuming a turnover of 7.7% per year resulting from a 13-year water heater lifespan (Elwell, 2022), the effective NO_x emission factor in 2018 was calculated to be 39 lb/mscf, as shown in Table A1. Similarly, the current version of Rule 9-6 requires commercial water heaters to meet a 14 ng/joule (33 lb/mscf) NO_x emission limit starting in 2013. Applying the same turnover rate yields an effective NO_x emission factor of 65 lb/mscf in 2018 (see Table A1). Given the assumed fleet turnover, the current version of Rule 9-6 for water heaters was estimated to reach full implementation in 2021 for residential heaters and in 2025 for commercial heaters. For space heaters, Bay Area appliances were estimated to meet the 40 ng/joule NO_x emission

⁹ <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-1-external-0>

requirement of the current Rule 9-4 in 2018. This estimation was based on an assumed 18-year lifespan for space heating equipment (Elwell, 2022).

Table A1: Natural gas combustion emission factors (lb/mscf).

EIC	Description	Emission Factors (lb/mscf)						
		CO	NO _x	SO _x	TOG	ROG	PM ₁₀	PM _{2.5}
060-030-0110-0000	Commercial – water heating	40	65 ^a	0.6	11	4.8	7.6	7.6
610-608-0110-0000	Residential – water heating	40	39 ^a	0.6	11	4.8	7.6	7.6
--	All other appliances	40	93	0.6	11	4.8	7.6	7.6

^a For water heaters, NO_x emission factors reflect the impact of the current version of Rule 9-6 in 2018.

Table A2 shows natural gas emissions in the Bay Area for commercial and residential area sources, as well as permitted sources. As noted above, the permitted source sector includes emissions from commercial and industrial operations that are tracked as individual facilities (“points”). NO_x emissions from commercial and residential natural gas combustion are about 76% of NO_x emissions from total natural gas combustion for these three sectors combined.

Table A3 shows NO_x emissions for appliances targeted by Rules 9-4 and 9-6. As discussed above, Rule 9-6 had not been fully implemented by 2018, so a portion of the 2018 baseline NO_x emissions will be reduced when full implementation takes place. As shown in Table A3, this portion of the baseline NO_x emissions is 576 tons, or 13.5% of the 2018 total of 4,267 tons emitted by the targeted appliances. The remaining 86.5% (3,690 tons) will be addressed by the proposed rule amendments. For the CMAQ modeling analysis, the control case removed the entire 4,267 tons of NO_x associated with the targeted appliances to simulate the full impact of emissions from this source sector. To estimate benefits attributable to proposed amendments only, modeled reductions in concentrations of selected species were multiplied by a scaling factor of 0.865.

Specifically, this scaling factor was applied to modeled reductions in NO_x and secondary PM_{2.5} concentrations (the latter adjustment was necessary because NO_x participates in secondary PM_{2.5} formation). Adjusted secondary PM_{2.5} reductions were then added to total reductions in primary PM_{2.5} concentrations¹⁰ to calculate a total PM_{2.5} benefit from the proposed amendments. All BenMAP, exposure, and NAAQS analyses were based on the estimated pollutant reductions associated with proposed rule amendments only, with any reductions associated with current rule versions being excluded.

¹⁰ Reductions in emissions of primary PM_{2.5} and other pollutants besides NO_x are solely due to proposed rule amendments, so no adjustment was needed.

Table A2: Bay Area 2018^a natural gas combustion emissions (ton/yr).

EIC	Description	2018 Annual Emissions (ton/yr)						
		CO	NO _x	SO _x	TOG	ROG	PM ₁₀	PM _{2.5}
060-020-0110-0000	Commercial – space heating	237.8	552.8	3.6	65.4	28.8	45.2	45.2
060-030-0110-0000	Commercial – water heating	291.5	475.7	4.4	80.2	35.3	55.4	55.4
060-995-0110-0000	Commercial – other	237.8	552.8	3.6	65.4	28.8	45.2	45.2
--	<i>Commercial subtotal</i>	<i>767.0</i>	<i>1581.3</i>	<i>11.5</i>	<i>210.9</i>	<i>92.8</i>	<i>145.7</i>	<i>145.7</i>
610-606-0110-0000	Residential – space heating	1,036.6	2,410.0	15.5	285.1	125.4	196.9	196.9
610-608-0110-0000	Residential – water heating	847.3	828.3	12.7	233.0	102.5	161.0	161.0
610-610-0110-0000	Residential – cooking	92.0	213.9	1.4	25.3	11.1	17.5	17.5
610-995-0110-0000	Residential – other	83.2	193.5	1.2	22.9	10.1	15.8	15.8
--	<i>Residential subtotal</i>	<i>2,059.1</i>	<i>3,645.7</i>	<i>30.9</i>	<i>566.3</i>	<i>249.2</i>	<i>391.2</i>	<i>391.2</i>
Various	Permitted - all source types	1,055.3	1,662.6	16.5	604.1	265.8	122.1	122.1
--	Grand Total	3,881.4	6,889.5	58.9	1,381.3	607.8	659.1	659.1

^a Natural gas combustion emissions represent the Air District's latest estimates for residential (2019), commercial (2018), and permitted (2018) sources. These estimates were considered representative of 2018 conditions for modeling purposes.

Table A3: NO_x emissions from appliances targeted by proposed rule amendments (ton/yr).

Description	NO _x Emissions (ton/yr)		
	2018 Baseline	Reduction from existing Rule 9-6	Reduction from proposed amendments
Commercial – space heating	552.8	--	552.8
Commercial – water heating	475.7	235.2	240.5
Residential – space heating	2,410.0	--	2410.0
Residential – water heating	828.3	341.1	487.2
Total	4,266.7	576.3	3,690.5
<i>Percentage</i>	<i>100.0%</i>	<i>13.5%</i>	<i>86.5%</i>

A.2 BenMAP-CE Computer Program

Applications of BenMAP-CE computer program require the development of two sets of inputs: ambient PM_{2.5} concentrations and population data. The calculations implemented by BenMAP-CE include population exposure, using health impact functions to estimate the incremental change in selected human health outcomes.

Epidemiological data are used to develop concentration-response functions, which BenMAP-CE uses to quantify the links between pollutant exposure and adverse health outcomes. These functions are typically stratified by population subgroups (e.g., age, race, and ethnicity) and

account for the effects associated with a specific duration and degree of pollutant exposure (Table A4).

Population data and pollutant concentration data input to BenMAP-CE must be prepared in a manner consistent with these concentration-response functions. Epidemiological data linking PM_{2.5} exposure and mortality are typically stratified by age group (e.g., infants, 18 years of age, and older) and reflect an annual averaging period. The BenMAP-CE program overlays population data onto changes in ambient pollutant concentrations to calculate spatially resolved impacts associated with pollutant exposure.

In this study, BenMAP-CE’s companion tool, PopGrid, was used to estimate the 2010 population in each of the 1-km grids over the entire Bay Area where annual average PM_{2.5} concentrations were estimated. We then used BenMAP-CE to project the 2010 1-km grid population to 2020. PM_{2.5} health impacts were estimated for a total of 304 population groups (Table A2). They comprised nineteen age, four race, and two ethnic groups, as well as male and female groups. BenMAP-CE’s racial classification schema is identical to that of the Centers for Disease Control and Prevention (CDC), from which BenMAP-CE obtains baseline health data. CDC’s schema is aligned with the U.S. Census 2010 schema, except that multiracial (“2 or more races,” for example) as well as “other race” responses are reclassified into one of the four “single-race” bins based on auxiliary data. Therefore, multiracial and other classifications have not been dropped; they have been reclassified into one of the four categories.

Table A4: Demographic groups and characteristics available in BenMAP-CE.^a

Race	Ethnicity	Age
White, African American, Asian, American Indian	Hispanic, Non-Hispanic	<1, 1–4, 5–9, 10–14, 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80–84, ≥85

^a Based on Table JI (U.S. EPA 2021); both males and females included.

A.3 Discount Rates

In general, benefits realized from the reduction in air pollution might need to be discounted because of (1) societal preferences for current over future benefits, (2) the need for future-year benefits estimates to be comparable with current-year benefits for cost-benefit analyses, and (3) the ability to compare future benefits with those occurring during the analysis year.

This assessment estimates annual valuations (in 2020 US dollars) of health impacts attributed to emissions targeted by the proposed rule amendments. Valuations are for impacts that occur within a year, but costs can extend to future years. In BenMAP-CE, discount rates¹¹ can be applied to economic valuations, providing an estimate of future costs in dollar amounts for the analysis year.

¹¹ Discounting is based on the concept that the value of a dollar decreases with time. For example, in 20 years \$1 is worth \$0.55 today at an annual discount rate of 3% and \$0.26 at an annual discount rate of 7%.

For example, for the case of a cardiac arrest, costs calculated within BenMAP-CE are assumed to extend beyond the year of the event, and annual costs beyond the first year can be discounted using an assumed discount rate. BenMAP-CE provides two sets of pre-calculated unit costs, one associated with a 3% discount rate and one for a 7% discount rate. Economic valuations presented in this report assumed an annual discount rate of 3%.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX F

Exposure and Equity Assessment of Natural Gas Appliances in the San Francisco Bay Area

This page has been intentionally left blank.

Exposure and Equity Assessment of Natural Gas Appliances in the San Francisco Bay Area

Prepared by

David Holstius and Phil Martien

Contributors

Saffet Tanrikulu, Yuanyuan Fang, Steve Reid, and Song Bai

Overview	2
Modeled Air Quality Impacts	2
Exposure Calculations	5
Simplified Example	6
Main Analysis	8
Baseline conditions: impacts from all sources	8
Exposures to PM _{2.5} from targeted emissions	8
Patterns within and between counties	12
References	17

Overview

This document analyzes the intensities and distributions of annual average exposures (modeled outdoor concentrations weighted by residential population) attributed to emissions targeted by proposed amendments to Bay Area Air Quality Management District (Air District or BAAQMD) Rules 9-4 and 9-6. These proposed rule amendments (Elwell 2022) would limit emissions of oxides of nitrogen (NO_x) from natural gas-fired furnaces (9-4) and water heaters and boilers (9-6). They would impose a zero- NO_x standard on natural gas-fired commercial and residential building space and water heating appliances.

The impacts evaluated in this analysis are taken to be equivalent to the difference between a baseline scenario and a control scenario, in which the latter represents a world where those NO_x and fine particulate matter ($\text{PM}_{2.5}$) emissions have been eliminated. The elimination of NO_x emissions is consistent with the proposed zero- NO_x standard; if electric appliances are adopted to meet this standard, direct, or primary, $\text{PM}_{2.5}$ emissions would also be eliminated.

As explained in the accompanying appendices and in the main document, the emission reductions attributed to the proposed rulemaking (hereafter, “targeted emissions”) would be in addition to those realized by full compliance with existing NO_x regulations. The analyses in this document are restricted to those additional emission reductions and the resulting reductions in exposures for Bay Area residents. In addition to results for the total Bay Area residential population, staff calculated results for four different racial/ethnic groups. The focus in this document, motivated by the results of the health benefits assessment (Tanrikulu et al. 2022), is on differences in annual average $\text{PM}_{2.5}$ exposure intensities for those groups.

Modeled Air Quality Impacts

The emissions and air quality modeling used as the basis for this analysis are described in Tanrikulu et al (2022). Figures 1 through 4 depict modeled annual average baseline concentrations and reductions attributed to elimination of the targeted emissions (baseline minus control) of NO_x and secondary, primary, and total $\text{PM}_{2.5}$ within the study area. Secondary $\text{PM}_{2.5}$ is formed in the atmosphere from precursors such as NO_x , while primary $\text{PM}_{2.5}$ is directly emitted; total $\text{PM}_{2.5}$ is the sum of the two.

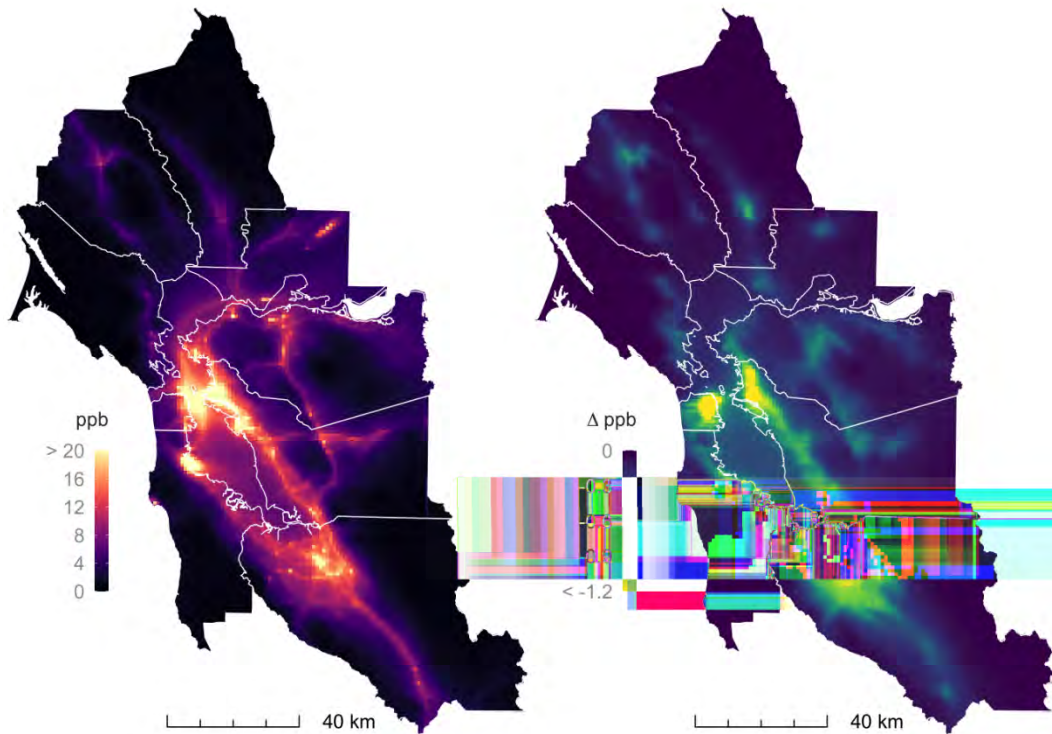


Figure 1: Baseline concentrations (left) and reductions (right) for NO_x.

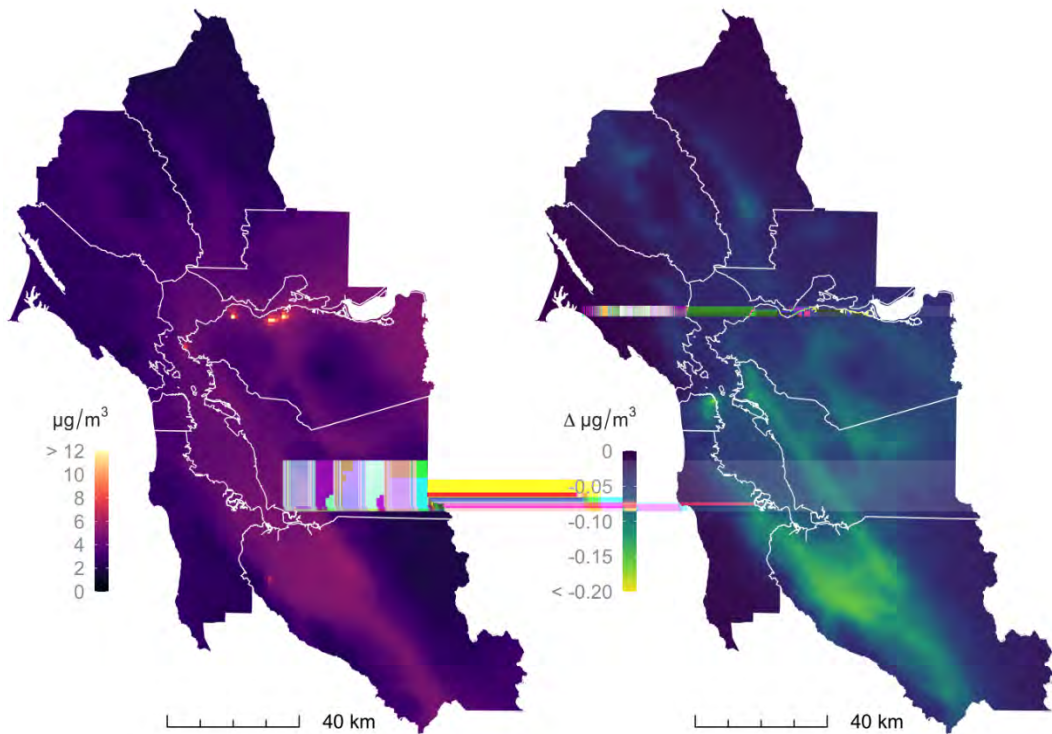


Figure 2: Baseline concentrations (left) and reductions (right) for secondary PM_{2.5}.

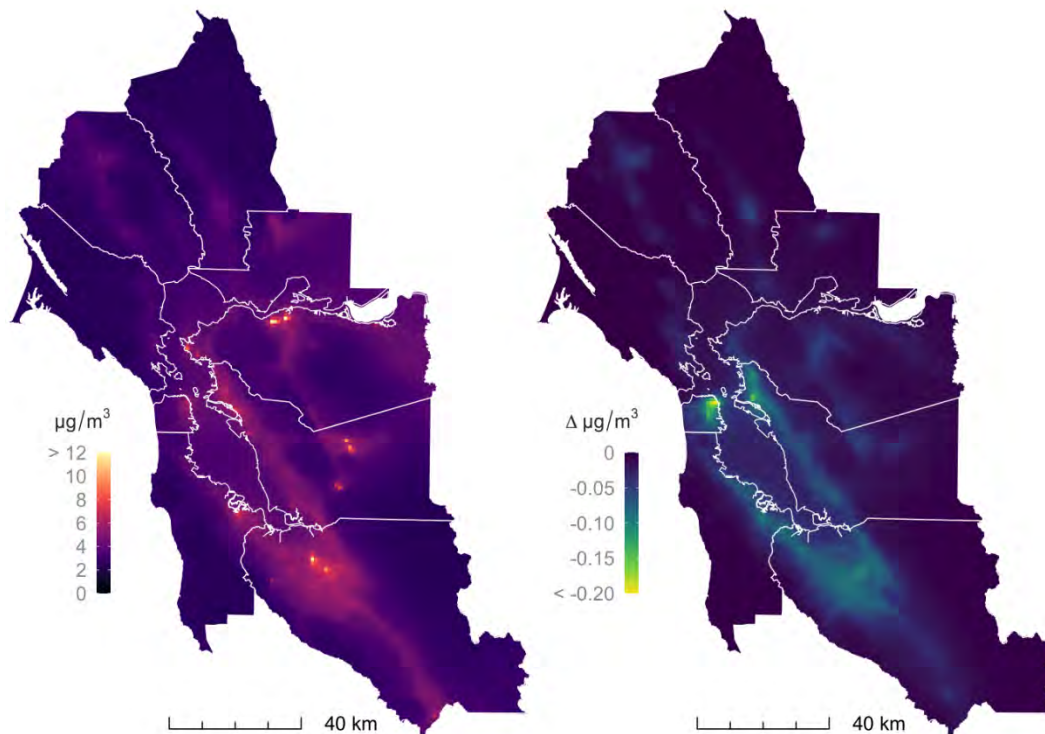


Figure 3: Baseline concentrations (left) and reductions (right) for primary $\text{PM}_{2.5}$.

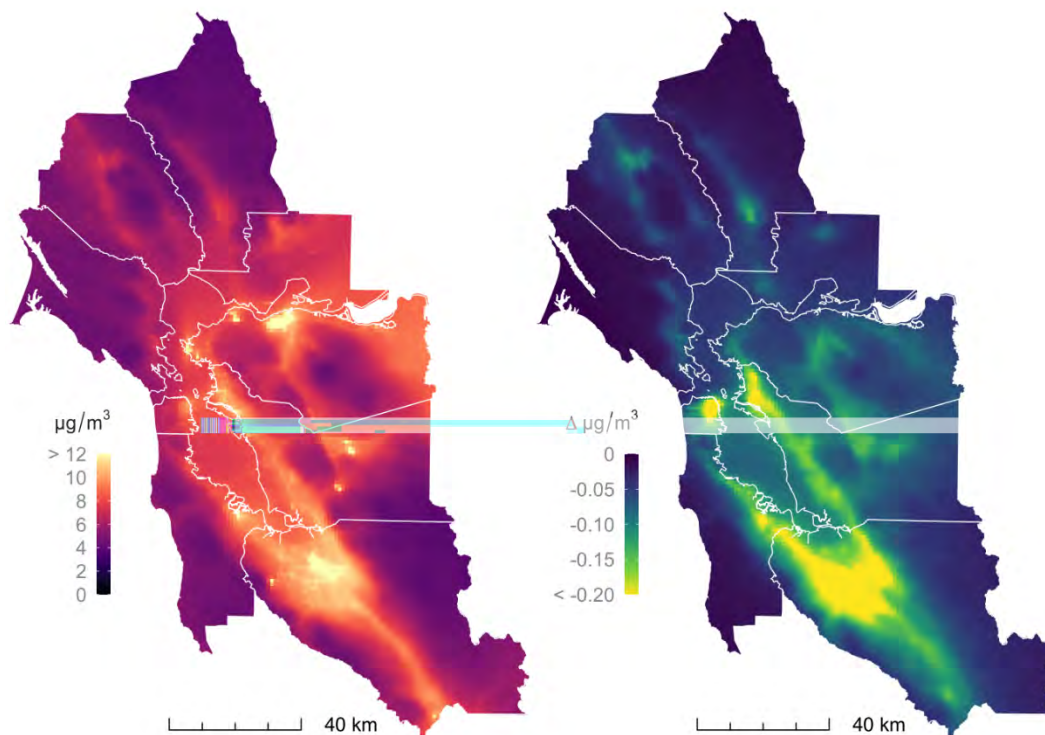


Figure 4: Baseline concentrations (left) and reductions (right) for total $\text{PM}_{2.5}$.

Exposure Calculations

Annual average exposures were computed for this analysis using weighted sums of 1x1 km grid-cell concentrations, with the modeled population (also on the same 1x1 km grid) serving as the weights. This is consistent with the approach taken in most large-scale epidemiological studies of outdoor air pollution. In this document, we use the term “exposure intensity” interchangeably with “population-weighted concentration”, or, equivalently, exposure “per capita.” These all have the same units as concentrations. For PM_{2.5}, for example, the units are micrograms per cubic meter (µg/m³).

Total population exposure, in contrast to the above, has units of persons multiplied by intensity (e.g., person-µg/m³). We computed average exposure intensities by first computing total population exposures. The total exposure X_{ijk} of a population group k , in cell j , to pollutant i , is:

$$X_{ijk} = C_{ij} \cdot P_{jk}$$

... where C_{ij} is the modeled annual average concentration (e.g., µg/m³) of pollutant i in cell j , and P_{jk} the size (in persons) of that population subgroup k within that cell j .

Across a region corresponding to a set of cells indexed by $j \in J$, consisting of more than one cell (for example, the set of cells equated with a particular county), different summary statistics for subgroup k may be computed. Below is the formula we used to calculate the average exposure intensity for a member of group k , to pollutant i , across all cells j in J . It is the total population exposure for group k , within that region, divided by the total number of persons in group k , again within that region:

$$\frac{\sum_{j \in J} X_{ijk}}{\sum_{j \in J} P_{jk}}$$

Computing an average exposure intensity for all residents, for pollutant i , across all cells j in J is similar: it is again the sum of population exposure divided by the sum of population:

$$\frac{\sum_{j \in J} \sum_{k \in K} X_{ijk}}{\sum_{j \in J} \sum_{k \in K} P_{jk}}$$

For county-specific calculations, cells were assigned to counties by calculating the intersections of cells and county polygons. For each cell, the county with the largest amount of overlap (i.e., the largest share of that cell's area) was used as the label for that cell.

Simplified Example

This simplified set of example calculations uses real data from the main analysis (Table 1, below). It illustrates the counter-intuitive result, found in the main analysis, that one group can be the most impacted overall while not being the most impacted within most counties.

For clarity, this example is restricted to just two counties and two racial/ethnic groups. In both counties, the impact on African-American/Black residents is larger. Santa Clara county, which is more impacted overall, is home to the majority of Asian/Pacific Islander residents. The majority of African-American/Black residents, on the other hand, live in Alameda County.

Table 1: Example data.

	Average Exposure	Population
Asian/Pacific Islander		
Santa Clara	0.195 µg/m ³	760,000
Alameda	0.152 µg/m ³	540,000
African-American/Black		
Santa Clara	0.199 µg/m ³	60,000
Alameda	0.165 µg/m ³	180,000

If the Asian/Pacific Islander population were the same size in both counties, the “regional” (two-county) average for Asian/Pacific Islander residents would simply be the average of 0.195 and 0.152, or 0.174 µg/m³. Similarly, if the African-American/Black population were the same size in both counties, the result would be the average of 0.199 and 0.165, or 0.182 µg/m³.

However, there are many more Asian/Pacific Islander residents in Santa Clara than in Alameda, and Santa Clara is more impacted. So, the “regional” average in this example, for Asian/Pacific Islander residents, is closer to Santa Clara’s:

$$\frac{(0.195 * 760,000) + (0.152 * 540,000)}{760,000 + 540,000} = 0.177$$

In contrast, the majority of African-American/Black residents live in Alameda. Since Alameda is less impacted, the “regional” average for African-American/Black residents is weighted in the opposite direction:

$$\frac{(0.199 * 60,000) + (0.165 * 180,000)}{60,000 + 180,000} = 0.174$$

... resulting in a slightly smaller value than that for Asian/Pacific Islander residents.

In our main analysis, the effect is more complex, because there are more areas and more racial/ethnic groups. However, the elements are the same: (1) more variation between areas than between racial/ethnic groups; and (2) a demographic picture with sufficiently distinct racial/ethnic compositions at a sub-regional level.

This effect does not appear in all datasets, but it can arise at any geographic scale. For example, a large exposure disparity has been reported for $PM_{2.5}$ from residential gas combustion at the national level: across the US, Asian/Pacific Islander residents were estimated to be 92% more impacted than average by $PM_{2.5}$ from those sources (Tessum et al. 2021). The published data for that analysis suggest that New York exerts high leverage on the national result—New York has both a large Asian/Pacific Islander population and a much larger average impact from residential gas combustion, relative to other states. Without additional information, one cannot say for certain whether the national-level findings apply *within* New York, or within other states in that analysis. They might, but the patterns of disparity might be different in terms of magnitudes or directions. We have not analyzed Bay Area results using areal units other than counties (for example, ZIP Code Tabulation Areas, Census Places, or Metropolitan Statistical Areas), but we may do so in future work.

Main Analysis

The study area included the portions of the 9-county Bay Area that are under the jurisdiction of the Bay Area Air Quality Management District (Figure 5). The modeled population was projected by BenMAP (PopGrid) for the year 2020, using Census 2010 data as a base year. This population was estimated to be approximately 7.7 million residents. A breakdown by county and race/ethnicity, using categories supplied by BenMAP/PopGrid, is given in Table 2. The focus in this section, motivated by the results of the health benefits assessment, is on differences in annual average PM_{2.5} impacts for those groups.

Table 2: Modeled residential population. Percentages are row-wise; they indicate shares of that county's population. Basis: BenMAP/PopGrid projection from 2010 to 2020.

	Asian	Hispanic	Black	White	(all)
Alameda	32.6%	24.3%	11.0%	32.1%	1,668,306
Contra Costa	18.5%	28.7%	9.2%	43.6%	1,180,605
Marin	7.4%	18.3%	3.2%	71.1%	266,439
Napa	8.5%	36.8%	2.3%	52.5%	147,553
San Francisco	34.6%	15.1%	5.2%	45.1%	866,833
San Mateo	31.5%	26.6%	2.7%	39.1%	797,428
Santa Clara	38.3%	27.7%	2.8%	31.2%	1,991,116
Solano	21.7%	27.8%	17.3%	33.2%	311,782
Sonoma	5.6%	30.5%	2.2%	61.7%	461,976
(all)	28.6%	25.6%	6.4%	39.4%	7,692,039

Baseline conditions: impacts from all sources

Under baseline conditions, the annual average exposure intensity (modeled outdoor concentration weighted by residential population) was calculated to be 8.53 µg/m³. This is from all modeled sources of PM_{2.5}, including sources other than space and water heating appliances, and including sources beyond the Air District's jurisdictional boundary. Of this 8.53 µg/m³, 49% was attributed to secondary PM_{2.5}. The remaining 51% was attributed to primary PM_{2.5}.

In addition to regional annual averages for PM_{2.5} and NO_x, staff calculated impacts for residents within particular racial/ethnic groups. At a regional level, White residents were found to be less impacted than people of color by PM_{2.5} from all sources combined (Table 3, column "Baseline"). Secondary PM_{2.5} from all sources had the largest impact on Asian/Pacific Islander residents, while primary PM_{2.5} and total PM_{2.5} from all sources had the largest impacts on Hispanic/Latino residents.

Exposures to PM_{2.5} from targeted emissions

Approximately **0.14 µg/m³**, or 1.6% of the 8.53 µg/m³ baseline, was attributed to targeted emissions from space and water heating appliances. Of this 0.14 µg/m³ contribution, 61% was

attributed to secondary PM_{2.5}. The remaining 39% was attributed to directly emitted (“primary”) PM_{2.5}.

Table 3: Modeled exposures (outdoor concentrations, weighted by residential population) under baseline and control scenarios. Reductions are expressed relative to baseline exposures.

	Baseline	Control	Reduction
Total PM_{2.5} (µg/m³)			
Asian/Pacific Islander	8.817	8.667	0.150 (1.7%)
Hispanic/Latino	8.826	8.687	0.139 (1.6%)
African-American/Black	8.670	8.536	0.134 (1.5%)
White	8.116	7.988	0.128 (1.6%)
(average)	8.534	8.397	0.138 (1.6%)
Primary PM_{2.5} (µg/m³)			
Asian/Pacific Islander	4.496	4.437	0.059 (1.3%)
Hispanic/Latino	4.558	4.505	0.054 (1.2%)
African-American/Black	4.491	4.436	0.055 (1.2%)
White	4.140	4.091	0.050 (1.2%)
(average)	4.371	4.318	0.054 (1.2%)
Secondary PM_{2.5} (µg/m³)			
Asian/Pacific Islander	4.321	4.230	0.091 (2.1%)
Hispanic/Latino	4.268	4.182	0.086 (2.0%)
African-American/Black	4.179	4.099	0.079 (1.9%)
White	3.976	3.898	0.079 (2.0%)
(average)	4.163	4.079	0.084 (2.0%)
NO_x (ppb)			
Asian/Pacific Islander	10.079	9.324	0.755 (7.5%)
Hispanic/Latino	9.958	9.268	0.690 (6.9%)
African-American/Black	10.930	10.212	0.718 (6.6%)
White	8.113	7.470	0.643 (7.9%)
(average)	9.328	8.636	0.692 (7.4%)

Figure 5 depicts the same data summarized in Figure 4 (right panel) and Table 2, but in the form of contours overlaid on the residential population. The outermost contour represents a contribution of +0.05 µg/m³ of total PM_{2.5} attributed to targeted emissions from space and water heating appliances. This amount is approximately one-half of 1 percent of the population-weighted annual average from all modeled sources, including sources outside the study area.

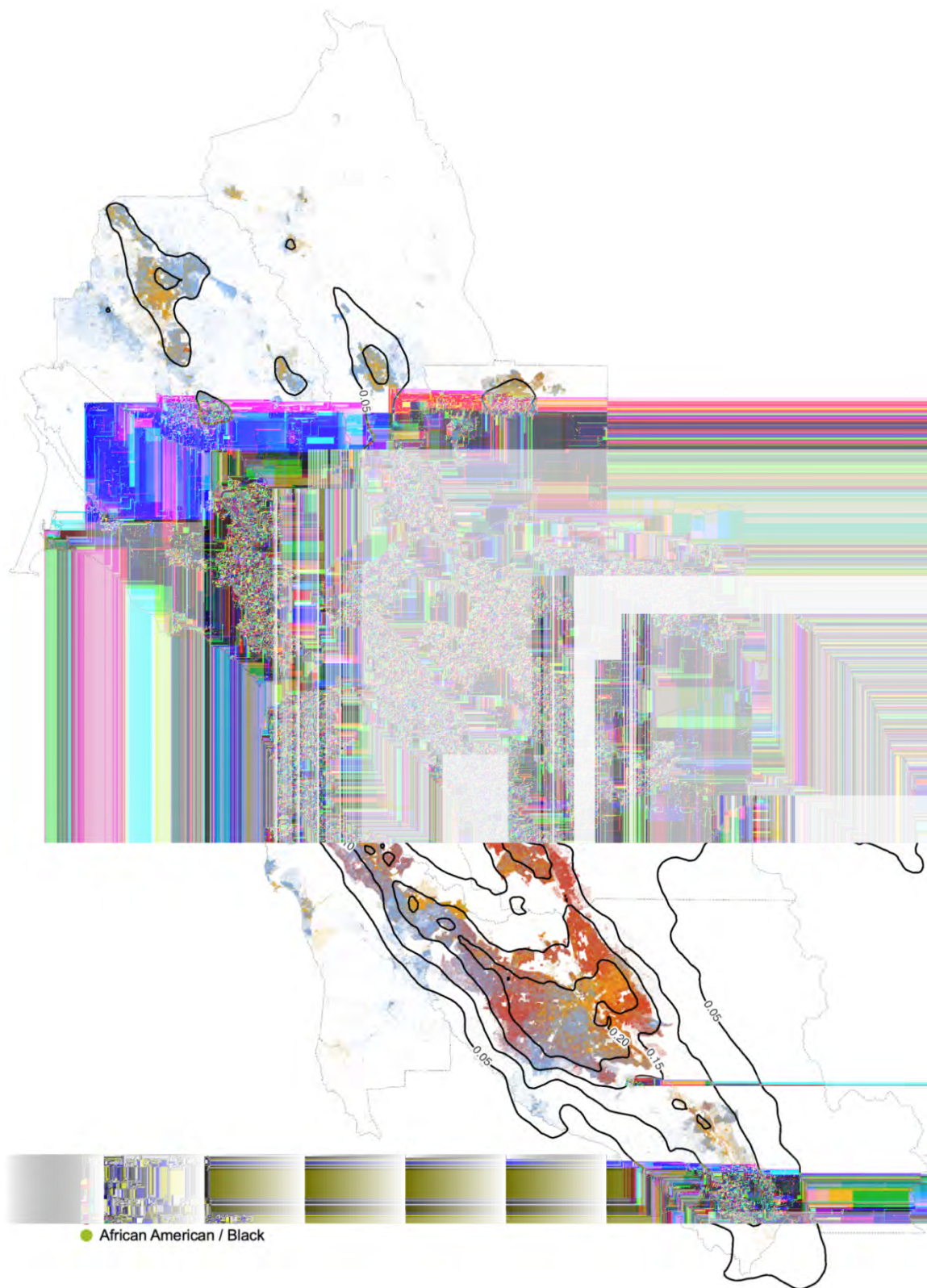


Figure 5: Contours of total PM_{2.5} attributed to targeted emissions from space and water heating appliances, overlaid on residential population (n = 7.7 million).

In the scenario where both NO_x and PM_{2.5} emissions were eliminated, resulting in reductions to primary PM_{2.5} as well as secondary PM_{2.5}, the Bay Area's Asian/Pacific Islander population realized the largest reductions in average total PM_{2.5} exposure intensity. This was true in both relative and absolute terms (Table 3, column "Reduction"), and it was true for both PM_{2.5} components (primary and secondary) as well as the total. For total PM_{2.5}, the reduction for Asian/Pacific Islander residents was 9% more than average; for Hispanic/Latino residents, 1% more; for African-American/Black residents, 2% less; and for White residents, 7% less. These differences from the average are evident in the right panel of Figure 6, where the dotted horizontal line represents the average.

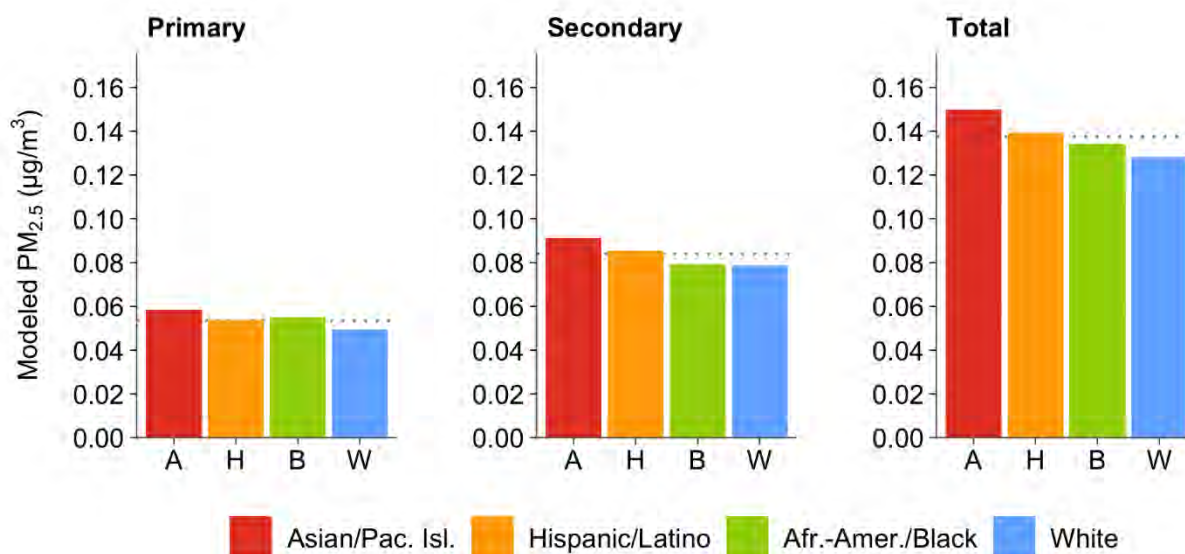


Figure 6: PM_{2.5} impacts (annual average outdoor concentrations, weighted by residential population) attributed to targeted emissions from space and water heating appliances. Total = primary + secondary. Dotted horizontal lines indicate averages.

Figure 7 illustrates patterns of exposure using tertiles of total PM_{2.5} attributed to these appliances. Tertiles are constructed so that one-third of the total population falls into each bin: here, the bins are 0.00 to 0.10 µg/m³, 0.10 to 0.17 µg/m³, and 0.17 to 0.42 µg/m³ PM_{2.5} attributed to targeted emissions from space and water heating appliances.

In a situation where exposures are equal, exactly one-third of each racial/ethnic group will also fall into each tertile. However, the modeling indicates that almost twice as many Asian/Pacific Islander residents live in locations corresponding to the highest tertile (0.17 to 0.42 µg/m³), compared to the lowest (0.00 to 0.10 µg/m³). For White residents, the pattern is reversed.

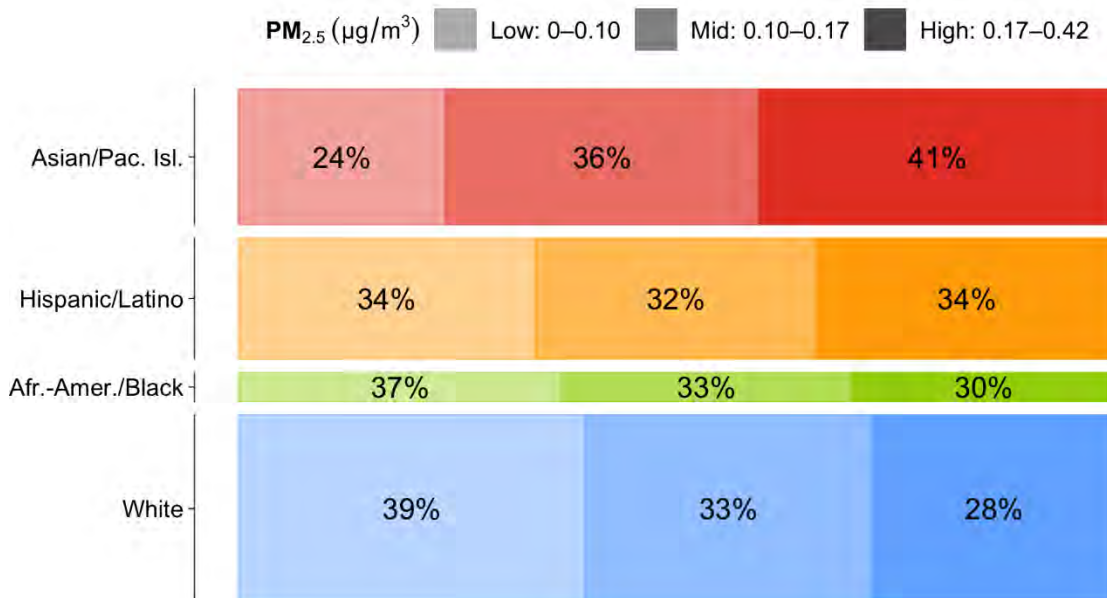


Figure 7: Share of total population within each racial/ethnic group and tertile of exposure. Tertiles are from left to right, and represent total $\text{PM}_{2.5}$ impacts from targeted emissions from space and water heating appliances. One-third of the total population falls into each tertile: 0.00 to 0.10 $\mu\text{g}/\text{m}^3$; 0.10 to 0.17 $\mu\text{g}/\text{m}^3$; or 0.17 to 0.42 $\mu\text{g}/\text{m}^3$. The thickness of each bar is proportional to the number of residents in that racial/ethnic category.

Patterns within and between counties

Within counties, the patterns of racial/ethnic inequality are different. Focusing on impacts from targeted emissions from space and water heating appliances, Tables 4 through 7 show this by unpacking the “reduction” data from Table 3. From these tables, it is apparent that variation between counties is much larger than variation between racial/ethnic groups. It is also apparent that, in every county except Contra Costa, African-American/Black and Hispanic/Latino residents, rather than Asian/Pacific Islander residents, are the most impacted by total $\text{PM}_{2.5}$ from targeted emissions from space and water heating appliances (Table 4). This recalls the example data presented in the previous section on Exposure Calculations.

The three most-impacted counties, in terms of per-capita total $\text{PM}_{2.5}$ impacts attributed to space and water heating appliances, are Santa Clara, San Francisco, and Alameda, and they are approximately twice as impacted as others (0.17 vs 0.09 $\mu\text{g}/\text{m}^3$, respectively).

The association between exposure and demographics at the county level is further illustrated by Figure 8, which ranks all Bay Area counties by average exposure to $\text{PM}_{2.5}$ attributed to targeted emissions from space and water heating appliances, and then shows the demographics within each county. Santa Clara, San Francisco, and Alameda counties comprise approximately 59% of the Bay Area’s total population, 73% of its Asian/Pacific Islander population, and 51% of its White population.

Additional detail is supplied by Figure 9, which depicts the distributions of attributable exposures within each combination of county and race/ethnicity. Like Figure 8, Figure 9 also communicates the relative number of people within each group: it is proportional to the area of each histogram. So, the same demographic patterns can be observed, with (for example) three-quarters of the Asian/Pacific Islander population found in the top three counties.

The overall association is strong enough, and the variation between counties large enough (compared to variation between racial/ethnic groups) that, while African-American/Black or Hispanic/Latino residents are the most impacted *within* all counties but Contra Costa, on a regional basis it is Asian/Pacific Islander residents who are the most impacted.

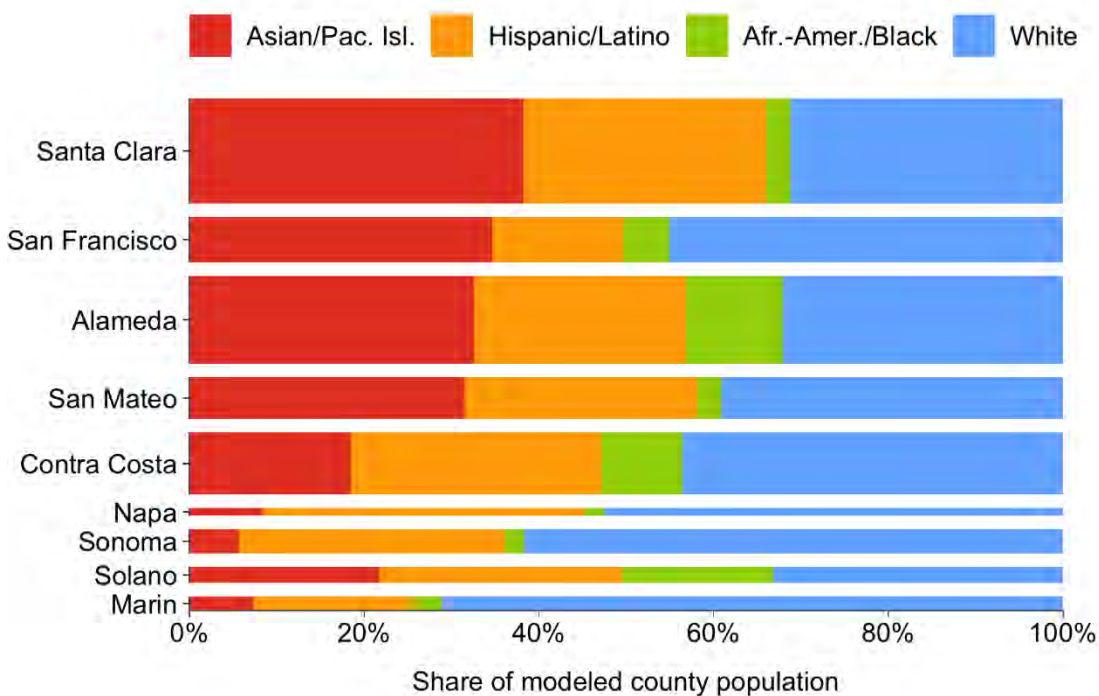


Figure 8: Demographics by county. Counties are ranked by average PM_{2.5} impact from targeted emissions from space and water heating appliances, with the most impacted at the top. The thickness of each bar is proportional to the number of residents in that county. See also Table 2.

Table 4: Average exposures (outdoor concentrations, weighted by residential population) to total (primary + secondary) PM_{2.5} attributed to targeted emissions from space and water heating appliances.

	Asian	Hispanic	Black	White	(average)
Total PM_{2.5} (µg/m³)					
Santa Clara	0.195	0.198	0.199	0.194	0.196
San Francisco	0.154	0.175	0.171	0.168	0.165
Alameda	0.152	0.155	0.165	0.148	0.153
San Mateo	0.097	0.121	0.117	0.113	0.110
Contra Costa	0.092	0.090	0.086	0.092	0.091
Napa	0.069	0.088	0.069	0.076	0.080
Sonoma	0.066	0.069	0.070	0.061	0.064
Solano	0.062	0.066	0.065	0.060	0.063
Marin	0.058	0.062	0.057	0.055	0.056
(average)	0.150	0.139	0.134	0.128	0.138

Table 5: Average exposures (outdoor concentrations, weighted by residential population) to secondary PM_{2.5} attributed to targeted emissions from space and water heating appliances.

	Asian	Hispanic	Black	White	(average)
Secondary PM_{2.5} (µg/m³)					
Santa Clara	0.126	0.126	0.127	0.127	0.126
San Francisco	0.073	0.082	0.081	0.079	0.077
Alameda	0.093	0.094	0.095	0.091	0.093
San Mateo	0.055	0.069	0.068	0.067	0.064
Contra Costa	0.063	0.059	0.056	0.064	0.062
Napa	0.047	0.056	0.047	0.051	0.052
Sonoma	0.043	0.045	0.045	0.040	0.042
Solano	0.041	0.042	0.042	0.040	0.041
Marin	0.037	0.039	0.037	0.035	0.036
(average)	0.091	0.086	0.079	0.079	0.084

Table 6: Average exposures (outdoor concentrations, weighted by residential population) to primary PM_{2.5} attributed to targeted emissions from space and water heating appliances.

	Asian	Hispanic	Black	White	(average)
Primary PM_{2.5} (µg/m³)					
Santa Clara	0.069	0.072	0.072	0.067	<i>0.069</i>
San Francisco	0.082	0.093	0.090	0.090	<i>0.088</i>
Alameda	0.059	0.061	0.070	0.057	<i>0.060</i>
San Mateo	0.041	0.052	0.049	0.046	<i>0.046</i>
Contra Costa	0.029	0.031	0.030	0.028	<i>0.029</i>
Napa	0.023	0.031	0.022	0.025	<i>0.027</i>
Sonoma	0.023	0.024	0.025	0.021	<i>0.022</i>
Solano	0.021	0.024	0.023	0.020	<i>0.022</i>
Marin	0.021	0.023	0.020	0.020	<i>0.020</i>
<i>(average)</i>	<i>0.059</i>	<i>0.054</i>	<i>0.055</i>	<i>0.050</i>	<i>0.054</i>

Table 7: Average exposures (outdoor concentrations, weighted by residential population) to NO_x attributed to targeted emissions from space and water heating appliances.

	Asian	Hispanic	Black	White	(average)
NO_x (ppb)					
Santa Clara	0.852	0.876	0.890	0.833	<i>0.854</i>
San Francisco	1.086	1.228	1.198	1.194	<i>1.162</i>
Alameda	0.777	0.793	0.920	0.748	<i>0.788</i>
San Mateo	0.576	0.705	0.670	0.625	<i>0.632</i>
Contra Costa	0.377	0.390	0.384	0.358	<i>0.373</i>
Napa	0.300	0.425	0.301	0.343	<i>0.369</i>
Sonoma	0.305	0.320	0.331	0.272	<i>0.290</i>
Solano	0.279	0.318	0.309	0.273	<i>0.293</i>
Marin	0.292	0.320	0.286	0.273	<i>0.284</i>
<i>(average)</i>	<i>0.755</i>	<i>0.690</i>	<i>0.718</i>	<i>0.643</i>	<i>0.692</i>

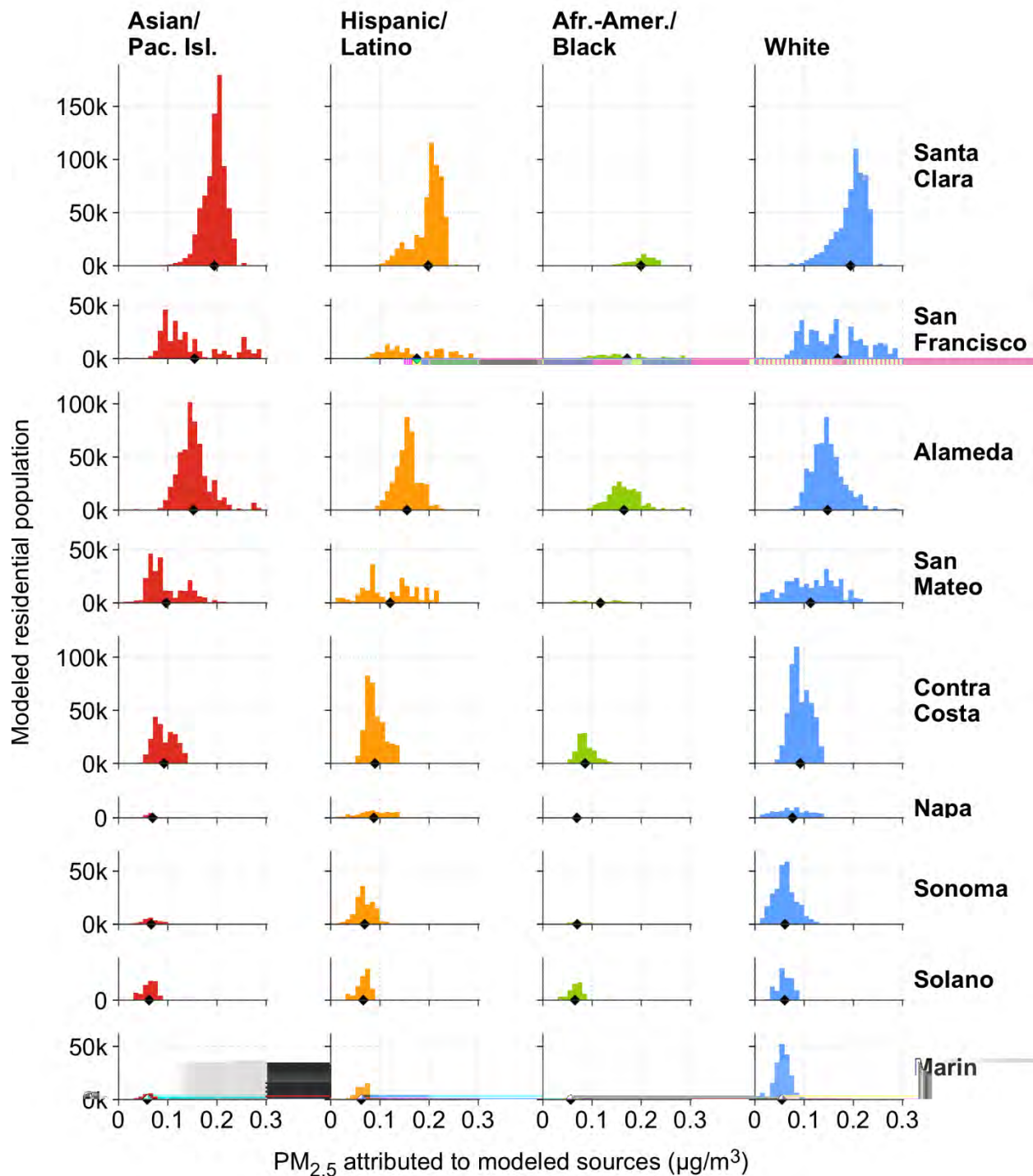


Figure 9: Distributions of exposure to total PM_{2.5} attributed to targeted emissions from space and water heating appliances, by county and race/ethnicity. Diamonds on the x-axis indicate averages for each panel; exact values for these may be found in Table 4. Histograms provide 0.01-µg/m³ resolution detail. For clarity, a small number of exposures greater than 0.3 µg/m³ are not shown.

References

Elwell, Jennifer. 2022. "BAAQMD Staff Report, Proposed Amendments to Building Appliance Rules—Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters." Bay Area Air Quality Management District (BAAQMD). <https://www.baaqmd.gov/rules-and-compliance/rule-development/building-appliances>.

Tanrikulu, Saffet, Stephen Reid, Bonyoung Koo, Yuanyuan Fang, Andrea Baird, Yiqin Jia, James Cordova, and Jeff Matsuoka. 2022. "Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area: Supplemental Information for Proposed Amendments to Regulation 9, Rule 4 and Rule 6 (Interim DRAFT Report - Version 1)." Bay Area Air Quality Management District (BAAQMD).

Tessum, Christopher W., David A. Paoella, Sarah E. Chambliss, Joshua S. Apte, Jason D. Hill, and Julian D. Marshall. 2021. "PM_{2.5} Polluters Disproportionately and Systemically Affect People of Color in the United States." *Science Advances* 7 (18). doi:10.1126/sciadv.abf4491.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX G

Draft Environmental Impact Report
Prepared by Ascent Environmental

This page has been intentionally left blank.

Draft Environmental Impact Report
for the

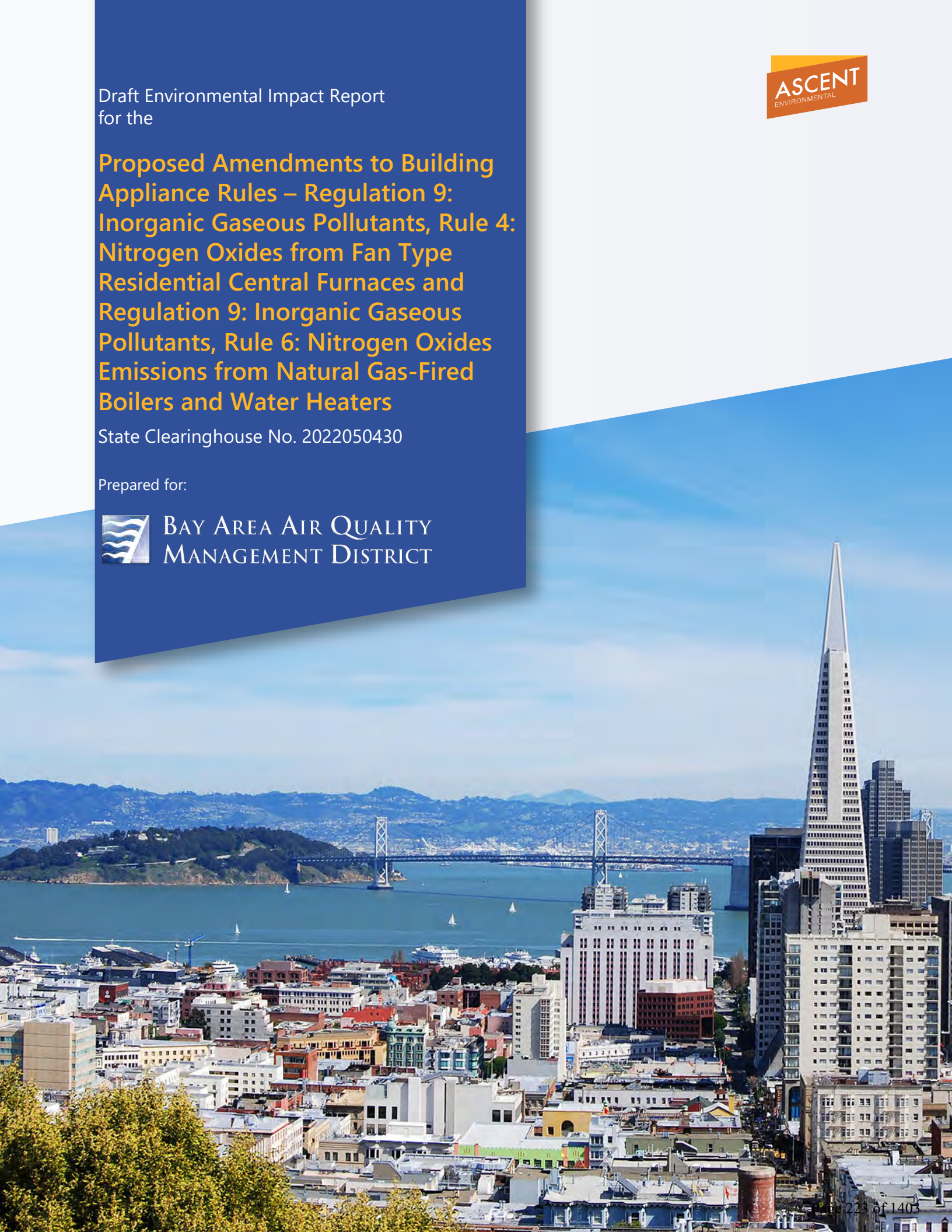
**Proposed Amendments to Building
Appliance Rules – Regulation 9:
Inorganic Gaseous Pollutants, Rule 4:
Nitrogen Oxides from Fan Type
Residential Central Furnaces and
Regulation 9: Inorganic Gaseous
Pollutants, Rule 6: Nitrogen Oxides
Emissions from Natural Gas-Fired
Boilers and Water Heaters**

State Clearinghouse No. 2022050430

Prepared for:



**BAY AREA AIR QUALITY
MANAGEMENT DISTRICT**



Draft Environmental Impact Report for the

Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

State Clearinghouse No. 2022050430

Prepared for:



**BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT**

Bay Area Air Quality Management District

375 Beale Street, Suite 600
San Francisco, California 94105

Contact:

Jennifer Elwell

415.749.4900

Prepared by:



Ascent Environmental

455 Capitol Mall, Suite 300
Sacramento, CA 95814

Contact:

Mike Parker, AICP

916.444.7301

December 2022

18010065.04

TABLE OF CONTENTS

Section	Page
LIST OF ABBREVIATIONS	VI
EXECUTIVE SUMMARY	ES-1
ES.1 Introduction.....	ES-1
ES.2 Summary Description of the Project.....	ES-1
ES.3 Environmental Impacts and Recommended Mitigation Measures	ES-4
ES.4 Alternatives to the Proposed Project.....	ES-6
ES.5 Areas of Controversy and Issues to be Resolved	ES-8
1 INTRODUCTION	1-1
1.1 Purpose and Intended Uses of the Draft EIR	1-1
1.2 Scope of Environmental Analysis.....	1-1
1.3 Agency Roles and Responsibilities	1-9
1.4 CEQA Public Review Process.....	1-9
1.5 Organization of the Draft EIR.....	1-10
1.6 Standard Terminology	1-11
2 PROJECT DESCRIPTION.....	2-1
2.1 Introduction.....	2-1
2.2 Project Objectives.....	2-1
2.3 Project Location	2-1
2.4 Background	2-3
2.5 Proposed Amendments to Rule 9-4.....	2-6
2.6 Proposed Amendments to Rule 9-6.....	2-7
2.7 Potential Physical Effects of Rule Amendments.....	2-7
3 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES	3-1
3.1 Air Quality	3.1-1
3.2 Greenhouse Gas Emissions and Climate Change.....	3.2-1
3.3 Utilities and Service Systems (Energy Resources)	3.3-1
3.4 Noise.....	3.4-1
3.5 Aesthetics	3.5-1
4 ALTERNATIVES.....	4-1
4.1 Introduction.....	4-1
4.2 Considerations for Selection of Alternatives.....	4-2
4.3 Alternatives Considered but Not Evaluated Further	4-2
4.4 Alternatives Selected for Detailed Analysis	4-4
4.5 Environmentally Superior Alternative.....	4-13
5 OTHER CEQA SECTIONS.....	5-1
5.1 Growth Inducement.....	5-1
5.2 Significant and Unavoidable Adverse Impacts.....	5-2
5.3 Significant and Irreversible Environmental Changes.....	5-3
6 REPORT PREPARERS.....	6-1
7 REFERENCES.....	7-1

Appendices

Appendix A – Notice of Preparation, Initial Study, and Scoping Comments

Appendix B – Air Quality Calculations

Appendix C – Electrical Study

Figures

Figure 2-1	Boundary of BAAQMD's Jurisdiction.....	2-2
Figure 2-2	Passenger Vehicle Emissions vs. Residential Natural Gas Combustion (2018).....	2-4
Figure 2-3	Residential Natural Gas Combustion Emissions by Equipment Type in 2018.....	2-5
Figure 2-4	Projected NO _x Emissions under Proposed Amendments.....	2-9
Figure 2-5	Potential GHG Emissions Upon Implementation of Proposed Amendments.....	2-11
Figure 3.5-1	Scenic Highways.....	3.5-2
Figure 3.5-2	Major Bay Area Scenic Resources.....	3.5-6
Figure 3.5-3a	Representative Photographs of Heat Pump Units at Ground Level Next to a Building.....	3.5-9
Figure 3.5-3b	Representative Photographs of Heat Pump Units on the Side of Multi-Family Buildings.....	3.5-10
Figure 3.5-3c	Representative Photographs of Heat Pump Units on Building Rooftops.....	3.5-11
Figure 4-1	Projected NO _x Emissions under Alternative 2: Earlier Compliance Date.....	4-7
Figure 4-2	Projected NO _x Emissions under Alternative 3: Later Compliance Date.....	4-11

Tables

Table ES-1	Summary of Impacts and Mitigation Measures.....	ES-9
Table ES-2	Summary Environmental Impacts of the Alternatives Relative to the Proposed Project.....	ES-6
Table 2-1	Projected NO _x Emissions Upon Implementation of Proposed Amendments.....	2-10
Table 2-2	Potential GHG Emissions Upon Implementation of Proposed Amendments.....	2-11
Table 3.1-1	National and California Ambient Air Quality Standards.....	3.1-2
Table 3.1-2	Sources and Health Effects of Criteria Air Pollutants.....	3.1-6
Table 3.1-3	Attainment Status Designations for the San Francisco Bay Area Air Basin.....	3.1-7
Table 3.1-4	Projected NO _x Emissions Upon Implementation of Proposed Amendments.....	3.1-12
Table 3.2-1	Statewide GHG Emissions by Economic Sector.....	3.2-4
Table 3.2-2	Potential GHG Emissions Upon Implementation of Proposed Amendments.....	3.2-9
Table 3.3-1	Electricity Consumption by County in 2020.....	3.3-4
Table 3.3-2	Natural Gas Consumption by County in 2020.....	3.3-4
Table 3.3-3	Summary of Potential 2050 Electric Grid Impacts of the Proposed Amendments.....	3.3-7
Table 3.4-1	Typical A-Weighted Noise Levels.....	3.4-4
Table 3.5-1	California State Scenic Highway System Officially Designated and Eligible Routes in the Bay Area.....	3.5-3
Table 4-1	Anticipated Electric Grid Capacity and Required Upgrades for Alternative 2: Earlier Compliance Date Compared with the Project.....	4-6
Table 4-2	Projected NO _x Emissions from Alternative 2: Earlier Compliance Date.....	4-8

Table 4-3	Cumulative Emissions Reductions from Proposed Project and Alternative 2, 2024-2052	4-8
Table 4-4	Anticipated Electric Grid Capacity and Required Upgrades for Alternative 3: Later Compliance Date	4-10
Table 4-5	Projected NO _x Emissions from Alternative 3: Later Compliance Date	4-11
Table 4-6	Cumulative Emissions Reductions from Proposed Project and Alternative 3, 2024-2052	4-12
Table 4-7	Summary of Environmental Effects of the Alternatives Relative to the Proposed Project.....	4-13

LIST OF ABBREVIATIONS

AAQS	air quality standards
AB	Assembly Bill
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
BART	Bay Area Rapid Transit
BTU	British thermal unit
CAA	federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fuel economy
CALGreen	California Green Building Standards
Caltrans	California Department of Transportation
CAP	climate action plan
CARB	California Air Resources Board
CCA	Community Choice Aggregation
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH ₄	methane
CI	carbon intensity
CNEL	Community Noise Equivalent Level
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CPP	corridor protection program
CPUC	California Public Utilities Commission
dB	decibels
dBA	A-weighted decibels
Delta	Sacramento–San Joaquin Delta

diesel PM	particulate matter exhaust from diesel engines
E3	Energy + Environmental Economics
EIR	environmental impact report
EO	Executive Order
EPA	US Environmental Protection Agency
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
GHG	greenhouse gas
GHGRP	greenhouse gas reduction plan
HAP	hazardous air pollutant
H ₂ SO ₄	sulfuric acid
HFC	hydrofluorocarbons
HNO ₃	nitric acid
Hot Spots Act	Air Toxics Hot Spots Information and Assessment Act of 1987
Hz	hertz
I-	Interstate
IS	initial study
lb/day	pounds per day
L _{eq}	Equivalent Continuous Sound Level
L _{max}	Maximum Sound Level
MMTCO ₂ e	million metric tons of carbon dioxide equivalent
mPa	micro-Pascals
MTC/ABAG	Metropolitan Transportation Commission and Association of Bay Area Governments
MW	megawatt
N ₂	nitrogen

N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
ng/joule	nanograms per joule
NO ₂	nitrogen dioxide
NOP	notice of preparation
NO _x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
O ₂	oxygen
OSHA	Occupational Safety and Health Administration
PFC	perfluorocarbons
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM ₁₀	respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
PM _{2.5}	fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less
ppm	parts per million
PRC	Public Resources Code
Project	proposed amendments to Rules 9-4 and 9-6
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
Rule 9-4	Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces
Rule 9-6	Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters
RWQCB	regional water quality control board
SB	Senate Bill
SB 350	Clean Energy and Pollution Reduction Act
SCAQMD	South Coast Air Quality Management District
SF ₆	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SIP	state implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District

SO ₂	sulfur dioxide
SPUR	San Francisco Bay Area Planning and Urban Research Association
SR	State Route
TAC	toxic air contaminant
TCR	tribal cultural resource
VOC	volatile organic compounds

This page intentionally left blank.

EXECUTIVE SUMMARY

ES.1 Introduction

This summary is provided in accordance with California Environmental Quality Act Guidelines (State CEQA Guidelines) Section 15123. As stated in Section 15123(a), “an EIR [environmental impact report] shall contain a brief summary of the proposed action and its consequences. The language of the summary should be as clear and simple as reasonably practical.” As required by the guidelines, this chapter includes (1) a summary description of the Project, (2) a synopsis of environmental impacts and recommended mitigation measures (Table ES-1), (3) identification of the alternatives evaluated and of the environmentally superior alternative, and (4) a discussion of the areas of controversy associated with the Project.

ES.2 SUMMARY DESCRIPTION OF THE PROJECT

The Bay Area Air Quality Management District (BAAQMD) is proposing amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). Rule 9-4 applies to the natural gas-fired space-heating furnaces commonly found in single-family homes, and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. Space- and water-heating appliances generate a large portion of nitrogen oxide (NO_x) emissions from sources in the Bay Area. NO_x is formed during natural gas combustion when ambient nitrogen and oxygen combine at high temperatures. If adopted, the proposed rule amendments (or Project) would substantially reduce NO_x emissions from these appliances.

ES.2.1 Project Location

The proposed amendments to Rules 9-4 and 9-6 would apply to building appliances within the BAAQMD’s jurisdiction, which encompasses 5,600 square miles. The area of BAAQMD’s jurisdiction includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast.

ES.2.2 Background and Need for the Project

The BAAQMD has regulated NO_x emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was first adopted in 1992 and was most recently updated with more stringent NO_x emissions standards for certain equipment in 2007. All versions of these rules have included a NO_x emissions standard expressed as nanograms of NO_x per joule of useful heat (ng/joule) delivered by the appliance.

In addition, the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) have adopted regulations that are similar in structure and standards to Rules 9-4 and 9-6. SCAQMD Rule 1111 and SJVAPCD Rule 4905, which are similar to Rule 9-4 in applicability to furnaces, have been updated within the last ten years and require a NO_x emissions standard of 14 ng/joule, the same initial standard identified in the proposed amendments. Rule 9-6 for water heaters and small boilers currently contains NO_x emission standards equivalent to those in SCAQMD Rules 1146.2 and 1121 and SJVAPCD Rules 4308 and 4902 for similar equipment.

The proposed rule amendments to the two rules focus on NO_x emissions from natural gas-fired space- and water-heating appliances in buildings. Space and water heaters are the greatest source of NO_x emissions in the building sector.

Nitrogen oxides are a key criteria pollutant as a precursor to ozone and secondary particulate matter (PM) formation. Secondary PM is formed from the conversion of NO_x to ammonium nitrate through atmospheric chemical reactions with ammonia. Particulate matter, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less (PM_{2.5}) under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) and unclassifiable under National Ambient Air Quality Standards (NAAQS). Exposure to PM_{2.5}, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NO_x compounds in the atmosphere contribute to the formation of secondary PM, any NO_x emission reduction would also result in PM_{2.5} reductions.

In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under all CAAQS and NAAQS. Emissions of reactive organic gases (ROG) and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. ROG and NO_x react through atmospheric chemical reactions to form ozone. Therefore, reductions in emissions of ROG and NO_x are needed throughout the region to decrease ozone levels. As the ambient temperature rises, ground-level ozone forms at an accelerated rate. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Exceedances of State or national ozone standards in the Bay Area occur only on hot, relatively stagnant days. Because weather conditions have a strong impact on ozone formation, ozone levels can vary significantly from day to day or from one summer to the next. Longer and more severe heat waves expected as a result of climate change may cause more ozone formation, resulting in more frequent exceedances of ozone standards.

ES.2.3 Project Objectives

The overall purpose of the proposed amendments is to reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Specifically, the objectives of the proposed amendments to Rules 9-4 and 9-6 are to:

- ▶ for Rule 9-4, introduce an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024;
- ▶ for Rule 9-4, establish a zero-NO_x standard in 2029;
- ▶ for Rule 9-6, establish a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size;
- ▶ expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances;
- ▶ update and clarify the certification and calculation methods contained in the rules;
- ▶ ensure equitable implementation of the rules; and
- ▶ improve the clarity and enforceability of the rules.

ES.2.4 Characteristics of the Project

The proposed amendments to Rules 9-4 and 9-6 would establish more stringent NO_x emission standards for natural gas-fired space- and water-heating appliances in buildings in the Bay Area.

PROPOSED AMENDMENTS TO RULE 9-4

The proposed amendments for Rule 9-4 include introducing an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024 and setting a zero-NO_x standard in 2029. Like the current rule, amended Rule 9-4 would apply only to new devices and only to natural gas-fired devices. The proposed new lower and zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces.

PROPOSED AMENDMENTS TO RULE 9-6

The proposed amendments for Rule 9-6 include setting a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size. Like the current rule, amended Rule 9-6 would apply only to new devices and only to natural gas-fired devices. The proposed new zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing water heaters.

EMISSION CONTROL METHODS

Emission control methods to meet the proposed 14 ng/joule standard for Rule 9-4 are well established and currently required by SCAQMD Rule 1111 and SJVAPCD Rule 4905. Potential complications identified in other jurisdictions, such as high-altitude and cold weather scenarios, are not applicable in the Bay Area. The BAAQMD anticipates that dual-fuel systems able to demonstrate compliance with this new proposed standard would be eligible for certification.

Current space and water heating appliances that meet the zero-NO_x standard and are available on the market consist mainly of electric heat pump systems. The BAAQMD does not intend to mandate specific technology solutions, but currently available electric solutions were used as the bases to form estimates and projections. Natural gas technologies, with combustion occurring in the absence of nitrogen, along with a variety of other technologies, could also meet the proposed standards. The assumed use of electric appliances for CEQA analysis purposes allows for a conservative estimate for impacts to utility systems and NO_x reductions and potential adverse environmental impacts because a switch to electric appliances would slightly reduce NO_x emissions reductions (some increase in NO_x emissions from power generation); have impacts on utilities and services systems from the additional electricity needed to power these appliances; and have potential noise impacts, as discussed herein. Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, NO_x emission reductions would be greater than those shown here as the resultant emissions would be zero (i.e., fewer potential emissions associated with electricity generation), there would be lesser impacts due to electricity need, and there would be no other foreseeable potential adverse impacts on any environmental impact areas. Thus, for CEQA analysis purposes, the BAAQMD assumes that currently in-use natural gas-fired appliances would be replaced with electric appliances. The proposed amendments include a zero-NO_x standard four to eight years in the future to encourage technology development, as well as availability and accessibility throughout the Bay Area.

OTHER POTENTIAL PHYSICAL EFFECTS

As described above, the proposed amendments to Rules 9-4 and 9-6 would affect natural gas-fired space- and water-heating appliances, including furnaces and water heaters used in single-family homes; multifamily residences; and commercial spaces, such as retail and office buildings. These appliances would be installed at existing and new residential and commercial buildings. The proposed rule amendments would not result in any land use changes and would not require construction (other than installation of the replacement units at existing buildings). These proposed amendments would also not result in foreseeable changes to equipment manufacturing processes that could require construction of new or expanded equipment manufacturing facilities or notable changes to equipment distribution patterns that could increase vehicle miles traveled. The BAAQMD conducted additional research on electrical grid capacity to serve the Project. The results of this research are included in Appendix C. Although the Project does not include development of other facilities that would directly increase demand for electricity, the Project would result in

long-term replacement of appliances with zero-NO_x appliances that are assumed to be electric. This assumption is made for purposes of conducting a conservative CEQA analysis and is based on currently available technology. This change to electric appliances would contribute to increased electricity demand resulting from other programs, especially State-led decarbonization programs that involve much more reliance on renewable energy. The potential for the Project to contribute to substantial adverse physical effects associated with any electrical supply increases or necessary grid capacity upgrades is analyzed in this EIR in Section 3.3, "Utilities and Service Systems (Energy Resources)." Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, these potential grid impacts would decrease.

PROJECT TIMELINE

The proposed rule amendments would be in effect beginning in 2024. They would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces and water heaters. The equipment changeout is projected to be completed in 2046.

ENVIRONMENTAL PERMITS

No environmental permits would be required for Project implementation.

ES.3 ENVIRONMENTAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

ES.3.1 Project-Specific Impacts

This EIR has been prepared pursuant to the CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 1500, et seq.) to evaluate the physical environmental effects of the Proposed Amendments to Rules 9-4 and 9-6 Project. The BAAQMD is the lead agency for the Project. The BAAQMD has the principal responsibility for approving and carrying out the Project and for ensuring that the requirements of CEQA have been met. After the final EIR is prepared and the EIR public review process is complete, the BAAQMD Board of Directors is the party responsible for certifying that the EIR adequately evaluates the impacts of the Project.

Table ES-1, presented at the end of this chapter, provides a summary of the environmental impacts for the Proposed Amendments to Rules 9-4 and 9-6 Project. The table provides the level of significance of the impact before mitigation, recommended mitigation measures, and the level of significance of the impact after implementation of the mitigation measures.

As described in Chapter 1, "Introduction," the following were identified as resources that would not experience any significant environmental impacts from the Project.

- ▶ Agriculture and Forest Resources
- ▶ Biological Resources
- ▶ Cultural Resources
- ▶ Energy
- ▶ Geology and Soils
- ▶ Hazards and Hazardous Materials
- ▶ Hydrology and Water Quality
- ▶ Land Use and Planning
- ▶ Mineral Resources
- ▶ Population and Housing
- ▶ Public Services
- ▶ Recreation
- ▶ Transportation
- ▶ Tribal Cultural Resources
- ▶ Wildfire

ES.3.2 Significant-and-Unavoidable Impacts

As documented in this Draft EIR, most of the impacts associated with the Project would be less than significant. The following impacts are considered significant and unavoidable; that is, no feasible mitigation is available to reduce the impacts to a less-than-significant level.

UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact

Assuming that heat pumps are used to replace existing natural gas-fired space and water heating appliances, the Project would, under the “worst case” Low Policy Reference Scenario evaluated by E3 (Appendix C), over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero-NO_x standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 megawatt (MW) of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts, under the “worst case” Low Policy Reference Scenario. For context, this represents 0.6 to 1.2 percent of the State’s total projected land needed solar and land-based wind development for the State to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant, and may include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects.. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.

As described in Section 3.3, “Utilities and Service Systems,” the location and type of these projects are currently speculative but based on current projections as presented in the E3 study, their associated environmental impacts would generally be located outside the Bay Area, and potentially outside California. The energy projects described would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the BAAQMD cannot identify feasible mitigation to reduce the Project’s contribution to these impacts and the impact remains potentially significant and unavoidable under the Low Policy Reference Scenario.

NOISE

Impact 3.4-1: Potential to Generate Long-Term Operational Noise

The proposed amendments would include installation of stationary sources such as heat pump units, which would be installed inside and outside of existing buildings. The potential operational noise impacts associated with this equipment could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise

from some units would remain significant and unavoidable, especially because the BAAQMD does not have jurisdiction to monitor or enforce any of these mitigation measures. Therefore, the Project would result in a substantial long-term operational noise impact, and this impact would be potentially significant.

As described in Section 3.4, "Noise," the installation of appliances that meet the proposed NO_x standards would occur throughout the nine-county Bay Area and operation of these appliances would generate noise. Mitigation measures, such as enclosures or screening, are likely available to minimize operational noise impacts to a less-than-significant level; however, it is likely that some would remain significant and unavoidable. The BAAQMD does not have land use authority to require these mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures. Therefore, the Project's contribution to these impacts and the impact remains potentially significant and unavoidable.

ES.4 ALTERNATIVES TO THE PROPOSED PROJECT

The following provides brief descriptions of the alternatives evaluated in this Draft EIR. Table ES-2 presents a comparison of the environmental impacts between the alternatives and the Project.

- ▶ Alternative 1: No Project Alternative assumes no actions would be taken by the BAAQMD and the proposed rule amendments would not be adopted. The BAAQMD's existing Rules 9-4 and 9-6, which already establish NO_x emissions standards for natural gas-fired space- and water-heating appliances, would remain in effect without any changes.
- ▶ Alternative 2: Earlier Compliance Date would establish a zero-NO_x standard with a compliance date of January 1, 2026, which is approximately three years earlier than the compliance date for the Project (phased in between 2027 and 2031). Except for the earlier compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.
- ▶ Alternative 3: Later Compliance Date would establish a zero-NO_x standard with a compliance date of January 1, 2035, which is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). Except for the later compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.

Table ES-2 Summary of Environmental Effects of the Alternatives Relative to the Proposed Project

Environmental Topic	Proposed Project	Alternative 1: No Project Alternative	Alternative 2: Earlier Compliance Date	Alternative 3: Later Compliance Date
Air Quality	LTS (Beneficial)	Greater	Similar	Similar
Greenhouse Gas Emissions and Climate Change	LTS (Beneficial)	Greater	Similar	Similar
Utilities and Service Systems (Energy Resources)	SU	Less	Greater	Slightly Less
Noise	SU	Less	Similar	Similar
Aesthetics	LTS	Slightly Less	Similar	Similar

Notes: LTS = less than significant; SU = significant and unavoidable.

Source: Data compiled by Ascent Environmental in 2022.

ES.4.1 Environmentally Superior Alternative

As described in Chapter 4, "Alternatives," the State CEQA Guidelines (Section 15126.6[a]) require EIRs to describe a range of reasonable alternatives to the project that would attain most of the project objectives but would "avoid or substantially lessen any of the *significant effects of the project*" (*emphasis added*). CEQA also requires identification of the environmentally superior alternative. In the case of a project that is designed to reduce existing significant

environmental impacts, such as the proposed Project, determination of which alternative is environmentally superior is unique. On one hand, alternatives have been identified that would reduce significant impacts associated with the Project; on the other hand, the Project achieves higher levels of air quality and greenhouse gas (GHG) reduction than the alternatives that lessen the Project's significant impacts—and air quality and climate change are significant impacts under existing conditions. If we follow CEQA to the letter, and view the alternatives only in terms of those that address the Project's significant impacts, then we must grant that the No Project Alternative is the environmentally superior alternative because it avoids significant potential Project impacts associated with noise and also avoids the Project's potential considerable contribution to significant impacts related to electrical infrastructure expansion (including renewable energy expansion). CEQA further specifies that if the environmentally superior alternative is the "no project" alternative, the EIR must identify an environmentally superior alternative among the other alternatives.

Alternative 2 would establish a zero-NO_x standard with a compliance date of January 1, 2026, which is approximately three years earlier than the compliance date for the Project (phased in between 2027 and 2031). Except for the compliance date, Alternative 2 would meet most of the project objectives. Further, Alternative 2 would achieve reductions in NO_x emissions three years earlier than could be achieved under the Project (2043 as compared with 2046), and lead to greater NO_x reductions over the long term due to the earlier implementation date. Alternative 2 would result in similar air quality, GHG, noise, and aesthetic impacts compared to the Project. However, this change in compliance date would ultimately result in greater impacts related to the construction of new or expanded grid capacity. Alternative 2 would also not reduce the Project's significant noise impacts. Alternative 2's greater impacts related to the construction of new or expanded grid capacity are sufficient to eliminate it from further consideration as the environmentally superior alternative.

Alternative 3 would establish a zero-NO_x standard with a compliance date of January 1, 2035, which is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). Except for the compliance date, Alternative 3 would meet most of the project objectives. Alternative 3, however, would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same rate of reduction (2052 as compared with 2046) and would achieve fewer NO_x reductions overall due to the later implementation date. Alternative 3 would result in similar air quality, GHG, noise, and aesthetic impacts compared to the Project. However, under Alternative 3, a significant and unavoidable impact of the Project could be slightly reduced (although not eliminated) because the compliance date would be delayed six years, thereby requiring a slightly smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity compared with the Project. Therefore, in accordance with CEQA, this Draft EIR concludes that because Alternative 3 would result in a slight reduction to the Project's substantial contribution to a significant cumulative impact related to the construction of new or expanded grid capacity, Alternative 3 is considered the environmentally superior alternative.

However, it is important to note that if "environmentally superior alternative" were more simply defined as the alternative that is best for the overall environment, including beneficial effects, then the conclusion would likely be different. As described throughout this EIR, the Bay Area is currently designated as a non-attainment area under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) for particulate matter. In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under CAAQS and the National Ambient Air Quality Standards (NAAQS). This is an existing and significant air quality impact. The Project would address this significant air quality impact by reducing NO_x emissions in the Bay Area, thereby resulting in a less-than-significant (beneficial) impact to regional air quality (see Section 3.1, "Air Quality"). This reduction, as described above, would also occur with implementation of Alternative 3; however, Alternative 3, would not achieve the rate of reduction in NO_x emissions until six years after the Project could begin to achieve NO_x reductions (2052 as compared with 2046), leading to fewer NO_x reductions and therefore less associated health benefits overall. The Project would result in a greater beneficial effect related to GHG and climate change because the reductions would occur sooner than later.

The Project achieves higher levels of NO_x and GHG reduction than Alternative 3 and addresses existing significant air quality impacts in the Air Basin. Weighing the Project's benefits to air quality and GHG against its significant impacts related to noise and utilities and considering that Alternative 3 does not achieve the same level of total NO_x or GHG

reduction as the Project, it would be difficult to justify naming it environmentally superior to the Project. However, to be clear, based on CEQA's specific intent for the identification of alternatives to minimize or avoid a project's significant impacts, as discussed above, Alternative 3 is considered the environmentally superior alternative because it slightly reduces the Project's impact on utilities and service systems.

ES.5 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

A notice of preparation (NOP) and Initial Study were distributed for the Project on May 19, 2022, to responsible agencies, interested parties, and organizations, as well as private organizations and individuals that may have an interest in the Project. A public scoping meeting was held virtually on June 9, 2022, from 6:00 p.m. to 8:00 p.m. The purpose of the NOP and the scoping meeting was to provide notification that an EIR for was being prepared for the Project and to solicit input on the scope and content of the environmental document. The NOP and responses to the NOP are included in Appendix A. Key environmental concerns and issues that were expressed during the scoping process include the following:

- ▶ electrical grid capacity to support increased demands and the potential for blackouts if the grid system is unprepared;
- ▶ emissions from new power generation facilities;
- ▶ increased electrical demand could stress the grid and/or generate more air pollution if electrical generation is not clean;
- ▶ premature zero-NO_x implementation could result in a net increase in GHG emissions associated with increased electricity production;
- ▶ potential impacts to cultural resources, including resources that may be considered tribal cultural resources; and
- ▶ need to consult with California Native American tribes in accordance with Assembly Bill 52.

All of the substantive environmental issues raised in the NOP comment letters and the scoping meeting have been addressed or otherwise considered during preparation of this Draft EIR.

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Air Quality			
<p>Impact 3.1-1: Long-Term Operational-Related Emissions of ROG, NO_x, PM₁₀, and PM_{2.5} The proposed amendments would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. This would be achieved through the replacement of these appliances with ultra-low and zero-NO_x natural gas appliances or electric appliances. Operation of ultra-low and zero-NO_x natural gas appliances would inherently result in a reduction in NO_x emissions within the SFBAAB. Moreover, any turnover to electric appliances would eliminate emissions of criteria air pollutants from on-site natural gas combustion and associated emissions from this activity. For these reasons, the proposed amendments would have a less-than-significant (beneficial) impact to regional air quality.</p>	LTS (Beneficial)	No mitigation is required for this impact.	LTS (Beneficial)
Greenhouse Gas Emissions and Climate Change			
<p>Impact 3.2-1: Potential to Generate GHG Emissions The proposed amendments would result in a decrease in GHG emissions over the next 24 years. This decrease exceeds the net zero threshold of significance and would assist the state in meeting its long-term GHG reduction goals extending to 2045. Therefore, the proposed amendments would not have a cumulatively considerable contribution to climate change. This impact would be less than significant.</p>	LTS (Beneficial)	No mitigation is required for this impact.	LTS (Beneficial)
Utilities and Service Systems (Energy Resources)			
<p>Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact Assuming that heat pumps are used to replace existing natural gas-fired space and water heating appliances, the Project would, under the “worst case” Low Policy Reference Scenario evaluated by E3 (Appendix C), over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero-NO_x standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 MW of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts, under the “worst case” Low Policy Reference Scenario. For context, this represents 0.6 to 1.2 percent of the State’s total projected land needed for the State to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant, and may include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural</p>	PS	No mitigation measures are available.	SU

NI = No impact

LTS = Less than significant

PS = Potentially significant

S = Significant

SU = Significant and unavoidable

Bay Area Air Quality Management District

Proposed Amendments to Rules 9-4 and 9-6 Draft EIR

ES-9

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
resources and operations; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.			
Noise			
<p>Impact 3.4-1: Potential to Generate Long-Term Operational Noise</p> <p>The proposed amendments would include installation of stationary sources such as heat pump units, which would be installed inside and outside of existing buildings. The potential operational noise impacts associated with this equipment could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable, especially because the BAAQMD does not have jurisdiction to monitor or enforce any of these mitigation measures. Therefore, the Project would result in a substantial long-term operational noise impact, and this impact would be potentially significant.</p>	PS	No mitigation measures are available.	SU
Aesthetics			
<p>Impact 3.5-1: Substantial Adverse Effects on a Scenic Vista</p> <p>The proposed Project—specifically proposed Rule 9-4, which imposes NO_x limitations on residential and commercial central furnaces—could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Even the largest of these units would not likely be large enough to substantially adversely affect a scenic vista, especially given that the outdoor units would be mounted on or next to structures that would be much larger and more noticeable than the equipment. For these reasons, the Project would result in a less-than-significant impact related to scenic vistas.</p>	LTS	No mitigation is required for this impact.	LTS
<p>Impact 3.5-2: Substantially Damage Scenic Resources, Including, but not Limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway</p> <p>Proposed amendments to Rule 9-4, which impose NO_x limitations on residential and commercial central furnaces, could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Implementation of this rule change would not affect trees, rock outcroppings, or other natural scenic resources. Although furnace replacement in existing historic buildings may include exterior heat pumps</p>	LTS	No mitigation is required for this impact.	LTS

NI = No impact

LTS = Less than significant

PS = Potentially significant

S = Significant

SU = Significant and unavoidable

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
where no pumps currently exist, any such equipment to be placed on the exterior of historic structures is typically regulated by local municipalities. Even if such regulations did not apply, HVAC and air conditioning units are commonplace on historic structures, and the addition of this equipment to the exterior of a historic structure would not be considered "substantial damage" to the historic building itself or to a scenic resource as viewed from a State Scenic Highway. The Project would therefore result in a less-than-significant impact.			
Impact 3.5-3: Substantially Degrade the Existing Visual Character or Quality of Public Views Sites in Rural Areas, or Conflict with Applicable Zoning or Other Regulations Governing Scenic Quality in Urban Areas In rural areas, replacement of furnaces that would place exterior equipment on existing buildings where no such equipment currently exists would not substantially degrade the visual character of the site because the addition of a small piece of external equipment on an existing or new building would not change the visual character of the site or adversely affect public views. In urbanized areas, exterior equipment is commonplace and the addition of outdoor heat pump units as a result of the Project would not likely conflict with any existing zoning or other regulations governing scenic quality. If such regulations exist, the entity replacing the equipment would be required to comply. For these reasons, the Project would not substantially degrade the existing visual character or quality of public views of the Bay Area or conflict with applicable zoning or other regulations governing scenic quality, and this impact would be less than significant.	LTS	No mitigation is required for this impact.	LTS
Impact 3.5-4: Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area Outdoor heat pump units do not include bright lights and are not made of reflective materials (i.e., polished metal or mirrored glass). The proposed rule amendments would not require new lighting fixtures. Therefore, the Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. No impact would occur.	NI	No mitigation is required for this impact.	NI

NI = No impact

LTS = Less than significant

PS = Potentially significant

S = Significant

SU = Significant and unavoidable

Bay Area Air Quality Management District

Proposed Amendments to Rules 9-4 and 9-6 Draft EIR

ES-11

This page intentionally left blank.

1 INTRODUCTION

This draft environmental impact report (EIR) has been prepared by the Bay Area Air Quality Management District (BAAQMD) to evaluate the environmental impacts resulting from implementing proposed amendments to its building appliance rules. Amendments are proposed to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). The proposed amendments to Rules 9-4 and 9-6 (Project) would reduce nitrogen oxides (NOx) emissions from space and water heating appliances in the Bay Area. This Draft EIR has been prepared under the direction of the BAAQMD in accordance with the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000-21177) and the State CEQA Guidelines (California Code of Regulations [CCR], Title 14, Division 6, Chapter 3, Sections 15000-15387). The BAAQMD is the lead agency for consideration of this EIR and potential Project approval.

1.1 PURPOSE AND INTENDED USES OF THE DRAFT EIR

CEQA requires that public agencies consider the potentially significant adverse environmental effects of projects over which they have discretionary approval authority before taking action on those projects (PRC Section 21000 *et seq.*). CEQA also requires that each public agency avoid or mitigate, wherever feasible, the significant adverse environmental effects of projects it approves or implements. If a project would result in significant and unavoidable environmental impacts (i.e., significant effects that cannot be feasibly mitigated to less-than-significant levels), the project can still be approved, but the lead agency's decision-maker, in this case the BAAQMD Board of Directors, must prepare findings and issue a "statement of overriding considerations" explaining in writing the specific economic, social, or other considerations that they believe, based on substantial evidence, make those significant effects acceptable (PRC Section 21002, CCR Section 15093).

According to CCR Section 15064(f)(1), preparation of an EIR is required whenever a project may result in a significant adverse environmental impact. An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental effects of a project, identify possible ways to mitigate or avoid the significant effects, and describe a range of reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

In accordance with CCR Section 15161, this document is a project EIR that examines the environmental impacts of a specific project. This type of EIR focuses on the changes in the environment that would result from a specific project. In accordance with CCR Section 15161, a project EIR must examine the environmental effects of all phases of the project, including construction and operation.

Because it has the principal authority over approval or denial of the Project, the BAAQMD is the lead agency, as defined by CEQA, for this EIR.

1.2 SCOPE OF ENVIRONMENTAL ANALYSIS

Pursuant to CEQA and the State CEQA Guidelines, a lead agency shall focus an EIR's discussion on significant environmental effects and may limit discussion on other effects to brief explanations about why they are not significant (PRC Section 21002.1, CCR Section 15128). A determination of which impacts would be potentially significant was made for this Project based on a review of the information presented in the Initial Study prepared for the Project (Appendix A) and comments received as part of the public scoping process (Appendix A), as well as additional research and analysis of relevant Project data during preparation of this Draft EIR.

The BAAQMD has determined that the Project has the potential to result in significant environmental impacts on the following resources, which are addressed in detail in this Draft EIR:

- ▶ Air Quality
- ▶ Greenhouse Gas Emissions and Climate Change,
- ▶ Utilities and Service Systems (Energy Resources),
- ▶ Noise, and
- ▶ Aesthetics.

1.2.1 Effects Found Not to Be Significant

CEQA allows a lead agency to limit the detail of discussion of the environmental effects that are not considered potentially significant (PRC Section 21100, CCR Sections 15126.2[a] and 15128). Effects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR unless the lead agency subsequently receives information inconsistent with the finding in the Initial Study (CCR Section 15143).

Based on a review of the information presented in the Initial Study prepared for the Project (Appendix A) and comments received as part of the public scoping process (Appendix A), as well as additional research and analysis of relevant Project data during preparation of this Draft EIR, the following were identified as resources that would not experience any significant environmental impacts from the Project. Accordingly, these resources are not addressed further in this Draft EIR but are identified below with a brief explanation as to why significant impacts to each resource are not anticipated, as required by CEQA. Impacts associated with potential expansion of existing and planned energy infrastructure in response to project-related increases in energy demand are addressed in Section 3.3, "Utilities and Service Systems."

- | | |
|------------------------------------|-----------------------------|
| ▶ Agriculture and Forest Resources | ▶ Mineral Resources |
| ▶ Biological Resources | ▶ Population and Housing |
| ▶ Cultural Resources | ▶ Public Services |
| ▶ Energy | ▶ Recreation |
| ▶ Geology and Soils | ▶ Transportation |
| ▶ Hazards and Hazardous Materials | ▶ Tribal Cultural Resources |
| ▶ Hydrology and Water Quality | ▶ Wildfire |
| ▶ Land Use and Planning | |

The BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. This area covers about 5,600 square miles, and land uses within the area include a range of commercial, industrial, residential, agricultural, and open space uses.

AGRICULTURE AND FOREST RESOURCES

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new buildings in residential and commercial areas. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Existing agricultural and forest land resources within the BAAQMD's jurisdiction would not be affected. The Project would not convert farmland to non-agricultural use, conflict with zoning for agricultural use or a Williamson Act contract, conflict with zoning of forest land, or convert forest land to non-forest use.

For the reasons above, the Project would result in no impacts related to agriculture and forest resources, and this issue is not discussed further.

BIOLOGICAL RESOURCES

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new buildings in residential and commercial areas. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, the Project would not involve construction, including the use of heavy-duty construction equipment and vehicles, substantial ground disturbance, or conversion of land. Therefore, the Project would also not result in habitat conversion or vegetation removal. Existing biological resources, including special-status species, habitats, and wildlife corridors, within the BAAQMD's jurisdiction would not be affected. Therefore, the Project would not have a substantial adverse effect on a candidate, sensitive, or special-status species; riparian habitat or other sensitive natural community; or state or federally protected wetlands. Additionally, the Project would not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

Existing biological resources, including special-status species, habitats, and wildlife corridors, within the BAAQMD's jurisdiction would not be affected. Therefore, the Project would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Similarly, the Project would not conflict with a habitat conservation plan or natural community conservation plan.

For the reasons above, the Project would result in no impacts related to biological resources, and this issue is not discussed further.

CULTURAL RESOURCES

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not require any excavation that may disturb historical or archaeological resources or human remains or structure modification that would cause a substantial adverse change to the significance of historic structures. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities that may disturb historical or archaeological resources or human remains. Therefore, the Project would not adversely affect historical or archaeological resources or disturb human remains, including those interred outside of formal cemeteries.

For the reasons above, the Project would result in no impacts related to cultural resources, and this issue is not discussed further.

ENERGY

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not require any grading or other ground disturbance. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Regardless of the Project, Bay Area

consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, implementation of the proposed rule amendments would not require the use of any heavy-duty equipment or other construction-related vehicles and thus, would not result in consumption of energy resources. Regarding operations, the proposed rule amendments would allow for any heating appliance that meets the proposed emissions standards. If natural gas-fired appliances are developed that meet the proposed emissions standards, there will be no change from the current consumption of energy resources, and no environmental impact would occur. If, on the other hand and based on currently available technology, natural gas-fired appliances are replaced with electric solutions, this would also not lead to an adverse environmental impact. According to the California Air Resources Board, electrification supports the wise and efficient use of energy resulting in beneficial long-term operation impacts on energy demand. Replacement of older equipment typically results in increased energy efficiency. In addition, as discussed in the Initial Study (Appendix A), approximately 85 percent of the electricity Pacific Gas and Electric Company supplied in 2020 was greenhouse gas free with more than 35 percent being delivered from Renewable Portfolio Standard -eligible sources, including solar, wind, geothermal, small hydroelectric, and various forms of bioenergy (PG&E 2021). Thus, implementation of the proposed rule amendments would not result in wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

For the reasons above, the Project would not result in significant impacts related to energy, and this issue is not discussed further. The potential for the Project to require or result in the relocation or construction of new or expanded electric power facilities is considered, as required by CEQA, in Section 3.3, "Utilities and Service Systems (Energy Resources)."

GEOLOGY AND SOILS

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not require any grading or other ground disturbance. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, the Project would not involve construction activities that would result in substantial ground disturbance, excavation, or building construction. Therefore, the Project would not expose people or structures to substantial adverse effects related to rupture of a known earthquake fault, strong seismic ground shaking, strong ground failure or liquefaction, or landslides.

The proposed rule amendments would not result in substantial soil erosion or the loss of topsoil because the appliances would be installed at existing and new residential and commercial buildings and would not require any grading or other ground disturbance.

Geologic hazards are not expected because no construction activities would occur that would result in substantial ground disturbance, excavation, or building construction. The Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Further, the Project would not be located on expansive soils.

Septic tanks or other similar alternative wastewater disposal systems are typically associated with small residential projects in remote areas. Residential and commercial consumers affected by the proposed rule amendments would

already be connected to appropriate wastewater treatment facilities in the Bay Area and would not rely on septic tanks or similar alternative wastewater disposal systems. Based on these considerations, septic tanks or other alternative wastewater disposal systems are not expected to be affected by the Project.

While outdoor installations are expected, the Project would not involve construction activities that would result in substantial ground disturbance, grading, or excavation. Thus, the Project would not destroy unique paleontological resources or sites or unique geologic features.

For the reasons above, the Project would result in no impacts related to geology and soils, and this issue is not discussed further.

HAZARDS AND HAZARDOUS MATERIALS

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not require the transport, use, or disposal of hazardous materials. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, the Project would not involve construction activities that include the transport, use, or disposal of hazardous materials or the accidental release of hazardous materials. Therefore, the proposed amendments would not create a significant hazard to the public or environment related to the transport, use, or disposal of hazardous materials or the accidental release of hazardous materials.

Schools may be located within a quarter mile of residential and commercial buildings affected by the proposed rules amendments. The proposed amendments to Rules 9-4 and 9-6 would not result in the construction or operation of equipment or result in modifications to existing equipment that would generate hazardous emissions, or result in the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Compliant furnaces and water heaters are not considered sources of toxic air contaminants. Therefore, no increase in hazardous emissions is expected due to implementation of the proposed amendments to Rule 9-4 and 9-6.

Government Code Section 65962.5 requires the creation of lists of facilities that may be subject to Resource Conservation and Recovery Act (RCRA) permits or site cleanup activities. Because the Project area includes nine counties, it is not known if the affected residential and commercial buildings are located on the hazardous materials sites list pursuant to Government Code Section 65962.5. However, the proposed rule amendments would not interfere with site cleanup activities or create additional site contamination and would not create a significant hazard to the public or environment.

The proposed rule amendments would not result in a safety hazard for people residing or working within two miles of a public airport. No impacts on airports or airport land use plans are anticipated from implementation of the amendments to Rules 9-4 and 9-6 because new appliances would be installed inside of residential and commercial buildings.

While outdoor installations are expected, the Project would not involve construction activities, the use of heavy-duty construction equipment and vehicles, or interfere with existing transportation routes or access. Therefore, the proposed rule amendments would not interfere with an adopted emergency response plan or emergency evacuation plan or require street closures that could affect emergency response or evacuation activities.

The proposed rule amendments would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed inside of residential and commercial buildings and would not generate additional development that would place people or structures closer to

wildland areas. The proposed rule amendments would not increase the existing risk of fire hazards, nor would it increase fire risk by increasing the use of flammable materials. The proposed rule amendments would not expose people or structures to wildfires.

For the reasons above, the Project would result in no impacts related to hazards and hazardous materials, and this issue is not discussed further.

HYDROLOGY AND WATER QUALITY

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. The proposed rule amendments would not result in an increase in water runoff or wastewater discharge, would not result in water quality impacts, and would not result in the degradation of surface water or groundwater. The proposed rule amendments are not expected to result in any modifications to National Pollutant Discharge Elimination System (NPDES) permits or result in violation of NPDES permits. No grading or site preparation would be involved and, therefore, no water would be used during these activities. Additionally, the proposed rule amendments would not alter the existing drainage or drainage patterns, result in erosion or siltation, alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite. Further, the proposed rule amendments would not result in an increase in wastewater that requires treatment and would not affect any wastewater treatment facility, storm water runoff, or existing drainage patterns. Additionally, the proposed rule amendments would not include the construction of new or relocation of existing housing or other types of facilities and, as such, would not require the placement of housing or other structures within a 100-year flood hazard area. Because no development of new structures or associated construction activities are involved, the proposed rule amendments would not substantially increase risks from flooding; expose people or structures to significant risk of loss, injury or death involving flooding; or increase existing risks, if any, of inundation by seiche, tsunami, or mudflow.

For the reasons above, the Project would result in no impacts related to hydrology and water quality, and this issue is not discussed further.

LAND USE AND PLANNING

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not affect land use or planning. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Because no development of structures or associated construction activities would occur, the proposed rule amendments would not physically divide an established community. As noted above, the proposed rule amendments would apply to residential and commercial areas; the Project would not conflict with land use plans, policies, or regulations.

For the reasons above, the Project would result in no impacts related to land use and planning, and this issue is not discussed further.

MINERAL RESOURCES

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings and would not require any grading or other ground disturbance. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would

require construction of new or expanded facilities. Because no grading or subsurface excavation would occur, the proposed amendments would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or a locally important mineral resource recovery site. Thus, no impacts to mineral resources would occur, and this issue is not discussed further.

POPULATION AND HOUSING

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings. No new residential or commercial buildings would be constructed. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities.

The Project would not change the number of equipment installations only the specific type of appliances being installed. Therefore, the Project is not expected to result in an expansion of the labor pool. It is expected that the existing labor pool in the Bay Area would accommodate installation activities necessary for appliance installation.. As such, implementing the proposed amendments to Rules 9-4 and 9-6 would not induce substantial population growth.

The proposed rule amendments would not displace people or housing or require the construction of replacement housing.

Thus, no impacts to population and housing would occur, and this issue is not discussed further. The potential for growth-inducing effects is considered, as required by CEQA, in Chapter 5, "Other CEQA Sections."

PUBLIC SERVICES

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings that are currently provided with applicable public services; the Project would not increase the demand for these services. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. No additional fire or police protection services are expected to be required due to the proposed rule amendments as they would apply to existing emission sources.

As noted above under, "Population and Housing," implementation of the proposed rule amendments would not induce population growth because the existing labor pool in the Bay Area is expected to accommodate the activities necessary for appliance installation. As such, the proposed rule amendments would not increase the demand for public services nor generate the need for new or physically altered governmental facilities. Thus, no impacts to public services would occur, and this issue is not discussed further.

RECREATION

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. No new residential or commercial buildings would be constructed, and the existing labor pool in the Bay Area is expected to accommodate the activities necessary for appliance installation. Because the proposed amendments to 9-4 and 9-6 would not increase or redistribute population, the proposed amendments would not increase the demand for or use of existing neighborhood and regional parks or other recreational facilities or require the construction of new or the expansion of existing recreational facilities. Thus, no impacts to recreation would occur, and this issue is not discussed further.

TRANSPORTATION

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new buildings in residential and commercial areas. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded equipment manufacturing facilities or notable changes to equipment distribution patterns that could increase vehicle miles traveled.

The proposed rule amendments would regulate the type of equipment that would be installed, not whether it would be installed. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. Similarly, maintenance or repair activities (should they be needed), would occur regardless of the Project. It is expected that the existing labor pool in the Bay Area would accommodate the very minor installation and (should they be needed) maintenance and repair activities.

As discussed above under "Population and Housing," no new residential or commercial buildings would be constructed and the existing labor pool in the Bay Area is expected to accommodate the activities necessary for appliance installation. Thus, no increase in permanent worker or truck traffic would occur. The proposed amendments to Rules 9-4 and 9-6 would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Further, the proposed rule amendments would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3 subdivision(b), as no substantial increase in traffic would occur.

The proposed rule amendments would not increase traffic hazards or create incompatible uses. The Project does not involve construction of any roadways or other transportation design features; therefore, no changes to current roadway designs that would increase traffic hazards would occur. Because the proposed rule amendments would not change the roadway system, would not involve construction, and would not generate substantial truck trips, no impacts to emergency access would occur.

Thus, no impacts to transportation would occur, and this issue is not discussed further.

TRIBAL CULTURAL RESOURCES

Assembly Bill (AB) 52, as provided in PRC Sections 21080.3.1, 21080.3.2, and 21082.3, requires that lead agencies undertaking CEQA review must, upon written request of a California Native American Tribe, begin consultation once the lead agency determines that the application for the project is complete, before the issuance of a notice of preparation (NOP), of an EIR or notice of intent to adopt a negative declaration or mitigated negative declaration. The BAAQMD is not currently aware of any tribal cultural resources (TCRs) that exist in the vicinity of the Project. Further, no California Native American tribes have requested to be informed of projects by BAAQMD; therefore, there is no trigger to begin consultation under AB 52.

As discussed in the Initial Study (Appendix A), the Bay Area has locations that were historically used by Native Americans. Thus, there is the potential for the presence of unrecorded tribal cultural resources to be buried throughout the BAAQMD's jurisdiction. However, the proposed amendments to Rules 9-4 and 9-6 would not involve ground disturbance and would result in the installation of new furnaces and water heaters at existing and new residential and commercial buildings. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities that may disturb tribal cultural resources. As noted above, no California Native American tribes have requested to be informed of projects by BAAQMD; therefore, there is no trigger to begin consultation under AB 52, resulting in no resources identified as TCRs under Public Resources Code Section 21074. Therefore, such resources would not be adversely affected by the proposed rule amendments. Thus, the Project would result in no impacts related to TCRs, and this issue is not discussed further.

WILDFIRE

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings, which are subject to state and local building and fire codes that take wildfire hazard zones and fire protection into consideration. Installation and operation of these appliances would not change existing wildfire risks in the Bay Area. Therefore, the proposed rule amendments would not impair an adopted emergency response plan or emergency evacuation plan, would not expose people to pollutants from a wildfire or the uncontrolled spread of a wildfire, would not require the installation of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk, and would not expose people or structures to flooding or landslides as a result of post-fire slope or drainage changes. Thus, no impacts related to wildfire would occur, and this issue is not discussed further.

1.3 AGENCY ROLES AND RESPONSIBILITIES

1.3.1 Lead Agency

The BAAQMD is the lead agency responsible for approving and carrying out the Project and for ensuring that the requirements of CEQA have been met. After the EIR public review process is complete, the BAAQMD Board of Directors will determine whether to certify the EIR (see State CEQA Guidelines Sections 15090) and approve the Project.

1.3.2 Trustee and Responsible Agencies

A trustee agency is a State agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. There are no trustee agencies for this Project.

Responsible agencies are public agencies, other than the lead agency, that have discretionary-approval responsibility for reviewing, carrying out, or approving elements of a project. There are no responsible agencies for this Project.

1.3.3 Other Required Permits and Approvals

No permits or approvals from other agencies are anticipated to be required.

1.4 CEQA PUBLIC REVIEW PROCESS

1.4.1 Notice of Preparation and Initial Study

In accordance with PRC Section 21092 and CCR Section 15082, the BAAQMD issued an NOP and Initial Study on May 19, 2022, to inform agencies and the general public that an EIR was being prepared and to invite comments on the scope and content of the document (Appendix A). The NOP and Initial Study were submitted to the State Clearinghouse, which then distributed the NOP to potential responsible and trustee agencies; posted on the BAAQMD's website (<https://www.baaqmd.gov/>); posted with the applicable County Clerks; and made available at the BAAQMD's office. In addition, the NOP was distributed directly to public agencies. The NOP was circulated for a 34-day review period, with comments accepted through June 21, 2022.

In accordance with CCR Section 15082(c), a noticed scoping meeting for the EIR was held virtually on June 9, 2022, from 6:00 p.m. to 8:00 p.m.

The purpose of an NOP is to provide sufficient information about the Project and its potential environmental impacts to allow agencies and interested parties the opportunity to provide a meaningful response related to the scope and content of the EIR, including mitigation measures that should be considered and alternatives that should be

addressed (CCR Section 15082[b]). Comments submitted in response to the NOP are used by the lead agency to identify broad topics to be addressed in the EIR. Comments on environmental issues received during the NOP public comment period are considered and addressed in this Draft EIR. Appendix A contains the NOP, Initial Study, and comment letters submitted during the NOP public comment period.

1.4.2 Public Review of this Draft EIR

This Draft EIR is being circulated for public review and comment for a period of 48 days, from December 20, 2022 to February 6, 2023.

During the public comment period, written comments from the public as well as organizations and agencies on the Draft EIR's accuracy and completeness may be submitted to the BAAQMD. Written comments (including via email) must be received by 5:00 p.m. on February 6, 2023. Written comments should be addressed to:

Jennifer Elwell, BAAQMD
375 Beale Street, Suite 600
San Francisco, CA 94105
E-mail: jelwell@baaqmd.gov

Comments provided by email should include the name and physical address of the commenter in the body of the email.

The Draft EIR is available for review during normal business hours at the BAAQMD office (375 Beale Street, Suite 600, San Francisco). The Draft EIR is also available online at: <https://www.baaqmd.gov/>.

1.4.3 Final EIR

Following public review of the Draft EIR, a Final EIR will be prepared that will include both written and oral comments on the Draft EIR received during the public review period, responses to those comments, and any revisions to the Draft EIR. The Draft EIR and Final EIR will comprise the EIR for the Project.

Before taking action on the Project, the lead agency is required to certify that the EIR has been completed in compliance with CEQA, that the decision-making body reviewed and considered the information in the EIR, and that the EIR reflects the independent judgment of the lead agency.

1.5 ORGANIZATION OF THE DRAFT EIR

This Draft EIR is organized as follows:

The "Executive Summary" introduces the Project; provides a summary of the environmental review process, effects found not to be significant, and key environmental issues; and lists significant impacts and mitigation measures to reduce significant impacts to less-than-significant levels.

Chapter 1, "Introduction," describes the purpose of the EIR, the scope of the environmental analysis, agency roles and responsibilities, the CEQA public review process, organization of this Draft EIR, and standard terminology.

Chapter 2, "Project Description," describes the purpose of and need for the Project, identifies Project objectives, and provides a detailed description of the Project.

Chapter 3, "Environmental Impacts and Mitigation Measures," evaluates the expected environmental impacts generated by the Project, arranged by subject area (e.g., Air Quality, Greenhouse Gas Emissions and Climate Change, Utilities and Service Systems [Energy Resources], Aesthetics, and Noise). Within each subsection of Chapter 3, the regulatory setting, environmental setting, methodology, and thresholds of significance are described. The anticipated changes to the existing conditions after development of the Project are then evaluated for each subject area. For any significant or potentially significant impact that would result from Project implementation, mitigation measures are

presented along with the remaining level of significance. Environmental impacts are numbered sequentially within each section (e.g., Impact 3.1-1, Impact 3.1-2, etc.).

Chapter 4, "Alternatives," evaluates alternatives to the Project, including alternatives considered but eliminated from further consideration. The environmentally superior alternative is identified.

Chapter 5, "Other CEQA Sections," provides a discussion of growth-inducing impacts, significant and unavoidable impacts, and significant and irreversible environmental changes.

Chapter 6, "Report Preparers," identifies the individuals who contributed to preparation of this Draft EIR.

Chapter 7, "References," identifies the references used in preparation of this Draft EIR.

1.6 STANDARD TERMINOLOGY

This Draft EIR includes the following terminology regarding the significance of environmental impacts of the Project:

- ▶ No Impact: Implementing the Project would not result in an adverse effect.
- ▶ Less-than-Significant Impact: The impact would be adverse but would not exceed the defined standard or threshold of significance. Less-than-significant impacts do not require mitigation.
- ▶ Significant Impact: The impact would exceed the defined standard or threshold of significance and would or could cause a substantial adverse change in the environment. Potentially feasible mitigation measures or alternatives are recommended to eliminate the impact, reduce it to a less-than-significant level, or reduce it to the degree feasible.
- ▶ Potentially Significant Impact: The impact may be or is likely to be significant. Because information is limited, the conclusion is not definitive. For purposes of the EIR analysis, a potentially significant impact is treated the same as a significant impact and requires feasible mitigation measures or alternatives.
- ▶ Mitigation Measure: The measure could feasibly avoid, minimize, or compensate for a significant impact. Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments. Compliance with state and federal laws or other regulations, including potential actions to achieve such compliance, may be sufficient mitigation in instances in which compliance would be reasonably expected to avoid, minimize, or compensate for the environmental impact.

This page intentionally left blank.

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD) is proposing amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). Rule 9-4 applies to the natural gas-fired space-heating furnaces commonly found in single-family homes, and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. Space- and water-heating appliances generate a large portion of nitrogen oxide (NO_x) emissions from sources in the Bay Area. If adopted, the proposed amendments would substantially reduce NO_x emissions from these appliances.

This chapter describes the proposed amendments to Rules 9-4 and 9-6 (Project) and provides a brief discussion of the potential environmental impacts associated with implementing these amendments. A more detailed analysis of the Project's potential environmental impacts is provided in Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures."

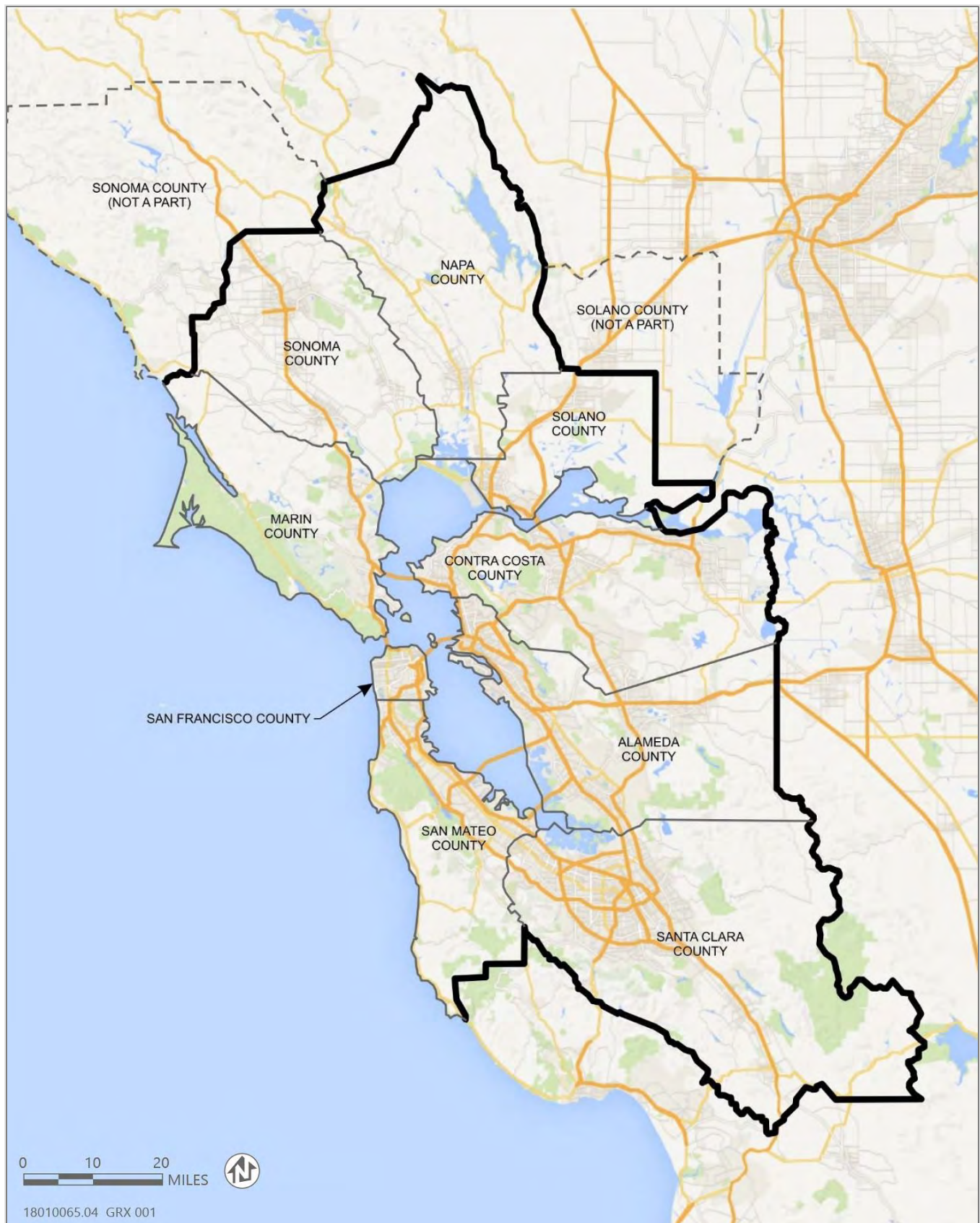
2.2 PROJECT OBJECTIVES

The overall purpose of the proposed amendments is to reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Specifically, the objectives of the proposed amendments to Rules 9-4 and 9-6 are to:

- ▶ for Rule 9-4, introduce an "ultra-low" NO_x standard for space-heating appliances with a compliance date in 2024;
- ▶ for Rule 9-4, establish a zero-NO_x standard in 2029;
- ▶ for Rule 9-6, establish a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size;
- ▶ expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances;
- ▶ update and clarify the certification and calculation methods contained in the rules;
- ▶ ensure equitable implementation of the rules; and
- ▶ improve the clarity and enforceability of the rules.

2.3 PROJECT LOCATION

The proposed amendments to Rules 9-4 and 9-6 would apply to building appliances within the BAAQMD's jurisdiction, which encompasses 5,600 square miles. The area of BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties (Figure 2-1). The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast.



Source: Adapted from BAAQMD 2021.

Figure 2-1 Boundary of BAAQMD's Jurisdiction

2.4 BACKGROUND

2.4.1 Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces

Rule 9-4 imposes a NO_x emission limit of 40 nanograms of NO_x per joule (40 nanograms per joule [ng/joule]) of useful heat produced by central furnaces with a maximum heat input rating of 175,000 British thermal units per hour (BTU/hour). Additionally, Rule 9-4 requires that furnaces subject to this rule be certified to comply with this limit by their manufacturer. Furnaces in this size range are used in most single-family homes, some multiunit dwellings, and some small commercial spaces in the Bay Area, but Rule 9-4 currently applies only to residential furnaces.

2.4.2 Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

Rule 9-6 sets NO_x emission standards for small boilers and water heaters, with existing standards varying based on size (less than 2 million BTU/hour) and equipment application.

2.4.3 Industry Description

Proposed amendments to Rules 9-4 and 9-6 would affect natural gas-fired space- and water-heating appliances, including furnaces and water heaters used in single-family homes; multifamily residences, such as apartment buildings; and commercial spaces, such as retail and office buildings. The BAAQMD regulates these sources on a point-of-sale basis, requiring that equipment manufactured after the compliance date and installed within the geographical jurisdiction of the BAAQMD meet the standards contained in the rules. The proposed amendments would apply to commercial and residential applications, as well as noncentral space-heating configurations.

2.4.4 Regulatory History

The BAAQMD has regulated NO_x emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was first adopted in 1992 and was most recently updated with more stringent NO_x-emissions standards for certain equipment in 2007. All versions of these rules have included a NO_x emissions standard expressed as nanograms of NO_x per joule of useful heat (ng/joule) delivered by the appliance.

In addition, the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) have adopted regulations that are similar in structure and standards to Rules 9-4 and 9-6. SCAQMD Rule 1111 and SJVAPCD Rule 4905, which are similar to Rule 9-4 in applicability to furnaces, have been updated within the last 10 years and require a NO_x-emissions standard of 14 ng/joule, the same initial standard identified in the proposed amendments. Rule 9-6 for water heaters and small boilers currently contains NO_x-emission standards equivalent to those in SCAQMD Rules 1146.2 and 1121 and SJVAPCD Rules 4308 and 4902 for similar equipment.

2.4.5 Emissions Context

Nitrogen oxide emissions from building appliances in the Bay Area are estimated based on aggregated natural gas usage data from the Pacific Gas and Electric Company. These data, combined with data and assumptions regarding the age of buildings and their equipment, are used to calculate criteria and greenhouse gas (GHG) emissions associated with the building sector.

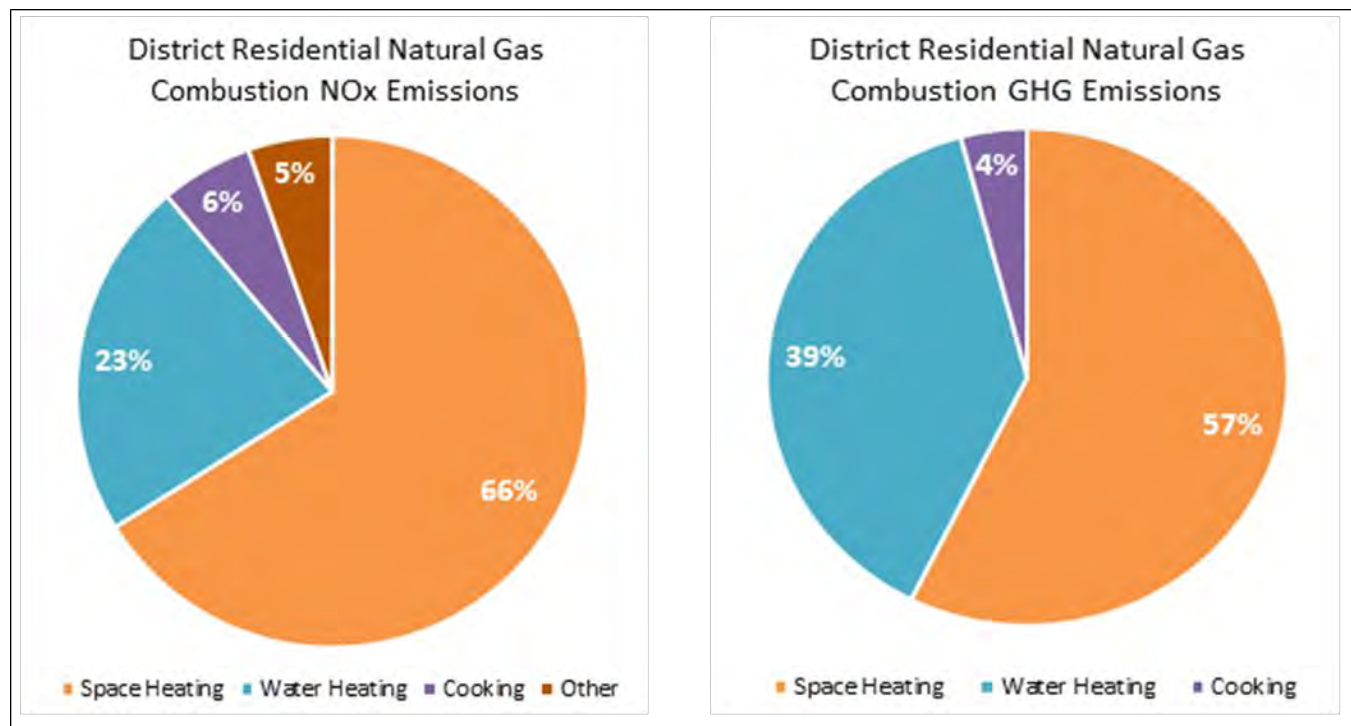
The building sector, identified as a significant Bay Area source of emissions in the BAAQMD's 2017 Clean Air Plan, was highlighted in measures SS30, BL1, and BL2 (BAAQMD 2017). For context, Figure 2-2 compares emissions from natural gas combustion in residential buildings with emissions from passenger vehicles.



Source: Data provided by BAAQMD in 2022.

Figure 2-2 Passenger Vehicle Emissions vs. Residential Natural Gas Combustion (2018)

The proposed rule amendments to the two rules focus on emissions from natural gas-fired space- and water-heating appliances in buildings. Although space and water heaters are not the only natural gas-consuming appliances in buildings, they consume the vast majority of natural gas used in buildings and, therefore, are the greatest source of NO_x emissions in the building sector. Figure 2-3 shows the emissions share by appliance type for residential natural gas combustion. As shown in the figure, space and water heating together represent 89 and 96 percent of NO_x and GHG emissions from residential natural gas combustion, respectively.



Source: Data provided by BAAQMD in 2022.

Figure 2-3 Residential Natural Gas Combustion Emissions by Equipment Type in 2018

2.4.6 Nitrogen Oxide Emissions

The proposed amendments seek to substantially reduce NO_x emissions from space- and water-heating appliances. These appliances emitted 2,410 and 828 tons of NO_x per year, respectively, from residential buildings in the Bay Area in 2018.

Nitrogen oxides are a key criteria pollutant as a precursor to ozone and secondary particulate matter (PM) formation. Secondary PM is formed from the conversion of NO_x to ammonium nitrate through atmospheric chemical reactions with ammonia. Particulate matter, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less (PM_{2.5}) under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) and unclassifiable under National Ambient Air Quality Standards (NAAQS). Exposure to PM_{2.5}, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NO_x compounds in the atmosphere contribute to the formation of secondary PM, any NO_x emission reduction would also result in PM_{2.5} reductions.

In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under CAAQS and NAAQS. Emissions of reactive organic gases (ROG) and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. Therefore, reductions in emissions of ROG and NO_x are needed throughout the region to decrease ozone levels. As the ambient temperature rises, ground-level ozone forms at an accelerated rate. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Exceedances of State or national ozone standards in the Bay Area occur only on hot, relatively stagnant days. Because weather conditions have a strong impact on ozone formation, ozone levels can vary significantly from day to day or from one summer to the next. Longer and more severe heat waves expected as a result of climate change may cause more ozone formation, resulting in more frequent exceedances of ozone standards.

2.5 PROPOSED AMENDMENTS TO RULE 9-4

The proposed amendments for Rule 9-4 include introducing an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024 and setting a zero-NO_x standard in 2029. Like the current rule, amended Rule 9-4 would apply only to new devices and only to natural gas-fired devices. The proposed new lower and zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces and water heaters. The details of these amendments are discussed below.

2.5.1 Rule Title and Applicability

Rule 9-4 is currently titled “Nitrogen Oxides from Fan Type Residential Central Furnaces.” To expand the applicability of this rule to a larger breadth of space-heating appliances, the proposed amendments would change the title to “Nitrogen Oxides from Residential and Commercial Furnaces.” Existing requirements for residential fan type furnaces would be unchanged. Only new units would be subject to the zero-NO_x emission standard in proposed new Section 9-4-301.3. The BAAQMD differentiates the units through the addition of a definition for “residential fan type central furnace” and specifications for where the standards are more broadly applicable to natural gas-fired space-heating equipment.

2.5.2 Definitions

For clarity and enforceability, the proposed amendments include the addition of definitions for “British thermal unit (BTU),” “heat input,” “natural gas,” “nitrogen oxides,” and “residential fan type central furnace.”

2.5.3 Standards

The proposed amendments to Section 9-4-301 would clarify emissions standards, including existing requirements for residential fan type central furnaces in the current version of the rule (Section 9-4-301.1). Section 9-4-301.2 would be added to introduce the “ultra-low NO_x” requirement (14 ng/joule) in 2024 to align with SCAQMD and SJVAPCD emissions standards and achieve near term NO_x reductions and health benefits. This requirement would also be applicable only to residential fan type central furnaces as drafted.

The proposed amendments include the addition of new Section 9-4-301.3 to introduce the zero-NO_x standard, as well as additional applicable equipment. As proposed, the zero-NO_x standard would take effect in 2029 and would apply to all residential and commercial space-heating appliances. This includes wall heating and other direct-vent units. This requirement would not be applicable to furnaces used in mobile homes. The proposed standard is intended to result in substantial regional NO_x (and therefore ozone and secondary PM) emission reductions in the long term. The proposed standard would take effect in 2029 based on a current understanding of the available technology, accessibility, and affordability of zero-NO_x units and planned industry technology development to reduce these barriers.

2.5.4 Administrative Requirements

The proposed amendments include updates and clarifications to certification and calculation methods. The BAAQMD expects dual-fuel units that can demonstrate compliance with the ultra-low NO_x standard, on average, to be able to meet the standards and certification requirements of these rule amendments. In addition, Rule 9-4 requires the completion of a compliance statement for recordkeeping purposes, and the proposed amendments would add a provision to this section to allow for the submission of compliance statements issued by SCAQMD for equivalent emission standards.

The proposed amendments include the addition of an interim report to be brought to the Board of Directors by the Air Pollution Control Officer at least two years before the compliance date for the zero-NO_x standard. BAAQMD staff

intends for this report to provide information to the Board and the public about the accessibility of zero-NO_x appliances to Bay Area residents and to allow the Board of Directors an opportunity to take any necessary action in response to this information. Contents of this report would include information on technology development, market availability of zero-NO_x units, potential costs of compliance, and availability of incentive programs to decrease these costs.

2.5.5 Manual of Procedures

The proposed amendments include the addition of a BAAQMD Manual of Procedures section to provide further clarity around equipment certification and determination of emissions through source tests conducted in accordance with U.S. Environmental Protection Agency reference methods.

2.6 PROPOSED AMENDMENTS TO RULE 9-6

The proposed amendments for Rule 9-6 include setting a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size. Like the current rule, the proposed amendments to Rule 9-6 would apply only to new devices and only to natural gas-fired devices. The proposed new zero-NO_x standards would apply to appliance retailers/wholesalers and installers and would affect Bay Area consumers when they replace their existing furnaces and water heaters. The details of these amendments are discussed below.

2.6.1 Standards

The proposed amendments to Rule 9-6 include the introduction of a zero-NO_x standard for natural gas-fired residential and commercial water heaters and boilers. The proposed compliance dates for these appliances are dependent on equipment size. Units under 75,000 BTU/hour (typically used in single-family residences) would be required to comply by 2027, and larger units of up to 2 million BTU/hour (typically used in multifamily and commercial buildings) would have a 2031 compliance date as proposed.

The BAAQMD anticipates, based on a current understanding of available technologies and market development, that zero-NO_x solutions for single-family residential applications would be available and affordable on a shorter timeframe than larger boilers used in multifamily and commercial applications. This includes the development of lower-voltage heat pump water heaters that would lower cost barriers associated with electric upgrades.

2.6.2 Administrative Requirements

As in Rule 9-4, proposed amendments include the addition of an interim report to be presented to the Board of Directors by the Air Pollution Control Officer at least two years before the compliance dates for the zero-NO_x standards. The BAAQMD intends for this report to provide information to the Board and the public about the accessibility of zero-NO_x appliances to Bay Area residents and to allow the Board of Directors an opportunity to take any necessary action in response to this information. Contents of this report would include information on technology development, market availability of zero-NO_x units, potential costs of compliance, and availability of incentive programs to decrease these costs.

2.7 POTENTIAL PHYSICAL EFFECTS OF RULE AMENDMENTS

The proposed amendments to Rules 9-4 and 9-6 would establish more stringent NO_x emission standards for natural gas-fired space- and water-heating appliances in buildings in the Bay Area. The following sections discuss how the proposed amendments may affect NO_x emissions in the future. This analysis has been prepared by the BAAQMD using existing emissions inventories and reasonable expectations for future appliance replacement rates, emissions

profiles, and available technology. An analysis of the Project's potential environmental impacts is provided in Chapter 3, "Environmental Checklist."

2.7.1 Emission Control Methods

Emission control methods to meet the proposed 14 ng/joule standard for Rule 9-4 are well established and currently required by SCAQMD Rule 1111 and SJVAPCD Rule 4905. Potential complications identified in other jurisdictions, such as high-altitude and cold weather scenarios, are not applicable in the Bay Area. The BAAQMD anticipates that dual-fuel systems able to demonstrate compliance with this new proposed standard would be eligible for certification.

Current space and water heating appliances that meet the zero-NO_x standard and are available on the market consist mainly of electric heat pump systems. The BAAQMD does not intend to mandate specific technology solutions, but currently available electric solutions were used as the basis to form estimates and projections. Natural gas technologies, with combustion occurring in the absence of nitrogen, along with a variety of other technologies, could also meet the proposed standards. The assumed use of electric appliances for CEQA analysis purposes allows for a conservative estimate for impacts to utility systems and NO_x reductions and potential adverse environmental impacts because a switch to electric appliances would slightly reduce NO_x emissions reductions (some increase in NO_x emissions from power generation); have impacts on utilities and services systems from the additional electricity needed to power these appliances; and have potential noise impacts, as discussed herein. Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, NO_x emission reductions would be greater than those shown here as the resultant emissions would be zero (i.e., fewer emissions associated with electricity generation), there would be lesser impacts due to electricity need, and there would be no other foreseeable potential adverse impacts on any environmental impact areas. Thus, for CEQA analysis purposes, the BAAQMD assumes that currently in-use natural gas-fired appliances would be replaced with electric appliances. The proposed amendments include a zero-NO_x standard four to eight years in the future to encourage technology development, as well as availability and accessibility throughout the Bay Area.

2.7.2 Emission Reductions

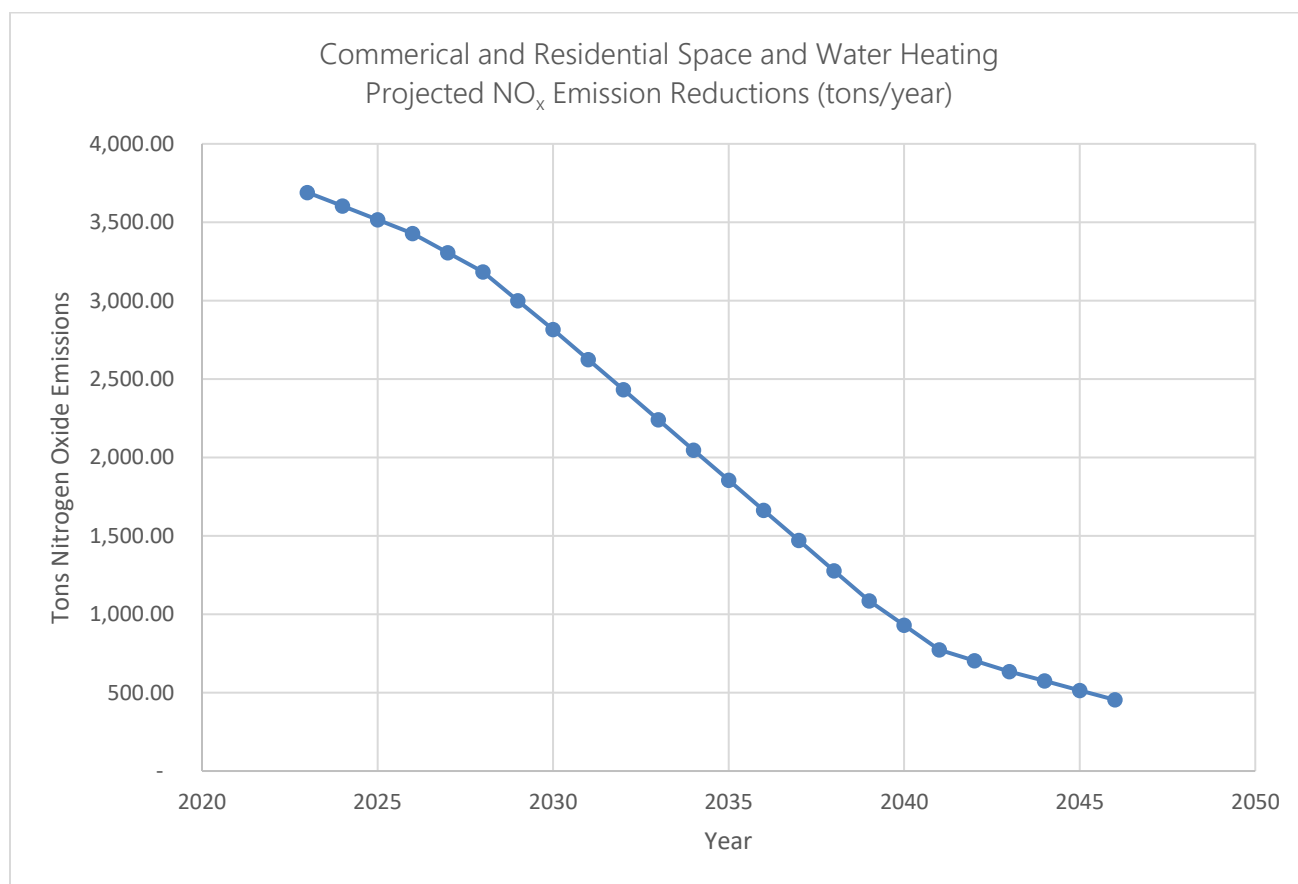
Because the applicable rules function as point-of-sale requirements, emission reductions associated with the proposed rule amendments would occur over time in relation to the lifespan of currently installed equipment. To model these predicted emission reductions, the BAAQMD made the following assumptions:

- ▶ While the proposed regulatory amendments would allow for natural gas-fired zero-NO_x appliances, based on currently available technology, staff assumed that, upon burnout, natural gas-fired appliances would be replaced with electric solutions when the proposed zero-NO_x standards are in effect. As noted above, this results in a conservative analysis of NO_x reductions because other technologies that may be developed could avoid the additional NO_x from electricity generation.
- ▶ For electric replacements, it is assumed that the electricity provided is from the community choice aggregator local to the customer, or direct from the Pacific Gas and Electric Company. The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load is discussed further in Appendix B. The resulting weighted average is 85 percent carbon and NO_x-free electricity generation. Further information on this calculation is provided in Appendix B.
- ▶ Electricity generated from natural gas-fired powerplants is assumed to result in NO_x emissions of 5 parts per million by dry volume at 15-percent oxygen. This emission limit represents best available control technology for simple-cycle gas turbine power plants over 50 megawatts (CARB 2004).
- ▶ Although some Bay Area residents are choosing to install zero-NO_x solutions at this time, and this trend is expected to continue and increase over time, modeled emission reductions do not assume any voluntary uptake of zero-NO_x technology before the proposed compliance dates. BAAQMD staff anticipates that voluntary uptake

rates will be minimal when considered in comparison with the overall inventory of equipment and, therefore, will not substantially affect emissions projections shown here.

- ▶ Commercial space and water heating is frequently achieved through the use of larger boilers that are covered under the BAAQMD's Regulation 9, Rule 7. For this reason, BAAQMD staff assumed that 50 percent of commercial space- and water-heating baseline emissions would not be affected by the proposed amendments.
- ▶ Since the proposed amendments would affect only direct emissions from two types of building appliances and would not affect natural gas distribution, BAAQMD staff did not assume any upstream emission reductions along the natural gas infrastructure. These reductions could have been associated with GHG co-benefits through reduced methane leakage but are not guaranteed because the technologies to be used to meet the proposed standards could rely on the natural gas system for energy, and the proposed amendments would not affect the existing natural gas distribution system.
- ▶ Water heaters were assumed to have an average lifespan of 13 years, and space-heating equipment was assumed to have an average lifespan of 18 years (E3 2019:41).

Figure 2-4 shows the projected NO_x emissions over time based on the assumptions described above and the proposed amendments to Rules 9-4 and 9-6. The 2018 BAAQMD emissions inventory provides the baseline for this projection.



Source: Data provided by BAAQMD in 2022.

Figure 2-4 Projected NO_x Emissions under Proposed Amendments

Initial reductions would be achieved by the introduction of the ultra-low NO_x requirements (14 ng/joule) for residential furnaces. For replacements under this standard between 2024 and 2029, BAAQMD staff estimates a 65-percent reduction in NO_x emissions on a per unit basis compared to existing standards. Additional substantial

emission reductions would be achieved starting in 2027 with the zero-NO_x compliance date for small water heaters and additionally in 2029 with the zero-NO_x compliance date for all new space-heating units.

Yearly emission reductions would continue as the zero-NO_x level requirements for large water heaters take effect in 2031 and units, including ultra-low NO_x units, are changed out over the course of the average assumed appliance lifetimes.

Table 2-1 presents values for projected yearly emissions and for projected reductions compared with the baseline emissions inventory for selected years as represented by the graph in Figure 2-4. It should be noted that 2018 is the baseline year for the projected NO_x emissions; however, BAAQMD staff anticipates that reductions would not occur until 2024 because the BAAQMD has assumed that voluntary uptake rates would be minimal.

Table 2-1 Projected NO_x Emissions Upon Implementation of Proposed Amendments

Year	Projected Yearly NO _x Emissions (tons/year)	Projected NO _x Reduction vs. Baseline (tons/year)
2018*	3,690	—
2025	3,516	174
2030	2,816	874
2035	1,855	1,835
2040	930	2,761
2045	515	3,176
2046	454	3,236

Notes: NO_x = nitrogen oxide.

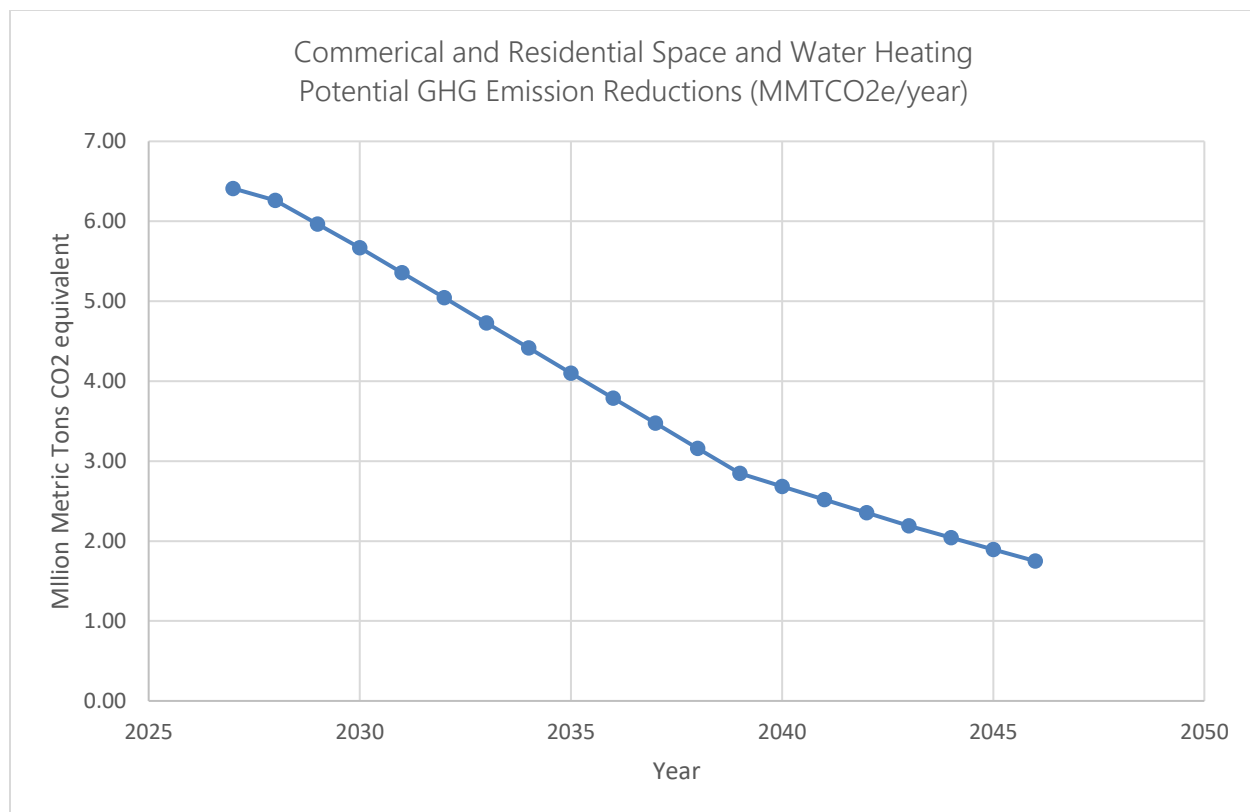
* 2018 is the baseline year for emissions inventory.

Source: Data provided by BAAQMD in 2022.

These NO_x emission reductions would be substantial over time, with an 88-percent reduction of emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2046. This reduction could be realized sooner with voluntary uptake and replacements before breakdown both before and throughout the compliance period. NO_x is a criteria pollutant of concern for the Bay Area and these emissions affect overall regional air quality and ozone formation, as well as secondary PM formation. BAAQMD staff anticipates that the significant NO_x reduction expected from the proposed amendments to the rules would result in meaningful local health benefits through reduced PM formation.

The BAAQMD additionally estimated GHG emission co-benefits that may result from the proposed amendments. Figure 2-5 shows the potential GHG emission reductions over time based on the same set of assumptions listed at the beginning of this section. These assumptions include the proliferation of electric technologies in the absence of other new technology development but do not include potential GHG savings along the natural gas infrastructure that could result from the widespread use of electric appliances. If zero-NO_x natural gas-fired technologies are developed and adopted, the potential GHG savings depicted below would not occur at the scale projected in Figure 2-5 and Table 2-2. For GHGs, 2018 BAAQMD emissions data serve as the baseline.

GHG co-benefits would be achieved in a fashion similar to the emission reductions described for NO_x. Potential GHG co-benefits are based largely on the assumption of in-kind electric replacements and low-carbon content power provided by Pacific Gas and Electric Company and the community choice aggregators in the Bay Area as described above. Further details on and examples of this calculation are provided in Appendix B.



Source: Data provided by BAAQMD in 2022.

Figure 2-5 Potential GHG Emissions Upon Implementation of Proposed Amendments

Table 2-2 provides values for projected yearly emissions and projected reductions compared with the baseline emissions inventory for selected years as represented by the graph in Figure 2-5. It should be noted that 2018 is the baseline year for the projected GHG emissions; however, BAAQMD staff anticipates that reductions would not occur until 2027 because BAAQMD staff has assumed that voluntary uptake rates would be minimal.

Table 2-2 Potential GHG Emissions Upon Implementation of Proposed Amendments

Year	Projected Yearly GHG Emissions (MMTCO ₂ e/yr)	Potential GHG Reduction vs. Baseline (MMTCO ₂ e/yr)
2018*	6.56	—
2030	5.67	0.89
2035	4.10	2.46
2040	2.68	3.88
2046	1.75	4.81

Notes: GHG = greenhouse gas; MMTCO₂e/yr = million metric tons of carbon dioxide equivalent per year.

* 2018 is the baseline year for the GHG emissions inventory.

Source: Data provided by BAAQMD in 2022.

2.7.3 Other Potential Physical Effects

As described above, the proposed amendments to Rules 9-4 and 9-6 would affect natural gas-fired space- and water-heating appliances, including furnaces and water heaters used in single-family homes; multifamily residences; and commercial spaces, such as retail and office buildings. These appliances would be installed at existing and new residential and commercial buildings. The proposed rule amendments would not result in any land use changes and would not require construction (other than installation of the replacement units at existing buildings). These proposed

amendments would also not result in foreseeable changes to equipment manufacturing processes that could require construction of new or expanded equipment manufacturing facilities or notable changes to equipment distribution patterns that could increase vehicle miles traveled. The BAAQMD conducted additional research on electrical grid capacity to serve the Project. The results of this research are included in Appendix C. Although the Project does not include development of other facilities that would directly increase demand for electricity, the Project would result in long-term replacement of appliances with zero-NO_x appliances that are assumed to be electric. This assumption is made for purposes of conducting a conservative CEQA analysis and is based on currently available technology. This change to electric appliances would contribute to increased electricity demand resulting from other programs, especially State-led decarbonization programs that involve much more reliance on renewable energy. The potential for the Project to contribute to substantial adverse physical effects associated with any electrical supply increases or necessary grid capacity upgrades is analyzed in this EIR in Section 3.3, "Utilities and Service Systems (Energy Resources)." Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, these potential grid impacts would decrease.

A more detailed analysis of the Project's potential environmental impacts is provided in Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures."

3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

APPROACH TO THE ENVIRONMENTAL ANALYSIS

This Draft EIR evaluates and discloses the environmental impacts associated with the Proposed Amendments to Rules 9-4 and 9-6 Project, in accordance with CEQA (Public Resources Code [PRC] Section 21000, et seq.) and the State CEQA Guidelines (California Code of Regulation, Title 14, Chapter 3, Section 1500, et seq.). Sections 3.1 through 3.5 of this Draft EIR present a discussion of regulatory setting, environmental setting, environmental impacts associated with construction and operation of the Project, mitigation measures to reduce the level of impact, and residual level of significance (i.e., after application of mitigation, including impacts that would remain significant and unavoidable after application of all feasible mitigation measures). Issues evaluated in these sections consist of the environmental topics identified for review in the notice of preparation (NOP) prepared for the Project (see Appendix A). Chapter 4, "Alternatives," presents a reasonable range of alternatives and evaluates the environmental effects of those alternatives relative to those of the Project, as required by Section 15126.6 of the State CEQA Guidelines. Chapter 5, "Other CEQA Sections," includes an analysis of the Project's growth inducing impacts, as required by Section 21100(b)(5) of CEQA.

Sections 3.1 through 3.5 of this Draft EIR each include the following components:

- ▶ **Regulatory Setting:** This subsection presents information on the laws, regulations, plans, and policies that relate to the issue area being discussed. Regulations originating from the federal, state, and local levels are each discussed as appropriate.
- ▶ **Environmental Setting:** This subsection presents the existing environmental conditions on the Project site and in the surrounding area as appropriate, in accordance with State CEQA Guidelines Section 15125. The discussions of the environmental setting focus on information relevant to the issue under evaluation. The extent of the environmental setting area evaluated (the Project study area) differs among resources, depending on the locations where impacts would be expected to occur. For example, air quality impacts are assessed for the air basin (macroscale) as well as the site vicinity (microscale).
- ▶ **Environmental Impacts and Mitigation Measures:** This subsection presents thresholds of significance and discusses significant and potentially significant effects of the Proposed Amendments to Rules 9-4 and 9-6 Project on the existing environment, including the environment beyond the Project boundaries, in accordance with State CEQA Guidelines Section 15126.2. The methodology for the impact analysis is described, including technical studies upon which the analyses rely. The thresholds of significance are defined, and thresholds for which the Project would have no impact are disclosed and dismissed from further evaluation. Project impacts and mitigation measures are numbered sequentially in each subsection (Impact 3.1-1, Impact 3.1-2, Impact 3.1-3, etc.). A summary impact statement precedes a more detailed discussion of each environmental impact. The discussion includes the analysis, rationale, and substantial evidence on which conclusions are based. The determination of level of significance of the impact is presented in bold text. A "less-than-significant" impact is one that would not result in a substantial adverse change in the physical environment. A "potentially significant" impact or "significant" impact is one that would result in a substantial adverse change in the physical environment; both are treated the same under CEQA in terms of procedural requirements and the need to identify feasible mitigation. Mitigation measures are identified, as feasible, to avoid, minimize, rectify, reduce, or compensate for significant or potentially significant impacts, in accordance with the State CEQA Guidelines Section 15126.4. Unless otherwise noted, the mitigation measures presented are recommended in the EIR for consideration by the BAAQMD to adopt as conditions of approval.

Where an existing law, regulation, or permit specifies mandatory and prescriptive actions about how to fulfill the regulatory requirement as part of the Project definition, leaving little discretion in its implementation, and would avoid an impact or maintain it at a less-than-significant level, the environmental protection afforded by the regulation is considered before determining impact significance. Where existing laws or regulations specify a

mandatory permit process for future projects, performance standards without prescriptive actions to accomplish them, or other requirements that allow substantial discretion in how they are accomplished, or have a substantial compensatory component, the level of significance is determined before applying the influence of the regulatory requirements. In this circumstance, the impact would be potentially significant or significant, and the regulatory requirements would be included as a mitigation measure.

This subsection also describes whether mitigation measures would reduce Project impacts to less-than-significant levels. Significant and unavoidable impacts are identified as appropriate in accordance with State CEQA Guidelines Section 15126.2(b). Significant and unavoidable impacts are also summarized in Chapter 5, "Other CEQA Sections."

Each section concludes with a discussion of potential cumulative impacts.

- ▶ **References:** The full references associated with the references cited in Sections 3.1 through 3.5 are presented in Chapter 7, "References," organized by section number.

3.1 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential air quality impacts caused by project implementation.

Two comments related to air quality were received in response to the notice of preparation (see Appendix A). The Air Conditioning, Heating, & Refrigeration Institute expressed concern about emissions from new power generation facilities. The San Francisco Bay Area Planning and Urban Research Association (SPUR) commented that increased electrical demand could stress the grid and/or generate more air pollution if electrical generation is not clean. To mitigate increased strain on the electrical grid, SPUR recommended that the EIR include an alternative in which the BAAQMD takes an active role in encouraging decentralized solar (and possibly storage). Alternatives are discussed in Chapter 4, "Alternatives." No new power generation facilities are proposed as part of the project. The BAAQMD did take into consideration NO_x emissions from electric power generation in its calculation of NO_x emissions estimates from the Project, as described in this section. NO_x emissions from an increase in electricity production would only occur if currently designed natural gas-fired appliances are replaced with electric heat pump appliances. In this scenario, the decrease in appliance combustion-related NO_x emissions from a switch from gas to electric appliances would far outweigh any increase in emissions from electricity production, as seen in the projected emissions reductions presented below. Indirect impacts, including potential air quality impacts, associated with potential expansion of existing and planned energy infrastructure in response to project-related increases in energy demand are addressed in Section 3.3, "Utilities and Service Systems."

3.1.1 Regulatory Setting

Ambient air quality in the project area is regulated through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, planning, policy making, education, and a variety of programs. The agencies responsible for improving air quality in the San Francisco Bay Area Air Basin (SFBAAB) are discussed below. There are currently no federal or state criteria air pollutant standards for space and water heating appliances.

FEDERAL

US Environmental Protection Agency

The US Environmental Protection Agency (EPA) has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970 (42 US Code Chapter 85). The most recent major amendments were made by Congress in 1990.

Criteria Air Pollutants

The CAA required EPA to establish National Ambient Air Quality Standards (NAAQS) for six common air pollutants found all over the United States, referred to as criteria air pollutants. EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM₁₀), fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}), and lead. The NAAQS are shown in Table 3.1-1. The primary standards protect public health, and the secondary standards protect public welfare. The CAA also required each state to prepare a state implementation plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. California's SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, it may prepare a federal implementation plan that imposes additional control

measures. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 3.1-1 National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS) ^{a, b}	National (NAAQS) ^c	
			Primary ^{b, d}	Secondary ^{b, e}
Ozone	1-hour	0.09 ppm (180 µg/m ³)	—	Same as primary standard
	8-hour	0.070 ppm (137 µg/m ³)	0.07 ppm (147 µg/m ³)	Same as primary standard
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	Same as primary standard
	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	Same as primary standard
Nitrogen dioxide (NO ₂)	Annual arithmetic mean	0.030 ppm (57 µg/m ³)	53 ppb (100 µg/m ³)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m ³)	100 ppb (188 µg/m ³)	—
Sulfur dioxide (SO ₂)	24-hour	0.04 ppm (105 µg/m ³)	—	—
	3-hour	—	—	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	75 ppb (196 µg/m ³)	—
Respirable particulate matter (PM ₁₀)	Annual arithmetic mean	20 µg/m ³	—	Same as primary standard
	24-hour	50 µg/m ³	150 µg/m ³	Same as primary standard
Fine particulate matter (PM _{2.5})	Annual arithmetic mean	12 µg/m ³	12 µg/m ³	15 µg/m ³
	24-hour	—	35 µg/m ³	Same as primary standard
Lead ^f	Calendar quarter	—	1.5 µg/m ³	Same as primary standard
	30-day average	1.5 µg/m ³	—	—
	Rolling 3-month average	—	0.15 µg/m ³	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m ³)	No national standards	No national standards
Sulfates	24-hour	25 µg/m ³	No national standards	No national standards
Vinyl chloride ^f	24-hour	0.01 ppm (26 µg/m ³)	No national standards	No national standards
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km	No national standards	No national standards

Notes: µg/m³ = micrograms per cubic meter; km = kilometers; mg/m³ = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million.

^a California standards for ozone, carbon monoxide, SO₂ (1- and 24-hour), NO₂, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^b Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^c National standards (other than for ozone and particulate matter and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM₁₀ 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. The PM_{2.5} 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the US Environmental Protection Agency for further clarification and current federal policies.

^d National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

^e National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^f The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2016.

Hazardous Air Pollutants and Toxic Air Contaminants

Toxic air contaminants (TACs) or, in federal parlance, hazardous air pollutants (HAPs) are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness or that may pose a hazard to human health. A substance that is listed as a HAP pursuant to Subsection (b) of Section 112 of the CAA (42 US Code Section 7412[b]) is

considered a TAC. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects, such as cancer, birth defects, neurological damage, asthma, bronchitis, and genetic damage, or short-term acute effects, such as eye watering, respiratory irritation (a cough), runny nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and noncarcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants for which ambient standards have been established (Table 3.1-1). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA and, in California, the California Air Resources Board (CARB) regulate HAPs and TACs, respectively, through statutes (i.e., 42 US Code Section 7412[b]) and regulations that generally require the use of the maximum achievable control technology or best available control technology (BACT) for toxics to limit emissions.

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA) (California Health and Safety Code Section 40910).

Criteria Air Pollutants

The CCAA, which was adopted in 1988, required CARB to establish California Ambient Air Quality Standards (CAAQS) (Table 3.1-1). CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants identified by EPA. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to attain and maintain the CAAQS by the earliest date practical. It specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources. The CCAA also provides air districts with the authority to regulate indirect sources.

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, particulate matter (PM) exhaust from diesel engines (diesel PM) was added to CARB's list of TACs.

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate BACT for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than are produced under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced substantially over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control

technologies. With implementation of CARB's Risk Reduction Plan and other regulatory programs, it is estimated that emissions of diesel PM will be less than half of those in 2010 by 2035 (CARB 2022). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

REGIONAL

Bay Area Air Quality Management District

The BAAQMD maintains and manages air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans and programs for the attainment of the NAAQS and CAAQS, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The BAAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA and CCAA.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS in their region by the earliest practical date. To achieve the CAAQS, the BAAQMD prepares and updates air quality plans on a regular basis.

For state air quality planning purposes, the SFBAAB is classified as a nonattainment area with respect to the 1-hour ozone standard. On April 19, 2017, the BAAQMD adopted the most recent revision to the Clean Air Plan, titled the *2017 Clean Air Plan: Spare the Air, Cool the Climate* (BAAQMD 2017a). This plan serves to:

- ▶ define a vision for transitioning the region to a postcarbon economy needed to achieve 2030 and 2050 greenhouse gas reduction targets;
- ▶ decrease emissions of air pollutants most harmful to Bay Area residents, such as particulate matter, ozone, and TACs;
- ▶ reduce emissions of methane and other potent climate pollutants; and
- ▶ decrease emissions of carbon dioxide by reducing fossil fuel combustion.

Although offensive odors are typically below health thresholds, they can be unpleasant, leading to considerable stress (and associated negative health impacts) among the public and often generating citizen complaints to local governments and the BAAQMD. The BAAQMD's Regulation 7 ("Odorous Substances") regulates odors.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or that the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address include public facilities, parks and recreation, community design, natural resources, healthy communities, energy and sustainability, air quality, and growth management. Except for the San Joaquin Valley area, air quality is an optional general plan topic. Jurisdictions may choose to consider air quality as a stand-alone topic, as part of another mandatory or optional element, or not at all. Local planning policies related to air quality often address exposure to air pollutants, public health, density, compact development, alternative transportation modes, energy conservation, cleaner-fuel vehicles, emissions reduction, and public education, among other topics.

3.1.2 Environmental Setting

The Project is located in the SFBAAB. The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties; the western portion of Solano County; and the southern portion of Sonoma County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released

by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

CLIMATE, METEOROLOGY, AND TOPOGRAPHY

The Bay Area region has a Mediterranean climate characterized by wet winters and dry summers. Rainfall totals can vary widely over a short distance, with windward coastal mountain areas receiving over 40 inches of rain, while leeward areas receive about 15 inches. During rainy periods, horizontal and vertical air movement ensures rapid pollutant dispersal.

Normally, air temperatures decrease with increasing elevations. Sometimes this normal pattern is inverted, with warmer air aloft and cool air trapped near the earth's surface. This phenomenon occurs in all seasons. In summer, especially when wind speeds are very low, a strong inversion will trap air emissions, and high levels of ozone smog can occur. In winter, a strong inversion can trap emissions of particulate and carbon monoxide near the surface, resulting in unhealthy air quality. Particulate matter (PM) pollution exposure is anticipated to increase because of climate change, which can lead to worsening asthma symptoms, chronic obstructive pulmonary disease, and respiratory infections associated to premature mortality. Increasing temperatures related to climate change are also anticipated to lead to an increase in wildfires across California. Wildfires are a significant source of smoke and PM exposure. PM can also be carried over long distances by wind and then settle on ground or water. Depending on chemical composition, the effects of PM settling may include; making lakes and streams acidic, changing the nutrient balance in coastal waters and large river basins, depleting the nutrients in soil, damaging sensitive forests and farm crops and affecting the diversity of ecosystems, contributing to acid rain effects (EPA 2022a).

The Bay Area topography is complex, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Pacific Ocean bounds the area to the west with warmer inland valleys to the south and east. The only major break in California's Coast Ranges occurs at San Francisco Bay. The gap on the western side is called the Golden Gate, and on the eastern side, it is called the Carquinez Strait. These gaps allow air to pass between the Central Valley and the Pacific Ocean. The general region lies in the semipermanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, and offshore winds.

Regional wind patterns vary from season to season. During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, Golden Gate, or the San Bruno Gap. In the winter, the region frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage refers to the reversal of the usual daytime air flow patterns; air moves from the Central Valley toward the coast.

Wind tends to move from areas of high pressure to areas of low pressure. In warmer months, this means that air currents move onshore from the Pacific Ocean to inland areas. Pacific Ocean air receives emissions from numerous sources (anthropogenic and biogenic) as it comes onshore and will carry these pollutants to areas many miles away. Mountains and valleys often affect onshore winds. This means that a wind pattern that started as northwesterly will often swing 90 degrees or more when it encounters topographic features.

The climatological pollution potential of an area is largely dependent on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and a strong inversion produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour, smog potential is greatly reduced. Because of wind patterns and, to a lesser degree, the geographic location of emission sources, high ozone levels usually occur in inland valleys, such as the Livermore area. High PM levels can occur in areas of intense

motor vehicle use, such as freeways and ports and in most valley areas where residential wood smoke and other pollutants are trapped by inversions and stagnant air.

CRITERIA AIR POLLUTANTS

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. A brief description of key criteria air pollutants in the SFBAAB is provided below. Emission source types and health effects are summarized in Table 3.1-2. The attainment designation of the SFBAAB is summarized in Table 3.1-3.

Ozone

Ground-level ozone is not emitted directly into the air but is created by chemical reactions between ROG and NO_x. This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant because of its effects on people and the environment, and it is the main ingredient in smog (EPA 2022a).

Acute health effects of ozone exposure include increased respiratory and pulmonary resistance, cough, pain, shortness of breath, and lung inflammation. Chronic health effects include permeability of respiratory epithelia and possibility of permanent lung impairment (EPA 2022a). Emissions of the ozone precursors ROG and NO_x have decreased over the past two decades because of BAAQMD regulations, more stringent motor vehicle standards and cleaner burning fuels (CARB 2013).

Table 3.1-2 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute ¹ Health Effects	Chronic ² Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO _x in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO _x results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO ₂)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO ₂)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO ₂ exposure to chronic health impacts
Respirable particulate matter (PM ₁₀), Fine particulate matter (PM _{2.5})	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO ₂ and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_x = oxides of nitrogen; ROG = reactive organic gases.

¹ "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations.

² "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Source: EPA 2016.

Nitrogen Dioxide

NO₂ is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO₂ are combustion devices, such as boilers, gas turbines, and mobile and stationary internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO₂. The combined emissions of NO and NO₂ are referred to as NO_x and are reported as equivalent NO₂. Because NO₂ is formed and depleted by reactions associated with photochemical smog (ozone), the NO₂ concentration in a particular geographical area may not be representative of the local sources of NO_x emissions (EPA 2022a).

Acute health effects of exposure to NO_x include coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis, pulmonary edema, breathing abnormalities, cyanosis, chest pain, rapid heartbeat, and death. Chronic health effects include chronic bronchitis and decreased lung function (EPA 2022a).

Table 3.1-3 Attainment Status Designations for the San Francisco Bay Area Air Basin

Pollutant	Averaging Time	California Standard	California Designation Status	National Standard	National Designation Status
Ozone	1-hour	0.09 ppm	N	—	—
	8-hour	0.070 ppm	N	0.070 ppm	N
Fine particulate matter (PM _{2.5})	24-hour	—	—	35 µg/m ³	N
	Annual	12 µg/m ³	N	12 µg/m ³	U/A
Respirable particulate matter (PM ₁₀)	24-hour	50 µg/m ³	N	150 µg/m ³	U
	Annual	20 µg/m ³	N	—	—
Carbon monoxide (CO)	1-hour	20 ppm	A	35 ppm	U/A
	8-hour	9 ppm	A	9 ppm	U/A
Sulfur dioxide (SO ₂)	1-hour	0.25 ppm	A	75 ppb	A/U
	24-hour	0.04 ppm	A	—	—
Nitrous oxide (NO ₂)	Annual	0.030 ppm	A	0.053 ppm	U
	1-hour	0.18 ppm	A	100 ppb	U/A
Lead	3-month rolling average	—	—	0.15 µg/m ³	U/A
	30-day average	1.5 µg/m ³	A	—	—

Notes: µg/m³ = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million; A = Attainment, N = Non-Attainment, U = Unclassified.

Source: EPA 2022b.

Particulate Matter

PM is emitted directly into the air and includes soot, smoke, and fugitive dust from mobile and stationary sources, construction operations, and fires and natural windblown dust. PM can also be secondarily formed in the atmosphere by the reaction of gaseous precursors (CARB 2013). PM_{2.5} includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. Current estimates of PM_{2.5} show that secondary formation contributes about half of total ambient levels. Major sources of PM₁₀ emissions in the SFBAAB include fugitive dust emissions from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and industrial sources, such as landfills and aggregate facilities. Residential wood burning and on-road mobile sources each contribute about 10 percent of total PM₁₀ emissions. Direct emissions of PM₁₀ are projected to remain relatively constant through 2035. Major contributors of PM_{2.5} in the SFBAAB are fuel combustion sources, including residential wood burning, which contribute nearly a quarter of annual PM_{2.5} emissions; industrial sources; and on-road and off-road mobile sources, such as cars, trucks, construction equipment, and ships. Stationary non-combustion sources, such as petroleum refining, commercial cooking, landfills, and other industrial sources in total contribute more than 20 percent. Direct emissions of PM_{2.5} have steadily declined in the SFBAAB between 2000 and 2010 and are projected to increase slightly through 2035 (CARB 2013).

Acute health effects of exposure to PM₁₀ include breathing and respiratory symptoms; aggravation of existing respiratory and cardiovascular diseases, including asthma and chronic obstructive pulmonary disease; and premature death. Chronic health effects include alterations to the immune system and carcinogenesis (EPA 2022a). For PM_{2.5}, short-term exposure (up to 24-hour duration) has been associated with premature mortality, increased hospital admissions for heart or lung cases, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. Long-term exposure (months to years) to PM_{2.5} has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children.

TOXIC AIR CONTAMINANTS

According to the 2013 Edition of the *California Almanac of Emissions and Air Quality*, health risks from TACs can largely be attributed to relatively few compounds, the most important being diesel PM (CARB 2013: 5-2 to 5-4). Other TACs that pose high ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Diesel PM poses the greatest health risk among the 10 TACs mentioned.

ODORS

Odors generally do not cause direct health impacts. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition occurs only with an alteration in the intensity.

Odor sources of concern include wastewater treatment plants, sanitary landfills, composting facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting operations, coffee roasters, rendering plants, food packaging plants, and cannabis (BAAQMD 2017b). These sources of odor are interspersed throughout the SFBAAB.

SENSITIVE RECEPTORS

Sensitive receptors are generally considered to include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Residential dwellings, schools, hospitals, playgrounds, and similar facilities are of primary concern because of the presence of individuals particularly sensitive to pollutants and/or the potential for increased and prolonged exposure of individuals to pollutants. Sensitive receptors are located throughout the SFBAAB.

3.1.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation in the Bay Area.

Operation of ultra-low and zero NO_x appliances would result in decreased NO_x emissions in the SFBAAB. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. Estimates of future reductions are presented quantitatively and presented below under Impact 3.1-1. Because the applicable rules function as point-of-sale requirements, emission reductions associated with the proposed rule amendments would occur over time in relation to the lifespan of currently installed equipment. Staff estimated emissions reductions from the proposed amendments as newer equipment is phased in over time due to equipment replacements. To model these predicted emission reductions, staff made the following assumptions:

- ▶ While the proposed regulatory amendments would allow for natural gas-fired zero NO_x appliances, based on currently available technology, staff assumed that, upon burnout, natural gas-fired appliances would be replaced with electric solutions when the proposed zero NO_x standards are in effect. As noted above, this results in a conservative analysis of NO_x reductions because other technologies that may be developed could avoid the additional NO_x from electricity generation.
- ▶ For electric replacements, it is assumed that the electricity provided is from the community choice aggregator local to the customer, or direct from the Pacific Gas and Electric Company. The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load is discussed further in Appendix B. The resulting weighted average is 85 percent carbon and NO_x -free electricity generation.
- ▶ Electricity generated from natural gas-fired powerplants is assumed to result in NO_x emissions of 5 ppm by dry volume at 15 percent oxygen. This emission limit represents best available control technology for simple-cycle gas turbine power plants over 50 megawatts (CARB 2004).
- ▶ While some Bay Area residents are choosing to install zero NO_x solutions at this time, and this is expected to continue and increase over time, modeled emissions reductions do not assume any voluntary uptake of zero NO_x technology prior to the proposed compliance dates because voluntary uptake is not expected to be significant.
- ▶ Commercial space and water heating is frequently achieved through the use of larger boilers that are covered under the BAAQMD's Regulation 9, Rule 7. Based on available inventories, staff assumed that 50 percent of commercial space and water heating baseline emissions would not be affected by the proposed amendments to Rule 9-4 and Rule 9-6.
- ▶ Because the proposed rule amendments would affect only direct emissions from two types of building appliances and would not affect natural gas distribution, staff did not assume any upstream emission reductions along the natural gas infrastructure. Although reduced use of natural gas may result in less methane leakage, this reduced leakage is not guaranteed because the technologies used to meet the proposed standards may rely on the natural gas system for energy, and the proposed amendments do not affect the existing natural gas distribution system.
- ▶ Water heaters were assumed to have an average lifespan of 13 years and space heating equipment were assumed to have an average lifespan of 18 years (E3 2019: 41).

Detailed model assumptions and inputs for these calculations are presented in Appendix B.

THRESHOLDS OF SIGNIFICANCE

The significance criteria used to evaluate impacts on air quality under CEQA are based on Appendix G of the State CEQA Guidelines and thresholds of significance adopted by the BAAQMD. According to State CEQA Guidelines Appendix G, an air quality impact would be significant if implementation of the Project would:

- ▶ conflict with or obstruct implementation of the applicable air quality plan,
- ▶ violate any air quality standard or contribute substantially to an existing or projected air quality violation,

- ▶ result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors),
- ▶ expose sensitive receptors to substantial pollutant concentrations, or
- ▶ create objectionable odors affecting a substantial number of people.

The BAAQMD's air quality thresholds of significance are tied to achieving or maintaining attainment designations with the NAAQS and CAAQS, which are scientifically substantiated, numerical concentrations of criteria air pollutants considered to be protective of human health. Implementing the Project would have a significant impact related to air quality such that human health would be adversely affected if it would (BAAQMD 2017b):

- ▶ cause construction-generated criteria air pollutant or precursor emissions to exceed 54 pounds per day (lb/day) of ROG and NO_x, 82 lb/day for PM₁₀ exhaust, and 54 lb/day for PM_{2.5} exhaust, or substantially contribute to emissions concentrations (e.g., PM₁₀, PM_{2.5}) that exceed the applicable NAAQS or CAAQS;
- ▶ result in a net increase in long-term operational criteria air pollutant or precursor emissions that exceed 54 lb/day or 10 tons per year (tons/year) of ROG and NO_x, 82 lb/day or 15 tons/year for PM₁₀ exhaust, and 54 lb/day or 10 tons/year for PM_{2.5} exhaust, or substantially contribute to emissions concentrations (e.g., PM₁₀, PM_{2.5}) that exceed the applicable NAAQS or CAAQS;
- ▶ not implement the BAAQMD's Basic Construction Mitigation Measures for dust emissions (e.g., PM₁₀ and PM_{2.5});
- ▶ result in long-term operational local mobile-source CO emissions that would violate or contribute substantially to concentrations that exceed the 1-hour CAAQS of 20 parts per million (ppm) or the 8-hour CAAQS of 9 ppm;
- ▶ result in an incremental increase in cancer risk (i.e., the risk of contracting cancer) greater than 10 in one million at any off-site receptor and/or a noncarcinogenic hazard index of 1.0 or greater; or
- ▶ result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

ISSUES NOT DISCUSSED FURTHER

Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, implementation of the proposed amendments would not result in any new construction or development that could result in direct emissions of air pollutants. The proposed amendments involve a change in the type of appliances that would be installed in the future; the Project would not change the number of appliances or require construction-related activities. Therefore, the Project would not result in direct construction-related emissions of air pollutants. However, the Project would result in a long-term increase in electricity demand, which would contribute, along with implementation of statewide decarbonization programs, to the need for expansion of energy infrastructure in California and outside the state. Therefore, the Project's projected incremental energy demand increase would require the construction of new and/or expanded infrastructure (i.e., transmission lines, substations, solar fields, battery storage facilities) to accommodate the increased electricity demand from the conversion of natural gas appliances to electric appliances. It is anticipated that most of the necessary energy projects would be constructed outside the Bay Area and a portion of these projects would occur outside of the state (see E3 study included as Appendix C). These projects would produce construction-related emissions in various air basins depending on the future locations of this infrastructure. The Project's potential contribution to environmental impacts (including impacts to air quality) associated with these energy projects are described in Section 3.3, "Utilities and Service Systems." Thus, construction-related emissions of criteria air pollutants and ozone precursors are not discussed further in this analysis.

The proposed amendments would result in an overall decrease in on-site NO_x emissions associated with furnaces and water heaters throughout the Bay Area. Furnaces and water heaters are not considered significant sources of TACs. Therefore, TAC impacts from the proposed amendments would not occur, and TACs are not discussed further.

The proposed amendments would not generate new vehicle trips beyond what is currently occurring within the Bay Area. The proposed amendments would change the emissions factors for new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These changes would not directly influence the rate or magnitude that furnaces and water heaters would be replaced. Therefore, localized CO impacts from the proposed amendments would not occur, and CO hotspot emissions are not discussed further.

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing residential and commercial buildings. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Newly installed appliances would not contribute odors within residential and commercial buildings beyond existing conditions. Therefore, odor impacts from the proposed amendments would not occur, and odors are not discussed further.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: Long-Term Operational-Related Emissions of ROG, NO_x, PM₁₀, and PM_{2.5}

The proposed amendments would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. This would be achieved through the replacement of these appliances with ultra-low and zero-NO_x natural gas appliances or electric appliances. Operation of ultra-low and zero-NO_x natural gas appliances would inherently result in a reduction in NO_x emissions within the SFBAAB. Moreover, any turnover to electric appliances would eliminate emissions of all criteria air pollutants from on-site natural gas combustion and associated emissions from this activity. For these reasons, the proposed amendments would have a less-than-significant (beneficial) impact to regional air quality.

The overall purpose of the proposed amendments is to reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Table 3.1-4 shows the projected yearly emissions and projected reductions compared with the baseline inventory (2018) for selected years. These NO_x emission reductions would be substantial over time, with an 88 percent reduction of emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2046.

NO_x emissions are a key criteria pollutant as a precursor to ozone and secondary PM formation. Secondary PM is formed from the conversion of NO_x to ammonium nitrate through atmospheric chemical reactions with ammonia. PM, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for PM_{2.5} under the CAAQS. Exposure to PM_{2.5}, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NO_x compounds in the atmosphere contribute to the formation of secondary PM, any NO_x emission reduction would also result in reduction of the formation of secondary PM_{2.5} reductions. In addition, the Bay Area is currently in non-attainment for ozone, a regional pollutant, under NAAQS and CAAQS. Emissions of ROG and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. Therefore, reductions in emissions of ROG and NO_x are needed throughout the region to decrease ozone levels. Thus, implementation of the proposed rule amendments would directly support the goals of the BAAQMD's 2017 Clean Air Plan, Spare the Air, Cool the Climate (Plan) to reduce ozone precursor emissions and improve public health. In addition, because the proposed rule amendments would reduce NO_x emissions (a precursor to ozone and secondary PM formation), as discussed above, implementation would not result in a cumulatively considerable net increase in any air pollutants for which the Bay Area is designated as a non-attainment area or exposure sensitive receptors to substantial pollutant concentrations. This impact would be less than significant (beneficial).

Table 3.1-4 Projected NO_x Emissions Upon Implementation of Proposed Amendments

Year	Projected Yearly NO _x Emissions (tons/year)	Projected NO _x Reduction vs. Baseline (tons/year)
2018*	3,690	—
2025	3,516	174
2030	2,816	874
2035	1,855	1,835
2040	930	2,761
2045	515	3,176
2046	454	3,236

Notes: NO_x = nitrogen oxide.

* 2018 is the baseline year for emissions inventory.

Source: Provided by BAAQMD in 2022.

Mitigation Measures

No mitigation is required for this impact.

CUMULATIVE IMPACTS

As described under Impact 3.1-1, the Project would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. As summarized above under the heading, “Thresholds of Significance,” the BAAQMD has developed project-level thresholds of significance for evaluating new development or proposed actions that contribute criteria air pollution to the SFBAAB. Projects that emit ROG, NO_x, PM₁₀, and PM_{2.5} below the BAAQMD’s thresholds would not contribute to air basin’s nonattainment designation under the NAAQS and CAAQS. Project-level thresholds of significance are developed in consideration of long-term regional air quality planning (i.e., the BAAQMD’s Clean Air Plan), and are designed to minimize a project’s contribution of air pollution in a regional context.

These thresholds are, therefore, inherently cumulative by design. With respect to the proposed amendments, which would result in a net decrease in NO_x emissions—a precursor pollutant to the secondary formation of ground-level ozone—from strengthening of emissions standards for furnaces and water heaters compared to baseline conditions and would serve to assist the BAAQMD in its long-term regional air quality planning efforts to attain the NAAQS and CAAQS ozone standards. Impact 3.1-1 is therefore a cumulative impact analysis and no further cumulative impact analysis is needed for air quality.

3.2 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

This section presents a summary of regulations applicable to greenhouse gas (GHG) emissions, a summary of climate change science and GHG sources in California, and quantification of the Project's potential impact on GHG emissions in the Bay Area.

One comment related to GHG emissions was received in response to the notice of preparation (see Appendix A). The Rheem Manufacturing Company expressed concern that premature zero-NO_x implementation could result in a net increase in GHG emissions associated with increased electricity production. The BAAQMD did take into consideration GHG emissions from electric power generation in its calculation of GHG emissions estimates from the Project, as described in this section. Potential GHG emissions from electric power generation are conservatively based on the Pacific Gas and Electric Company's (PG&E) current mix of power sources and do not cause an increase in GHG emissions. GHG emissions from an increase in electricity production would only occur if currently designed natural gas-fired appliances are replaced with electric heat pump appliances, and under this assumption, the decrease in appliance combustion-related GHG emissions from a switch from gas to electric appliances would far outweigh any increase in emissions from electricity production, as shown in the emissions estimates below. Indirect impacts, including potential GHG impacts, associated with potential expansion of existing and planned energy infrastructure in response to project-related increases in energy demand are addressed in Section 3.3, "Utilities and Service Systems."

3.2.1 Regulatory Setting

FEDERAL

Greenhouse Gas Emission Standards

In *Massachusetts et al. v. Environmental Protection Agency et al.*, 549 US 497 (2007), the Supreme Court of the United States ruled that carbon dioxide (CO₂) is an air pollutant as defined under the federal Clean Air Act (CAA) and that the US Environmental Protection Agency (EPA) has the authority to regulate GHG emissions. In 2010, EPA started to address GHG emissions from stationary sources through its New Source Review permitting program, including operating permits for "major sources" issued under Title V of the CAA. There are currently no federal GHG emissions standards for space and water heating appliances.

STATE

Plans, policies, regulations, and laws established by the state agencies are generally presented in the order they were established. There are currently no state GHG emissions standards for space and water heating appliances.

Statewide GHG Emission Targets and Climate Change Scoping Plan

Reducing GHG emissions in California has been the focus of the state government for approximately two decades. GHG emission targets established by the state legislature include reducing statewide GHG emissions to 1990 levels by 2020 (Assembly Bill [AB] 32 of 2006) and reducing them to 40 percent below 1990 levels by 2030 (Senate Bill [SB] 32 of 2016). Executive Order S-3-05 calls for statewide GHG emissions to be reduced to 80 percent below 1990 levels by 2050. Executive Order B-55-18 calls for California to achieve carbon neutrality by 2045 and achieve and maintain net negative GHG emissions thereafter. These targets are in line with the scientifically established levels needed in the U.S. to limit the rise in global temperature to no more than 2 degrees Celsius, the warming threshold at which major climate disruptions, such as super droughts and rising sea levels, are projected; these targets also pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

The *California's 2017 Climate Change Scoping Plan*, prepared by the California Air Resources Board (CARB), outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 and "substantially advance toward our 2050 climate goals" (CARB 2017). It identifies the reductions needed by each GHG

emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). CARB and other state agencies also released the *January 2019 Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* consistent with the carbon neutrality goal of Executive Order B-55-18 (CalEPA et al. 2019). On May 10, 2022, CARB released the Draft 2022 Scoping Plan Update, which sets the framework for the state to achieve carbon neutrality as set by Executive Order B-55-18 and an 80 percent reduction in 1990 baseline GHG emissions by 2050. At the time of writing this Draft EIR, CARB has not adopted the final version of the Draft 2022 Scoping Plan Update.

The state has also passed more detailed legislation addressing GHG emissions associated with transportation, electricity generation, and energy consumption, as summarized below.

Legislation Associated with Electricity Generation

The state has passed legislation requiring the increasing use of renewables to produce electricity for consumers. California's Renewables Portfolio Standard Program was established in 2002 (SB 1078) with the initial requirement to generate 20 percent of their electricity from renewable by 2017, 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011), 52 percent by 2027 (SB 100 of 2018), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018).

LOCAL

Bay Area Air Quality Management District

The BAAQMD is the primary agency responsible for addressing air quality concerns in the San Francisco Bay Area. Its role is discussed further in Section 3.1, "Air Quality." The BAAQMD also recommends methods for analyzing project-related GHG emissions in CEQA analyses and recommends multiple GHG reduction measures for land use development projects. The BAAQMD recently developed and finalized its *Justification Report: CEQA Thresholds for Evaluating the Significance from Land Use Project and Plans* (Justification Report) (BAAQMD 2022). The Justification Report is intended to be used to uniformly evaluate the significance of operation-related emissions from land use development projects; however, the proposed amendments do not fit within the category of a land use development project or a plan.

City and County General Plans

The most comprehensive land use planning for the San Francisco Bay Area region is provided by city and county general plans, which local governments are required by State law (California Government Code Section 65300 et seq.) to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or that the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address include public facilities, parks and recreation, community design, natural resources, healthy communities, energy and sustainability, air quality, and growth management. Except for the San Joaquin Valley area, air quality is an optional general plan topic. Jurisdictions may choose to consider air quality as a stand-alone topic, as part of another mandatory or optional element, or not at all. Local planning policies related to air quality often address exposure to air pollutants, public health, density, compact development, alternative transportation modes, energy conservation, cleaner-fuel vehicles, emissions reduction, and public education, among other topics.

Local Climate Action Plans

Consistent with CARB recommendations, several Bay Area jurisdictions have completed community emissions inventories (103), and 79 jurisdictions have finalized and adopted community climate action plans (CAPs) or greenhouse gas reduction plans (GHGRPs). The Bay Area's CAPs seek to help local jurisdictions achieve state emissions goals. They identify recommendations for meeting emissions goals, often in terms of different land uses or categories, including transportation, land use, energy, water, waste, and green infrastructure, and require monitoring of emissions over time. While not required above, a majority of jurisdictions in the region participate in the creation of both emissions inventories and CAPs.

3.2.2 Environmental Setting

Certain gases in the earth’s atmosphere, classified as GHGs, play a critical role in determining the earth’s surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth’s surface, and a smaller portion of this radiation is reflected toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead “trapped,” resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth’s climate, known as global climate change or global warming. The Sixth Assessment Report contains IPCC’s strongest warnings to date on the causes and impacts of climate change. Importantly, the report notes that, in terms of solutions, “We need transformational change operating on processes and behaviors at all levels: individual, communities, business, institutions, and governments. We must redefine our way of life and consumption” (IPCC 2021).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes, GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with any certainty, it is understood that more CO₂ is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO₂ emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO₂ emissions remain stored in the atmosphere (IPCC 2013).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is considered to be enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

SAN FRANCISCO BAY AREA EMISSIONS

As discussed previously, GHG emissions are attributable in large part to human activities. The BAAQMD conducted the most recent GHG inventory for the San Francisco Bay Area in 2015 for a baseline year of 2011; emissions totaled 86.6 million metric tons of carbon dioxide equivalent (MMTCO₂e) (BAAQMD 2015). Table 3.2-1 summarizes the GHG inventory for the Bay Area by MMTCO₂e and percentage.

Table 3.2-1 Bay Area GHG Emissions by Economic Sector

Sector	MMTCO ₂ e	Percent
Transportation	34.3	39.7%
Industrial/Commercial	31.0	35.7%
Electricity/Co-Generation	12.1	14.0%
Residential Fuel Usage	6.6	7.7%
Off-Road Equipment	1.3	1.5%
Agriculture/Farming	1.3	1.5%
Total	86.6	100%

Note: MMTCO₂e = million metric tons of carbon dioxide equivalent.

Source: BAAQMD 2015.

As shown in Table 3.2-1, transportation, industry/commercial, and electricity/co-generation comprise the greatest sources of GHGs in the Bay Area.

Emissions of CO₂ are byproducts of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) associated with agricultural practices, landfills, and forest fires. Leaks from the natural gas distribution network also contribute to methane emissions. Nitrous oxide is also largely attributable to agricultural practices and soil management. CO₂ sinks, or reservoirs, include vegetation and the ocean, which absorb CO₂ through sequestration and dissolution (CO₂ dissolving into the water) and are two of the most common processes for removing CO₂ from the atmosphere.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

The global average temperature is expected to increase by 3 to 7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). According to California's Fourth Climate Change Assessment, depending on future GHG emissions scenarios, average annual maximum daily temperatures in California are projected to increase between 3.6 and 5.8°F by 2050 and by 5.6 to 8.8°F by 2100 (OPR, CEC, and CNRA 2018).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and resulting rise in global average temperature. In recent years, California has been marked by extreme weather and its effects. Climate model projections for California demonstrate that impacts will vary throughout the state and show a tendency for the northern part of the state to become wetter while the southern portion of California to become drier (Pierce et al. 2018). According to California Natural Resources Agency's (CNRA) report, *Safeguarding California Plan: 2018 Update* (CNRA 2018), California experienced the driest four-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018). Climate model projections included in California's Fourth Climate Change Assessment, demonstrate that seasonal summer dryness in California may be prolonged due to earlier spring soil drying and would last longer into the fall and winter rainy season. Increases in temperature are also predicted to result in changes to California's snowpack. Based on climate model projections, the mean snow water equivalent, a common measurement which indicates the amount of water contained within snowpack, in California is anticipated to decline to two-thirds of its historic average by 2050 and between less than half and less than one-third of historic average by 2100, depending on future emissions scenarios (OPR, CEC, and CNRA 2018).

Climate model projections demonstrate that California will experience variation in precipitation patterns as well. The Northern Sierra Nevada range experienced its wettest year on record in 2016 (CNRA 2018). As temperatures increase, the increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada and Cascade mountains until spring will flow into the Central Valley concurrently with winter rainstorm events. This scenario will place more pressure on California's levee/flood control system (CNRA 2018). As the climate continues to warm, extreme precipitation events in California will increase and could, subsequently, increase the probability of 'mega-flood' events (Polade et al. 2017).

Climate change is also projected to result in tertiary impacts on energy infrastructure throughout California. Changes in temperature, precipitation patterns, extreme weather events, and sea-level rise have the potential to affect and decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines, disrupt electrical demand, and threaten energy infrastructure with the increased risk of flooding (CNRA 2018).

According to California's Fourth Climate Change Assessment, climate change will create impacts on the state's transportation network that will have 'ripple effects' including direct and indirect impacts on inter-dependent infrastructure networks as well as negative impacts on the economy. Without appropriate adaptations strategies for roadway materials (i.e., asphalt and pavement), researchers estimate that the median total cost to California for 2040-2070 will be between \$1 billion and \$1.25 billion (OPR, CEC, and CNRA 2018). The California Department of Transportation (Caltrans) owns and operates more than 51,000 miles along 265 highways, as well as three of the busiest passenger rail lines in the nation. Sea level rise, storm surge, and coastal erosion are imminent threats to highways, roads, bridge supports, airports, transit systems and rail lines near sea level and seaports. Shifting precipitation patterns, increased temperatures, wildfires, and increased frequency in extreme weather events also

threaten transportation systems across the state. Temperature extremes and increased precipitation can increase the risk of road and railroad track failure, decreased transportation safety, and increased maintenance costs (CNRA 2018). Modeling for flood events in California demonstrates that approximately 370 miles of highways are susceptible to flooding in a 100-year storm event by the year 2100 (OPR, CEC, and CNRA 2018).

Water availability and changing temperatures affect the prevalence of pests, disease, and species, which will directly impact crop development, forest health, and livestock production. Other environmental concerns include decline in water quality, groundwater security, and soil health (CNRA 2018). Vulnerabilities of water resources also include risks to degradation of watersheds, alteration of ecosystems and loss of habitat, (OPR, CEC, and CNRA 2018).

California's Fourth Climate Change Assessment also identifies the impacts climate change will have on public health and social systems. Average temperature increases in California are estimated to have impacts on human mortality, with 6,700 to 11,300 additional annual deaths in 2050, depending on higher or lower emissions scenarios (Ostro et al. 2011). Studies have also shown that impacts from climate change can also have indirect impacts on public health, such as increased vector-borne diseases, and stress and mental trauma due to extreme events, economic disruptions, and residential displacement (Gould and Dervin 2012; McMichael and Lindgren 2011; US Global Change Research Program 2016).

3.2.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation in the Bay Area. All new furnaces and water heaters would be required to be zero-NO_x units upon implementation of the proposed amendments. Currently, zero-NO_x units that are available on the market are electric heat pump units. Electric heat pumps not only emit zero NO_x, but also emit zero GHGs. Operation of electric heat pump appliances would result in decreased natural gas combustion resulting in a decrease in GHG emissions associated with natural gas combustion. However, the proposed amendments do allow for manufacturers to develop and market zero-NO_x appliances that are natural gas-fired. If such appliances are developed, consumers would be able to choose between zero- NO_x electric heat pumps and zero-NO_x natural gas-fired units upon implementation of the proposed amendments, and the result would be that some combination of electric heat pumps and zero-NO_x natural gas fired appliances are installed. If this is the case, GHG emissions would still decrease upon implementation of the proposed rule amendments, but not by as much as if current appliances are only replaced by electric heat pumps. The analysis here assumes, based on currently available technology, that only electric heat pumps are installed once the proposed amendments are implemented. The GHG emission reduction projections should be seen as the maximum potential reductions.

Turnover of currently designed appliances would also generate some vehicle trips associated with the sale and distribution of furnaces and water heaters, including worker commute trips to install these appliances; however, this level of trips would not be greater than what is occurring at present. The proposed amendments would result in the disposal of currently designed natural gas-powered furnaces and water heaters; however, GHG emissions from solid waste disposal are generated from the anaerobic decomposition of organic material in landfills, and such appliances are not categorized as organic. Notably, this level of solid waste disposal would not be greater than what is occurring at present. Because there would not be an increase in new vehicle trips or solid waste disposal compared to baseline conditions, there would be no GHG emissions from mobile sources or solid waste disposal. The proposed amendments would also not generate any water or wastewater; thus, no emissions from the water sector would occur.

Estimates of future reductions are presented quantitatively and presented below under Impact 3.2-1. Because the applicable rules function as point-of-sale requirements, emission reductions associated with the proposed rule amendments would occur over time in relation to the lifespan of currently installed equipment. Staff estimated

emissions reductions from the proposed amendments as newer equipment is phased in over time due to equipment replacements. To model these potential emission reductions, staff made the following assumptions:

- ▶ While the proposed regulatory amendments would allow for natural gas-fired zero NO_x appliances, based on currently available technology, staff assumed that, upon burnout, natural gas-fired appliances would be replaced with electric solutions when the proposed zero NO_x standards are in effect. This results in presenting maximum potential GHG reductions from the proposed amendments.
- ▶ For electric replacements, it is assumed that electricity provided is from the community choice aggregator local to the customer, or direct from (PG&E). The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load is discussed further in Appendix B. The resulting weighted average is 85 percent carbon and NO_x-free electricity generation.
- ▶ For natural-gas generated electricity, a correction factor is applied to account for operational differences between natural gas appliance and turbine combustion. Further information on this calculation is provided in Appendix B.
- ▶ While some Bay Area residents are choosing to install zero NO_x solutions at this time, and this is expected to continue and increase over time, modeled emissions reductions do not assume any voluntary uptake of zero-NO_x technology prior to the proposed compliance dates because voluntary uptake is not expected to be significant.
- ▶ Commercial space and water heating is frequently achieved through the use of larger boilers that are covered under the BAAQMD's Regulation 9, Rule 7. Based on available inventories, staff assumed that 50 percent of commercial space and water heating baseline emissions would not be affected by the proposed amendments to Rule 9-4 and Rule 9-6.
- ▶ Because the proposed rule amendments would affect only direct emissions from two types of building appliances and would not affect natural gas distribution, staff did not assume any upstream emission reductions along the natural gas infrastructure. Although reduced use of natural gas may result in less methane leakage, this reduced leakage is not guaranteed because the technologies used to meet the proposed standards may rely on the natural gas grid for energy.
- ▶ Water heaters were assumed to have an average lifespan of 13 years and space heating equipment were assumed to have an average lifespan of 18 years (E3 2019: 41).

Detailed model assumptions and inputs for these calculations are presented in Appendix B.

THRESHOLDS OF SIGNIFICANCE

The issue of global climate change is inherently a cumulative issue because the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the proposed amendments' impact on climate change is addressed only as a cumulative impact.

State CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency with relevant, adopted plans and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. Under Appendix G of the State CEQA Guidelines, implementing a project would result in a cumulatively considerable contribution to climate change if it would:

- ▶ generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- ▶ conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

As noted in Section 3.2.1, "Regulatory Setting," the BAAQMD published new guidance for evaluating climate change impacts for land use development projects in 2022. In its guidance, the BAAQMD states, "[t]here is no proposed construction-related climate impact threshold at this time. Greenhouse gas emissions from construction represent a very small portion of a project's lifetime GHG emissions. The proposed thresholds for land use projects are designed

to address operational GHG emissions which represent the vast majority of project GHG emissions” (BAAQMD 2022). Based on this guidance, construction-related emissions are not compared to any standard of significance.

The BAAQMD’s guidance also provides land use development and lead agencies with mechanisms that can be incorporated as project design features that would suggest that a project is doing their fair share to reduce GHG emissions and assist the state in meeting its long-term GHG reduction goals. These project design features recommended by the BAAQMD are intended to reduce operational GHG emissions from land use development projects, which the Project is not.

The BAAQMD also establishes guidance for CAP or GHGRP CEQA streamlining. The proposed amendments would apply throughout the Bay Area, which currently supports dozens of CAPs and GHGRPs depending on location. Replacement of furnaces and hot water heaters would not individually be considered a project under CEQA. Therefore, CAP streamlining would not be an appropriate standard for the proposed amendments.

Thus, because the proposed amendments are not a land use development project and CAP streamlining would not be appropriate, the BAAQMD’s CEQA guidance is not applicable to the Project.

The Project would not generate new vehicle trips beyond what is currently occurring within the Bay Area. The Project could induce electricity demand (based on currently available zero NO_x electric heat pump technology), which would, in turn, produce GHG emissions; however, these emissions would be offset by a decrease in on-site natural gas combustion. Appendix D of the Draft 2022 Scoping Plan states that an “approach to project-level alignment with State climate goals is net zero GHG emissions” (CARB 2022: 12). Projects that demonstrate a net zero increase in GHG emissions, resulting in no contribution to GHG impacts, may therefore be an appropriate overall objective for a project and would demonstrate alignment with the state’s long-term goals of reducing emissions by 40 percent below 1990 levels by 2030 (SB 32) and 85 percent below 1990 and carbon neutrality by 2045 (AB 1279).

Using CARB’s guidance, the proposed amendments would not have a potentially significant contribution to global climate change if it were to demonstrate a net zero increase in GHG emissions.

ISSUES NOT DISCUSSED FURTHER

Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. Installation activities (which would include minimal truck trips for delivery/installation, spread out across the nine counties of the Bay Area, and occurring over several decades as consumers replace their existing furnaces and water heaters) would occur with or without the Project. While outdoor installations are expected, implementation of the proposed amendments would not result in any new construction or development that could result in direct GHG emissions from the use of heavy-duty equipment or vehicles. The proposed amendments involve a change in the type of appliances that would be installed in the future; the Project would not change the number of appliances or require construction-related activities. Therefore, the Project would not result in direct construction-related GHG emissions. However, based on currently available zero NO_x electric heat pump technology, the Project could result in a long-term increase in electricity demand, which would contribute, along with implementation of statewide decarbonization programs, to the need for expansion of energy infrastructure in California and outside the state. Therefore, the Project’s projected incremental demand increase would require the construction of new and/or expanded infrastructure (i.e., transmission lines, substations, solar fields, battery storage facilities) to accommodate the increased electricity demand from the conversion of natural gas appliances to electric appliances. It is anticipated that most of the necessary energy projects would be constructed outside the Bay Area and a portion of these projects would occur outside of the state (see E3 study included as Appendix C). These projects would produce construction-related GHG emissions in various air basins depending on the future locations of this infrastructure. The Project’s potential contribution to environmental impacts (including impacts to GHG) associated with these energy projects are described in Section 3.3, “Utilities and Service Systems.” Thus, construction-related GHG emissions are not discussed further in this analysis.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.2-1: Potential to Generate GHG Emissions

The proposed amendments would result in a decrease in GHG emissions over the next 24 years. This decrease exceeds the net zero threshold of significance and would assist the state in meeting its long-term GHG reduction goals extending to 2045. Therefore, the proposed amendments would not have a cumulatively considerable contribution to climate change. This impact would be less than significant (beneficial).

The proposed amendments would result in a transition from currently designed natural gas-powered furnaces and water heaters to zero-NO_x electric furnaces and water heaters and/or zero-NO_x natural gas-powered appliances (if they are developed by manufacturers). If zero-NO_x natural gas-powered appliances are developed, consumers would be able to choose between gas and electric zero-NO_x appliances, and it is assumed that the proposed amendments would result in the installation of some combination of the two choices. If this is the case, GHG emissions would still decrease upon implementation of the rule amendments, but not by as much as if current appliances are only replaced by electric heat pumps. The analysis here assumes, based on currently available technology, that only electric heat pumps are installed once the proposed amendments are implemented. The GHG emission reduction projections should be seen as the maximum potential reductions. Replacement of currently designed natural gas-powered appliances with electric appliances upon rule implementation would result in a decrease in on-site natural gas combustion; however, the energy used to power these appliances would be sourced from the electrical grid of the Bay Area and surrounding regions (see Section 3.3, "Utilities and Service Systems," for a discussion of the project's contribution to energy infrastructure impacts). The electrical grid is also a source of GHG emissions.

The level of GHGs generated by electricity consumption is contingent upon a variety of factors. A utility's energy portfolio (i.e., the composition of the sources used to generate electricity). For example, PG&E is the main electricity provider in the Bay Area, among other Community Choice Aggregates operating within the region. In 2019, PG&E provided its customers on its base plan with 27 percent electricity sourced from large hydroelectric power, which is considered a renewable electricity source that doesn't produce GHG emissions (CEC 2020). Due to statewide drought in 2020, this percentage in 2020 fell to 10 percent of PG&E's total base plan (CEC 2021). Due to decreased availability of large hydroelectric power, PG&E relied upon a greater percentage of natural gas consumption in 2020 compared to 2019 resulting in comparatively greater GHG emissions.

Notably, several statewide regulations and mechanisms are in place to require public and private utilities, such as PG&E, to procure an incrementally greater portion of their electricity from eligible renewable energy sources. The RPS requires that utilities be 100 percent renewable by 2045, at a minimum. PG&E has also committed to a goal of achieving carbon neutrality by 2040, 5 years ahead of the state's carbon neutrality goal by 2045. Therefore, while the proposed amendments may result in increased electrical demand, the GHG emissions associated with this demand would become progressively less over time.

Table 3.2-2 provides values for projected yearly emissions and maximum potential reductions compared with the baseline emissions inventory for selected years, assuming that only electric heat pumps are installed upon implementation of the proposed rule amendments. It should be noted that 2018 is the baseline year for the projected GHG emissions; however, BAAQMD staff anticipates that reductions would not occur until 2027 because BAAQMD staff has assumed that voluntary uptake rates would be minimal.

As shown in Table 3.2-2, the proposed amendments could result in a reduction of 4.81 MMTCO₂e by 2046 compared to baseline conditions. This decrease goes beyond meeting the net zero increase threshold of significance and demonstrates that the proposed amendments would not conflict with the 2022 Scoping Plan or the state's long-term GHG reduction goals. Moreover, if some combination of electric heat pumps and zero-NO_x natural gas-fired appliances are installed upon implementation of the proposed amendments, the proposed Rules would still result in a reduction in GHG emissions, though it would be less than 4.81 MMTCO₂e/year. This impact would be less than significant (beneficial).

Table 3.2-2 Potential GHG Emissions Upon Implementation of Proposed Amendments

Year	Projected Yearly GHG Emissions (MMTCO ₂ e/yr)	Potential GHG Reduction vs. Baseline (MMTCO ₂ e/yr)
2018*	6.56	—
2030	5.67	0.89
2035	4.10	2.46
2040	2.68	3.88
2046	1.75	4.81

Notes: GHG = greenhouse gas; MMTCO₂e/yr = million metric tons of carbon dioxide equivalent per year.

* 2018 is the baseline year for the GHG emissions inventory.

Source: Data provided by BAAQMD in 2022.

Mitigation Measures

No mitigation is required for this impact.

CUMULATIVE IMPACTS

As described above, the discussion of GHG emissions in Impact 3.2-1 is inherently a cumulative impact analysis. GHG emissions from one project cannot, on their own, result in changes in climatic conditions; therefore, the emissions from one project must be considered in the context of their contribution to cumulative global emissions. Impact 3.2-1 is therefore a cumulative impact analysis and no further cumulative impact analysis is needed for GHG emissions and climate change.

This page intentionally left blank.

3.3 UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

The proposed amendments are not expected to generate substantial demand for water, water treatment, wastewater treatment, natural gas infrastructure, or solid waste disposal. Therefore, this section provides a focused evaluation of the availability of existing electricity systems to serve the proposed amendments and the impact of the proposed amendments on these systems. Because the proposed amendments target nitrogen oxide (NO_x) emissions standards for natural gas-powered furnaces and water heaters, relevant information related to natural gas is provided in the regulatory and environmental settings below.

The analysis is based on the accompanying technical report *Electric Infrastructure Impacts from Proposed Zero NO_x Standards* prepared by Energy + Environmental Economics (E3) in 2022 (Appendix C).

Several comments related to utilities and service systems (energy resources) were received in response to the notice of preparation (see Appendix A). The Associated General Contractors of California expressed concern about there being sufficient electrical grid capacity to support increased demands and the potential for blackouts if the grid system is unprepared. The Air Conditioning, Heating, & Refrigeration Institute expressed concern about emissions from new power generation facilities and ensuring that grid updates and capacity are capable of meeting increased demand prior to enacting rules changes. The San Francisco Bay Area Planning and Urban Research Association commented that increased electrical demand could stress the grid. These issues are addressed in this section.

3.3.1 Regulatory Setting

FEDERAL

No federal plans, policies, regulations, or laws are applicable to energy for the proposed amendments.

STATE

California Environmental Quality Act

Appendix F of the State CEQA Guidelines sets forth goals for energy conservation, including decreasing per capita energy consumption and reliance on fossil fuels and increasing reliance on renewable energy sources. CEQA requires EIRs to describe potential energy impacts of projects, with an emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (Public Resources Code [PRC] Section 21100[b][3]).

The California Energy Commission (CEC) prepares an integrated policy report every two years that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (CEC 2022). Energy efficiency is one of the key components of the state's strategy to reduce greenhouse gas emissions (GHGs) and to achieve reduction targets set forth by Assembly Bill (AB) 32, Senate Bill (SB) 32, and Governor Brown's Executive Order (EO) B-30-15. Efficiency achieved through building codes, appliance standards, and ratepayer-funded programs has had a positive impact on GHG emissions in recent years (CEC 2022). The policy report discusses efforts to decarbonize California's energy system and recognizes transitioning to zero- and near-zero emission vehicles will be a fundamental part of meeting the state's climate goals.

The California Public Utilities Commission (CPUC) 2008 Energy Efficiency Strategic Plan established goals of having all new residential construction in California be zero net energy (ZNE) by 2020 and all new commercial construction ZNE by 2030 (CPUC 2008).

Clean Energy and Pollution Reduction Act

On October 7, 2015, the Clean Energy and Pollution Reduction Act (SB 350) was signed into law, establishing new clean energy, clean air, and GHG reduction goals for 2030 and beyond. SB 350 codifies Governor Brown's clean energy goals to increase California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030, and is part of California's overall strategy to address climate change. SB 350 enhances the state's ability to meet its long-term climate goal of reducing GHG emissions to 40 percent of 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

California Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by the California Energy Code. The code was established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy-efficiency standards for residential and nonresidential buildings. CEC updates the California Energy Code every three years, typically including more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions.

The 2019 California Energy Code was adopted by CEC on May 9, 2018 and applies to projects constructed after January 1, 2020. CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficacy lighting (CEC 2018).

The 2022 California Energy Code was adopted by CEC on August 11, 2021 and will go into effect on January 1, 2023. The 2022 California Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, and strengthens ventilation standards.

California Green Building Standards (Title 24, Part 11)

The California Green Building Standards, also known as CALGreen, is a reach code (i.e., optional standards that exceed the requirements of mandatory codes) developed by CEC that provides green building standards for statewide residential and nonresidential construction. The current version is the 2019 CALGreen Code, which took effect on January 1, 2020. As compared to the 2016 CALGreen Code, the 2019 CALGreen Code strengthened sections pertaining to EV and bicycle parking, water efficiency and conservation, and material conservation and resource efficiency, among other sections of the CALGreen Code. The CALGreen Code sets design requirements equivalent to or more stringent than those of the California Energy Code for energy efficiency, water efficiency, waste diversion, and indoor air quality. These codes are adopted by local agencies that enforce building codes and used as guidelines by state agencies for meeting the requirements of EO B-18-12.

Legislation Associated with Electricity Generation

The state has passed multiple pieces of legislation requiring the increasing use of renewable energy to produce electricity for consumers. California's Renewable Portfolio Standard (RPS) Program was established in 2002 (SB 1078) with the initial requirement to generate 20 percent of their electricity from renewable by 2017, 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011), 52 percent by 2027 (SB 100 of 2018), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018).

Green Building Initiative

In 2012, Governor Brown's EO B-18-12 (State of California Governor Office 2012) and its related Green Building Action Plan state the following energy and water efficiency improvement goals for facilities owned, funded, and leased by the State:

- ▶ All new state buildings beginning design after 2025 shall be constructed as ZNE facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be ZNE. State agencies shall also take measures toward achieving ZNE for 50 percent of the square footage of existing state-owned building area by 2025.

- ▶ The state shall identify at least three buildings by January 1, 2013, to pursue ZNE as pilot projects.
- ▶ New and major renovated state buildings shall be designed and constructed to exceed the applicable version of CCR Title 24, Part 6, by 15 percent or more, and include building commissioning, for buildings authorized to begin design after July 1, 2012.
- ▶ Any proposed new or major renovation of state buildings larger than 10,000 square feet shall use clean, onsite power generation such as solar photovoltaic, solar thermal, and wind power generation, and clean backup power supplies, if economically feasible.
- ▶ New and major renovated state buildings larger than 10,000 square feet shall obtain Leadership in Energy and Environmental Design (LEED) "Silver" certification or higher.
- ▶ State agencies shall reduce water use at the facilities they operate by 10 percent by 2015 and by 20 percent by 2020, as measured against a 2010 baseline.
- ▶ All new and renovated state buildings and landscapes shall utilize alternative sources of water wherever cost-effective. Sources may include, but are not limited to: recycled water, graywater, rainwater capture, stormwater retention, and other water conservation measures.
- ▶ Landscape plants shall be selected based on their suitability to local climate and site conditions, and reduced water needs and maintenance requirements.
- ▶ State agencies shall identify and pursue opportunities to provide electric vehicle charging stations, and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

LOCAL

Local Climate Action Plans

Consistent with recommendations of the California Air Resources Board (CARB), several Bay Area jurisdictions have completed community emissions inventories (103), and 79 jurisdictions have finalized and adopted community climate action plans (CAPs) or greenhouse gas reduction plans. The Bay Area's CAPs seek to help local jurisdictions achieve state emissions goals. They identify recommendations for meeting emissions goals, often in terms of different land uses or categories, including transportation, land use, energy, water, waste, and green infrastructure, and require monitoring of emissions over time. While not required above, a majority of jurisdictions in the region participate in the creation of both emissions inventories and CAPs.

Community Choice Aggregation Programs

Several Community Choice Aggregation (CCA) programs operate in the Bay Area. A CCA allows local governments to partner with local utilities to procure power on behalf of its residents, businesses, and municipal accounts. CCAs use the transmission and distribution services of a utility while supporting a municipality's choice to obtain energy from typically greener sources. CCAs in the Plan area include East Bay Community Energy, Peninsula Clean Energy, MCE, CleanPowerSF, San Jose Clean Energy, Silicon Valley Clean Energy, and Sonoma Clean Power, all of which have partnered with the Pacific Gas and Electric Company (PG&E).

3.3.2 Environmental Setting

ENERGY

Electricity

Electricity within the Bay Area is serviced by PG&E in partnership with several CCAs, including East Bay Community Energy, Peninsula Clean Energy, MCE, CleanPowerSF, San Jose Clean Energy, Silicon Valley Clean Energy, and

Sonoma Clean Power. Table 3.3-1 summarizes the electricity consumption of the nine counties governed by the BAAQMD in 2020, which comprise the project area for the proposed amendments.

Table 3.3-1 Electricity Consumption by County in 2020

County	Electricity Demand (GWh)
Alameda	10,247
Contra Costa	8,622
Marin	1,330
Napa	1,032
San Francisco	5,025
San Mateo	4,167
Santa Clara	16,435
Solano	3,320
Sonoma	2,867
Total	53,045

Notes: GWh = gigawatt hour.

Source: Data compiled by Ascent Environmental in 2022.

In 2020, PG&E supplied its customers on its base plan with 31 percent renewable energy (i.e., biomass, geothermal, eligible hydroelectric, solar, and wind), 43 percent nuclear, 16 percent natural gas, and 10 percent large hydroelectric power (PG&E 2021). PG&E also offers its customers with an option to engage in a 50 or 100 percent Solar Choice option, where customers may pay an additional fee to ensure that their electricity is procured from renewable energy resources.

Natural Gas

Natural gas is supplied to residents of the Bay Area by PG&E. Natural gas is distributed throughout the Bay Area through a network of underground pipes. Table 3.3-2 summarizes the natural gas combustion for each of the nine counties covered by the BAAQMD in 2020.

Table 3.3-2 Natural Gas Consumption by County in 2020

County	Millions of Therms ¹
Alameda	366
Contra Costa	1,061
Marin	67
Napa	36
San Francisco	208
San Mateo	200
Santa Clara	418
Solano	217
Sonoma	104
Total	2,677

Notes: ¹ The therm is a unit of heat energy equal to 100,00 British thermal units.

Source: Data compiled by Ascent Environmental in 2022.

3.3.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

Current emission control methods for the proposed zero-NO_x emissions standard available on the market consist mainly of electric heat pump systems. The BAAQMD does not intend to mandate specific technology solutions, but currently available electric solutions were used to form estimates and projections. Natural gas technologies, with combustion occurring in the absence of nitrogen, along with a variety of other technologies, could also meet the proposed standards. The assumed use of electric appliances for CEQA analysis purposes allows for a conservative estimate for impacts to the electric grid. Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, the potential impacts on the electric grid would be lessened. Thus, to understand maximum potential impact on utilities and service systems, for CEQA analysis purposes, the BAAQMD assumes that all currently in-use natural gas-fired appliances would be replaced with electric appliances if the proposed rules are implemented.

As described above, the electric grid analysis is based on the accompanying technical report *Electric Infrastructure Impacts from Proposed Zero NO_x Standards* prepared by E3 and included as Appendix C. Potential electric grid impacts were evaluated relative to two reference scenarios: a Low Policy Reference, which assumes no major state policy changes in support of building electrification, and a High Policy Reference, which assumes major state policy support for building electrification by the 2030s.

Maximum potential space heating and water heating load impacts are calculated based on gas usage data provided to the BAAQMD by PG&E. These data include annual gas usage in the BAAQMD's territory for four end uses: residential space heating, residential water heating, commercial space heating, and commercial water heating. For each end use, the maximum potential load impact assumes that 100 percent of gas demand for that end use shifts to heat pumps and is adjusted for the device performance characteristics of gas devices and heat pumps. Annual load impacts are then calculated for each end use as a percentage of the maximum potential load impact, based on the incremental heat pump adoption relative to a reference scenario in that year.

Current levels of air conditioning adoption and estimates of future adoption are based on data from the CEC's 2019 Residential Appliance Saturation Survey. Average per-building air conditioning loads were calculated from the National Renewable Energy Laboratory (NREL) ResStock and ComStock databases.

THRESHOLDS OF SIGNIFICANCE

According to State CEQA Guidelines Appendix G, a utilities and service systems impact would be significant if implementation of the Project would:

- require or result in the relocation or construction of new or expanded electric power facilities, the construction or relocation of which could cause significant environmental effects.

ISSUES NOT DISCUSSED FURTHER

As described above, the proposed amendments to Rules 9-4 and 9-6 does not include the construction of new facilities or an increased demand for utility services. The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing residential and commercial buildings that are already provided with utility services. There would be no change to existing water use or wastewater treatment. Therefore, the proposed rule amendments would not adversely affect the sufficiency of water supplies or wastewater treatment capacity. No impact would occur, and the issue of impact on water use and wastewater systems will not be analyzed further.

The proposed rule amendments would regulate the type of equipment that would be installed, not whether it would be installed. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. When new appliances are installed, the old appliances would be removed and properly disposed of either at an appropriate recycling facility (that accepts scrap metal) or landfill in accordance with federal, state, and local laws. This would be a continuation of existing conditions. It is not anticipated that the amount of solid waste generated as a result of the proposed rule amendments would exceed the capacity of Bay Area landfills, which have an estimated average of 46 percent remaining capacity (MTC and ABAG 2021: 3.14-18), because proper disposal of old appliances would continue to occur regardless of whether the Project is implemented. Therefore, no impact would occur, and the issue of impact on solid waste will not be analyzed further.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact

Assuming that heat pumps are used to replace existing natural gas-fired space and water heating appliances, the Project would, under the “worst case” Low Policy Reference Scenario evaluated by E3 (Appendix C), over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero-NO_x standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 MW of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts, under the “worst case” Low Policy Reference Scenario. For context, this represents 0.6 to 1.2 percent of the State’s total projected land needed for the State to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant, and may include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.

The Project does not include any development or other use that would result in a direct increase in demand for electricity such that relocation or construction of new or expanded electric infrastructure would be required as part of the Project. However, the zero-NO_x standard would be in effect beginning in 2027, and over time, result in replacement of appliances powered by natural gas or propane with appliances that meet zero-NO_x standards, which, at least in the foreseeable future, would primarily use electricity. This would result in a long-term increase in electricity demand as more electric appliances are installed under the proposed rules change. Full installation is anticipated for year 2046. Over this long term, a variety of other (primarily) state-led programs, such as CARB’s 2022 Scoping Plan and future updates, would also be implemented and will substantially increase electricity demand. As described above under “Analysis Methodology,” the analysis that follows is based on the accompanying technical report *Electric Infrastructure Impacts from Proposed Zero NO_x Standards* prepared by E3 and included as Appendix C. The E3 report examines the project’s contribution to projected increases in electricity demand through year 2050.

The Project would amend Rules 9-4 and 9-6, which govern NO_x emissions from residential and commercial space and water heating systems. The proposed amendments would introduce zero-NO_x standards for devices covered

under these rules. Today, the only technologies that meet zero-NO_x standards for these end uses are electric space and water heating devices. In the future, gas-fired technologies that meet the proposed standards could be developed. To determine potential conservative impacts on electric infrastructure, the E3 study assumed that gas space heating and water heating devices would be replaced by electric heat pump devices upon burnout.

The E3 study evaluates potential electric grid impacts based on two reference scenarios: a Low Policy Reference, which represents a business-as-usual future in which California does not meet its 2030 or 2045 GHG emissions targets, and a High Policy Reference, which assumes major state policy changes to decarbonize all sectors of the state's economy aligned with achieving the state's GHG emissions targets.

Under the Low Policy Reference scenario, heat pump adoption would occur consistent with the 2022 Draft Scoping Plan Business-as-Usual Reference Scenario. As such, this scenario assumes existing and currently planned levels of incentives for heat pumps and no major policy changes supporting building electrification would occur. As a result, this scenario assumes relatively low heat pump adoption through 2045. Under the Low Policy Reference scenario, the proposed amendments would generate 2,180 megawatt (MW), 680 MW, 460 MW, and 420 MW of new electrical demand for new solar, new batteries, new transmission capacity, and distribution capacity, respectively, by 2050.

Under the High Policy Reference, heat pump adoption would be consistent with the 2022 Draft Scoping Plan Proposed Scenario and state-level policies would drive a fast pace of heat pump adoption. Under the High Policy Reference Scenario, the proposed amendments would generate 70 MW, <10 MW, <10 MW, and <10 MW of new electrical demand for new solar, new batteries, new transmission capacity, and distribution capacity, respectively, by 2050. Table 3.3-3 summarizes the potential 2050 electric grid impacts of the proposed amendments.

Table 3.3-3 Summary of Potential 2050 Electric Grid Impacts of the Proposed Amendments

Grid Impact Category	Impact Relative to Low Policy Reference	Impact Relative to High Policy Reference
Utility-scale solar to serve electric loads	2,180 MW new solar by 2050	70 MW new solar by 2050 + accelerated build in 2030s & 2040s
4-hour battery storage for generation capacity	680 MW new batteries by 2050	< 10 MW new batteries by 2050 + accelerated build in 2030s & 2040s
Transmission capacity	460 MW impact by 2050	< 1 MW impact by 2050 + accelerated build in 2030s & 2040s
Distribution capacity	420 MW impact by 2050	< 10 MW impact by 2050 + accelerated build in 2030s & 2040s

Notes: MW = megawatt.

Source: Modeling prepared by E3 in 2022 (see Appendix C).

Given the high priority of the state to decarbonize, the High Policy Reference scenario may be more likely to occur than the Low Policy Reference scenario; however, because the Low Policy Reference scenario assumes the Project would result in a higher level of electricity demand, it serves as a more conservative scenario for evaluating potential impacts to the environment under CEQA. For this reason, the Low Policy Reference scenario will be the focus of the analysis that follows.

Also, as described in the E3 study, resource planning studies have considered the mix of new electric generation resources that will be developed in California. CPUC's Integrated Resource Plan (IRP) developed a Preferred System Plan that describes the optimal resource build through 2032. This plan includes the development of the following energy resources: 19 GW of utility-scale solar, 5 GW of land-based wind (including 1.5 GW out of state), 2 GW of offshore wind, 1 GW of geothermal, and 0.1 GW of biomass. In addition, battery storage, pumped hydro storage, and demand response are developed to provide generation capacity.

While the IRP is focused on resource needs over the next decade, the 2021 "SB100 Joint Agency Report" considers resource needs through 2045. This report documents a joint study by the CEC, CPUC, and CARB, investigating electric generation resource needs to meet the SB 100 requirement that 100 percent of electric retail sales be from zero-carbon resources by 2045. Results of this study indicate that energy needs will be met through a mix of utility-scale

solar, customer solar, land-based wind, and offshore wind, with utility-scale solar representing the majority of resource additions.

Together, these studies indicate that utility-scale solar will be the predominant generation resource built to serve new loads in California, although some amount of land-based wind, offshore wind, geothermal, biomass, and/or other resources may also be developed. The location and type of any particular development is not within BAAQMD's jurisdiction and is unknown and speculative at this time.

Utility-Scale Solar

As shown in Table 3.3-3, under the Low Policy Reference, the proposed amendments would necessitate 2,180 MW of new solar by 2050. Based on a NREL study, the direct land use impact of utility scale solar is estimated to be 9 acres per MW. Using this ratio of acreage to MW, the incremental utility scale solar needs summarized in Table 3.3-3 would correspond to a direct land use impact of 19,500 acres under the Low Policy Reference in 2050.

This projected acreage is unlikely to be sited within the Bay Area due to the characteristics of the region's climate. Rather, utility scale solar development would be focused in areas of high solar sources including the Central Valley, Inland Empire, and Mojave Desert. The location and type of any particular development is not within BAAQMD's jurisdiction and is unknown and speculative at this time. Potential impacts of these utility-scale solar projects would be evaluated in separate, future EIRs by various lead agencies. Likely impacts to the environment could include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; and adverse effects to other natural resources and waterways. Mitigation measures would likely be available to reduce many of these impacts. Some impacts may not be able to be mitigated to a less-than-significant level and may remain significant and unavoidable. The BAAQMD does not have jurisdiction to develop energy resources or monitor or enforce any of these mitigation measures.

Other Energy Sources

The land requirements of renewable generation resources are well understood, and environmental restrictions on renewable project siting are an active topic of discussion among policymakers and stakeholders. In 2019, The Nature Conservancy published a report called "The Power of Place," which considered the land impacts of renewable generation needed to achieve California's climate goals and evaluated scenarios with different environmental exclusions for renewable development. Across the scenarios evaluated, the study found 480,000 to 2.6 million acres of land would be developed by 2050 for wind generation (Nature Conservancy n.d.: 6). This does not include the area necessary for offshore wind development. Geothermal, biomass, and other energy generation sources would also be developed, although these constitute a small fraction of the overall energy generation projected to be developed to meet the state's future energy needs, as the state implements existing and planned decarbonization programs. Impacts associated with these other energy resources include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; conversion of Forestland and other impacts to forest resources; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat (including bird and bat strikes and impacts to marine habitat associated with wind facilities); adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures would likely be available to reduce many of these impacts. Some impacts may not be able to be mitigated to a less-than-significant level and may remain significant and unavoidable. The BAAQMD does not have jurisdiction to develop energy resources or monitor or enforce any of these mitigation measures.

Transmission and Distribution Capacity/4-Hour Battery Storage

Based on the values summarized in Table 3.3-3, relative to the Low Policy Reference, potential heat pump adoption under the proposed standards would require infrastructure to support 680 MW, 460 MW, and 420 MW of 4-hour battery storage capacity, incremental transmission capacity need, and distribution capacity need, respectively, by 2050.

Under the Low Policy Reference, it is projected that the proposed amendments could require the construction of 6 new electrical banks, 45 new electric feeders, 10 new electric line sections, 31 bank upgrades, and 35 line section upgrades. The location of any particular construction project is unknown and speculative at this time.

Distribution infrastructure projects range from upgrades or replacements of existing equipment, which occur in existing rights of way, to greenfield construction of new line sections, distribution feeders, or substations, which may have a more significant environmental impact. Potential impacts of these transmission and distribution infrastructure projects would be evaluated in separate, future EIRs by various lead agencies. Environmental impacts likely to occur as a result of installation of transmission, distribution, and storage would include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; conversion of Forestland and other impacts to forest resources; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures would likely be available to reduce many of these impacts. Some impacts may not be able to be mitigated to a less-than-significant level and may remain significant and unavoidable. The BAAQMD does not have jurisdiction to develop energy resources or monitor or enforce any of these mitigation measures.

Conclusion

The state of California has adopted stringent statewide GHG reduction targets, including reducing emissions by 40 percent below 1990 levels by 2030 as mandated by SB 32 and reducing emissions by 85 percent below 1990 levels and achieving carbon neutrality by 2045 as directed by AB 1279. To reach these ambitious targets, the decarbonization of several sectors, including the mobile source and existing and future building sectors, is necessary.

The electrical sector's capacity in California will need to be expanded to accommodate increased electrical demand as energy production shifts from the burning of fossil fuels such as natural gas, gasoline, and diesel. As the state's mobile source sector continues to electrify through programs such as the Advanced Clean Cars II Program, Advanced Clean Fleets Regulation, and Advanced Clean Trucks Regulation, CARB, CPUC, and CEC are currently investing in retrofitting and expanding California's electrical grid to meet the demands of electric vehicles.

Moreover, the California Energy Code is trending towards total decarbonization and reflects new building requirements with every update to the code. The 2022 California Energy Code, which will go into effect on January 1, 2023, requires new residential and nonresidential development to be prewired to support electric appliances in lieu of natural gas-powered appliances. Home and business owners will have access to outlets in locations where water heaters, stoves, and furnaces are placed to facilitate the transition to electric appliances at the owner's discretion.

California's electrical sector is also progressively becoming more renewable as utilities continue to meet their renewable standard requirements under the RPS. To meet these benchmark goals, investments are being made statewide in small hydroelectric energy, geothermal technologies, on- and off-shore wind, solar photovoltaic systems, solar water and oil fields, and biomass facilities.

The High Policy Reference accounts for these other regulatory pressures that would require an expansion of the electricity sector's capacity and represents the most realistic scenario to be realized in the state. Under the High Policy Reference Scenario, the proposed amendments' contribution of electrical demand would be negligible in the greater context of total electrical demand in the Bay Area and would individually not require the construction of new electrical infrastructure or facilities. However, although the High Policy Reference Scenario is more likely to occur, the analysis above and the conclusions of this evaluation are based on the Low Policy Reference Scenario because the pace of policy implementation under the High Policy Reference Scenario cannot be guaranteed, and assuming implementation under the Low Policy Reference Scenario provides a conservative analysis of the Project's contribution to environmental impacts.

Therefore, under the "worst case" Low Policy Reference Scenario evaluated by E3 (Appendix C), the Project would, over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero NOx standards could result in 6.2 terrawatt-hours per year of

additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that the Project could require approximately 19,500 acres of utility-scale solar under the “worst-case” Low Policy Reference Scenario. This represents 0.6 to 1.2 percent of the state’s total projected land needed for the state to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). As indicated above, almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. Development of these potential new energy resources is not part of the current Project under review, but rather a likely indirect impact of implementation of the proposed amendments. Selection, location, development, review, and approval of any new energy resources is outside of BAAQMD’s jurisdiction and would be completed by other agencies. It is not possible to determine any particular energy resource that would be developed to meet growing demand; that determination is outside of BAAQMD’s jurisdiction and is unknown and speculative at this time. The potential impacts associated with these energy facilities are described above. As discussed, mitigation measures are likely available to minimize potentially significant impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.

Mitigation Measures

As described above, the location and type of these projects are currently speculative but based on current projections as presented in the E3 study, their associated environmental impacts would generally be located outside the Bay Area, and potentially outside California. The energy projects described would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the BAAQMD cannot identify feasible mitigation to reduce the Project’s contribution to these impacts and the impact remains potentially significant and unavoidable under the Low Policy Reference Scenario.

CUMULATIVE IMPACTS

As described under Impact 3.3-1, the Project would result in a long-term increase in energy demand. The zero NO_x standard would be in effect beginning in 2027, and comparison of this long-term energy demand increase with existing energy supplies would not be realistic, especially in the context of the massive statewide projected energy demand increases associated with existing and planned decarbonization programs described above, which will require drastic changes to the existing energy infrastructure in the Bay Area and across the state. Impact 3.3-1 evaluates the Project’s contribution to the projected statewide increase in energy demand and the associated proportion of the likely resulting environmental impacts. Impact 3.3-1 is therefore a cumulative impact analysis and no further cumulative impact analysis is needed for utilities.

3.4 NOISE

This section includes a summary of applicable regulations related to noise and vibration, a description of ambient-noise conditions, and an analysis of potential noise impacts associated with the proposed amendments.

The proposed amendments, which would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area, are not anticipated to generate substantial construction noise or vibration. Further, the proposed amendments would not expose people residing or working in the Project area to excessive noise levels associated with airports and would not locate residents or commercial buildings or other sensitive noise receivers closer to airport operations. Therefore, this section provides a focused evaluation of the Project's potential to generate a substantial permanent increase in ambient noise levels.

The notice of preparation (NOP) for this Project did not identify noise as a potentially significant impact. No comments related to noise were received in response to the NOP (see Appendix A). However, the BAAQMD has determined the need to address potential noise impacts in this EIR.

3.4.1 Regulatory Setting

COMMON NOISE DESCRIPTORS

Prior to providing the regulatory and environmental setting, some fundamental definitions of commonly used noise terms are provided in this section. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors used throughout this section.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound level that occurs during the same period (Caltrans 2013: 2-48). For instance, the 1-hour equivalent sound level, also referred to as the hourly L_{eq} , is the energy average of sound levels occurring during a 1-hour period and is the basis for noise abatement criteria used by the California Department of Transportation (Caltrans) and the Federal Transit Administration (FTA) (Caltrans 2013: 2-47; FTA 2018).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period (Caltrans 2013: 2-48; FTA 2018).

Community Noise Equivalent Level (CNEL): CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-decibels (dB) penalty applied to sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the sound levels occurring during evening hours between 7 p.m. and 10 p.m. (Caltrans 2013: 2-48).

FEDERAL

US Environmental Protection Agency Office of Noise Abatement and Control

The US Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, documents and research completed by the EPA Office of Noise Abatement and Control continue to provide value in the analysis of noise effects.

STATE

California General Plan Guidelines

The State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (2017), provides guidance for the compatibility of projects within areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been determined to help guide new land use decisions in California communities. In many local jurisdictions, these guidelines are used to derive local noise standards and guidance. Citing EPA materials and the State Sound Transmissions Control Standards, the State's general plan guidelines recommend interior and exterior CNEL of 45 and 60 decibels (dB) for residential units, respectively (OPR 2017:378).

State guidance reflects the fact that noise-sensitive land uses are compatible with exterior transportation-related noise exposure not exceeding 65 A-weighted dB (dBA) CNEL, which is the typical noise standard for suburban areas. In areas with more urban development exterior noise exposure is considered incompatible if noise exposure exceeds 70 dBA CNEL.

REGIONAL

City and County General Plans

Cities and counties within California must adopt a noise element as part of their general plans to identify, assess, and address noise problems within their communities. According to California Government Code 65302, the noise element of a general plan is to be used as "a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise." The noise element should assess current and projected future noise levels associated with local noise sources, including, but not limited to, traffic, trains, aircraft, and industrial operations. California general plan guidance establishes land use compatibility guidelines for various land uses. However, local jurisdictions may adopt their own noise exposure goals and policies, which may or may not be the same as or similar to those recommended by the State. Additionally, based on Title 24 standards and State general plan guidelines, interior noise exposure should not exceed 45 dB CNEL within noise-sensitive spaces, whether in suburban or urban environments. Standard modern building techniques and requirements, such as use of dual-paned windows, typically reduce exterior to interior noise transmission by 25 dB. The standards within the noise element of locally adopted general plans are for planning policy purposes and are generally not regulatory. Most jurisdictions regulate noise through their municipal code.

Local Noise Ordinances and Standards

The local noise code is generally applied to address noise complaints associated with non-transportation (e.g., public address systems, mechanical equipment). Noise exposure criteria presented within municipal codes should match performance criteria presented in the noise element of the general plan for the given jurisdiction.

Cities and counties often provide noise level performance standards for stationary noise sources (e.g., mechanical equipment) in the municipal code. These standards are used to address intermittent noise exposure and are often in terms of the hourly average noise level (L_{eq}) or maximum noise level (L_{max}). Noise standards are generally provided for interior and exterior noise exposure, with lower standards for interior noise. Most jurisdictions have different stationary noise standards depending on the time of day (e.g., daytime and nighttime) to account for changes in noise sensitivity during different times of day. Similarly, land uses or zoning districts often have different noise standards to account for the noise sensitivity of various receivers. Residential land uses are more sensitive to noise exposure than commercial and industrial land uses. For example, Section 13.40.050 of the City of Berkeley Municipal Code provides exterior noise standards for residential land uses of 55 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} from 10:00 p.m. to 7:00 a.m. The City of Berkeley has a higher noise standard for commercial uses of 65 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 60 dBA L_{eq} from 10:00 p.m. to 7:00 a.m. Section 13.40.050 of the City of Berkeley Municipal Code contains separate noise standards for interior noise exposure of 40 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 40 dBA L_{eq} from 10:00 p.m. to 7:00 a.m. for all zoning districts. Other jurisdictions, such as Marin County, do

not have numerical noise standards for non-transportation noise sources in their municipal code and instead cite nuisance noise. For example, Section 6.70.030, Enumerated Noises, of the Marin County Code prohibits unnecessary and excessive noise levels from horns, signaling devices, radios, loudspeakers, amplifiers, and yelling between the hours of 11:00 p.m. and 7:00 a.m.

Noise ordinances throughout the Bay Area reflect the differences in the intensity of land uses in each jurisdiction. Typical noise standards for rural and suburban areas are often lower than urban areas to account for the existing noise environment. For example, the City of Oakland (a more urban area), has higher noise allowances of up to 75 dBA L_{eq} during the daytime for residential uses (Section 17.120.050 of the City of Oakland Municipal Code), while the City of Rohnert Park (a more suburban area) has lower residential daytime residential noise standards of 60 dBA L_{max} (City of Rohnert Park Municipal Code Section 17.12.030).

3.4.2 Environmental Setting

ACOUSTIC FUNDAMENTALS

Prior to discussing the noise setting for the Project, background information about sound, noise, and vibration, and is needed to provide context and a better understanding of the technical terms referenced throughout this section.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a human ear. Noise is defined as loud, unexpected, annoying, or unwanted sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this large range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB).

Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness at the same time, the resulting sound level at a given distance would be 3 dB higher than if only one of the sound sources was producing sound under the same conditions. For example, if one idling truck generates an SPL of 70 dB, two trucks idling simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level approximately 5 dB louder than one source.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within this range better than sounds of the same amplitude with frequencies outside of this range. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level (expressed in units of A-weighted decibels) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels. All sound levels discussed in this section are expressed in A-weighted decibels. Table 3.4-1 describes typical A-weighted noise levels for various noise sources.

Table 3.4-1 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet	— 100 —	
Gas lawn mower at 3 feet	— 90 —	
Diesel truck at 50 feet at 50 miles per hour	— 80 —	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, daytime, Gas lawn mower at 100 feet	— 70 —	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	— 60 —	
Quiet urban daytime	— 50 —	Large business office, Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime	— 30 —	Library, Bedroom at night
Quiet rural nighttime	— 20 —	
	— 10 —	Broadcast/recording studio
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Notes: dBA = A-weighted decibels.

Source: Caltrans 2013: Table 2-5.

Human Response to Changes in Noise Levels

The doubling of sound energy results in a 3-dB increase in the sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dB changes in sound levels when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000–8,000 Hz) range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hz and perceives both higher and lower frequency sounds of the same magnitude with less intensity (Caltrans 2013: 2-18). In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness (Caltrans 2013). Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which a noise level decreases with distance depends on the following factors:

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Roads and highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources, thus propagating at a slower rate in comparison to a point source. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a source to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling provides additional attenuation associated with geometric spreading. Traditionally, this additional attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), additional ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the attenuate rate associated with cylindrical spreading, the additional ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. This would hold true for point sources, resulting in an overall drop-off rate of up to 7.5 dB per doubling of distance.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels, as wind can carry sound. Sound levels can be increased over large distances (e.g., more than 500 feet) from the source because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also affect sound attenuation.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction (Caltrans 2013: 2-41; FTA 2018: 42). Barriers higher than the line of sight provide increased noise reduction (FTA 2018: 16). Vegetation between the source and receiver is rarely effective in reducing noise because it does not create a solid barrier unless there are multiple rows of vegetation (FTA 2018: 15).

EXISTING NOISE ENVIRONMENT

Existing Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels, and because of the potential for nighttime noise to result in sleep disruption. Additional land uses such as schools, transient lodging, historic sites, cemeteries, and places of worship are also generally considered sensitive to increases in noise levels. Local general plans often specify noise sensitive land uses in their jurisdiction.

Existing Noise Sources

The existing noise environment in the Bay Area is composed of two primary categories of noise sources: transportation and non-transportation. The ambient noise environment in the urban areas of the Bay Area is primarily influenced by traffic noise. Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the type of ground (i.e., hard or soft), the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receivers to the roadway. Baseline traffic noise within the Bay Area has been characterized by traffic noise modeling. The baseline for the noise analysis is a simulation of 2015 traffic levels and land use. Based on modeling conducted for all roadway types within Bay Area, average noise levels range from 52.6 dBA CNEL (next to collector and small roads) to as high as 74.9 dBA CNEL (next to freeways) (MTC and ABAG 2021: 3.12-9).

The Bay Area is also affected by noise from freight and passenger rail operations. While these operations generate significant noise levels in the immediate vicinity of the railways, train operations are intermittent and area railways are widely dispersed. Commuter rail, such as San Francisco Municipal Railway and Valley Transportation Authority, operate with more frequency than standard gauge rail operations but at lower speeds, resulting in lower noise levels. Bay Area Rapid Transit operations, on the other hand, can attain higher speeds and have the potential for greater noise levels along extended stretches. Based on available data, noise levels from rail operations within the Bay Area can range from 62 dBA CNEL to 81 dBA CNEL (MTC and ABAG 2021: 3.12-9).

The Bay Area has many airports, including public use, private use, and military facilities. Major airports include San Francisco International, Oakland International, and Norman Y. Mineta San Jose International. In addition to the daily aircraft operations originating and terminating at these facilities, aircraft not using these airports frequently fly over the Bay Area. All of these operations contribute to the overall ambient noise environment. In general, like rail noise, the proximity of the receiver to the airport and aircraft flight path determines the noise exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft, and atmospheric conditions. Atmospheric conditions may contribute to the direction of aircraft operations (flow) and affect aircraft noise propagation.

A wide variety of industrial and other non-transportation noise sources are located within the Bay Area. These include manufacturing plants, landfills, treatment plants (e.g., water), power generation facilities, refineries, food packaging plants, lumber mills, and aggregate mining facilities, just to name a few. Noise generated by these sources varies widely, but in many cases may be a significant if not dominant contributor to the noise environment (MTC and ABAG 2021: 3.12-11).

3.4.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

This analysis evaluates the potential operational noise impacts associated with appliances that emit zero NO_x and would be allowed for sale and installation within the Bay Area if the proposed amendments are adopted. Because noise thresholds are not standardized throughout the Bay Area this analysis presents a qualitative assessment of noise from appliances, such as new furnaces and water heaters, for residential and commercial installation.

All new furnaces and water heaters would be required to be zero-NO_x units upon implementation of the proposed amendments. Currently, zero-NO_x units that are available on the market are electric heat pump units. However, the proposed amendments do allow for manufacturers to develop and market zero-NO_x appliances that are natural gas-fired. If such appliances are developed, consumers would be able to choose between zero-NO_x electric heat pumps and zero-NO_x natural gas-fired units upon implementation of the proposed amendments, and the result would be that some combination of electric heat pumps and zero-NO_x natural gas fired appliances are installed. Both natural gas-fired and electric heat pump units would generate noise, though it is unknown if one would generate more noise than the other or if they would generate a similar amount of noise. The analysis here assumes, based on currently available technology, that only electric heat pumps are installed if the proposed amendments are implemented.

THRESHOLDS OF SIGNIFICANCE

According to State CEQA Guidelines Appendix G, a noise impact would be significant if implementation of the Project would:

- ▶ generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards;
- ▶ generate excessive groundborne vibration or groundborne noise levels; or
- ▶ for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

ISSUES NOT DISCUSSED FURTHER

Construction Noise

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of appliances, such as furnaces and water heaters, that would be allowed for sale and installation within the Bay Area. The proposed rule amendments would not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. The proposed rule amendments would regulate the type of equipment that would be installed, not whether it would be installed. Regardless of the Project, Bay Area consumers would continue to purchase and install new furnaces and water heaters over the coming decades. These appliances meeting the NOx standards would primarily be installed inside of residential and commercial buildings, but may also be installed outside. Installation activities, which may generate a small amount of noise and would be temporary, would occur with or without the Project. Installation of these appliances on building exteriors, such as at ground level, or on exterior walls and roofs, would require minimal construction (e.g., less than a week) and would not involve large or loud construction equipment. Because any exterior construction noise involved with appliance installation would be minimal, the proposed amendments would not generate a substantial temporary increase in ambient noise levels in excess of local noise standards. Therefore, noise impacts associated with construction activities would not occur, and this issue will not be discussed further.

Vibration

The proposed rule amendments would not generate or expose people to excessive groundborne vibration or groundborne noise. No large construction equipment that would generate substantial noise or vibration (e.g., backhoes, graders, jackhammers, etc.) would be needed to install new appliances, no new appliances that would generate vibration would be installed, and no increase in traffic would be generated. Therefore, no vibration impacts would occur, and this issue will not be discussed further.

Airport Noise

Airports may be located within two miles of residential and commercial buildings affected by the proposed rule amendments. However, the proposed rule amendments, which would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area, would not expose people residing or working in the Project area to excessive noise levels associated with airports. Further, the proposed amendments would not locate residents or commercial buildings or other sensitive noise sources closer to airport operations. Therefore, the Project would not expose people residing or working in the Project area to excessive noise levels. No impacts related to airport noise would occur, and this issue will not be discussed further.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.4-1: Potential to Generate Long-Term Operational Noise

The proposed amendments would include installation of stationary sources such as heat pump units, which would be installed inside and outside of existing buildings. The potential operational noise impacts associated with this equipment could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable, especially because the BAAQMD does not have jurisdiction to monitor or enforce any of these mitigation measures. Therefore, the Project would result in a substantial long-term operational noise impact, and this impact would be potentially significant.

The proposed amendments would result in a transition from currently designed natural gas-powered furnaces and water heaters to zero-NO_x electric furnaces and water heaters and/or zero-NO_x natural gas-powered appliances (if they are developed by manufacturers). If zero-NO_x natural gas-powered appliances are developed, consumers would be able to choose between gas and electric zero-NO_x appliances, and it is assumed that the proposed amendments would result in the installation of some combination of the two choices. Both natural gas-fired and electric heat pump units would generate noise, though it is unknown if one would generate more noise than the other or if they would generate a similar amount of noise, and it is unknown if zero-NO_x natural gas-fired appliances would include equipment installed outdoors. Currently available zero-NO_x electric heat pumps used for space heating include equipment that is installed both inside and outside of the building the appliance is heating. The exterior equipment would add a new source of noise to the outside environment, while the interior equipment would replace currently existing equipment of similar noise levels. Currently available zero-NO_x electric heat pumps used for water heating are installed at the same location (typically indoors in an enclosed utility closet) as standard natural gas-fired tank water heaters, but may produce more noise than currently installed appliances. The analysis here assumes, based on currently available technology, that only electric heat pumps are installed if the proposed amendments are implemented.

Noise from new appliances that meet the proposed NO_x standards would vary depending on the size, model of equipment installed, and if the equipment would serve residential or commercial uses. The loudest published level for commercial heat pumps that would be installed for the proposed rule amendments is 83 dBA (Daikin 2021). Noise levels from commercial equipment are used in this analysis to represent a conservative assessment of stationary source equipment because commercial equipment would generally be larger and therefore louder than appliances for residential development. This analysis is conservatively based on the loudest published noise levels for commercial heat pumps of 83 dBA and does not take into consideration measures, such as locating heat pumps in enclosures or behind barriers, that would reduce noise levels.

Noise levels from the equipment at the nearest receiver would vary depending on several factors including distance to receivers, location of installation (e.g., utility closet, on the ground, wall, or roof), and if the equipment would be installed inside or outside of the building. Equipment installed inside of buildings would not be audible outside of the building and, thus, would not affect surrounding receivers but may affect residents of the building. Noise levels from equipment installed on the exterior of buildings may result in noise in exceedance of community noise levels.

Stationary noise is typically regulated through local municipal codes, which provide performance-based noise standards, specific to the noise source. Some agencies have a permit process for installation of equipment, such as heat pump units. Therefore, noise generated by appliances that meet the proposed NO_x standards outside of buildings would be subject to the maximum allowable exterior and interior noise standards contained in the applicable jurisdictions municipal code.

However, because noise standards vary across the Bay Area, this analysis determines if there would be a substantial increase in noise based on if the jurisdiction is considered a rural, suburban, or urban area. For example, urban development is frequently located in areas subject to higher noise, and local standards often provide that higher

noise levels are conditionally acceptable for residential uses in such areas. The City of San Francisco, for example, lists noise levels as high as 70 dBA CNEL as conditionally acceptable for residential uses.

As discussed above under "Existing Noise Environment," the Bay Area has a variety of noise environments and sensitive receivers. Rural or less densely populated areas would experience higher outdoor noise levels from proposed stationary equipment than urbanized areas because the stationary sources would be more audible over lower existing ambient noise. Based on the range of existing noise standards in the Bay Area, a substantial exterior noise impact would occur if Project-specific noise levels result in an exceedance of 70 dBA CNEL in urban and mixed-use areas and 65 dBA CNEL in a suburban or rural area. A substantial interior increase in noise from the Project would occur if noise levels from new appliances would exceed the California Building Code and California General Plan Guidelines of 45 dBA CNEL.

Implementation of the Project could result in an increase in location-specific and/or community noise levels from operation of the new appliances. Noise from new appliances would vary depending on ambient noise levels and amount of existing development. Noise from stationary equipment installed to meet the zero-NO_x standard would be intermittent in nature and would fluctuate throughout the day. These appliances do not typically run all day, but operate in short bursts. However, this analysis conservatively assumes that noise from operation of individual appliances could be as loud as 83 dBA outdoors operating up to 24 hours a day.

Although specific noise locations for new appliances as part of the Project are not known at this time, considering the high density of land development throughout the Bay Area in already urbanized areas, including suburban and rural development, where existing sensitive receivers exist, the Project could result in a significant impact on certain noise receptors on its own, and/or an increase in community noise levels that is significant. Multiple appliances in operation could together result in a significant impact on certain individual residents and/or an exceedance of community noise exposure of existing sensitive receivers to noise levels above 65 dBA CNEL or 70 dBA CNEL (exterior) and 45 dBA CNEL (interior). The appliances may be installed in areas that already exceed acceptable noise levels, and any additional noise impact in these areas could introduce a cumulatively considerable addition to an existing significant impact.

Compliance with performance-based noise standards may require installation of noise reduction measures. However, such permit processes and requirements are not required in all jurisdictions throughout the Bay Area. Stationary equipment noise is typically regulated through local municipal codes, which provide specific performance-based noise standards in L_{eq} and L_{max} , specific to the noise source, and give the local jurisdiction the ability to enforce noise sources that violate the code (see "Regional Setting," above). These criteria are generally tied directly to the standards presented in the city/county municipal code (i.e., noise ordinance).

Any noise producing equipment must comply with local noise ordinances and applicable federal Occupational Safety and Health Administration (OSHA) and California OSHA noise requirements. Compliance with these noise requirements would apply to residential and commercial buildings and would be expected to limit noise to acceptable levels. Noise from the new appliances could be further reduced through requirements to add shielding, screening, or coverings on proposed equipment where noise would exceed applicable standards. However, it is likely that noise from operation of some of these appliances would still exceed applicable standards in some locations. Therefore, the Project could result in a substantial long-term operational noise impact, and this impact would be potentially significant.

Mitigation Measures

As described above, the installation of appliances that meet the proposed NO_x standards would occur throughout the nine-county Bay Area and operation of these appliances would generate noise. Mitigation measures, such as enclosures or screening, are likely available to minimize operational noise impacts to a less-than-significant level; however, it is likely that some would remain significant and unavoidable. The BAAQMD does not have land use authority to require these mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures. Therefore, the Project's contribution to these impacts and the impact remains potentially significant and unavoidable.

CUMULATIVE IMPACTS

As described under Impact 3.4-1, the Project could result in a long-term increase in operational noise. If approved, the zero-NO_x standards would be in effect beginning in 2027, and a quantitative comparison of this long-term increase in operational noise with the existing noise environment would not be realistic, especially in the context of the nine-county Bay Area, which includes a variety of different noise environments and noise regulations. Impact 3.4-1 evaluates the Project's direct noise impacts and the Project's contribution to the existing and projected long-term increase in operational noise throughout the Bay Area. Impact 3.4-1 is therefore both a project-based impact analysis and a cumulative impact analysis and no further cumulative impact analysis is needed for noise.

3.5 AESTHETICS

This section describes the existing visual conditions, meaning the physical features that make up the visible landscape, in the Bay Area and evaluates the potential changes to those conditions that would occur from Project implementation. The effects of the Project on the visual environment are generally defined in terms of the Project's physical characteristics and potential visibility, the extent to which the Project's presence would change the perceived visual character and quality of the environment, and the expected level of sensitivity that the viewing public may have where the Project would alter existing views.

The notice of preparation (NOP) for this Project did not identify aesthetics as a potentially significant impact. No comment letters regarding aesthetics were received in response to the NOP (see Appendix A). However, the BAAQMD has determined the need to evaluate potential aesthetic impacts in this EIR.

3.5.1 Regulatory Setting

FEDERAL

No federal plans, policies, regulations, or laws related to aesthetics are applicable to the Project.

STATE

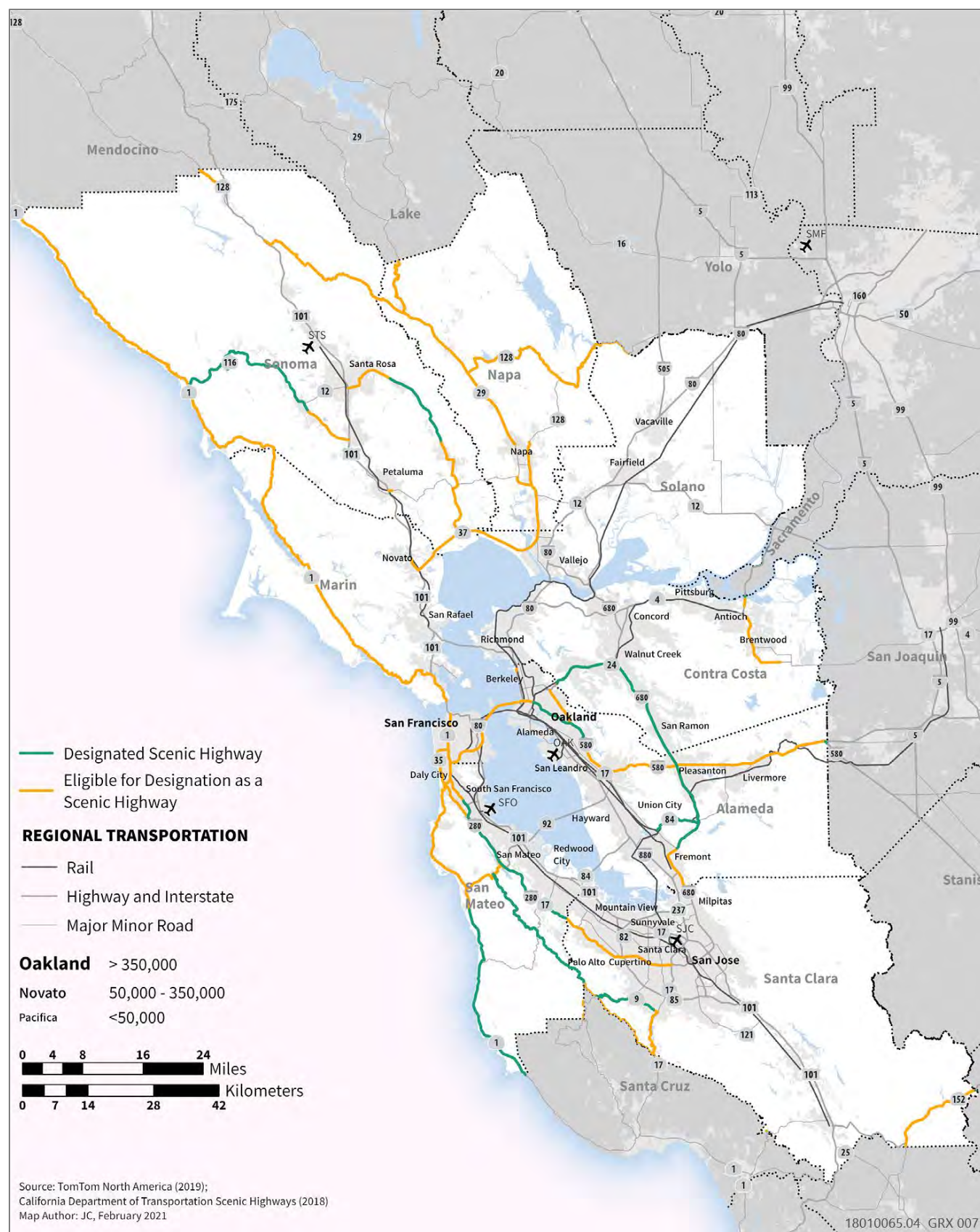
California Scenic Highway Program

Recognizing the value of scenic areas and views from roads in such areas, the State Legislature established the California Scenic Highway Program in 1963, and is managed by the California Department of Transportation (Caltrans). This legislation preserves and protects scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. The goal of the Scenic Highway Program is to preserve and enhance the natural beauty of California. Under this program, portions of a number of State highways have been designated as eligible for inclusion as scenic routes. To nominate a scenic highway the local jurisdictions through which the roadway passes must conduct a visual assessment, submit a Scenic Highway Proposal, and prepare and adopt a corridor protection program (CPP). After Caltrans and the State Scenic Highway Coordinators review the nomination and recommend designation of the roadway, the State may officially designate roadways as scenic routes. Interstate highways, State highways, and county roads may be designated as scenic under the program (Caltrans n.d.).

As noted, a CPP must be adopted by the local governments with land use jurisdiction over the area through which the roadway passes as the first step in moving a road from "eligible" to "designated" status. Each designated corridor is monitored by the State, and designation may be revoked if a local government fails to enforce the provisions of the corridor protection program. Although there are no restrictions on scenic highway projects, local agencies and Caltrans must work together to coordinate transportation and development projects and ensure the protection of the corridor's scenic value to the greatest extent possible, including undergrounding all visible electric distribution and communication utilities within 1,000 feet of a scenic highway. In some cases, local governments have their own land use and site planning regulations in place to protect scenic values along a designated corridor. At a minimum, each corridor protection program must include:

- ▶ regulation of land use and density of development,
- ▶ detailed land and site planning,
- ▶ control of outdoor advertising devices,
- ▶ control of earthmoving and landscaping, and
- ▶ regulation of the design and appearance of structures and equipment.

The Bay Area includes numerous designated or eligible State scenic highways. Officially designated State scenic highways are illustrated in Figure 3.5-1. All officially designated and eligible State scenic highways in the Bay Area are listed in Table 3.5-1.



Source: MTC and ABAG 2021: Figure 3.2-2.

Figure 3.5-1 Scenic Highways

3.5-2

Table 3.5-1 California State Scenic Highway System Officially Designated and Eligible Routes in the Bay Area

Designation	Route	County	Location
OD	1	San Mateo	Santa Cruz County line to southern city limit of Half Moon Bay
OD	9	Santa Clara	Santa Cruz County line/Saratoga Gap to Blaney Plaza in Saratoga
OD	9	Santa Clara	Blaney Plaza in Saratoga to Los Gatos city limit
OD	12	Sonoma	Danielli Avenue east of Santa Rosa to London Way north of Agua Caliente
OD	24	Contra Costa	East portal of Caldecott Tunnel to I-680 north of Walnut Creek
OD	35	San Mateo	Santa Cruz County line to Santa Clara County line
OD	35	San Mateo	Santa Clara County line to SR 92 in Half Moon Bay
OD	84	Alameda	SR 238 (Mission Boulevard) to I-680 near Sunol
OD	116	Sonoma	SR 1 to southern city limit of Sebastopol
OD	280	San Mateo	Santa Clara County line to northern city limit of San Bruno
OD	580	Alameda	San Joaquin County line to SR 205
OD	580	Alameda	San Leandro city limit to SR 24 in Oakland
OD	680	Alameda	Mission Boulevard in Fremont to Bernal Avenue near Pleasanton
OD	680	Alameda	Bernal Avenue near Pleasanton to Contra Costa County line
OD	680	Contra Costa	Alameda County line to SR 24
E	1	Marin/ Sonoma/Mendocino	SR 101 near Marin City to SR 101 near Leggett
E	1	San Francisco	SR 35 in San Francisco to SR 101 near Golden Gate Bridge in San Francisco
E	1	San Luis Obispo/San Mateo/ San Francisco	SR 101 near San Luis Obispo to SR 35 near Daly City
E	4	Contra Costa	SR 160 near Antioch to SR 84 near Brentwood
E	9	Santa Clara	SR 35 to SR 17 near Los Gatos
E	12	Sonoma	SR 101 near Santa Rosa to SR 121 near Sonoma
E	13	Alameda	SR 24 to I-580
E	17	Santa Cruz/Santa Clara	SR 1 near Santa Cruz to SR 9 near Los Gatos
E	24	Contra Costa	Alameda/Contra Costa County line to I-680 in Walnut Creek
E	29	Napa/Lake	Trancas Street in Napa to SR 20 near Upper Lake
E	29	Solano/Napa	SR 37 near Vallejo to SR 221 near Napa
E	35	Santa Clara/Santa Cruz/ San Mateo/San Francisco	SR 17 to SR 92/I-280/SR 1 in San Francisco
E	37	Marin	SR 251 near Nicasio to SR 101 near Novato
E	37	Marin/ Sonoma/Solano	SR 101 near Ignacio to SR 29 near Vallejo
E	80	San Francisco/Alameda	I-280 near First Street in San Francisco to SR 61 in Oakland
E	84	Alameda	SR 238 to I-680 near Sunol
E	92	San Mateo	SR 1 north of Half Moon Bay to I-280 north of Crystal Springs Lake
E	101	Marin	North of San Francisco across the Golden Gate Bridge to SR 1 in Marin City
E	101	Marin	SR 37 near Ignacio to SR 37 near Novato
E	116	Sonoma	SR 1 near Jenner to SR 101 near Cotati
E	121	Napa	SR 221 near Napa State Hospital to near Trancas Street in Napa
E	121	Sonoma	SR 37 near Sears Point to SR 12 near Sonoma
E	152	Santa Clara/Merced	SR 156 near San Felipe to I-5
E	156	Monterey/San Benito/Santa Clara	SR 1 near Castroville to SR 152 northeast of Hollister

Designation	Route	County	Location
E	160	Contra Costa/Sacramento	SR 4 near Antioch to Sacramento
E	221	Napa	SR 29 at Suscol Road to SR 121 in Napa
E	239	Alameda/Contra Costa	I-580 west of Tracy to SR 4 near Brentwood
E	251	Marin	SR 37 near Nicasio to SR 1 near Point Reyes
E	280	Santa Clara/San Mateo/ San Francisco	SR 17 to I-80 near First Street in San Francisco
E	580	San Joaquin/Alameda	I-5 southwest of Vernalis to I-80
E	680	Alameda/Contra Costa	Santa Clara County line to SR 24 in Walnut Creek

Notes: E = eligible; OD = officially designated; I- = Interstate; SR = State Route.

Source: Caltrans 2019.

Open Space Easement Act of 1974

Cities and counties can use open space easements as a mechanism to preserve scenic resources if they have adopted open space plans, as provided by the Open Space Easement Act of 1974 (Government Code, Sections 51070, 51097). According to this act, a city or county may acquire or approve an open space easement through a variety of means, including use of public money.

California Code of Regulations Title 24 Part 6

The California Energy Code (24 CCR 6) creates standards in an effort to reduce energy consumption. The type of luminaries and the allowable wattage of certain outdoor lighting applications are regulated.

REGIONAL AND LOCAL

City and County General Plans

City and county general plans may include policies for protecting scenic resources, such as hillsides, natural areas, landmarks, roads, and historic districts. Such policies may restrict new development in areas that maintain scenic vistas or areas that contain important character-defining structures. Additionally, design guidelines established at the local level may establish specific standards for addressing development where local character and/or important visual resources may be affected.

Counties and municipalities also may have scenic route components within their individual general plans. Policies usually encourage the designation of scenic routes as scenic corridors, either by local action or through the State program. Counties and municipalities may also establish regulatory programs or recommend corridor studies to determine the appropriate regulatory program to preserve scenic quality.

Issues pertaining to visual resources are typically addressed in the land use elements of general plans, but policies can also be found in the conservation and open space elements. The General Plan Guidelines, prepared by the California Governor's Office of Planning and Research, recommend that the land use element address an inventory of scenic viewsheds and points of interest, definition of community scenic values, programs for protecting and promoting community aesthetics, and identification of scenic highways and byways (OPR 2017).

3.5.2 Environmental Setting

The Bay Area is characterized by the diversity of urban development and the combination of rural and agricultural landscapes, as well as the natural beauty and wildlife provided by the surrounding mountain ranges and rich wildlife habitats. It stretches along the central northern Pacific coast of California, with several branches of the Coast Ranges dividing it into valleys, plains, and water bodies. The largest of these valleys contains San Francisco Bay, whereas at the eastern edge of the region is the great Central Valley, a flat plain lying between the Coast Ranges and the Sierra Nevada. The hills of the Coast Ranges provide expansive views of the valleys and plains below, revealing a variety of

development types, including urban areas along the bay plains and inland valleys, agricultural lands, and protected open space, and natural areas.

The landscapes of the San Francisco Bay Area are varied, unique, and recognized by many in the region and beyond. The basin formed by the Coast Ranges, East Bay hills, and the Bay itself are prominent physical features of the region. To the west, the Pacific Ocean and the Coast Ranges dominate the visual setting, stretching from Mount Tamalpais in the north to the Santa Cruz Mountains in the south. To the east, the Diablo Range, punctuated by Mount Diablo, provides a view of a different character. In the north, the vineyards of Napa and Sonoma Counties are unique and draw visitors from around the world. Many built features in the Bay Area—the Golden Gate and Bay Bridge and the San Francisco skyline in particular—are also of international renown. Bay Area residents and tourists alike value the variety and quality of the visual experiences that are found throughout the Bay Area, including urban and rural public spaces, regional parks, and transportation corridors in the region, including heavily traveled freeways, transit lines, and ferries, and narrow country roads through secluded forests and agricultural areas. Figure 3.5-2 depicts the locations of major scenic resources found in the Bay Area. Major land use and/or transportation projects may affect the visual experiences of travelers and the distinctive visual environment of the region.

HILLS AND VALLEYS

The Bay Area contains several distinct mountain ranges and hills. Along the peninsula between the Pacific Ocean and San Francisco Bay lie the coastal hills of San Mateo and Santa Clara Counties and, north of the Golden Gate, the hills of Marin County. The East Bay hills rise steeply from the urbanized plain along the eastern edge of the Bay, forming a several mile-wide band that also defines the western edge of the Diablo and Livermore Valleys of Contra Costa and Alameda Counties. The rolling hills of the Diablo Range separate these valleys from the lowlands of the Central Valley. These hills converge at the south end of the Bay Area in Santa Clara County. To the north, several ranges frame the Napa and Sonoma valleys.

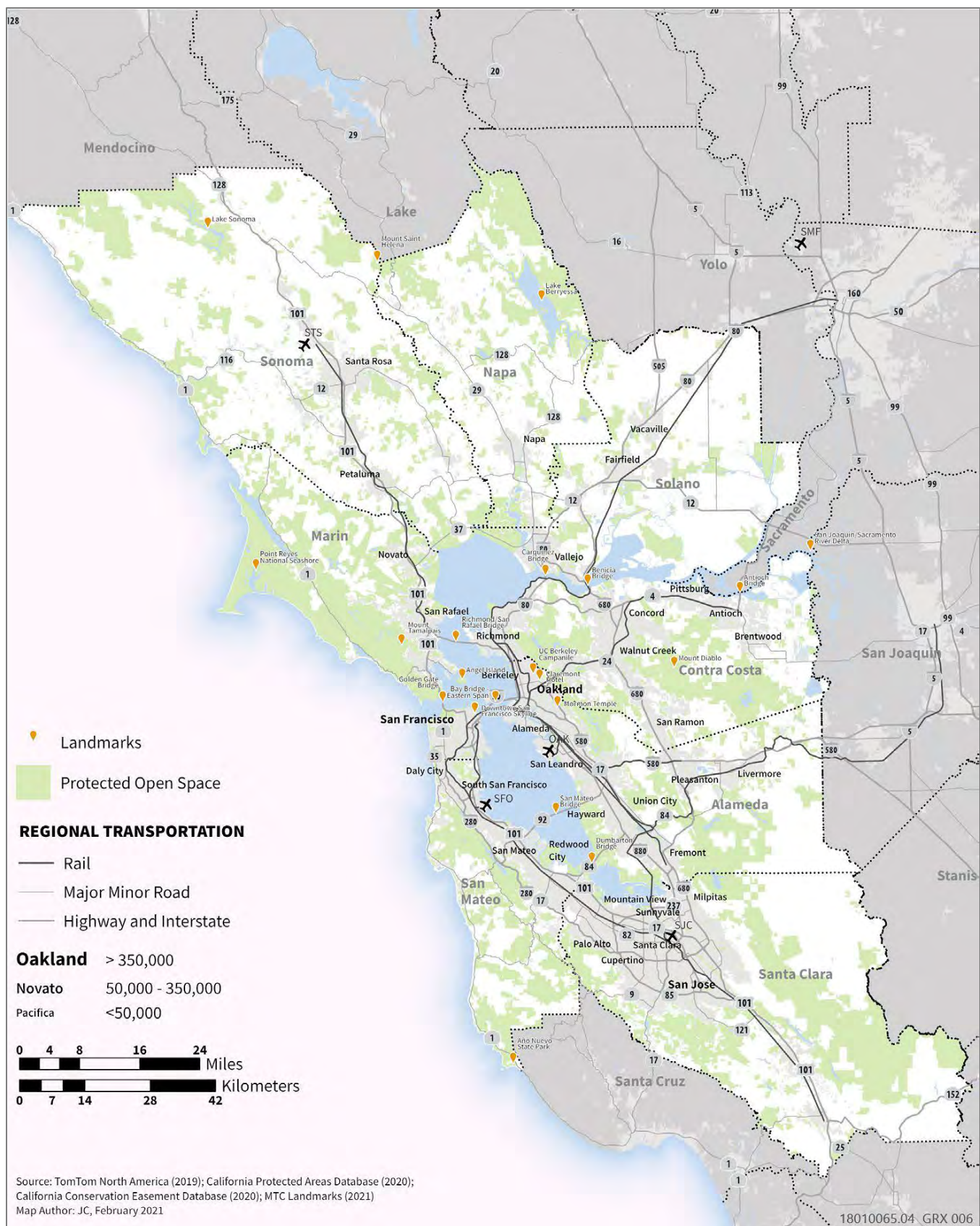
Between these ranges and hills are numerous valleys, both broad and narrow. San Francisco Bay, for example, is bordered along the east and west by a narrow, heavily urbanized plain. This plain widens in the south into the Santa Clara Valley, which, until World War II, was primarily agricultural. The East Bay and coastal hills, which are visible throughout these lowlands, orient viewers and give a sense of scale to the surrounding urban areas. Likewise, to the north, the hills forming the Sonoma and Napa valleys enclose these agricultural areas with urban pockets.

LANDMARKS AND GATEWAYS

Certain features of the Bay Area stand out as symbols and points of orientation (see Figure 3.5-2). These landmarks include the Golden Gate and Bay Bridges, Alcatraz and Angel Islands, San Francisco skyline, several large buildings in the East Bay hills (the Campanile on the University of California, Berkeley, campus; the Claremont Hotel; and the Mormon Temple in Oakland, for example), and Mount Saint Helena at the northern end of the Napa Valley. These landmarks help visitors and residents locate themselves within the region and, in the case of the Golden Gate Bridge, symbolize the Bay Area for the rest of the world.

WATERWAYS

The Bay Area is home to a number of bodies of water and waterways that flow through or are located in the region. Estuaries, creeks, and built waterways are found throughout the region, as well as the dominant body of water, the San Francisco Bay, which reaches out to the northern and southernmost counties of the Bay Area. Most rivers and streams originating in each of the nine counties of the Bay Area flow into the San Francisco Bay, which provides access to the Pacific Ocean. There are also many smaller built reservoirs in the Bay Area that provide notable landscape features, as well as a few larger reservoirs, notably Lake Berryessa in Napa County and Lake Sonoma in Sonoma County.



Source: MTC and ABAG 2021: Figure 3.2-1.

Figure 3.5-2 Major Bay Area Scenic Resources

3.5-6

Bay Area Air Quality Management District
 Proposed Amendments to Rules 9-4 and 9-6 Draft EIR

VIEWS FROM TRAVEL CORRIDORS

Many roadways and rail lines that intersect the landscapes of the Bay Area provide expansive, regional views of surrounding areas, often because of their wide rights-of-way, location along high points, the elevation of the facilities, or a combination of these factors. Examples include Interstate (I-) 280 along the peninsula, State Route (SR) 92 as it crosses the Coastal Ranges, I-80 near Rodeo, I-580 over the Altamont Pass and above Oakland, and the SR 24 corridor. Similarly, the rest area on I-80 above Vallejo, the west end of the Caldecott Tunnel, southbound US 101 in Marin County, and portions of US 101 in San Francisco offer dramatic views of notable Bay Area landscapes. The bridges crossing San Francisco Bay and the Carquinez Strait offer similar experiences. Both the Bay and Golden Gate Bridges provide world-famous views of San Francisco, whereas the Richmond-San Rafael Bridge provides sweeping views of the North Bay, including Mount Tamalpais and Angel Island. The Antioch Bridge allows views over the Sacramento–San Joaquin Delta.

Similarly, rail facilities (including Bay Area Rapid Transit [BART]) can provide travelers with broad views of the region or portions of it. The elevated BART lines through the East Bay, for example, provide views of the East Bay hills and the neighborhoods of Oakland, Berkeley, and El Cerrito. The Amtrak rail lines along San Pablo Bay and the San Joaquin River also provide broad views of the water with the hills beyond.

Roads and rail lines also provide more intimate views of forested hills or narrow valleys. SR 35 (along the crest of the San Mateo Peninsula) and SR 84 (through the narrows of Niles Canyon) are examples of such views. Similarly, SR 1 and Sir Francis Drake Boulevard run through the forests and grasslands of Marin County to the beaches, parks, and open space areas along the coast, up to and through Sonoma County. SR 29 and the Silverado Trail through the Napa Valley and SR 12 through the Sonoma Valley provide dramatic views of enclosing hills, adjoining vineyards, and wineries.

Finally, although carrying only a small proportion of the region's travelers, the Bay ferries provide unique viewing experiences of the Bay Area.

3.5.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Assessment of impacts to aesthetics and visual resources is based on an objective evaluation of the Project's potential effects on the visual environment. This includes consistency with local ordinances and policies adopted for visual integrity of the community, impacts on viewsheds and scenic areas identified as important or valuable to the community, and changes in visual character of the area as compared to existing conditions.

THRESHOLDS OF SIGNIFICANCE

According to State CEQA Guidelines Appendix G, an aesthetic impact would be significant if implementation of the Project would:

- ▶ have a substantial adverse effect on a scenic vista;
- ▶ substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- ▶ in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage points); in urbanized areas, conflict with applicable zoning and other regulations governing scenic quality; or
- ▶ create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ISSUES NOT DISCUSSED FURTHER

All issues related to aesthetics listed under the significance criteria above are addressed in this section.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.5-1: Substantial Adverse Effects on a Scenic Vista

The proposed Project—specifically proposed Rule 9-4, which imposes NO_x limitations on residential and commercial central furnaces—could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Even the largest of these units would not likely be large enough to substantially adversely affect a scenic vista, especially given that the outdoor units would be mounted on or next to structures that would be much larger and more noticeable than the equipment. For these reasons, the Project would result in a less-than-significant impact related to scenic vistas.

Effects on scenic vistas associated with the proposed Project would relate to changes to views of important landscape features, such as the Golden Gate Bridge, or landforms, such as mountains. The potential to affect scenic vistas is related to the specific vantage point of a viewer and the types of development that currently exist. Important public views are typically protected based on locally adopted land use policies and/or regulations.

The proposed rule amendments would not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Therefore, no new or expanded buildings that could have substantial adverse effects on a scenic vista would be constructed as a result of the proposed rule amendments.

The proposed Project—specifically proposed Rule 9-4, which imposes NO_x limitations on residential and commercial central furnaces—could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Manufacturers may develop zero-NO_x natural gas-fired furnaces in the future, but there is currently no evidence to indicate that these appliances would be installed outdoors such that they could have potential visual impacts. Thus, the potential aesthetic impacts of installation of zero-NO_x space heating appliances focuses on installation of electric heat pump units.

The proposed Rule 9-6 amendments would require installation of zero-NO_x water heaters. Currently available zero NO_x electric heat pump water heaters appear visually similar to existing natural gas-fired water heaters and are installed within the same footprint of the existing appliances (typically in interior utility closets). Manufacturers may develop zero-NO_x natural gas-fired water heaters in the future, but there is currently no evidence to indicate that these appliances would be installed outdoors such that they could have potential visual impacts. Installation of zero-NO_x water heaters would not be expected to have any new visual impacts and this section focuses on potential impacts of amendments to Rule 9-4.

Electric heat pump units that replace furnaces are typically installed at ground level or on the exterior wall of a residential building. For larger, multifamily buildings or commercial applications, or in dense environments where there is no exterior space available at ground level, they may be installed on the roofs of buildings. Figures 3.5-3a through 3.5-3c shows a variety of heat pump units in different locations. The replacement of this equipment may involve a permitting process through a local agency, which could include visibility considerations, but there may be cases for which no permit would be required. In those cases, there would be no mechanism for a local agency to impose code or policy requirements related to visual resource protection.

Many of the furnace replacements would involve structures that currently have existing heating ventilation and air conditioning (HVAC) equipment or other exterior mechanical equipment, such that the addition or replacement of an outdoor unit would not result in any noticeable change. However, as indicated above, replacement of furnaces that are currently housed entirely within an existing structure (not uncommon in the Bay Area) with a heat pump unit would place some mechanical equipment on the exterior of the building—typically on the side or roofs of buildings, but in some cases may include smaller window units outside of individual, multi-family residential units.



Figure 3.5-3a Representative Photographs of Heat Pump Units at Ground Level Next to a Building



Figure 3.5-3b Representative Photographs of Heat Pump Units on the Side of Multi-Family Buildings

3.5-10



Figure 3.5-3c Representative Photographs of Heat Pump Units on Building Rooftops

In terms of scenic vistas, to substantially affect these resources, the exterior equipment would need to be large enough to obstruct views of the vistas or otherwise substantially alter the vista. Typical large outdoor units are under four feet in height and vary in width, depending on the style of unit, but most are under four feet in width. Most outdoor units, especially for single-family or small-to-medium-sized residential structures, would be smaller. Large buildings may have multiple outdoor units or clusters of units, typically mounted on rooftops. Ground-mounted units typically occur on the sides of structures where they are usually not conspicuously visible. Roof-mounted units are generally not visible from ground-level public viewing areas, but may be visible if the public viewing area is at or above the height of the structure's roof. In these cases, the existing structure itself would obstruct a given scenic vista far more than any additional piece(s) of equipment. For these reasons, a substantial adverse effect to a scenic vista is not considered to be a reasonably foreseeable outcome of the implementation of the proposed Project, and the impact would be less than significant.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.5-2: Substantially Damage Scenic Resources, Including, but not Limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway

Proposed amendments to Rule 9-4, which impose NO_x limitations on residential and commercial central furnaces, could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Implementation of this rule change would not affect trees, rock outcroppings, or other natural scenic resources. Although furnace replacement in existing historic buildings may include exterior heat pumps where no pumps currently exist, any such equipment to be placed on the exterior of historic structures is typically regulated by local municipalities. Even if such regulations did not apply, HVAC and air conditioning units are commonplace on historic structures, and the addition of this equipment to the exterior of a historic structure would not be considered "substantial damage" to the historic building itself or to a scenic resource as viewed from a State Scenic Highway. The Project would therefore result in a less-than-significant impact.

The proposed rule amendments would not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Therefore, no new or expanded buildings that could substantially damage scenic resources would be constructed as a result of the proposed rule amendments.

Proposed amendments to Rule 9-4, which impose NO_x limitations on residential and commercial central furnaces, could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Although it is possible that these units might be visible from one of the Bay Area's State Scenic Highways (see Figure 3.5-1), they would be associated with an existing or new structure and would not result in damage to trees, rock outcroppings, or other natural scenic resources. It is possible that units would be added to historic buildings visible from a State Scenic Highway; however, local agencies typically have strict requirements for alteration to the exterior of historic structures, including installation of equipment. Any installation of outdoor heat pump units on historic buildings would typically be subject to these requirements. Even if this equipment was added to a historic building where such requirements did not apply, it would not alter the visual character of the resource such that "substantial damage" would occur to the historic building itself or to a scenic resource as viewed from a State Scenic Highway. Historic buildings with HVAC and air conditioning units are extremely commonplace and still look like historic buildings. Further, it is likely that the new heat pump units would replace equipment already located on the exterior of historic buildings and/or would be co-located with other exterior utility equipment and, as such, would not materially alter the historic character of such buildings. Therefore, the addition of outdoor heat pump units to the exterior of a building, although potentially visible, would not result in substantial damage to a historic building itself or to a scenic resource seen from a State Scenic Highway, and the Project would result in a less-than-significant impact.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.5-3: Substantially Degrade the Existing Visual Character or Quality of Public Views Sites in Rural Areas, or Conflict with Applicable Zoning or Other Regulations Governing Scenic Quality in Urban Areas

In rural areas, replacement of furnaces that would place exterior equipment on existing buildings where no such equipment currently exists would not substantially degrade the visual character of the site because, by definition, an existing building would already exist in these circumstances, and addition of a small piece of external equipment on an existing building would not change the visual character of the site or adversely affect public views. In urbanized areas, exterior equipment is commonplace and the addition of outdoor heat pump units as a result of the Project would not likely conflict with any existing zoning or other regulations governing scenic quality. If such regulations exist, the entity replacing the equipment would be required to comply. For these reasons, the Project would not substantially degrade the existing visual character or quality of public views of the Bay Area or conflict with applicable zoning or other regulations governing scenic quality, and this impact would be less than significant.

Land within the Bay Area consists of a wide range of visual character types. Terrain ranges from flat valley floors, to sloping hillsides, to mountains. The Bay Area includes the Pacific Coast, the San Francisco Bay and Delta, as well as numerous lakes, reservoirs, rivers, and tributaries. The level of urban development within these areas highly influences the existing visual character. For example, an urbanized coastal community, such as Pacifica, has a much different character than the rural Sonoma coast. The urbanized valley land of San Jose has an entirely different visual character than the rural valley land of Gilroy.

The Environmental Checklist included as Appendix G of the State CEQA Guidelines identifies a two-part question that is used as the threshold of significance of this impact analysis: (1) in non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage points); (2) in urbanized areas, would the project conflict with applicable zoning and other regulations governing scenic quality. Because the proposed Project applies to the nine-county Bar Area region, both of these questions apply.

The proposed rule amendments would not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. Therefore, no new or expanded buildings that could substantially degrade the existing visual character or quality of public views Sites in rural areas, or conflict with applicable zoning or other regulations governing scenic quality in urban areas would be constructed as a result of the proposed rule amendments.

Similar to Impacts 3.5-1 and 3.5-2, above, this impact discussion focuses on proposed Rule 9-4, which imposes NO_x limitations on residential and commercial central furnaces, and could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). These units are typically installed at ground level or on the exterior wall of a residential or commercial building but may also be installed on the building's roof (see Figures 3.5-3a through 3.5-3c).

In non-urbanized areas, there are fewer structures than in urbanized areas; however, there are structures. This is important because the only cases where the rule could change the exterior of a structure involve existing structures. Therefore, in non-urbanized areas, the only change to the visual character would involve changes to an existing structure. Because the existing structure is already part of the visual character of the affected site, the addition of an outdoor heat pump unit to that structure would not substantially alter the visual character of the site.

In urbanized areas, exterior equipment such as HVAC units and air conditioners (and heat pumps) are extremely commonplace. It is highly unlikely that the addition of an outdoor heat pump unit would conflict with any zoning or other regulations governing visual quality. In cases where such codes and policies exist, the entity replacing the unit would be required to comply with any applicable restrictions or other regulations. Therefore, the proposed rule

amendments would not conflict with applicable zoning or other regulations governing scenic quality in urban areas. Implementation of the Project would result in a less-than-significant impact.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.5-4: Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area

Outdoor heat pump units do not include bright lights and are not made of reflective materials (i.e., polished metal or mirrored glass). The proposed rule amendments would not require new lighting fixtures. Therefore, the Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. No impact would occur.

The proposed amendments could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). These units are typically installed at ground level or on the exterior wall of a residential or commercial building but may also be installed on the building's roof. Outdoor heat pump units do not include bright lights and are not made of reflective materials (i.e., polished metal or mirrored glass). The proposed rule amendments would not require new lighting fixtures. Therefore, the Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. No impact would occur.

Mitigation Measures

No mitigation is required for this impact.

CUMULATIVE IMPACTS

As described under Impacts 3.4-1 through 3.4-4, the Project would not result in substantial adverse effects related to aesthetics. Therefore, the Project would not result in a considerable contribution to a significant cumulative impact related to aesthetics. This cumulative impact would be less than significant.

4 ALTERNATIVES

4.1 INTRODUCTION

The California Code of Regulations (CCR) Section 15126.6(a) (State CEQA Guidelines) requires EIRs to describe "... a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a range of potentially feasible alternatives that will avoid or substantially lessen the significant adverse impacts of a project and foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason." This section of the State CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. Subsection (b) further states the purpose of the alternatives analysis is as follows:

Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code [PRC] Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The State CEQA Guidelines require that the EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (CCR Section 15126.6[d]).

The State CEQA Guidelines further require that the "no project" alternative be considered (CCR Section 15126.6[e]). The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving a proposed project with the impacts of not approving the proposed project. If the no project alternative is the environmentally superior alternative, CEQA requires that the EIR "...shall also identify an environmentally superior alternative among the other alternatives." (CCR Section 15126[e][2]).

In defining "feasibility" (e.g., "... feasibly attain most of the basic objectives of the project ..."), CCR Section 15126.6(f) (1) states, in part:

Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

In determining what alternatives should be considered in the EIR, it is important to consider the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by the lead agency's decision-making body, here the BAAQMD Board of Directors. (See PRC Sections 21081.5, 21081[a] [3].)

4.2 CONSIDERATIONS FOR SELECTION OF ALTERNATIVES

4.2.1 Attainment of Project Objectives

As described above, one factor that must be considered in selection of alternatives is the ability of a specific alternative to attain most of the basic objectives of the project (CCR Section 15126.6[a]). Chapter 2, “Project Description,” articulated the Project’s purpose and objectives, which are repeated below.

The overall purpose of the proposed amendments is to reduce nitrogen oxide (NO_x) emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Specifically, the objectives of the proposed amendments to Rules 9-4 and 9-6 are to:

- ▶ for Rule 9-4, introduce an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024;
- ▶ for Rule 9-4, establish a zero-NO_x standard in 2029;
- ▶ for Rule 9-6, establish a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size;
- ▶ expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances;
- ▶ update and clarify the certification and calculation methods contained in the rules;
- ▶ ensure equitable implementation of the rules; and
- ▶ improve the clarity and enforceability of the rules.

4.2.2 Environmental Impacts of the Project

Sections 3.1 through 3.5 of this Draft EIR address the environmental impacts of implementation of the proposed amendments to Rules 9-4 and 9-6. Potentially feasible alternatives were developed with consideration of avoiding or lessening the significant, and potentially significant, adverse impacts of the project, as identified in Chapter 3 of this Draft EIR and summarized below. If an environmental issue area analyzed in this Draft EIR is not addressed below, it is because no significant impacts were identified for that issue area. In summary, the Project would result in the following significant impacts:

UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

- ▶ Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact (significant and unavoidable)

NOISE

- ▶ Impact 3.4-1: Potential to Generate Long-Term Operational Noise (significant and unavoidable)

4.3 ALTERNATIVES CONSIDERED BUT NOT EVALUATED FURTHER

As described above, State CEQA Guidelines Section 15126.6(c) provides that the range of potential alternatives for the project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. Alternatives that fail to meet the fundamental project purpose need not be addressed in detail in an EIR. (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1165-1167.)

In determining what alternatives should be considered in the EIR, it is important to acknowledge the objectives of the project, the project’s significant effects, and unique project considerations. These factors are crucial to the

development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of “potentially feasible” alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by lead agency decision-maker(s). (See PRC Section 21081(a)(3).) At the time of action on the project, the decision-maker(s) may consider evidence beyond that found in this EIR in addressing such determinations. The decision-maker(s), for example, may conclude that a particular alternative is infeasible (i.e., undesirable) from a policy standpoint, and may reject an alternative on that basis provided that the decision-maker(s) adopts a finding, supported by substantial evidence, to that effect, and provided that such a finding reflects a reasonable balancing of the relevant economic, environmental, social, and other considerations supported by substantial evidence. (*City of Del Mar v. City of San Diego* (1982) 133 Cal.App.3d 401, 417; *California Native Plant Society v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 998.)

The EIR should also identify any alternatives that were considered by the lead agency but were rejected during the planning or scoping process and briefly explain the reasons underlying the lead agency’s determination.

The following alternatives were considered by the BAAQMD but are not evaluated further in this Draft EIR.

4.3.1 Non-Zero Requirements

A potential alternative to the proposed rule amendments would be to implement a non-zero NO_x emissions limit for the applicable appliances that is substantially lower than the current limit (and lower than the interim ultra-low NO_x emissions limit that is part of the Project for space heating appliances). This approach is being considered as an alternative compliance method by the South Coast Air Quality Management District (SCAQMD) in their 2022 Air Quality Management Plan (SCAQMD 2022) and discussion of potential amendments to rules that cover similar appliances installed in the South Coast air basin. A non-zero NO_x emissions limit would potentially result in fewer conversions of gas-powered appliances to electric-powered appliances, and, therefore, the impacts to the electric grid and potential impacts associated with power generation and distribution and operational noise associated with the Project could be less. However, the extent of this difference is not known because many consumers may still choose to meet a non-zero requirement with an electric appliance. Additionally, the proposed rule amendments do not require electric appliances to be used; in the future, a zero NO_x natural gas appliance could be developed and would be compliant with the proposed requirements. The costs and impacts of developing lower NO_x, but non-zero, requirements are not currently known and cannot be accurately estimated within the scope of this analysis. Finally, the goals of the BAAQMD, aligned with those of the California Air Resources Board (CARB), to reduce emissions of NO_x and fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}) “using all mechanisms available” (CARB 2022) to improve ambient air quality and protect public health would not be met by the implementation of a non-zero standard when there is technology available to achieve the proposed standard. For these reasons, this alternative is not evaluated further in this Draft EIR.

Similarly, another potential alternative would be to only implement the ultra-low NO_x emissions limit for space heating appliances and forgo the zero NO_x emissions limits proposed for space and water heating appliances. This approach would align the BAAQMD standards with those currently in place in the SCAQMD as well as the San Joaquin Valley Air Pollution Control District (SJVAPCD), and likely greatly reduce the potential impacts to the electric grid of the proposed Project and the potential operational noise impacts. However, this alternative would also not achieve all feasible NO_x reductions or use “all mechanisms available,” in line with CARB’s and BAAQMD’s goals. Further, in October 2022, the Environmental Protection Agency required the SJVAPCD to evaluate the feasibility of a zero-NO_x appliance requirement in order to fulfill their requirements under the State Implementation Plan for attaining the PM_{2.5} National Ambient Air Quality Standards. For this reason, this alternative is not evaluated further in this Draft EIR.

4.3.2 Additional Planning Measures

In response to the notice of preparation (see Appendix A), the San Francisco Bay Area Planning and Urban Research Association (SPUR) recommended that the EIR include an alternative in which the BAAQMD takes an active role in

encouraging decentralized solar (and possibly storage). Should the proposed rule amendments be adopted, the BAAQMD is planning on convening an implementation working group that would allow stakeholder input into measures that the BAAQMD and other agencies can take to assist in implementation of the proposed rule amendments, including those mentioned by SPUR. However, planning measures such as these are not strictly under the purview of the BAAQMD, nor are they sources that are typically regulated through a BAAQMD rulemaking process. For these reasons, this alternative is not evaluated further in this Draft EIR.

4.3.3 No Change to Rule 9-4

Proposed revisions to Rule 9-4 requires zero NO_x space heating systems. As discussed in this Draft EIR, these proposed changes could result in significant noise impacts associated with installation of exterior equipment (i.e., heat pumps) where existing gas-burning space heating systems do not include exterior equipment. Alternatives were considered to reduce these impacts. Because any enhancement to the NO_x reduction associated with Rule 9-4 would likely lead to some level of electrification of space heating systems, eliminating the changes to Rule 9-4 would be the only alternative that would effectively minimize potential noise impacts. However, eliminating any changes to this Rule would not meet most of the project's primary objectives. For this reason, this alternative is not evaluated further in this Draft EIR.

4.4 ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

The following alternatives are evaluated in this Draft EIR.

- ▶ Alternative 1: No Project Alternative assumes no actions would be taken by the BAAQMD and the proposed rule amendments would not be adopted. The BAAQMD's existing Rules 9-4 and 9-6, which already establish NO_x emissions standards for natural gas-fired space- and water-heating appliances, would remain in effect without any changes.
- ▶ Alternative 2: Earlier Compliance Date would establish a zero-NO_x standard with a compliance date of January 1, 2026, which is approximately three years earlier than the compliance date for the Project (phased in between 2027 and 2031). Except for the earlier compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.
- ▶ Alternative 3: Later Compliance Date would establish a zero-NO_x standard with a compliance date of January 1, 2035, which is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). Except for the later compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.

Further details on these alternatives, and an evaluation of environmental effects relative to the Project, are provided below.

4.4.1 Alternative 1: No Project Alternative

Under Alternative 1, the No Project Alternative, no actions would be taken by the BAAQMD and the proposed rule amendments would not be adopted. The BAAQMD's existing Rules 9-4 and 9-6, which already establish NO_x emissions standards for natural gas-fired space- and water-heating appliances, would remain in effect without any changes. For a description of these current rules, see Section 2.4, "Background," in Chapter 2, "Project Description." Compared to existing conditions, the No Project Alternative would not reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area beyond what is required under the existing rules. Further, the No Project Alternative would not meet the project objectives. For example, the No Project Alternative would not establish a zero-NO_x standard; expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances; update and clarify the certification and calculation methods contained in the rules; or improve the clarity and enforceability of the rules. However, as required by CEQA, the No Project Alternative is evaluated in this Draft EIR.

Although it is acknowledged that with the No Project Alternative, there would be no discretionary action by the BAAQMD and, thus, no impact, for purposes of comparison with the other action alternatives, conclusions for each technical area are characterized as “impacts” that are greater, similar, or less, to describe conditions that are worse than, similar to, or better than those of the Project.

AIR QUALITY

Without implementation of the proposed rule amendments, the beneficial impacts resulting from the proposed rule amendments would not occur. This would include no reduction of NO_x emissions beyond what is required under the existing rules. There would be no further reductions in criteria air pollutants that would provide public health benefits, achieve federal and State ambient air quality standards (AAQS), and meet the goals of the State Implementation Plan (SIP). Additionally, the No-Project Alternative would not further decrease greenhouse gas (GHG) emissions in support of CARB’s climate targets.

NO_x emissions are a key criteria pollutant as a precursor to ozone and secondary PM formation. Secondary PM is formed from the conversion of NO_x to ammonium nitrate through atmospheric chemical reactions with ammonia. PM, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for PM_{2.5} under the State AAQS. Exposure to PM_{2.5}, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NO_x compounds in the atmosphere contribute to the formation of secondary PM, any NO_x emission reduction would also result in reduction of the formation of secondary PM_{2.5} reductions. In addition, the Bay Area is currently in non-attainment for ozone, a regional pollutant, under Federal and State AAQS. Emissions of ROG and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. Therefore, reductions in emissions of NO_x are needed throughout the region to decrease ozone levels and particulate matter levels. Reductions of NO_x expected from the proposed rule amendments can be seen in Table 3.1-4 in Section 3.1, “Air Quality.” Because the No Project Alternative would not result in reduction of the existing significant impacts related to air quality, the No Project Alternative would have greater air quality impacts compared with the Project. (*Greater*)

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Without implementation of the proposed rule amendments, the potential beneficial impacts resulting from the proposed rule amendments would not occur. This would include no likely reduction of GHG emissions. The No-Project Alternative would not support the achievement of GHG reduction goals that have been set by CARB. Because the No Project Alternative would not result in reduction of existing environmental impacts related to GHG emissions and climate change, the No Project Alternative would have greater GHG impacts compared with the Project. (*Greater*)

UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

Under the No Project Alternative, there would be no changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. The No Project Alternative would not influence the existing or projected demands for electricity in the Bay Area and, thus, would not contribute to the need for construction of additional electricity production or additional electrical grid capacity, which would likely result in significant impacts to the environment. Therefore, no impacts related to the construction of new or expanded facilities for electricity production or distribution would occur under the No Project Alternative, and the No Project Alternative would avoid a project-related considerable contribution to a significant cumulative impact. (*Less*)

NOISE

Under the No Project Alternative, there would be no changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. Therefore, the No Project Alternative would not result

in installation of new heat pump units and would not generate long-term operational noise. No impacts related to long-term operational noise would occur under the No Project Alternative, and the No Project Alternative would avoid a project-related considerable contribution to a significant cumulative impact. (*Less*)

AESTHETICS

Under the No Project Alternative, there would be no changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. Therefore, the No Project Alternative would not result in installation of new heat pump units and would not adversely affect scenic vistas, damage scenic resources, degrade the existing visual character or quality public views, conflict with applicable zoning and other regulations governing scenic quality, or create a new source of substantial light or glare. No impacts related to aesthetics would occur under the No Project Alternative. (*Slightly Less*)

4.4.2 Alternative 2: Earlier Compliance Date

As described in Chapter 2, "Project Description," the Project would establish a zero-NO_x standard with a compliance date in 2029 for Rule 9-4 and compliance dates ranging from 2027 to 2031 based on equipment type, use, and size for Rule 9-6.

There are currently appliances available on the market that meet the zero-NO_x requirements included in the proposed rule amendments. As such, Alternative 2 would require compliance with the zero-NO_x standard at an earlier date compared with the Project. This alternative would establish a zero-NO_x standard with a compliance date of January 1, 2026 for all appliances covered by the proposed zero-NO_x requirements in Rules 9-4 and 9-6. That is approximately three years earlier than the compliance date for the Project (2029). Table 4-1 shows the anticipated electric grid capacity and required upgrades for Alternative 2 assuming a compliance date of January 1, 2026.

Table 4-1 Anticipated Electric Grid Capacity and Required Upgrades for Alternative 2: Earlier Compliance Date Compared with the Project

Grid Impact Category	Impact Relative to Low Policy Reference	Impact Relative to High Policy Reference
Utility-scale solar to serve electric loads	2,240 MW new solar by 2050	120 MW new solar by 2050 + accelerated build in 2030s & 2040s
4-hour battery storage for generation capacity	700 MW new batteries by 2050	< 10 MW new batteries by 2050 + accelerated build in 2030s & 2040s
Transmission Capacity	460 MW impact by 2050	< 10 MW impact by 2050 + accelerated build in 2030s & 2040s
Distribution Capacity	440 MW impact by 2050	< 10 MW impact by 2050 + accelerated build in 2030s & 2040s

Notes: MW = megawatt.

Source: Data provided by BAAQMD in 2022.

As described in Section 3.3, "Utilities and Service Systems," the E3 study (see Appendix C) evaluates potential electric grid impacts based on two reference scenarios: a Low Policy Reference, which represents a business-as-usual future in which California does not meet its 2030 or 2045 GHG emissions targets, and a High Policy Reference, which assumes major state policy changes to decarbonize all sectors of the state's economy aligned with achieving the state's GHG emissions targets.

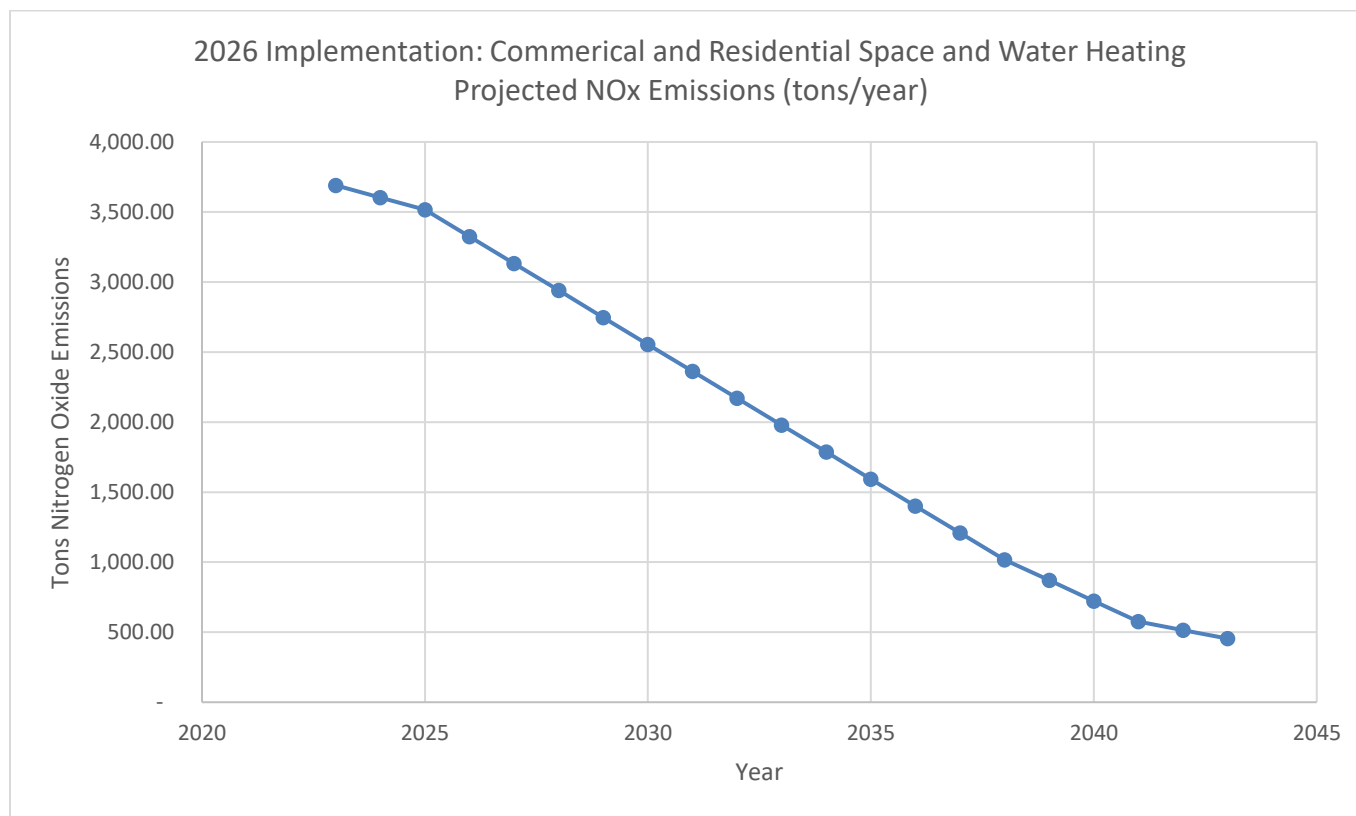
Under the Low Policy Reference scenario, heat pump adoption would occur consistent with the 2022 Draft Scoping Plan Business-as-Usual Reference Scenario. As such, this scenario assumes existing and currently planned levels of incentives for heat pumps and no major policy changes supporting building electrification would occur. As a result, this scenario assumes relatively low heat pump adoption through 2045. Under the Low Policy Reference, Alternative 2 would result in the demand for 2,240 megawatt (MW) of new solar, 700 MW of new batteries, 460 MW of new

transmission capacity, and 440 MW of new distribution capacity by 2050. Compared to the Project, Alternative 2 would require a slightly larger amount of new solar, new batteries, and distribution capacity, and the same amount of new transmission capacity (see Table 3.3-3 in Section 3.3, "Utilities and Service Systems").

Under the High Policy Reference, heat pump adoption would be consistent with the 2022 Draft Scoping Plan Proposed Scenario and state-level policies would drive a fast pace of heat pump adoption. Under the High Policy Reference, Alternative 2 would result in the demand for 120 MW of new solar, less than 10 MW of new batteries, less than 10 MW of new transmission capacity, and less than 10 MW of new distribution capacity by 2050. Compared to the Project, Alternative 2 would require a larger amount of new solar and transmission capacity and the same amount of new batteries and distribution capacity (see Table 3.3-3 in Section 3.3, "Utilities and Service Systems").

Given the high priority of the state to decarbonize, the High Policy Reference scenario may be more likely to occur than the Low Policy Reference scenario; however, consistent with the approach of the analysis in Section 3.3, "Utilities and Service Systems," because the Low Policy Reference scenario assumes Alternative 2 would result in a higher level of electricity demand, it serves as a more conservative scenario for evaluating potential impacts to the environment under CEQA. For this reason, the Low Policy Reference scenario will be the focus of the analysis that follows.

Figure 4-1 shows the projected NO_x emissions over time based on the assumptions described above for Alternative 2. The 2018 BAAQMD emissions inventory provides the baseline for this projection.



Source: Provided by BAAQMD in 2022.

Figure 4-1 Projected NO_x Emissions under Alternative 2: Earlier Compliance Date

Table 4-2 presents values for projected yearly emissions and for projected reductions compared with the baseline emissions inventory for selected years as represented by the graph in Figure 4-1 for Alternative 2. It should be noted that 2018 is the baseline year for the projected NO_x emissions; however, BAAQMD staff anticipates that reductions would not occur until the ultra-low NO_x standard is in place in 2024 because the BAAQMD has assumed that voluntary uptake rates would be minimal.

Table 4-2 Projected NO_x Emissions from Alternative 2: Earlier Compliance Date

Year	Projected Yearly NO _x Emissions (tons/year)	Projected NO _x Reduction vs. Baseline (tons/year)
2018*	3,690	—
2025	3,516	174
2030	2,555	1,135
2035	1,594	2,097
2040	722	2,968
2043	454	3,236

* 2018 is the baseline year for emissions inventory.

Source: Data provided by BAAQMD in 2022.

Alternative 2 would achieve an 88-percent reduction of NO_x emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2043; comparatively, the Project would not achieve the same 88-percent reduction until 2046, three years later than could be achieved under Alternative 2 (see Table 2-1 in Chapter 2, "Project Description"). While electric heat pump technology is available to meet the earlier compliance dates in Alternative 2, this technology is currently more expensive to install and can be in short supply. The later compliance dates in the proposed Project provide time for additional technology development (including potential natural gas-fired zero NO_x technology) and expected decreases in cost and increases in supply of electric heat pump technology.

Implementation of Alternative 2 would achieve most of the project objectives except those related to specific compliance dates that allow for equitable implementation of the amendments. Additionally, this alternative would reduce more total NO_x and GHG emissions because the reductions would occur earlier (compared to the Project). The earlier implementation of Alternative 2 results in an estimated 4,299 tons more of overall avoided NO_x emissions than the proposed Project and up to 11.02 MT CO₂e more GHG emissions reductions than the proposed Project for the years 2024 to 2052.

Table 4-3 shows the total NO_x and GHG emissions reductions for the proposed Project and Alternative 2 during this period.

Table 4-3 Cumulative Emissions Reductions from Proposed Project and Alternative 2, 2024-2052

Scenario	Total NO _x Emissions Reductions, 2024-2052 (tons)	Total GHG Emissions Reductions, 2024-2052 (MT CO ₂ e)
Proposed Project	60,161	83.42
Alternative 2	64,461	94.43

Notes: GHG = greenhouse gases; MT CO₂e = MTCO₂e = metric tons of carbon dioxide equivalent; NO_x = nitrogen oxide.

Source: Data provided by BAAQMD in 2022.

AIR QUALITY

Similar to the Project, Alternative 2 would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. This would be achieved through the replacement of these appliances with ultra low-NO_x furnaces in 2024 and then zero NO_x natural gas appliances or electric appliances beginning in 2026. Operation of zero-NO_x natural gas appliances would inherently result in a reduction in NO_x emissions within the San Francisco Bay Area Air Basin (SFBAAB). Moreover, the potential turnover to electric appliances would eliminate emissions of criteria air pollutants from on-site natural gas combustion and associated emissions from this activity. Alternative 2 would result in the same rate of reduction of the existing significant impacts related to air quality, but the reduction would occur earlier. The earlier reduction would result in greater total NO_x reductions and associated health benefits. Overall, Alternative 2 would result in similar impacts related to air quality compared to the Project. *(Similar)*

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Similar to the Project, Alternative 2 would result in a decrease in GHG emissions over the next 20 years. This decrease exceeds the net zero threshold of significance and would assist the state in meeting its long-term GHG reduction goals extending to 2045. Therefore, similar to the Project, Alternative 2 would not have a cumulatively considerable contribution to climate change. Alternative 2 would result in the same rate of potential reduction of existing environmental impacts related to GHG emissions and climate change, but the reduction would occur earlier. The earlier reduction would provide for greater total potential reductions in GHG emissions. Overall, Alternative 2 would result in similar impacts related to GHG emissions and climate change compared to the Project. (*Similar*)

UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

Similar to the Project, Alternative 2 would, over the long term, result in increased energy demand that would contribute to massive statewide energy demands as the state implements programs to decarbonize the state. As shown in Table 4-1, under the Low Policy Reference, Alternative 2 would result in the demand for 2,240 MW of new solar, 700 MW of new batteries, 460 MW of new transmission capacity, and 440 MW of new distribution capacity by 2050. Compared to the Project, Alternative 2 would require a larger amount of new solar, new batteries, and distribution capacity, and the same amount of new transmission capacity (see Table 3.3-3 in Section 3.3, "Utilities and Service Systems").

Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, Alternative 2 would result in greater impacts compared to the Project due to the larger amount of new solar, new batteries, and distribution capacity required for Alternative 2. (*Greater*)

NOISE

Similar to the Project, Alternative 2 could result in an increase in long-term operational noise related to the installation and operation of equipment such as heat pump units. The potential operational noise impacts associated with these units could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable. Therefore, Alternative 2 would result in similar impacts related to long-term operational noise compared to the Project. (*Similar*)

AESTHETICS

Similar to the Project, Alternative 2 could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Depending on the size and location of the building, these units can be installed at ground level, on the exterior wall of a building, or on a building's roof. Alternative 2 would result in similar, and less-than-significant, impacts related to effects on scenic vistas, damage to scenic resources, degradation of the existing visual character or quality public views, and conflicts with applicable zoning and other regulations governing scenic quality. Similar to the Project, Alternative 2 would not create a new source of substantial light or glare. Overall, Alternative 2 would result in similar impacts related to aesthetics compared to the Project. (*Similar*)

4.4.3 Alternative 3: Later Compliance Date

Alternative 3 would require compliance with the zero-NO_x standard at a later date compared with the Project. A later compliance date could have potential benefits related to consumer costs, technology development timelines, and electric infrastructure expansion and updates. Later compliance dates would allow for the market of zero-NO_x appliances to mature further, likely resulting in decreased consumer costs for appliance replacement. Based on current projections for State renewable energy development, a later compliance date would also result in removing the need for an accelerated build of electric resources to supply the project. This alternative would establish a zero-NO_x standard with a compliance date of January 1, 2035 for all appliances covered by the proposed zero-NO_x requirements in Rules 9-4 and 9-6. That is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031).

Table 4-4 shows the anticipated electric grid capacity and required upgrades for Alternative 3 assuming a compliance date of January 1, 2035.

Table 4-4 Anticipated Electric Grid Capacity and Required Upgrades for Alternative 3: Later Compliance Date

Grid Impact Category	Impact Relative to Low Policy Reference	Impact Relative to High Policy Reference
Utility-scale solar to serve electric loads	2,010 MW new solar by 2050	-60 MW new solar by 2050 (less need compared with the Project)
4-hour battery storage for generation capacity	650 MW new batteries by 2050	~0 new batteries by 2050 (less need compared with the Project)
Transmission Capacity	420 MW impact by 2050	~0 MW impact by 2050 (less need compared with the Project)
Distribution Capacity	390 MW impact by 2050	~0 MW impact by 2050 (less need compared with the Project)

Notes: MW = megawatt.

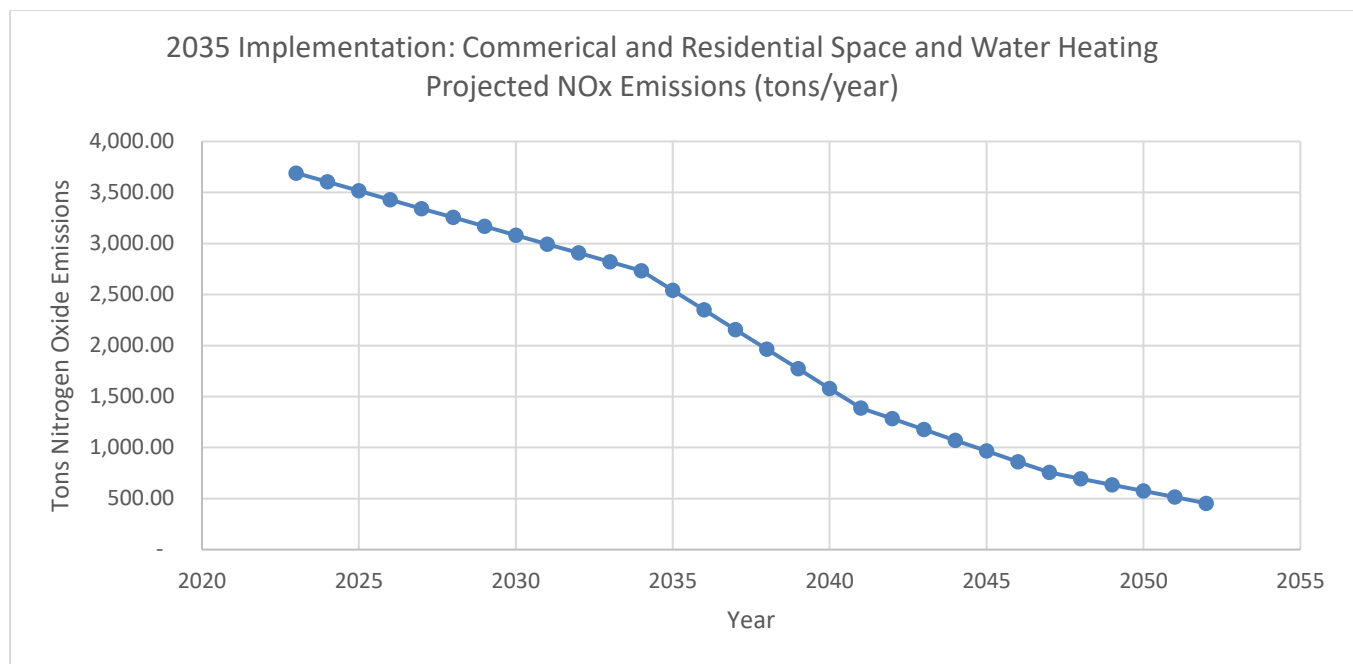
Source: Data provided by BAAQMD in 2022.

Under the Low Policy Reference scenario, heat pump adoption would occur consistent with the 2022 Draft Scoping Plan Business-as-Usual Reference Scenario. As such, this scenario assumes existing and currently planned levels of incentives for heat pumps and no major policy changes supporting building electrification would occur. As a result, this scenario assumes relatively low heat pump adoption through 2045. Under the Low Policy Reference, Alternative 3 would result in the demand for 2,010 MW of new solar, 650 MW of new batteries, 420 MW of new transmission capacity, and 390 MW of new distribution capacity by 2050. Compared to the Project, Alternative 3 would require a slightly smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity (see Table 3.3-3 in Section 3.3, “Utilities and Service Systems”).

Under the High Policy Reference, heat pump adoption would be consistent with the 2022 Draft Scoping Plan Proposed Scenario and state-level policies would drive a fast pace of heat pump adoption. Under the High Policy Reference, Alternative 3 would result in the demand for about 60 MW of new solar and no new batteries, new transmission capacity, or new distribution capacity by 2050. Compared to the Project, Alternative 3 would require a smaller amount of new solar, new batteries, new transmission capacity, and new distribution capacity (see Table 3.3-3 in Section 3.3, “Utilities and Service Systems”).

Given the high priority of the state to decarbonize, the High Policy Reference scenario may be more likely to occur than the Low Policy Reference scenario; however, consistent with the approach of the analysis in Section 3.3, “Utilities and Service Systems,” because the Low Policy Reference scenario assumes Alternative 3 would result in a higher level of electricity demand, it serves as a more conservative scenario for evaluating potential impacts to the environment under CEQA. For this reason, the Low Policy Reference scenario will be the focus of the analysis that follows.

Figure 4-2 shows the projected NO_x emissions over time based on the assumptions described above for Alternative 3. The 2018 BAAQMD emissions inventory provides the baseline for this projection.



Source: Provided by BAAQMD in 2022.

Figure 4-2 Projected NO_x Emissions under Alternative 3: Later Compliance Date

Table 4-5 presents values for projected yearly emissions and for projected reductions compared with the baseline emissions inventory for selected years as represented by the graph in Figure 4-2 for Alternative 3. It should be noted that 2018 is the baseline year for the projected NO_x emissions; however, BAAQMD staff anticipates that reductions would not occur until the proposed ultra-low NO_x standard for furnaces is in effect in 2024 because the BAAQMD has assumed that voluntary uptake rates would be minimal.

Table 4-5 Projected NO_x Emissions from Alternative 3: Later Compliance Date

Year	Projected Yearly NO _x Emissions (tons/year)	Projected NO _x Reduction vs. Baseline (tons/year)
2018*	3,690	—
2025	3,516	174
2030	3,081	609
2035	2,541	1,150
2040	1,580	2,111
2045	966	2,724
2050	574	3,116
2052	454	3,236

* 2018 is the baseline year for emissions inventory.

Source: Data provided by BAAQMD in 2022.

Alternative 3 would achieve an 88 percent reduction of NO_x emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2052; comparatively, the Project would achieve the same 88-percent reduction in 2046, six years earlier than could be achieved under Alternative 3 (see Table 2-1 in Chapter 2, "Project Description").

Alternative 3 is a feasible alternative to the Project. However, delayed implementation of the proposed rule amendments would result in delayed health benefits resulting from air quality improvements in the region and an overall increase in total NO_x emissions in the Bay Area versus the Project. The later implementation of Alternative 3

results in an estimated 10,722 tons of overall additional NO_x emissions, and up to 32.28 MT CO₂e additional GHG emissions that would not be emitted in the implementation schedule of the proposed Project.

Table 4-6 shows the total NO_x and GHG emissions reductions for the proposed Project and Alternative 2 during this period.

Table 4-6 Cumulative Emissions Reductions from Proposed Project and Alternative 3, 2024-2052

Scenario	Total NO _x Emissions Reductions, 2024-2052 (tons)	Total GHG Emissions Reductions, 2024-2052 (MT CO ₂ e)
Proposed Project	60,161	83.42
Alternative 3	49,439	51.14

Notes: GHG = greenhouse gases; MT CO₂e = MTCO₂e = metric tons of carbon dioxide equivalent; NO_x = nitrogen oxide.

Source: Data provided by BAAQMD in 2022.

Based on current projections for state renewable energy development, a later compliance date would also result in removing the need for an accelerated build of electric resources to supply the Project. While the Project would result in accelerated build of energy resources, it is important to note that the overall demand from appliances installed as a result of the proposed rule amendments is not expected to meaningfully change once fully implemented, regardless of the compliance date.

Implementation of Alternative 3 would achieve most of the project objectives except those related to specific compliance dates. Additionally, this alternative would reduce NO_x emissions but the reductions would begin to occur later and thus be lower overall (compared to the Project).

AIR QUALITY

Similar to the Project, Alternative 3 would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. This would be achieved through the replacement of these appliances with ultra-low and zero-NO_x natural gas appliances or electric appliances. Operation of zero-NO_x natural gas appliances would inherently result in a reduction in NO_x emissions within the SFBAAB. Moreover, the potential turnover to electric appliances would eliminate emissions of criteria air pollutants from on-site natural gas combustion and associated emissions from this activity. Alternative 3 would result in the same rate of reduction of the existing significant impacts related to air quality, but the reduction would occur later. Delaying these emissions reductions would result in greater total NO_x emissions and provide less health benefits than the Project. Overall, Alternative 3 would result in similar impacts related to air quality compared to the Project. (*Similar*)

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Similar to the Project, Alternative 3 would result in a decrease in GHG emissions over the next 29 years. This decrease exceeds the net zero threshold of significance and would assist the state in meeting its long-term GHG reduction goals extending to 2045. Therefore, similar to the Project, Alternative 3 would not have a cumulatively considerable contribution to climate change. Alternative 3 would result in the same rate of reduction of existing environmental impacts related to GHG emissions and climate change, but the reduction would occur later. Delaying the reduction would result in less overall GHG benefit than the Project because the total CO₂ emissions would be higher. Overall, Alternative 3 would result in similar impacts related to GHG emissions and climate change compared to the Project. (*Similar*)

UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

Similar to the Project, Alternative 3 would, over the long term, result in increased energy demand that would contribute to massive statewide energy demands as the state implements programs to decarbonize the state. As shown in Table 4-4, under the Low Policy Reference, Alternative 3 would result in the demand for 2,010 MW of new

solar, 650 MW of new batteries, 420 MW of new transmission capacity, and 390 MW of new distribution capacity by 2050. Compared to the Project, Alternative 3 would require a slightly smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity (see Table 3.3-3 in Section 3.3, "Utilities and Service Systems").

Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, Alternative 3 would result in slightly less impact compared to the Project due to the smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity required for Alternative 3; Alternative 3 would not avoid or substantially reduce a significant impact associated with the Project. (*Slightly Less*)

NOISE

Similar to the Project, Alternative 3 could result in an increase in long-term operational noise related to the installation and operation of heat pump units. The potential operational noise impacts associated with these units could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable. Therefore, Alternative 3 would result in similar impacts related to long-term operational noise compared to the Project. (*Similar*)

AESTHETICS

Similar to the Project, Alternative 3 could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Depending on the size and location of the building, these units can be installed at ground level, on the exterior wall of a building, or on a building's roof. Alternative 3 would result in similar, and less-than-significant, impacts related to effects on scenic vistas, damage to scenic resources, degradation of the existing visual character or quality public views, and conflicts with applicable zoning and other regulations governing scenic quality. Similar to the Project, Alternative 3 would not create a new source of substantial light or glare. Overall, Alternative 3 would result in similar impacts related to aesthetics compared to the Project. (*Similar*)

4.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 4-7 provides a summary comparison of the alternatives and the proposed Project.

Table 4-7 Summary of Environmental Effects of the Alternatives Relative to the Proposed Project

Environmental Topic	Proposed Project	Alternative 1: No Project Alternative	Alternative 2: Earlier Compliance Date	Alternative 3: Later Compliance Date
Air Quality	LTS (Beneficial)	Greater	Similar	Similar
Greenhouse Gas Emissions and Climate Change	LTS (Beneficial)	Greater	Similar	Similar
Utilities and Service Systems (Energy Resources)	SU	Less	Greater	Slightly Less
Noise	SU	Less	Similar	Similar
Aesthetics	LTS	Slightly Less	Similar	Similar

Notes: LTS = less than significant; SU = significant and unavoidable.

Source: Data compiled by Ascent Environmental in 2022.

As described above, the State CEQA Guidelines (Section 15126.6[a]) require EIRs to describe a range of reasonable alternatives to the project that would attain most of the project objectives but would “avoid or substantially lessen any of the *significant effects of the project*” (*emphasis added*). CEQA also requires identification of the environmentally superior alternative. In the case of a project that is designed to reduce existing significant environmental impacts, such as the proposed Project, determination of which alternative is environmentally superior is unique. On one hand, alternatives have been identified that would reduce significant impacts associated with the Project; on the other hand, the Project achieves higher levels of air quality and GHG reduction than the alternatives that lessen the Project’s significant impacts—and air quality and climate change are significant impacts under existing conditions. If we follow CEQA to the letter and view the alternatives only in terms of those that address the Project’s significant impacts, then we must grant that the No Project Alternative is the environmentally superior alternative because it avoids significant potential Project impacts associated with noise and also avoids the Project’s potential considerable contribution to significant impacts related to electrical infrastructure expansion (including renewable energy expansion). CEQA further specifies that if the environmentally superior alternative is the “no project” alternative, the EIR must identify an environmentally superior alternative among the other alternatives.

Alternative 2 would establish a zero-NO_x standard with a compliance date of January 1, 2026, which is approximately three years earlier than the compliance date for the Project (phased in between 2027 and 2031). Except for the compliance date, Alternative 2 would meet most of the project objectives. Further, Alternative 2 would achieve reductions in NO_x emissions three years earlier than could be achieved under the Project (2043 as compared with 2046) and lead to greater NO_x reductions over the long term due to the earlier implementation date. Alternative 2 would result in similar air quality, GHG, noise, and aesthetic impacts compared to the Project. However, this change in compliance date would ultimately result in greater impacts related to the construction of new or expanded grid capacity. Alternative 2 would also not reduce the Project’s significant noise impacts. Alternative 2’s greater impacts related to the construction of new or expanded grid capacity are sufficient to eliminate it from further consideration as the environmentally superior alternative.

Alternative 3 would establish a zero-NO_x standard with a compliance date of January 1, 2035, which is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). Except for the compliance date, Alternative 3 would meet most of the project objectives. Alternative 3, however, would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same rate of reduction (2052 as compared with 2046) and would achieve fewer NO_x reductions overall due to the later implementation date. Alternative 3 would result in similar air quality, GHG, noise, and aesthetic impacts compared to the Project. However, under Alternative 3, a significant and unavoidable impact of the Project could be slightly reduced (although not eliminated) because the compliance date would be delayed six years, thereby requiring a slightly smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity compared with the Project. Therefore, in accordance with CEQA, this Draft EIR concludes that because Alternative 3 would result in a slight reduction to the Project’s substantial contribution to a significant cumulative impact related to the construction of new or expanded grid capacity, Alternative 3 is considered the environmentally superior alternative.

However, it is important to note that if “environmentally superior alternative” were more simply defined as the alternative that is best for the overall environment, including beneficial effects, then the conclusion would likely be different. As described throughout this EIR, the Bay Area is currently designated as a non-attainment area under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) for particulate matter. In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under CAAQS and the National Ambient Air Quality Standards (NAAQS). This is an existing and significant air quality impact. The Project would address this significant air quality impact by reducing NO_x emissions in the Bay Area, thereby resulting in a less-than-significant (beneficial) impact to regional air quality (see Section 3.1, “Air Quality”). This reduction, as described above, would also occur with implementation of Alternative 3; however, Alternative 3, would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same reduction (2052 as compared with 2046) and would achieve fewer reductions overall. The Project would also likely result in a greater beneficial effect related to GHG and climate change because the reductions would occur sooner than later and be greater overall.

The Project achieves higher levels of NO_x and GHG reduction than Alternative 3 and addresses existing significant air quality impacts in the Air Basin. Weighing the Project's benefits to air quality and GHG against its significant impacts related to noise and utilities and considering that Alternative 3 does not achieve the same level of total NO_x or GHG reduction as the Project, it would be difficult to justify naming it environmentally superior to the Project. However, to be clear, based on CEQA's specific intent for the identification of alternatives to minimize or avoid a project's significant impacts, as discussed above, Alternative 3 is considered the environmentally superior alternative because it slightly reduces the Project's impact on utilities and service systems.

This page intentionally left blank.

5 OTHER CEQA SECTIONS

5.1 GROWTH INDUCEMENT

CEQA Section 21100(b)(5) specifies that the growth-inducing impacts of a project must be addressed in an EIR. Section 15126.2(d) of the State CEQA Guidelines provides the following guidance for assessing growth-inducing impacts of a project:

Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also, discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can induce growth directly, indirectly, or both. Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in any of the following:

- ▶ substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- ▶ substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; and/or
- ▶ removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

Growth inducement itself is not an environmental effect but may foreseeably lead to environmental effects. If substantial growth inducement occurs, it can result in secondary environmental effects, such as increased demand for housing, demand for other community and public services and infrastructure capacity, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, conversion of agricultural and open-space land to urban uses, and other effects.

5.1.1 Growth-Inducing Impacts of the Project

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new residential and commercial buildings. No new residential or commercial buildings would be constructed. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities.

It is expected that the existing labor pool in the Bay Area would accommodate the installation activities. . As such, implementing the proposed amendments to Rules 9-4 and 9-6 would not induce substantial population growth. Therefore, no impact would occur.

5.2 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

The State CEQA Guidelines Section 15126.2(b) requires EIRs to include a discussion of the significant environmental effects that cannot be avoided if the proposed project is implemented. As documented throughout Chapter 3 of this Draft EIR, most of the impacts associated with the Project would be less than significant. The following impacts are considered significant and unavoidable; that is, no feasible mitigation is available to reduce the impacts to a less-than-significant level.

5.2.1 Utilities and Service Systems (Energy Resources)

Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact

Assuming that heat pumps are used to replace existing natural gas-fired space and water heating appliances, the Project would, under the “worst case” Low Policy Reference Scenario evaluated by E3 (Appendix C), over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero-NO_x standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 megawatt (MW) of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts, under the “worst case” Low Policy Reference Scenario. For context, this represents 0.6 to 1.2 percent of the State’s total projected land needed for the State to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant, and may include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; construction-related air pollution, GHG emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario (described in Section 3.3 and the E3 study), the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.

As described in Section 3.3, “Utilities and Service Systems,” the location and type of these projects are currently speculative but based on current projections as presented in the E3 study, their associated environmental impacts would generally be located outside the Bay Area, and potentially outside California. The energy projects described would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the BAAQMD cannot identify feasible mitigation to reduce the Project’s contribution to these impacts and the impact remains potentially significant and unavoidable under the Low Policy Reference Scenario.

5.2.2 Noise

Impact 3.4-1: Potential to Generate Long-Term Operational Noise

The proposed amendments would include installation of stationary sources such as heat pump units, which would be installed inside and outside of existing buildings. The potential operational noise impacts associated with this equipment could be potentially significant depending on the existing ambient noise environment, noise levels

associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable, especially because the BAAQMD does not have jurisdiction to monitor or enforce any of these mitigation measures. Therefore, the Project would result in a substantial long-term operational noise impact, and this impact would be potentially significant.

As described in Section 3.4, "Noise," the installation of appliances that meet the proposed NO_x standards would occur throughout the nine-county Bay Area and operation of these appliances would generate noise. Mitigation measures, such as enclosures or screening, are likely available to minimize operational noise impacts to a less-than-significant level; however, it is likely that some would remain significant and unavoidable. The BAAQMD does not have land use authority to require these mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures. Therefore, the Project's contribution to these impacts and the impact remains potentially significant and unavoidable.

5.3 SIGNIFICANT AND IRREVERSIBLE ENVIRONMENTAL CHANGES

The State CEQA Guidelines requires a discussion of any significant irreversible environmental changes that would be caused by the project. Specifically, the State CEQA Guidelines section 15126.2(c) states:

Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generation to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The proposed amendments to Rules 9-4 and 9-6 would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area. These appliances would be installed at existing and new buildings in residential and commercial areas. The proposed rule amendments would also not result in foreseeable changes in equipment manufacturing that would require construction of new or expanded facilities. The overall goal of the Project is to reduce NO_x emissions. Therefore, the Project would not result in the irreversible and irretrievable commitment of energy and material resources.

As discussed in Section 3.3, "Utilities and Service Systems," the Project would, over the long term, result in increased energy demand that would contribute to massive statewide energy demands as the state implements programs to decarbonize the state. Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. These projects could result in the irreversible and irretrievable commitment of energy and material resources, including the following:

- ▶ construction materials, including such resources as soil, mineral resources, rocks, wood, concrete, glass, roof shingles, and steel;
- ▶ land area committed to new/expanded project facilities;
- ▶ water supply for project operation; and
- ▶ energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction and operation.

The potential impacts of these projects (including the use of nonrenewable resources) would be evaluated in separate, future EIRs by various lead agencies. The BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation.

This page intentionally left blank.

6 REPORT PREPARERS

Bay Area Air Quality Management District (Lead Agency)

Jennifer Elwell Senior Air Quality Engineer
Eric Lara Senior Air Quality Specialist
David Joe Rule Development Assistant Manager
Victor Douglas Rule Development Manager
Randi Wallach Assistant Counsel

Ascent Environmental, Inc. (CEQA Compliance)

Honey Walters Principal/Contract Manager, Senior Air Quality/GHG Specialist
Mike Parker, AICP Principal
Sarah Henningsen Project Manager
Julia Wilson Air Quality/GHG Specialist
Kari Zajac Noise Specialist
Brian Perry Graphic Specialist
Corey Alling Graphic Specialist
Gayiety Lane Publishing Specialist
Michele Mattei Publishing Specialist

This page intentionally left blank.

7 REFERENCES

Executive Summary

No references were used in this chapter.

1 Introduction

Pacific Gas and Electric Company. 2021. Corporate Sustainability Report. Available: https://www.pgecorp.com/corp_responsibility/reports/2021/pf04_renewable_energy.html. Accessed February 2022.

PG&E. See Pacific Gas and Electric Company.

2 Project Description

BAAQMD. See Bay Area Air Quality Management District.

Bay Area Air Quality Management District. 2017 (April 19). *Spare the Air – Cool the Climate: Final 2017 Clean Air Plan*. Adopted April 19, 2017. Available: https://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed December 13, 2021.

———. 2021 (October). *Initial Study and Draft Negative Declaration: Proposed Amendments to Regulation 2, Rule 1 Permits: General Requirements, Proposed Amendments to Regulation 2, Rule 5 Permits: Review of Toxic Air Contaminants*. San Francisco, CA. Prepared by Environmental Audit, Placentia, CA.

California Air Resources Board. 2004 (May). *Report to the Legislature: Gas-Fired Power Plant NO_x Emission Controls and Related Environmental Impacts*. Stationary Source Division. Available: <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/reports/l2069.pdf>. Accessed December 13, 2021.

CARB. See California Air Resources Board.

E3. See Energy + Environmental Economics

Energy + Environmental Economics. 2019 (April). *Residential Building Electrification in California: Consumer Economics, Greenhouse Gases and Grid Impacts*. San Francisco, CA. Available: https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf. Accessed December 13, 2021.

3 Environmental Impacts and Mitigation Measures

No references were used in this section.

3.1 Air Quality

BAAQMD. See Bay Area Air Quality Management District.

Bay Area Air Quality Management District. 2017a. *Spare the Air – Cool the Climate: A Blueprint for Clear Air and Climate Protection in the Bay Area*. Available: https://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed October 3, 2022.

———. 2017b. CEQA Air Quality Guidelines. Available: https://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed October 3, 2022.

California Air Resources Board. 2004 (May). *Report to the Legislature: Gas-Fired Power Plant NO_x Emission Controls and Related Environmental Impacts*. Available: <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/reports/l2069.pdf>. Accessed October 2022.

———. 2013. *California Almanac of Emissions and Air Quality—2013 Edition*. Available: <http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm>. Accessed January 4, 2017.

- . 2016 (May 4). *Ambient Air Quality Standards*. Available: <https://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed January 4, 2017.
- CARB. See California Air Resources Board.
- E3. See Energy + Environmental Economics.
- Energy + Environmental Economics. 2019 (April). *Residential Building Electrification in California: Consumer Economics, Greenhouse Gases and Grid Impacts*. San Francisco, CA. Available: https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf. Accessed October 2022.
- EPA. See US Environmental Protection Agency.
- Pacific Gas and Electric Company. 2021. *Power Source Disclosure Report*. Available: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page?WT.mc_id=Vanity_cleanenergy. Accessed October 2022.
- PG&E. See Pacific Gas and Electric Company.
- US Environmental Protection Agency. 2016. Criteria Air Pollutants. Available: <https://www.epa.gov/criteria-air-pollutants#self>. Last updated October 19, 2016. Accessed June 2022.
- . 2022a. Criteria Air Pollutants homepage. Available: <https://www.epa.gov/criteria-air-pollutants>. Accessed October 3, 2022.
- . 2022b (September 30). *Nonattainment Areas for Criteria Pollutants (Green Book)*. Available: <https://www.epa.gov/green-book>. Accessed October 3, 2022.
- ### 3.2 Greenhouse Gas Emissions and Climate Change
- BAAQMD. See Bay Area Air Quality Management District.
- Bay Area Air Quality Management District. 2015. Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011. Available: https://www.baaqmd.gov/~media/Files/Planning%20and%20Research/Emission%20Inventory/BY2011_GHGSummary.ashx?la=en&la=en. Accessed September 30, 2022.
- . 2022 (April). *Justification Report: CEQA Thresholds for Evaluating the Significance from Land Use Project and Plans*. Available: <https://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa-thresholds-2022/justification-report-pdf.pdf?la=en>. Accessed September 2022.
- California Air Resources Board. 2016. *Facts about the Advanced Clean Cars Program*. Available: https://www.arb.ca.gov/msprog/zevprog/factsheets/advanced_clean_cars_eng.pdf. Accessed February 13, 2020.
- . 2017 (November). *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target*. Available: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed August 23, 2018.
- . 2022. *Draft 2022 Scoping Plan: Appendix D – Local Actions*. Available: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-d-local-actions_0.pdf. Accessed September 30, 2022.
- CalEPA et al. See California Environmental Protection Agency, California Natural Resources Agency, California Department of Food and Agriculture, California Air Resources Board, and California Strategic Growth Council.
- California Energy Commission. 2020. Pacific Gas & Electric 2019 Power Content Label. Available: <https://www.energy.ca.gov/filebrowser/download/3245>. Accessed September 30, 2022.
- . 2021. Pacific Gas & Electric 2020 Power Content Label. Available: <https://www.energy.ca.gov/filebrowser/download/3882>. Accessed September 30, 2022.

- California Natural Resources Agency. 2018 (January). *Safeguarding California Plan: 2018 Update*. Available: <http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf>. Accessed August 23, 2018.
- California Environmental Protection Agency, California Natural Resources Agency, California Department of Food and Agriculture, California Air Resources Board, and California Strategic Growth Council. 2019. *January 2019 Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*. Available: <https://ww2.arb.ca.gov/sites/default/files/2020-10/draft-nwl-ip-040419.pdf>. Accessed January 26, 2022.
- CARB. See California Air Resources Board.
- CEC. See California Energy Commission.
- CNRA. See California Natural Resources Agency.
- E3. See Energy + Environmental Economics.
- Energy + Environmental Economics. 2019 (April). *Residential Building Electrification in California: Consumer Economics, Greenhouse Gases and Grid Impacts*. San Francisco, CA. Available: https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf. Accessed October 2022.
- Gould, S., and K. Dervin. 2012. *Climate Action for Health: Integrating Public Health into Climate Action Planning*. California Department of Public Health.
- Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency. 2018 (August). *California's Fourth Climate Change Assessment*.
- Intergovernmental Panel on Climate Change. 2007. *AR4 Climate Change 2007: The Physical Science Basis*.
- . 2013. Chapter 6, Carbon and Other Biogeochemical Cycles. Pages 465–570 in *Climate Change 2013: The Physical Science Basis*. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed August 23, 2018.
- . 2021. Sixth Climate Assessment Summary for Policymakers. Available: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf. Accessed October 4, 2022.
- IPCC. See Intergovernmental Panel on Climate Change.
- McMichael, A. J., and E. Lindgren. 2011. Climate Change: Present and Future Risks to Health, and Necessary Responses. *Journal of Internal Medicine* 270(5):401–413.
- OPR, CEC, and CNRA. See Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency.
- Ostro, B., S. Rauch, and S. Green. 2011. Quantifying the Health Impacts of Future Changes in Temperature in California. *Environmental Research* 111(8):1258–1264. Available: <https://pubmed.ncbi.nlm.nih.gov/21975126/>. Accessed May 23, 2022.
- Pacific Gas and Electric Company. 2021. *Power Source Disclosure Report*. Available: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page?WT.mc_id=Vanity_cleanenergy. Accessed October 2022.
- PG&E. See Pacific Gas and Electric Company.
- Pierce, D. W., J. F. Kalansky, and D. R. Cayan. 2018. *Climate, Drought, and Sea Level Rise Scenarios for California's Fourth Climate Change Assessment*. California Energy Commission. Available: https://www.energy.ca.gov/sites/default/files/2019-11/Projections_CCCA4-CEC-2018-006_ADA.pdf. Accessed May 23, 2022.

Polade, S. D., A. Gershunov, D. R. Cayan, M. D. Dettinger, and D. W. Pierce. 2017. Precipitation in a Warming World: Assessing Projected Hydro-Climate Changes in California and Other Mediterranean Climate Regions. *Scientific Reports* 7, article number 10783. Available: <https://www.nature.com/articles/s41598-017-11285-y>. Accessed May 23, 2022.

US Global Change Research Program. 2016. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*.

3.3 Utilities and Service Systems (Energy Resources)

California Energy Commission. 2018. 2018 (March). 2019 Building Energy Efficiency Standards: Frequently Asked Questions. Available: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf. Accessed August 2022.

———. 2022. *Final 2021 Integrated Energy Policy Report* Volume 1 Building Decarbonization. Available: <https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report>. Accessed October 3, 2022.

California Public Utilities Commission. 2008. *California Energy Efficiency Strategic Plan*. Available: <https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/5305-ee-strategicplan.pdf>. Accessed October 3, 2022.

CEC. See California Energy Commission.

CPUC. See California Public Utilities Commission.

Metropolitan Transportation Commission and Association of Bay Area Governments. 2021 (June). *Plan Bay Area 2050 Draft Program Environmental Impact Report*. State Clearinghouse No. 2020090519. Available: <https://www.planbayarea.org/EIR>. Accessed January 2022.

MTC and ABAG. See Metropolitan Transportation Commission and Association of Bay Area Governments.

Nature Conservancy. n.d. *The Power of Place*, Executive Summary. Available: https://www.scienceforconservation.org/assets/downloads/Executive_Summary_Power_of_Place.pdf. Accessed September 29, 2022.

Pacific Gas and Electric Company. 2021. 2020 Power Content Label. Available: <https://www.energy.ca.gov/filebrowser/download/3882>. Accessed October 3, 2022.

PG&E. See Pacific Gas and Electric Company.

State of California Governor Office. 2012. Executive Order B-18-12. Available: <https://www.green.ca.gov/buildings/resources/executiveorder/>. Accessed October 3, 2022.

3.4 Noise

California Department of Transportation. 2013 (September). *Technical Noise Supplement*. California Department of Transportation Division of Environmental Analysis. Sacramento, CA. Prepared by ICF Jones & Stokes.

Caltrans. See California Department of Transportation.

Daikin Air Intelligence. 2021 (November). Base Efficiency Heat Pump Packaged Rooftop Unit DBH Commercial 7.5 - 12.5 Nominal Tons.

Governor's Office of Planning and Research. 2017 (October). *State of California General Plan Guidelines*. Sacramento, CA. Available: https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf. Accessed October 24, 2022.

Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment*. Washington, D.C. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed October 20, 2022.

FTA. See Federal Transit Administration.

Metropolitan Transportation Commission and Association of Bay Area Governments. 2021 (June). *Plan Bay Area 2050 Draft Program Environmental Impact Report*. State Clearinghouse No. 2020090519. Available: <https://www.planbayarea.org/EIR>. Accessed October 2022.

MTC and ABAG. See Metropolitan Transportation Commission and Association of Bay Area Governments.

OPR. See Governor's Office of Planning and Research.

3.5 Aesthetics

California Department of Transportation. n.d. Scenic Highways – Frequently Asked Questions. Available: <https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways/lap-liv-i-scenic-highways-faq2>. Accessed October 2022.

———. 2019. Scenic Highways. Available: <https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways>. Last updated August 2019. Accessed October 2022.

Caltrans. See California Department of Transportation.

Governor's Office of Planning and Research. 2017. *State of California General Plan Guidelines*.

Metropolitan Transportation Commission and Association of Bay Area Governments. 2021 (June). *Plan Bay Area 2050 Draft Program Environmental Impact Report*. State Clearinghouse No. 2020090519. Available: <https://www.planbayarea.org/EIR>. Accessed October 2022.

MTC and ABAG. See Metropolitan Transportation Commission and Association of Bay Area Governments.

OPR. See Governor's Office of Planning and Research.

4 Alternatives

California Air Resources Board. 2022 (August 12). *Proposed 2022 State Strategy for the State Implementation Plan*. Available: https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf. Accessed September 2022.

CARB. See California Air Resources Board.

South Coast Air Quality Management District. 2022 *Air Quality Management Plan, Policy Brief: Residential and Commercial Building Appliances*. Available: <http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-residential-and-commercial-buildings-appliance.pdf?sfvrsn=8>. Accessed September 2022.

SCAQMD. See South Coast Air Quality Management District.

5 Other CEQA Sections

No references were used in this chapter.

This page intentionally left blank.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX H

Response to Comments: Proposed Amendments to Regulation 9, Rule 4 and Rule 6

This page has been intentionally left blank.

Response to Comments: Proposed Amendments to Regulation 9, Rule 4 and Rule 6

Table of Contents

Response to Comments: Proposed Amendments to Regulation 9, Rule 4 and Rule 6	3
Introduction:.....	6
i. Draft Environmental Impact Report Comments:.....	6
ii. Summary of Comments in Support of the Proposal:	6
General Support	6
Master Responses to Comments Received Critical of the Proposal and Supporting Documentation	9
Cost and Cost-Effectiveness.....	9
1) Cost: Cost vs. Benefits	9
2) Cost: Air Conditioning	9
3) Cost: Market change.....	10
4) Cost: Beyond Panel	10
5) Cost: Existing Spaces.....	10
6) Cost: Renters.....	11
7) Cost: General	11
8) Cost: Utility Costs.....	13
9) Cost: Funding	14
10) Cost: Landlord.....	15
11) Cost: Equity.....	16
12) Cost: Housing.....	17
13) Cost-Effectiveness: General.....	18
14) Cost-Effectiveness: Emissions reductions.....	18
Emissions	19
15) Emissions: GHG Co-Benefits	19
16) Emissions: Necessity, Health	20
17) Emissions: Peer Review	21
Existing Spaces.....	22
18) Existing Spaces: Permits/Setbacks.....	22
19) Existing Spaces: General	22
20) Existing Spaces: Exemptions	23

General Opposition.....	24
21) Fifth Amendment: Takings Clause	24
22) General Opposition: Emergency Situations	24
23) General Opposition: Exemptions	25
24) General Opposition: Necessity, Health	25
25) General Opposition: Electricity generation	26
26) General Opposition: Propane	27
27) General Opposition: Stove Study.....	27
28) General Opposition: CARB	27
29) General Opposition: Regional Regulation.....	28
30) General Opposition: Authority	28
31) General Opposition: Grandfathering	29
32) General Opposition: Safety.....	29
Grid Capacity	29
33) Grid Capacity: Insufficient Capacity	30
34) Grid Capacity: Air Conditioning.....	31
35) Grid Capacity: Reliability.....	31
36) Grid Capacity: Statewide Planning.....	32
Heat Pumps	33
37) Heat Pump: Noise	33
38) Heat Pump: Availability/Delay	34
39) Heat Pump: Reliability	34
40) Heat Pump: Efficiency.....	34
41) Heat Pump: Cold Weather Operation.....	35
42) Heat Pump: Operation	36
43) Heat Pump: Commercial	36
Natural Gas	37
44) Natural Gas: Ban	37
45) Natural Gas: Continued Operation	37
Panel Upgrades.....	38
46) Panel Upgrades: Need	38
47) Panel Upgrades: Time	39
48) Panel Upgrades: Cost.....	40

Public Education	40
49) Public Education: Compass	41
50) Public Education: Equity	41
Rule Language.....	42
51) Rule Language: Manufacture Date	42
52) Rule Language: Certification Calculation	42
53) Rule Language: Replacements	42
54) Rule Language: General	43
Suggestions.....	44
55) Suggestion: Funding.....	44
56) Suggestion: Enforcement.....	44
57) Suggestion: Equity	45
58) Suggestion: Advocacy	45
59) Suggestion: Zonal Electrification.....	45
Supply Chain and Timeline	46
60) Supply Chain: Appliances availability.....	46
61) Timeline: Permits/Setbacks	46
62) Timeline: Delay Implementation	47
Workforce.....	47
63) Workforce: Availability/Training.....	47
64) Workforce: Transition.....	48
Attachment 1: Organizations and Individuals Who Submitted Written Comments on the Proposed Amendments to Rule 9-4 and Rule 9-6.....	49
Attachment 2: Comments Received	81

Introduction:

The Bay Area Air Quality Management District (“BAAQMD” or the “Air District”) staff is proposing amendments to two Air District rules: Regulation 9, Rule 4: *Nitrogen Oxides from Fan Type Residential Central Furnaces* (“Rule 9-4”) and Regulation 9, Rule 6: *Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters* (“Rule 9-6”) to improve regional ambient air quality and health outcomes. Rule 9-4 currently applies to the natural gas-fired space-heating furnaces commonly found in single-family homes and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. These sources generate a substantial portion of nitrogen oxides (NOx) emissions from sources in the Bay Area.

Staff received letters from 565 commenters during the comment period that was open from December 20, 2022, until February 6, 2023. This document contains responses to comments received during this period. Attachment 1 to the Response to Comments lays out the master responses that are tied to comments contained within each letter, organized alphabetically by commenter. Copies of all comment letters received are included as Attachment 2 to this document.

i. Draft Environmental Impact Report Comments:

This document summarizes and responds to comments that were received on the proposed rule amendments. Responses to comments that specifically address the Draft Environmental Impact Report (EIR) are included in the Final EIR, which is also posted to the District’s website. Responses to comments on the Draft EIR received from public agencies must be responded to ten days in advance of a public hearing. The Air District received letters from the California Air Resources Board (CARB), Marin County, City of Berkeley et al., Pacific Gas and Electric, East Bay Community Energy, Silicon Valley Clean Energy commenting on the proposed rule amendments, however no public agencies provided comment on the Draft EIR.

ii. Summary of Comments in Support of the Proposal:

General Support

Comment: *Commenters support the regulatory proposal because natural gas is a major source of air pollution, which can lead to a variety of health issues such as asthma, heart disease, and cancer. By transitioning to clean energy sources, we can reduce the amount of harmful pollutants in the air and promote healthier communities. Additionally, the proposal is justified because it ensures that a comprehensive approach is being taken to reducing our dependence on fossil fuels and transitioning to clean energy. It also sends a clear signal to the market that we are committed to making this transition and can accelerate the development and deployment of clean energy alternatives. Some commenters expressed an urgent need for these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.*

Commenters: Community Choice Aggregators, Companies, Government, Organizations, Utility

350 Bay Area, Abalone Alliance, BayREN, Berkeley Electrification Working Group, California Air Resources Board, Climate Action CA et al, Climate Reality Project Silicon Valley, East Bay Community Energy, Harvest Thermal, Marin County, Pacific Gas and Electric, Physicians for Social Responsibility SF Bay, RMI et al, San Jose Community Energy Advocates, Sierra Club, Silicon Valley Clean Energy, SPUR,

Commenters: Members of the Public

Abbot Foote, Adam Buck, Adam Sweeney, Aditee Kumthekar, Adrienne Etherton, AJ Cho, Alan Chen, Alan Peevers, Alexander Pakter, Alexis Georgiou, Alfredo Angulo, Alice Polesky, Allan Campbell, Amanda Bancroft, Amanda Rosenberg, Amanda Zagara, Andrea Gara, Angela Evans, Angela Gantos, Angele Price, Anna Koster, Anna Shurter, Arlene Baxter, Ashesh Parekh, Aubrey Wilson, Audrey Ichinose, Barbara Hollenbach, Barbara Kyser, Barbara Sandow, Becca Ya, Belinda Chlouber, Ben Martin, Benjamin Bingaman, Benjamin Keller, Bhima Sheridan, Bianca Molgora, Blaine Burgdtrom, Brenda Wallace, Brendan Moriarty, Bret Andersen, Brittany Dhawan, Bruce Coston, Bruce England, Bruce J Burns, Bruce Naegel, Bruce Nilles, Caephren McKenna, Carla Davis, Carly Ritter, Carol Benioff, Carol Bettencourt, Carol Mone, Carol Savary, Carol Schaffer, Caroline Ayres, Caryn Graves, Catherine Cameron, Cecile Mochnek, Celeste Anacker, Charles Wieland, Cheryl Schaff, Cheryl Weiden, Chris Lish, Christina Nielsen, Christine Goldin, Christine Patel, Christopher Ware, Cindy Haag, Cindy Sidaris, Claire Broome, Claudia Hevel, Corwin Zechar, Craig Husfeld, Damon Brown, Dan Kalb, Dani Zacky, Danielle Mieler, Dave Clark, David Bezanson, David Boyer, David Fairley, David Gassman, David Kaskowitz, David Luu, David Romano, David Sowerwine, Deanna Knickerbocker, Debbie Mytels, Deborah Holcomb, Deborah St Julien, Deirdre Fennessy, Derrick Holt, Diane Bailey, Don Jackson, Don Meehan, Don Weiden, Donna Davies, Donna Sharee, Douglas Brookes, Du Ng, Dylan Ackerman, Edward Richardson, Edwin Aiken, Eihway Su, Eileen Adams, Eileen Lepera, Elena Engel, Elizabeth Gioumousis, Elizabeth Lee, Elizabeth Levy, Ellen Beans, Ellen Leng, Ellen Rosenblum, Emily Wheeler, Emma Hitzke, Eric Brettner, Erin Foret, Ernie Walters, Evan Jane Kriss, Felix Mbuga, Fiona Hyland, Flora Rosaa, Floy Andrews, Forest Frasier, Fred Bialy, Gabriel Quinto, Gary Farber, Gary Troutt, Genevieve Deppong, Gerard Manning, Giovannina Fazio, Gladwyn D'Souza, Gloria Linda Maldonado, Greg Ratkovsky, Greg Spooner, Gregory Bell, Hala Al-Shahwany, Hannah Quirk, Harriet Harvey-Horn, Harvest Thermal, Hilary Glann, Howard Cohen, Howdy Goudey, Igor Tregub, Ingrid Kallman, J Angell, J Barry Gurdin, J Herbert, J.W. Oman, James Wu, Jamie Nahman, Jan Rhoades, Janet Creech, Janet Odell, Jason Fish, Jean Jackman, Jeff Lindquist, Jeffery Hurwitz, Jeffery Mann, Jeffery Nigh, Jeffery Suplica, Jeffrey Perrone, Jeffrey Spencer, Jency James, Jennifer Graber, Jennifer Heggie, Jennifer Mazzon, Jennifer Thilman, Jennifer Thompson, Jennifer Valentine, Jenny Green, Jessie Hagler, Jiro Yamamoto, Joanna Smiley, Joe Smith, Joel Soloksky, John Anderson, John Becker, John De Forest, John McKenna, John Neal, John Oda, Jonathan Eden, Jordan Briskin, Joseph Lam, Josephine Coffey, Josh Dickinson, Joslyn Baxter, Judith Bushey, Judith Weisman, Julia Howlett, Julie Groves, Julie Kloper, Julie Lindow, Justin Evans, Kaela Plank, Karen Kirschling, Karl Peirce, Kat Snyder, Katherine Falk, Katherine Robinson, Kathy Battat, Kathy Dervin, Kathy Kerridge, Katie Rueff, Keith Rhinehart, Kevin Branstetter, Kevin Hearle, Kevin Ma, Kiana Chandruang, Kim Messmer, Kristel Rietesel, Kristel Wickham, Kristen Conner, Lacey Hicks, Laura Bernstein, Laura Dill, Lawrence Deng, Leana Rosetti, Leane Eberhart, Leonie Terfort, Lesley Hunt, Lesley Shultz, Leslie Smith, Lin Griffith, Linda Ramey, Linh Dan Do, Lisa Segnitz, Lori Kegler, Louise Chegwiddden, Luca Donisi, Lucy Weltner, Magi Amma, Manijeh Berenji, Marcia Pratt, Margaret Fowler, Marianna Riser, Marilyn Price, Marilyn Smith, Mark Grossman, Mark Hoffberg, Mark Hurst, Martha Goldin, Mary Ann Cramer, Mary Dateo, Mary Lou Meeks, Mary Noel, Matt Passell, Megan Micco, Melanie Cross, Meldan Heaslip, Melissa Vierra, Melissa Yu, Michael Closson, Michael Kutliek, Michael Mills,

Michael Wittig, Michele Hudson, Michelle Hudson, Michelle MacKenzie, Michelle Orengo-Mcfarlane, Michelle Peglau, Mignon Moskowitz, Mike Balma, Mira Chokshi, Mohan Sakhrani, Nancy Federspiel, Nancy Haber, Nancy Havassy, Nancy Schneider, Nanlouise Wolfe, Nicholas Cahill, Nicholas Ratto, Nicole Mo, Nikki Nafziger, Noah Armstrong, Noel Poddanchik, Nora Privitera, O Mandrussow, Pam Brigg McKown, Pamela Sieck, Pascal Bruyere, Pat Blackwell-Marchant, Pat Lang, Patricia Busk, Patricia Linder, Patrick Costello, Patrick McCully, Paul Malkin, Paul Meagher, Paul Perez, Paul Vesper, Paula Rochelle, Peter Belden, Peter Booth Lee, Philip Haves, Piper McNulty, Portland Coates, R D, Rachel Townsend, Rajan Narang, Raphael Hitzke, Rebecca Eliscu, Rebecca Young, Rich Waller, Richard Gallo, Richard Probst, Rick Edmondson, Robert Jardine, Robert Kahn, Robert Magarian, Robert Mayo, Robert Miller, Robert Raven, Robert Whitehair, Robert Zhou, Roberta Stern, Roman Capelli, Ross Simkover, Ryan Acebo, Sam Reed, Samantha Smith, Sandra Gamble, Sandra Slater, Sara Syer, Sara Theiss, Sarah Gao, Sarah Harper, Sarah Hubbard, Saran K, Scott Barlow, Scott Grinthal, Scott Nelson, Sheila Barbato, Sheila Tarbet, Sherman Lewis, Sherrill Futrell, Shirley Lutzky, Stan Fitzgerald, Steffen Rochel, Stephanie Bloom, Stephanie Nunez, Stephanie Reader, Stephanie Shindler, Stephen Rosenblum, Steve Mann, Steve Pease, Steve Shuput, Steven Mazliach, Steven Schlansker, Steven Schramm, Sue Blockstein, Summer Rogers, Susan Abby, Susan Chamberlain, Susan Green, Susan Nakashima, Susan Trivisonno, Susanna Marshland, Susannah Saunders, Sven Thesen, Sylvia De Baca, Tamara Alexa, Teresa Cheng, Terry and Martin Horwitz, Terry Nagel, Thalia Lubin, Thomas Carlino, Thomas Graly, Todd Synder, Tom Kabat, Toph Kerpan Evans, Travis Ramsey, Trish Mulvey, Tristia Bauman, Urmila Padmanabhan, Vansi Vallabhaneni, Vasu Murti, Victor Kamendrowsky, Victoria Armigo, Vince Augusta, Virginia Leslie, Wei-Tai Kwok, Wendy Chou, Yael Kisel, Yassen Roussev, Yves Decargouet, Zoe Jonick

Response: Air District staff acknowledges and appreciates the comments in support of the amendments as proposed. However, the proposed amendments are not a natural gas ban. Should a natural gas appliance demonstrate that it meets the standard(s), it would be allowed under the proposed amendments. As discussed in the Staff Report at Section IV.A., zero-NOx natural gas burners have been developed for use in certain industrial contexts but have not yet been designed for residential or commercial space and water heating.

Master Responses to Comments Received Critical of the Proposal and Supporting Documentation

Cost and Cost-Effectiveness

1) Cost: Cost vs. Benefits

Comment: *Commenters express concerns about cost-effectiveness in comparison to health benefits associated with rulemaking.*

Donald Duggan, Eric Frick

Response: The Air District is required to estimate and report the cost-effectiveness of proposed regulations in terms of the cost of compliance relative to the amount of the target pollutant reduced (the ratio of the annualized cost of the proposal to the annual amount of emissions reduction expected due to the proposal). Given that technology currently available in the market that can meet the zero-NOx standard is electric-powered, this cost-effectiveness estimate assumes that gas-to-electric conversions will occur. The cost-effectiveness values presented in the Staff Report were calculated on a household basis – the potential cost associated with installing compliant equipment per ton of NOx reduced by each individual appliance.

Additionally, information on potential health benefits and valuation of the proposed amendments were included in the Staff Report to allow a more informed decision by the Board of Directors and a better understanding by the public. See also Master Response 17 (Emissions: Peer Review). The Air District undertook this modeling exercise to provide context for the Board of Directors and the public to consider. The California Health and Safety Code does not require that estimated health benefits meet a particular threshold or value. The justification and need for the proposed amendments are detailed throughout the Staff Report.

The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. Staff strongly believes that the significant improvements to regional air quality and public health benefits of the Project outweigh the potential associated costs.

2) Cost: Air Conditioning

Comment: *Commenter questions evaluating cost savings associated with air conditioning if not used in certain parts of the Bay Area.*

Donald Duggan

Response: Air District staff recognizes that not all homes have air conditioning and the cost savings associated with air conditioning provided by high-efficiency heat pumps will not be realized

by those households. However, air conditioning uptake has increased in recent years, a trend that is expected to continue due to increases in summertime temperatures related to climate change, and air conditioning is already widespread in the outer, warmer Bay Area counties.

3) Cost: Market change

Comment: *Comment regarding uncertainty about how costs will change as market develops.*

Andrew Pollack, Craig Taylor, Eric Frick, Pearl Karrer

Response: Appliances that will be allowed under the zero-NOx emissions standards as laid out in the proposed amendments to each rule, such as heat pump water heaters and heat pump space conditioning systems, are currently widely available on the market. An evaluation of these models and those expected to come to the market soon are included in the Staff Report. Should both sets of proposed amendments be adopted, efforts of the planned implementation working group would include continued tracking of market availability of compliant appliances as well as how their cost is changing over time. These factors will be included in interim reports to the Board of Directors two years prior to the compliance dates provided in the proposed amendments.

4) Cost: Beyond Panel

Comment: *Additional costs associated with upgrades including construction costs, wall patching, and other ancillary costs.*

AHRI, Cynthia Cima-Ivy, Eric Frick, Steve Smith, Western Propane Gas Association

Response: Staff acknowledges that there may be situations in which additional work will be needed to accommodate compliant appliances over the average costs presented in the Staff Report and the socio-economic analysis, which is included as Appendix C to the Staff Report. Staff will endeavor to capture and evaluate these average costs throughout the implementation and interim reporting process, should the proposed amendments be adopted. It should be noted however, that these costs will vary greatly on a case-by-case basis.

5) Cost: Existing Spaces

Comment: *Retrofit costs associated with putting heat pumps in existing spaces that aren't originally designed for heat pumps (amount of space, air supply, wiring changes and related concerns).*

AHRI, Anthony Rondoni, Brian Johnson, Eric Frick, Gary Stevens, Jim Robbins, Steve Smith

Response: Staff appreciates comments and concerns raised about potential difficulties of installations in specific situations. Please see Master Response 19 (Existing Spaces: General) for a discussion of potential solutions to and considerations for installation of compliant appliances in existing spaces. Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided.

Staff acknowledges that there may be situations in which additional work will be needed to accommodate compliant appliances which may lead to higher average costs than those presented in the Staff Report and the socio-economic analysis, which is included as Appendix C to the Staff Report. The costs estimated in these reports do not include relocating building walls and other related concerns, as these costs are not expected to be borne by the majority of property owners due to the expected pace of advancement in zero-NOx technology. In addition, programs such as the High Efficiency Electric Home Rebate Program under the Inflation Reduction Act include funding for general electrical wiring changes. Air District staff sees the proposed rule amendment as providing a clear signal for the development of these funding sources at the federal, state and local levels, and alternative solutions should continue to grow in the years between potential adoption and the compliance dates in the proposed rule amendments.

Consolidation of this information and facilitating access to funding programs, knowledgeable contractors and educational materials will also be included in the Air District's work during the implementation period of the proposed rule amendments. The implementation working group will track accessibility factors, including cost, and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

6) Cost: Renters

Comment: *Concerns expressed about potential upgrades, costs from landlords being passed down to renters, rento-victions.*

Adams Broadwell Joseph and Cardozo, Andrew Pollack, Michal Atz Brenzel

Response: Staff appreciates concerns regarding potential indirect impacts of the proposed rule amendments on renters. Staff expects that since landlords are typically responsible for appliance purchases/replacements, the proposed rule amendments are expected to have a larger direct impact on landlords and building owners rather than renters in terms of capital expenses. However, staff recognizes that these costs could be passed down to renters through increases to rental rates and that there are past examples and concerns about landlords using remodels, retrofits, and/or delays as excuses to make rentals uninhabitable in order to discourage long-standing tenants who are paying rent-controlled prices from staying. Within the Bay Area, renter protections vary by city, thus whether or not costs can be passed through to renters through higher rents, and the degree to which this is legal, will vary. Concerns associated with equity issues for renters will continue to be tracked through the implementation working group and interim reporting process.

7) Cost: General

Comment: *Commenters expressed general concerns about high costs of compliance and stated that costs of compliance would be higher than those included in the Air District's analysis. Some commenters included cost estimates based on previous installations, contractor quotes, or published data sets of completed installations, with some comments indicating total project costs up to \$80,000 for a heat pump HVAC and water heater replacement and associated upgrades.*

AHRI, Ashley Kline, Barry Robbins, Bradford White Corporation, Charles Getz, Chibby Alloway, Cynthia Cima-Ivy, D Pickham, David Luce, Diane Perrone, Duncan Moody, Families and Homes

San Jose, Izmirian Roofing and Sheet Metal, Jason Biggs, Jeff Calcagno, Jeremy Wright, Jo Ann Mandinach, John Accinelli, Joseph Machado, Julia Wall, Kelly Porter, Mark Reifkind, Melodie Lew, Michael DeMoss, Michal Atz Brenzel, Nancy Green, Nancy Westreich, Ned Kuypers, Pat Marriott, Paul Frantz, Pedram Navid, Peter Jon Shuler, Regan Avery, Renee Alloy, Richard Hallsted, Rick Vujovich, Rob SS, Susan Ferrone, Victor Buathier, Western Propane Gas Association, William Williams

Response: Staff appreciates the concerns expressed by commenters regarding potential costs of compliance with the proposed rule amendments. The socioeconomic analysis, included as Appendix D to the Staff Report, evaluates potential costs to consumers as well as business and job impacts and costs to utilities. Included in this response to comments document are additional discussions of cost with regards to specific areas of concerns including costs impacting renters, landlords, housing, panel upgrades, other potential retrofit expenses, heat pump equipment, market changes, utility rates, labor, funding mechanisms and others.

Many commenters stated that costs for space heating and water heating equipment installation would be higher than the cost estimates used in the Air District's analysis, and presented cost estimates based on past project experiences, vendor/contractor quotes, or other reported data. The Air District has reviewed the comments and information submitted and maintains that the costs presented in the socioeconomic report and throughout the proposal package reflect staff's best estimate of average costs associated with the proposed rule amendments. As described in the socioeconomic report, staff reviewed and considered cost data from multiple studies and published reports, reflecting cost data collected from thousands of projects. While there are multiple potential sources of data and methodologies that may be employed when developing cost estimates, the Air District has expended considerable effort and followed a thorough process to solicit, gather, and assess information on potential compliance costs throughout the rule development process. The cost data considered and the average cost estimates used in the analysis reflect the most robust and substantiated data collected during the preparation of the socioeconomic report. While staff recognizes that costs for specific projects can vary widely and acknowledge that there are specific situations in which costs will be higher or lower than those average costs presented, the average cost estimates provide a representative and informative basis for evaluating cost impacts and socioeconomic impacts of the proposed amendments.

The Air District also acknowledges that additional cost data have been presented by commenters, and additional data continue to be generated as projects continue to be undertaken and completed. Staff has reviewed the cost data submitted during the public comment period. Air District staff understands that costs submitted to the TECH program will continue to be collected and analyzed, and staff looks forward to reviewing future report(s) on this data when released as part of its work with the implementation working group. Nevertheless, staff remains confident that the Air District's analysis includes a robust consideration of relevant cost data.

Note that cost estimates presented throughout documentation associated with the proposed rule amendments are in 2019 and 2018 year dollars, and do not account for potential cost changes since that time due to recent inflation or other factors. This could be another reason why staff's costs estimates are generally lower than those presented during the comment period. Staff notes that between 2019 and 2022, the national construction cost index increased 7.9%¹. Staff expects that equipment and construction costs associated with the proposed amendments will

¹ Engineering News Record 20 City Construction Cost Index. Annual averages 2019-2022. Accessed February 2023.

continue to change over time, with equipment costs expected to decrease. It is speculative to extend the short-term trends of 2019-2022 out to the compliance dates which begin in 2027. Changes to associated costs and of the proposed amendments will be evaluated over time through the implementation working group if the proposed rule amendments are adopted. Staff does not believe it is appropriate to inflate the 2018-2019 cost data to current dollars due to uncertainty related the representativeness and applicability of recent inflation trends, particularly given the long-term compliance timelines under the proposed amendments.

The Air District acknowledges that new cost data will continue to become available as projects continue to be undertaken and completed, equipment technology and markets continue to evolve, and further studies are conducted. The Air District looks forward to exploring and assessing these further developments through the implementation working group. In addition, the proposed rule amendments include a commitment from staff to provide an interim report to the Board of Directors discussing accessibility factors, of which consumer cost of compliance is central.

8) Cost: Utility Costs

Comment: *Comments regarding potentially increased costs associated with electricity rates vs. natural gas rates, especially considering upkeep of stranded gas assets.*

Adams Broadwell Joseph and Cardozo, AHRI, Anthony Rondoni, Catherine Su, Chibby Alloway, Gary Stevens, Jan Stoeckenius, Jason Biggs, Katherine Hughes, Lynn Norris, Marin County, Mary Louise Donnici, Maureen Galindo, Nancy Green, Pacific Gas and Electric, Paul Frantz, Victor Buathier, Western Propane Gas Association

Response: For heat pump water heaters that are installed in response to the proposed amendments to Rule 9-6, the efficiency increase results in the expectation that residents, on average, will have less expensive utility bills. For heat pump space conditioning installed in the place of a furnace in response to the proposed amendments to Rule 9-4, it is expected that there will be an increase in utility bills associated with space heating. However, with a heat pump space conditioning system, air conditioning is automatically included and much more efficient than many existing air conditioning systems. Thus, Bay Area residents that don't currently have space cooling will have that added benefit. Overall space conditioning bills are expected to be lower for residents that currently use conventional air conditioning. Further information on potential utility rate savings is included in the socioeconomic report, which is included as Appendix D to the Staff Report. This report estimates an overall annual savings of nearly \$30 million in utility rate savings across the Bay Area. Staff acknowledges that savings for each specific installation and use case will vary, including among different climates within the Bay Area, pre-existence of air conditioning, equipment chosen and many other factors.

While the above recognizes potential changes to customer utility costs that could result from the proposed rule amendments, there are also concerns associated with rising natural gas rates for customers. In the scenario in which natural gas use decreases, the fixed costs associated with maintaining the natural gas infrastructure will not change. Therefore, it is expected that natural gas rates will increase in order to cover these costs over less customer usage. The Air District recognizes this risk and the potential costs to consumers. Pacific Gas and Electric as well as the California Public Utilities Commission (CPUC, which is responsible for setting utility rates in California) would be members of the implementation working group and staff expects these

entities to be involved in discussions on best practices to ensure rate equity in the implementation of the rule amendments.

The CPUC is actively working on these issues through their Long Term Gas Planning Rulemaking.² CPUC has defined affordability and continues to address it via a dedicated rulemaking, R.18-07-006. The metrics used in that proceeding include the Affordability Ratio, representing how much of a household's discretionary income is spent on utility service; the Socioeconomic Vulnerability Index, composed of metrics similar to some used in CalEnviroScreen; and Average Hours Worked at Minimum Wage.³

Air District staff understands that organizations including Pacific Gas and Electric, community choice aggregators, some local Bay Area jurisdictions and other advocacy groups are promoting whole-home electrification programs in order to alleviate the potential consumer cost burden associated with natural gas prices. Staff notes that electrification is not required by the proposed amendments. While not required by the rule amendments, staff understands the potential value in these programs and will support partner organizations as appropriate, including presenting relevant information in the interim report to the Board of Directors and assisting in public education initiatives on consumer costs and options.

9) Cost: Funding

Comment: Comments regarding perceived lack of adequate funding for replacements, concerns regarding upfront capital costs that are still incurred with funding programs, prioritizing low-income residents for funding mechanisms, facilitating ease of access for funding programs. One commenter provides a summary of programs and that funds are increasing, another commenter claims that they are decreasing and are not available to many Bay Area families. Additional comments providing the opinion that regulation is unnecessary and that the Air District should focus on incentive programs.

Annette Ross, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Brian Johnson, Families and Homes San Jose, LR Jensen, Mary Porter, Patricia M Daeley, Richard Staehne, Susan Ferrone, Western Propane Gas Association

Response: Staff appreciates the comments received regarding concerns associated with access to and adequacy of funding and incentive mechanisms that could assist in offsetting costs that could be associated with compliance with the proposed rule amendments. Staff additionally recognizes comments expressing a preference for the sole use of incentive and funding mechanisms to drive the transition to zero-NOx appliances in the Bay Area. However, staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies available on the market that would be allowed under the proposed amendments. The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected

² CPUC Long-Term Gas Planning Rulemaking. <https://www.cpuc.ca.gov/industries-and-topics/natural-gas/long-term-gas-planning-rulemaking>.

³ *Ibid.*

to prevent up to 85 premature deaths per year and save up to \$890 million per year in health impacts.

There are a variety of tax credits and rebate programs for heat pump water heaters and furnaces. Section VI.D of the Staff Report includes a table of programs that are currently and expected to be available to Bay Area residents over the next decade. It is expected that the variety and level of funding will increase between potential adoption of the proposed rule amendments and the proposed compliance dates. The programs also vary in structure including upfront funding, tax rebates and other reimbursement programs as well as zero-interest loan programs such as on-bill financing offered through utilities. Some examples of available programs include up to a \$2,000 federal tax credit for heat pumps and up to \$8,000 in rebates from a local community choice aggregator (Silicon Valley Clean Energy) for heat pump equipment and electric panel upgrades or rewiring. Additional federal rebate programs targeted to moderate and low-income customers were authorized in the Inflation Reduction Act and are expected to roll out in 2023.

The program requirements for each of the programs discussed above and in the Staff Report are different. While many programs are open to a variety of households regardless of income level or rental status, others are available only to low- and moderate-income households and/or owner-occupants of homes. Staff recognizes that this makes access to these funding sources complex and possibly overwhelming for consumers. Facilitating access to these programs has also been stated as a goal by members of the Board of Directors. Should the proposed rule amendments be adopted, the implementation working group that will be convened by staff will include access to funding mechanisms and related public education efforts as a priority and a focus of the interim report that is required by the proposed rule amendments. Members of the implementation working group include many entities that administer funding programs including Pacific Gas and Electric, community choice aggregators, BayREN, local governments, the California Energy Commission and the California Public Utilities commission. Through continued coordination with these groups, staff will work to facilitate access to these programs as deemed appropriate by the Board of Directors.

10) Cost: Landlord

Comment: *Commenter is concerned about costs to landlords for required upgrades, potential lawsuits or unpaid rent associated with not providing habitable conditions for renters. Overall cost of compliance may be too much for small residential landlords to bear.*

Lisa Taner, LR Jensen

Response: Staff agrees with the commenter that it is the responsibility of landlords to provide habitable conditions for their renters. As with many other upgrades, it is the responsibility of the landlord to provide appropriate upgrades to the space and water heating systems as required by the proposed rule amendments.

Low-income property owners are eligible to receive additional significant assistance from programs such as those administered by community choice aggregators and the Federal Government to support their appliance upgrade. Replacing appliances is typically the responsibility of a landlord/property owner and not the tenant. Air District staff intends to ensure through the implementation working group that program operators continue to work diligently

with these property owners to ensure that they benefit from the variety of financial assistance programs.

11) Cost: Equity

Comment: *Commenters raise cost concerns for low-income residents, including seniors on a fixed income. One commenter provided comments regarding a desire for inclusion of cost impacts in emissions equity analysis. Further, State law requires that these customers be offered the opportunity to arrange payment plans before they lose the ability to heat their home. Rules governing customers with serious medical conditions are stricter. The proposed zero-emission space heater rule amendments violate the intent of these laws and regulations.*

AHRI, Andrew Pollack, Bradford White Corporation, Charles Getz, Chibby Alloway, Jamie Beckett, Jason Biggs, Jeremy Wright, Jim Beatty, Judy Weatherly, Leif Ortegren, Linnea Wickstrom, Lisa Cohen, Lisa Taner, Marin County, Mary Porter, Maureen Galindo, Meg Minto, Melanie Bieder, Melodie Lew, Michael Kapolnek, Nancy Burke, Nate Sanchez, Pacific Gas and Electric, Paul Frantz, Peter Garrison, Peter Jon Shuler, Renee Alloy, Rita Fanfelle, Houlihan, Thom Reinsteinst, Western Propane Gas Association

Response: Staff appreciates and recognizes the comments concerning how the costs of compliance with the proposed amendments will impact low-income and fixed-income residents. Air District staff intends to ensure through the implementation working group that program operators continue to work diligently with these residents to ensure that they benefit from the variety of financial assistance programs, many of which are intended to assist low- and moderate-income residents specifically.

There are a variety of tax credits and rebate programs for heat pump water heaters and furnaces. Section VI.D of the Staff Report includes a table of programs that are currently and expected to be available to Bay Area residents over the next decade. It is expected that the variety and level of funding will increase between potential adoption of the proposed rule amendments and the proposed compliance dates. The programs also vary in structure including upfront funding, tax rebates and other reimbursement programs as well as zero-interest loan programs such as on-bill financing offered through utilities. Some examples of available programs include up to a \$2,000 federal tax credit for heat pumps and up to \$8,000 in rebates from a local community choice aggregator (Silicon Valley Clean Energy) for heat pump equipment and electric panel upgrades or rewiring. Additional federal rebate programs targeted to moderate and low-income customers were authorized in the Inflation Reduction Act and are expected to roll out in 2023.

The program requirements for each of the programs discussed above and in the Staff Report are different. While many programs are open to a variety of households regardless of income level or rental status, others are available only to low- and moderate-income households and/or owner-occupants of homes. Staff recognizes that this makes access to these funding sources complex and possibly overwhelming for consumers. Facilitating access to these programs has also been stated as a goal by members of the Board of Directors. Should the proposed rule amendments be adopted, the implementation working group that will be convened by staff will include access to funding mechanisms and related public education efforts as a priority and a focus of the interim report that is required by the proposed rule amendments. Members of the implementation working group would include many entities that administer funding programs including Pacific Gas and Electric, community choice aggregators, BayREN, local governments,

the California Energy Commission and the California Public Utilities commission. Through continued coordination with these groups, staff will work to facilitate access to these programs as deemed appropriate by the Board of Directors.

With regards to potential additional costs, quoted by commenters to be up to \$80,000 associated with panel upgrades, other electric upgrades and other associated renovation work, Air District staff expects that, in some instances, the electric panel for a building may be required to be upgraded in order to install technology that are allowed under the proposed rule amendments. This is not the case in many instances and new technologies are being released, such as 120V heat pump water heaters and space conditioning systems which will substantially reduce the number of upgrades required, along with other load sharing devices. Data shared by Home Energy Analytics and SPUR shows that only 15 percent of homes participating in an energy savings program used more than half of their panel's capacity. Please see Master Response 46 (Panel upgrades: Need) for further discussion of this topic.

The equity analysis included as Appendix F to the Staff Report analyzes the intensities and distributions of annual average exposures (modeled outdoor concentrations weighted by residential population) attributed to emissions targeted by the proposed rule amendments. This analysis was not intended to and does not claim to address any equity issues associated with cost. The socioeconomic report, included as Appendix D to the Staff Report breaks down anticipated cost of the proposed amendments, including evaluations for different income levels, renters vs. property owners and other categories.

12) Cost: Housing

Comment: *Commenters note the potential need for relocation or other housing costs associated with potential displacement during required upgrades, estimated up to \$10,953 for 3 months of temporary housing. Commenters are additionally concerned that the proposed amendments will raise the cost of housing in the Bay Area, while another commenter is concerned that the proposed amendments will lower home values.*

*Andrew Pollack, Charles Getz, Families and Homes San Jose, Maureen Kennedy,
Michael Kapolnek*

Response: Staff appreciates comments regarding potential additional costs associated with housing displacement. Please see Master Response 46 (Panel upgrades: Need) for a discussion of scenarios in which significant upgrade work can be avoided and Master Response 47 (Panel Upgrades: Time) for a discussion of concerns regarding potentially long wait times associated with electrical upgrades that are needed. Air District staff believes that displacement will not be required for the vast majority of installations of compliant appliances. That being said, staff acknowledges that the average cost values presented in the Staff Report and socioeconomic analysis do not represent the maximum costs that will be incurred by some residents.

Staff believes that the further market proliferation of low voltage units will alleviate significant pressure on emergency replacements or other scenarios in which commenters are concerned about housing displacement, where many replacements can be made in place with no additional electric work. In addition, community choice aggregators and water heater replacement contractors are considering a water heater loaner program that will enable a customer to have hot water while working on a panel upgrade, if one is needed. These policies are allowable

under the proposed rule amendments as long as the loaner appliance was manufactured prior to the relevant compliance date. In addition, please see Master Response 63 (Workforce: Availability/Training) for further discussion of the focus to be placed on workforce training and availability throughout the implementation process to facilitate timely upgrades when they are necessary.

Staff respectfully disagrees that the proposed rule amendments will result in a significant change, neither increase nor decrease in the cost of housing in the Bay Area. In new construction, installation of zero-NOx technologies is common practice and already required in many local jurisdictions within the Bay Area. The costs associated with compliant appliances are documented in the Staff Report and questions related to ongoing costs are addressed in Master Response 8 (Costs: Utility Costs).

13) Cost-Effectiveness: General

Comment: *Commenters state that the Air District should consider the cost-effectiveness of the proposed amendments. One commenter asserts that proposed amendments fail the reasonable cost-effectiveness test and exceed the cost-effectiveness values in CARB's 2022 Scoping Plan.*

Eric Frick, Michael Kapolnek

Response: Cost-effectiveness is a required consideration for the adoption the proposed amendments, and the Staff Report includes the required analysis of cost impacts and cost-effectiveness. The California Health and Safety Code requires the Air District to consider cost-effectiveness and economic impacts, but it does not mandate any quantitative definition or test for cost-effectiveness. Cost-effectiveness values of other measures or from other analyses may provide further information for a consideration of cost-effectiveness, but do not limit the Air District's authority in adopting rules or amendments. As discussed in the Staff Report, the Air District evaluated and considered cost impacts in developing the proposed amendments, and found that the air quality and public health benefits presented demonstrate the value and necessity of the proposed rule amendments despite these potential impacts. Additional information on the justification of the proposed amendments is provided in the Staff Report.

Furthermore, the cost-effectiveness values from CARB's 2022 Scoping Plan Update cited by one commenter are in reference to costs per metric ton of carbon dioxide equivalent, while the cost-effectiveness being referenced in the Staff Report for the proposed amendments is per ton of NOx. Cost-effectiveness values are not typically compared between different pollutants due to differences in pollutant characteristics and their potential impacts to air quality and public health.

14) Cost-Effectiveness: Emissions reductions

Comment: *One commenter asserts that emissions from impacted sources are a small percentage of regional emissions, and emissions would not be completely eliminated due to increased electricity generation. The commenter asserts that the emission reductions are insufficient justification for the costs.*

Michael Kapolnek

Response: The Air District recognizes that there are many sources of emissions throughout the Bay Area, however, the buildings sector is a substantial contributor to NOx emissions in the San

Francisco Bay Area. As explained in the Staff Report, the proposed amendments would result in substantial overall emission reductions from this sector, even when accounting for potential emissions from incremental electricity generation. Staff respectfully disagrees with the commenter's assertion that there is insufficient justification for the proposed amendments, and provides additional information on the benefits and justification of the proposed amendments in the Staff Report.

Emissions

15) Emissions: GHG Co-Benefits

***Comment:** Commenter expresses concern about overall carbon footprint associated with electricity emissions and refrigerants that are included in heat pumps.*

Annette Ross, Eric Frick, Jan Stoeckenius, Lisa Cohen, Rheem, Robert Sherwood

Response: Please see Master Response 25 (General opposition: Electricity generation) for a discussion of the content of and emissions associated with electricity that is delivered to consumers in the Bay Area. This information is also included in Section V of the Staff Report. Overall, due to high percentages of carbon-free electricity delivered by Pacific Gas and Electric and the community choice aggregators in the Bay Area, significant greenhouse gas emissions reductions are a co-benefit of the proposed rule amendments.

The potential GHG co-benefits estimated in the Staff Report represent maximum potential emissions reductions anticipated from the proposed rule amendments. The exact quantity of GHG co-benefits to be achieved will depend on variables including the zero-NOx technologies available throughout the compliance periods of the proposed rules, whether zero-NOx natural gas-fired technologies are developed and if so, how many consumers choose natural gas-fired technologies versus electric technologies, performance characteristics of electric technologies, emissions associated with the electric grid, and the use of hydrofluorocarbon-based refrigerants in zero-NOx technologies. Staff agrees that improper use and disposal of refrigerants is an important issue that must be addressed and that if these emissions occur the maximum GHG co-benefits as presented may not be fully realized. Air District Climate Protection staff as well as CARB staff have evaluated the emissions associated with refrigerants contained within heat pump appliances and determined that they do not outweigh the potential emissions reductions presented in the Staff report.⁴ One commenter presented a calculation estimating an additional 0.45 million metric tons of CO₂ equivalent per year associated with refrigerant emissions resulting from the proposed rule amendments. While Staff does not believe there is sufficient evidence to support this value, 90 percent of GHG co-benefits estimated in the Staff Report would still be realized if the commenter's assumptions were correct. Despite this, staff recognizes the potential for emissions associated with refrigerants and supports additional actions towards minimizing and avoiding them, as summarized by CARB in its 2022 Scoping Plan:

⁴ Compliance data associated with Short Lived Climate Pollutant Reduction Strategy.

<https://ww2.arb.ca.gov/resources/documents/slcp-strategy->

final#:~:text=The%20Short%2DLived%20Climate%20Pollutant,)%2C%20and%20anthropogenic%20black%20carbon

“CARB has several regulations focused on reducing HFCs from the building sector and limiting the use of high [global warming potential (GWP)] refrigerants; however, if no further action is taken to reduce [hydrofluorocarbon (HFC)] emissions, the climate benefits of electrification will be partially offset, and the proportion of HFC emissions from buildings will continue to grow. Therefore, additional actions such as through incentives, regulations, and other policy measures focused on accelerating the transition to ultra-low GWP refrigerants...and recapturing, reclaiming and reusing refrigerants at end-of-life, particularly from existing equipment that utilizes high GWP refrigerants, could help reduce HFC emissions from buildings.”⁵

Leaks and end of life emissions of refrigerants from heat pumps can be avoided with proper equipment installation, maintenance and end of life reuse and recycling. A widely cited study of reports that ten percent of surveyed building heat pumps had detectable leaks, while 92 percent of refrigerant emissions were from a small number of catastrophic leaks⁶. Ensuring access to and availability of properly trained contractors and technicians will be included in the workforce initiatives of the implementation working group, which are discussed further in Master Response 63 (Workforce: Training/Availability). Additionally, the implementation working group will evaluate options for public education on and access to recycling programs in order to avoid end of life emissions from refrigerants. As noted above, potential refrigerant emissions from appliances that develop leaks or are inadequately recycled will continue to decrease over time as CARB rules further regulating these compounds will phase out the highest global warming potential gases. Recent CARB rulemakings and measures include the following:

- New heat pump equipment will be required to contain refrigerants with a GWP less than 750, with implementation dates between 2023 and 2026.⁷
- In conjunction with these rules, CARB developed an “F-gas Reduction Incentive Program” (FRIP) to increase the voluntary adoption of low-GWP climate-friendly refrigerant technologies that reduce GHG emissions in advance of any regulatory requirements.

16) Emissions: Necessity, Health

Comment: Commenters question the need for a zero-NOx standard including why lower, non-zero standards are not proposed as well as concerns regarding the lack of indoor air pollution impact data.

Bill Nugteren, Daniel Feldman, Izmirian Roofing and Sheet Metal, Jan Stoeckenius

Response: The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and

⁵ CARB 2022 Scoping Plan Appendix F. November 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-f-building-decarbonization.pdf>

⁶ Eunomia. Impacts of Leakage from Refrigerants in Heat Pumps. <https://www.eunomia.co.uk/reports-tools/impacts-of-leakage-from-refrigerants-in-heat-pumps/>

⁷ CARB HFC Reduction Measures Rulemaking. <https://ww2.arb.ca.gov/our-work/programs/hfc-reduction-measures/rulemaking>

resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts.

Staff appreciates comments regarding non-zero standards however staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies available on the market that would be allowed under the proposed amendments.

The proposed amendments only apply to furnaces and water heaters as defined in Sections 9-4-101 and 9-6-101. The proposed rule amendments do not include requirements for stoves, dryers or other appliances. All emissions reductions calculations, air quality modeling, health impacts analysis and other studies that are used as the basis for the Staff Report are specific to the potential impacts of the proposed rule amendments and evaluate the impact of emissions and potential reductions on overall outdoor air quality in the Bay Area.

17) Emissions: Peer Review

Comment: The Amendments appear to have been created without any indoor air monitoring whatsoever in homes in the San Francisco Bay Area to show what NOx and PM_{2.5} concentrations result from new water heaters and furnaces that comply with existing BAAQMD standards. The findings of the Staff Report on premature deaths, asthma, and economic analysis require both an observational basis and peer-review. Therefore, the claims listed in the Fact Sheet about premature deaths avoided and PM_{2.5} exposure would not and should not withstand scientific scrutiny.

Daniel Feldman

Response: The evaluation of health impacts conducted by the Air District in support of draft amendments, as summarized in the Staff Report and further documented in the Appendices, did not consider any impacts from indoor air pollution. Rather, it was assumed that existing appliances are properly vented to the outdoors. All the impacts evaluated were attributable to outdoor air pollution from space and water heating appliances covered by Rules 9-4 and 9-6.

The health impacts and economic analyses conducted by the Air District made use of EPA-approved models and methods that have been extensively peer-reviewed. Estimates of changes in outdoor air pollutant concentrations projected to result from the proposed appliance rule amendments were prepared using EPA's Community Multiscale Air Quality (CMAQ) Model, one of two photochemical grid models approved by EPA for regulatory applications. Health impacts and associated monetary valuations resulting from the concentration changes were estimated using EPA's Environmental Benefits Mapping and Analysis Program (BenMAP), which has been widely used to estimate the health impacts of changes in levels of outdoor air pollution.

The District's overall approach is consistent with recent regulatory impact analyses (RIAs) performed by EPA for proposed air quality regulations. Reliance on modeling results for such analyses is needed because air monitoring data cannot provide information on proposed future changes in emissions and air quality. For example, in 2022, EPA conducted an RIA for proposed reconsideration of national air quality standards for particulate matter. In that analysis, potential health benefits of emissions controls were estimated using a similar modeling-based approach, with the same modeling tools (CMAQ and BenMAP), as those applied by the Air

District (see Regulatory Impact Analysis for the Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, EPA-452/P-22-001, December 2022).

Existing Spaces

18) Existing Spaces: Permits/Setbacks

Comment: *Concerns regarding potential issues associated with outdoor installations of heat pump compressors, permitting needs, and potential conflict with city setback or other building code requirements.*

Annette Ross, Eric Frick, Izmirian Roofing and Sheet Metal, Jim Robbins, Linnea Wickstrom, Palo Alto Green Gables Residents, Renee Alloy, Richard Hallsted, Terry Houlihan

Response: Unlike water heaters which can frequently be replaced in the footprint of an existing natural gas appliance, heat pump space conditioning equipment may require installation of a condenser or other equipment outdoors. In the current market, low voltage systems taking up a smaller footprint exist for space heating but they typically only serve very small units or individual rooms. In order to provide the opportunity for development of additional or improved low voltage solutions as well as to allow for local jurisdictions such as cities to consider adjusting their setback and permitting requirements for outdoor installations, Air District staff has proposed a compliance date of January 1, 2029, for zero NOx furnaces. Air District staff also plans to convene an ongoing Implementation Working Group to further investigate a number of implementation topics, including the status of technology development and availability, as well as actions/activities of local jurisdictions that could support the adoption of zero-NOx technologies.

Staff has begun and intends to continue coordinating with local jurisdictions such as cities and counties on how they can support the adoption of zero-NOx technologies in their communities. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted, if the local jurisdiction so chooses, to align with the proposed rule amendments, should they be adopted by the Air District's Board of Directors.

19) Existing Spaces: General

Comment: *General concerns about retrofits and available space in existing homes for heat pump installations.*

Bradford White Corporation, Eric Frick, Families and Homes San Jose, Linnea Wickstrom, Marin County, Mary Porter, Maureen Kennedy, Michael Kopolnek, Ned Kuypers, Rheem

Response: Staff understands potential concerns associated with the installation of heat pump appliances in existing spaces. Please see Master Response 18 (Existing Spaces: Permits/Setbacks) for a discussion of scenarios in which compressors for heat pump space conditioning systems must be installed on the exterior of buildings. With regards to heat pump water heaters, it is typically recommended that the unit be installed in a space in which there is sufficient air flow for the unit to pull hot air out of the space in order to function optimally, transferring that heat to the water within the water heater. Manufacturer recommendations range from 600 to 1000 cubic feet of space to allow for optimal heat transfer for a heat pump

water heater unit. In cases where this space is not available and the existing appliance is in a smaller space such as a closet, staff acknowledges that there may be additional costs involved in the installation of a heat pump water heater, however solutions exist to minimize these concerns and associated costs. First, installation in a closet or other small existing space is still possible should the space have adequate provisions for air exchange such as venting or louvered doors. City staff that set local codes and CEC staff that is involved in the state building code process will be present on the working group to ensure that local codes allow for, and assist with, the installation of zero-NOx water heaters including heat pumps.

Additionally, with newer low voltage heat pump water heaters coming onto the market, less retrofitting work is needed for a heat pump water heater to be installed in a different space within the home, if desired. Finally, tankless water heaters are classified under Section 9-6-303.5, meaning that natural gas-fired tankless water heaters that are manufactured up to January 1, 2031 can continue to be installed under the proposed rule amendments. Tankless residential water heaters are not subject to the compliance date of January 1, 2027 in Section 9-6-301.5. Tankless heat pump technology exists and is on the market today but typically serves smaller loads. This technology is expected to improve over time and an updated evaluation of its efficacy will be included in the interim reporting to the Board of Directors that is required by the proposed rule amendments.

20) Existing Spaces: Exemptions

Comment: *Commenter explains a situation for a need for an exemption in a case where someone may live in a condominium and are unable to coordinate and/or execute a panel upgrade due to their HOA and/or a heat pump due to lack of space.*

Annette Ross

Response: Staff appreciates comments and concerns raised about potential difficulties of installations in specific situations. Please see Master Response 19 (Existing Spaces: General) for a discussion of potential solutions to and considerations for installation of compliant appliances in existing spaces. Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided.

Staff understands the commenters concerns associated with complications and costs of the installation of currently available zero-NOx appliances (heat pumps) in existing spaces. However, Air District staff did not propose to include exemptions in Rules 9-4 and 9-6 for specific installation scenarios. While installation of zero-NOx appliances may be more difficult and/or costly in some situations compared to others, depending on the types of zero-NOx technology available upon future compliances dates, installation of zero-NOx appliances is currently possible across all appliance categories subject to the proposed amendments, and costs and installation challenges are expected to go down in the coming years.

Air District staff plans to consolidate information and facilitate access to funding programs, knowledgeable contractors and educational materials as part of the Air District's work during the implementation period of the proposed rule amendments, should they be adopted. The implementation working group will track accessibility factors including cost and these will be

reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

General Opposition

21) Fifth Amendment: Takings Clause

Comment: *The proposed amendments constitute a taking under the 5th Amendment of property by forcing conversion to electric higher-priced and inferior products.*

Charles Getz, Jeremy Wright, Maureen Galindo

Response: The commenter states that adoption of the Proposed Amendments would constitute a taking in violation of the Fifth Amendment. Staff respectfully disagrees. The Fifth Amendment forbids the taking of private property for public use without just compensation. This Constitutional guarantee is “designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.” *Penn Central Transp. Co. v. City of New York*, 438 U.S. 104 (1978). Courts have found regulatory takings where regulations fully deprive property owners of the right to use their property, or unreasonably interfere with investment-backed expectations. Staff acknowledges the commenter’s concerns regarding price and performance of currently available zero-NOx appliances. These concerns are addressed at Master Responses 39 (Heat Pump: Reliability) and 40 (Heat Pump: Efficiency). Importantly, the Proposed Amendments would not “force conversions” or “take” existing operational appliances away from Bay Area property owners. Rather, they would require that when property owners purchase and install new appliances, these new appliances meet updated emissions standards. Further, the Proposed Amendments would not result in an unconstitutional taking if adopted because the Amendments would apply to appliances evenly throughout the Bay Area, would not deprive appliance owners of using their property or introduce unwanted occupants onto private property, would not reduce the value of property and have a valid and important public purpose of decreasing harmful NOx and PM_{2.5} emissions to improve air quality and public health.

22) General Opposition: Emergency Situations

Comment: *Commenters explain the potential issues associated with emergency situations and/or natural disasters where they may be unable to install compliant equipment, including some commenters’ request for exemptions in these scenarios.*

AGC of CA, AHRI, Bradford White Corporation, Michael Kapolnek, Mike Thompson, Randy Breunling, Rheem

Response: Staff understands that potential emergency replacements are a large concern for residents of the Bay Area and acknowledges that additional options to accommodate emergency changeouts need to be considered by the implementation working group, should the proposed rule amendments be adopted. These options additionally need to be a focus of public education campaigns leading up to the compliance dates of the proposed amendments. Please see Master Response 46 (Panel upgrades: Need) for a discussion of scenarios in which panel upgrades and other potentially time-consuming upgrades can be avoided in many scenarios. In particular, Staff believes that the further market proliferation of low voltage units will alleviate

significant pressure on emergency replacements where many replacements can be made in place with no additional electric work.

In addition, community choice aggregators and water heater replacement contractors are considering a water heater loaner program that will enable a customer to have hot water while working on a panel upgrade. These policies are allowable under the proposed rule amendments as long as the loaner appliance was manufactured prior to the relevant compliance date. Another potential approach to space heating concerns during emergencies is by the utilization of portable electric space heaters which are currently available in the market today. In addition, please see Master Response 63 (Workforce: Availability/Training) for further discussion of the focus to be placed on workforce training and availability throughout the implementation process to facilitate timely upgrades when they are necessary.

23) General Opposition: Exemptions

Comment: *Commenters request exemptions for locations with power outages, low-income households, seniors, locations where installations are impractical, where panel upgrades are required.*

AHRI, Annette Ross, Bill Maimone, BOMA, Daniel Hachigian, Gary Stevens, Kelly Porter, Lisha Mainz, Mats Lundgren, Michael Kapolnek, Niall Ferguson, Rick Yost

Response: Staff understands and appreciates the commenters concerns regarding power outages and costs of zero NOx appliances and their installation. However, Air District staff has not proposed to include exemptions in Rules 9-4 and 9-6 for specific installation scenarios. While installation of zero-NOx appliances may be more difficult and/or costly in some situations compared to others, zero-NOx appliances are currently available across all appliance categories subject to the proposed amendments, and depending on the types of zero-NOx technology available upon future compliances dates, costs and installation challenges are expected to go down in the coming years.

Air District staff plans to consolidate information and facilitate access to funding programs, knowledgeable contractors and educational materials as part of the Air District's work during the implementation period of the proposed rule amendments, should they be adopted. The implementation working group will track accessibility factors including cost and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

24) General Opposition: Necessity, Health

Comment: *General opposition comment regarding the need for the proposed rule amendments in terms of emissions from covered appliances, impacts to regional air quality and health impacts.*

Andrew Pollack, Ashley Kline, Bill Hough, Bill Maimone, Bill Nugteren, Brian Avery, Bruce Adornato, Catherine Su, Charles Getz, Chibby Alloway, Craig Talyor, D Pickham, David Luce, Diane Perrone, Emy Baldwin, Eric Frick, Fred Ortiz, Ginnie Plato, Henry Riggs, Henry Riggs, Holly Lazzarini, Jamie Beckett, Jan Stoeckenius, Janet Garcia, Jay Feldis, Jeremy Wright, Jim Beatty, Jim Clark, John Accinelli, Joseph Machado, Judy Weatherly, Katherine Hughes, Lada Adamic, Larry Thompson, Leif Ortegren, Linnea Wickstrom,

Lisa Cohen, Lisa Taner, Lynn Norris, Malcolm Post, Marilyn Barrett, Marsha Adams, Mary Gilles, Mary Porter, Mary Schumacher, Meg Minto, Melanie Bieder, Michael DeMoss, , Michael Kapolnek, Michal Atz Brenzel, Nancy Green, Niall Ferguson, Peter Jon Shuler, Philip Ragozzino, Randy Breunling, Regan Avery, Rick Vujovich, Rita Fanfelle, Rob SS, Robert Horstmeyer, Robert Sherwood, Rocky Fort, Roger Melen, Ronald Dow, Sandra Pachaud, Terry Houlihan, Thomas Pfaeffle, Victor Buathier, William Williams

Response: The proposed amendments will improve regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances.

Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. The standards will also improve overall regional air quality. The Bay Area does not currently attain all of the state and national ambient air quality standards for ozone or particulate matter, as discussed in Section V. of the Staff Report, and implementation of the proposed amendments will assist the Air District in its efforts to reach attainment.

25) General Opposition: Electricity generation

Comment: *General concerns expressed regarding electricity generation capacity and associated emissions.*

AGC of CA, Michael DeMoss, Mitch Lerman, Nancy Green, Thom Reinstein, Western Propane Gas Association

Response: As shown in the Staff Report associated with the proposed amendments, for electric replacements, the electricity provided is from the community choice aggregator local to the customer, or direct from Pacific Gas and Electric (PG&E). The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load are shown in Section V of the Staff Report. The resulting weighted average is 85 percent carbon and NOx-free electricity generation. The continued build out of utility-scale renewable development has greatly increased the reliability and availability of low-emission electricity in the Bay Area and beyond.

The emissions reductions calculated in the Staff Report also take into account the potential emissions associated with natural gas-fired power plant electricity generation. NOx emissions standards for natural gas-fired power plants represent a significant reduction over existing standards for residential space and water heaters. For example, the existing standard for furnaces in Rule 9-4 is 40 ng/J, or 55 parts per million NOx (ppm). In comparison, nearly all natural gas-fired power plants in the Bay Area are required to meet a 2.5 ppm NOx emission limit NOx. In addition as stated above, natural gas-fired power plants only provide for a small portion of electricity generation in the Bay Area. Potential air quality and greenhouse gas emissions impacts associated with the proposed rule amendments are discussed in detail in Sections 3.1 and 3.2 of the EIR respectively.

26) General Opposition: Propane

Comment: *Question regarding whether propane fueled appliances are covered by the rule amendments and potential concerns about rural needs for propane fueled appliances.*

Daniel Hachigian, Jeff Calcagno, Lisha Mainz, Niall Ferguson, Rick Yost, Tamara Gabel, Tony Gaughan, Western Propane Gas Association

Response: Appliances that utilize propane as fuel are not covered by the proposed rule amendments as Rules 9-4 and 9-6 have previously and would continue to specifically apply only to natural gas-fired sources, as stated in Sections 9-4-101 and 9-6-101 of the two rules.

27) General Opposition: Stove Study

Comment: *Commenter believes that rule applies to stoves. Additional comments associated with meta-data RMI study and lack of new data.*

Catherine Su, Chanel Harris, David Luce, Emy Baldwin, John Sheakley, Maureen Kennedy, Meg Minto, Regan Avery, Sally Giese, Sandra Pachaud, William Garrett

Response: The proposed amendments to each rule will only apply to furnaces and water heaters as defined in Sections 9-4-101 and 9-6-101, respectively. The proposed rule amendments do not include requirements for stoves. All emissions reductions calculations, air quality modeling, health impacts analyses, and other studies that are used to support the basis for the Staff Report are specific to the potential impacts of the proposed rule amendments. The recent study issued by Rocky Mountain Institute and other authors is focused on stoves, which are not included in the proposed rule amendments, and is not included in analysis associated with the proposed rule amendments.

28) General Opposition: CARB

Comment: *Comment regarding CARB's SIP commitment and suggestion that the Air District defer to CARB's future rulemaking.*

Rheem

Response: In the 2022 California State Implementation Plan Strategy, CARB signaled its intention to develop zero emission building appliance rules with a potential 2030 implementation date. No draft rulemaking has yet been proposed. The Air District's proposed rule amendments specifically regulate NOx emission requirements for the same or similar sources.

Air District staff sees the proposed amendments to Rules 9-4 and 9-6 and potential CARB rules as different, but complementary to each other and not in conflict. CARB agrees and strongly supports the Air District's efforts, stating in its comment letter:

CARB supports the Air District's proposed amendments to these rules and applauds Air District efforts to take action in this area where there is demonstrated technology ready to deploy at scale with tremendous health benefits. Bay Area's adoption of zero-NOx emission limits for space and water heaters will be an

essential contribution to California's strategy for attainment of air quality standards. CARB staff look forward to coordinating with the Bay Area on implementation of the rule amendments.

Air District staff is and will continue to be in close contact with CARB staff as they develop their regulations. Should the Air District's proposed amendments be adopted, CARB will be represented on our implementation working group. Through being involved in our implementation process, CARB will be able to apply lessons learned in development of their state-wide regulation and through our interim reporting process, we will have the space to adjust our administrative requirements if needed to alleviate any potential future conflict (although this is not necessarily anticipated).

29) General Opposition: Regional Regulation

Comment: *Concern was raised that proposed amendments will result in piecemealing, jurisdiction by jurisdiction electrification requirements.*

Adams Broadwell Joseph and Cardozo

Response: The proposed amendments are not electrification requirements, but rather are NOx emission standards for space- and water-heating appliances. Electric heat pumps are currently available and would not conflict with the proposed emissions standards, but natural gas-fired appliances that emit zero-NOx would also comply with the proposal. The Air District has been regulating NOx emissions from furnaces and water heaters for several decades. The current proposed amendments are in line with previous iterations of Rules 9-4 and 9-6 and would apply to space- and water-heating appliances within the Air District's jurisdiction. The Air District lacks authority to regulate appliances sold or installed outside of the Bay Area, but the proposed amendments will best address emissions from all replacement space and water heating appliances within the Bay Area region. As described in Master Response 28 (General Opposition: CARB), CARB and District staff sees the proposed amendments as complementary to potential state rulemaking efforts that would address air pollutant emissions from space and water heating appliances.

30) General Opposition: Authority

Comment: The commenters question whether the Air District has the authority to adopt the Proposed Amendments, and whether the state already has adopted the same or similar requirements for appliances.

Charles Getz, Randy Breunling, Steven Wilk

Response: The California Legislature vested the Air District with primary authority to control all sources of air pollution (except motor vehicles) in the San Francisco Bay Area, and the authority to adopt rules and regulations in support of its mission. It is the oldest regional air pollution control district in the nation, acting to protect the health of the Bay Area since 1955. Sections 40000, 40001, 40200, 40702, and 40725 through 40728.5 of the California Health and Safety Code outline these authorities. The Air District has regulated NOx emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was adopted in 1992 and was most recently updated with more stringent NOx emissions standards for certain equipment in 2007. The State

has not yet adopted regulatory requirements for emissions from space and water heating appliances, but has indicated plans to do so through the California Air Resources Board (CARB). CARB has commented that it strongly supports the Air District's Proposed Amendments and finds them complementary to its planned future efforts in this space.

31) General Opposition: Grandfathering

Comment: *Commenter explains the need for a grandfathering exemption for existing homes and for the new limits to only apply to new housing developments.*

A Yvette Huginnie, Barry Robbins, Linda Chin, Ned Kuypers

Response: The proposed rule amendments are intended to apply to all newly sold and installed appliances that are manufactured after the proposed compliance dates. The vast majority of housing in the Bay Area is existing housing and the overall emissions associated with natural gas combustion in buildings is a significant source of emissions that staff believes is necessary to address in order to improve the air quality and health outcomes for residents of the Bay Area. As stated in the Staff Report, Section VI, the proposed amendments are expected to prevent up to 85 premature deaths per year and save up to \$890 million in reduced health impacts due to reductions in fine particulate matter exposure.

32) General Opposition: Safety

Comment: *If affected residents cannot find affordable temporary housing, they may be tempted to heat their homes using unsafe means, this may include using a gas range to heat their home. Besides the safety hazards of the practice, it exposes residents to unhealthy indoor air.*

Michael Kapolnek

Response: Staff appreciates the commenter's concern for this safety / health issue and intends to examine these concerns during the implementation phase should the proposed amendments be adopted. As zero-NOx technology advances, the need for and/or potential delays involved with panel installations is expected to decrease significantly, allaying the commenter's concern regarding temporary housing. See Master Response 46 (Panel Upgrades: Need). Should delays remain a potential issue upon the compliance dates, one potential approach to avoid both the issues of temporary housing and the use of unsafe gas range heating is the utilization of portable electric space heaters during the transition from natural gas space heating to heat pumps. Portable space heaters are capable of heating a single room with costs ranging from \$30 to \$400 each, with most costing less than \$100.⁸ However, staff recognizes that this transitional approach may result in energy cost increases and an additional burden on the electric grid, but as mentioned earlier, it may avoid the need for temporary housing and unsafe heating practices.

Grid Capacity

⁸ Google Search: [Portable Electric Space Heater](#)

33) Grid Capacity: Insufficient Capacity

Comment: Including concerns about additional electric load associated with capacity availability from PG&E at transformer/neighborhood scale, generation capacity including renewable build out and peaker plants.

Adams Broadwell Joseph and Cardozo, AGC of CA, Annette Ross, Anthony Rondoni, Brian Avery, Carolyn Mar, Chibby Alloway, EJ Cire SMART Local Union 104, Families and Homes San Jose, Henry Riggs, Izmirian Roofing and Sheet Metal, Jason Biggs, Jeremy Wright, John Accinelli, Julia Wall, Katherine Hughes, Linnea Wickstrom, Lisa Taner, Malcolm Post, Marin County, Mark Reifkind, Marsha Adams, Mats Lundgren, Melanie Bieder, Michael DeMoss, Mitch Lerman, Nancy Green, Ned Kuypers, Pat Marriott, Peter Jon Shuler, Randy Breunling, Regan Avery, Robert Horstmeyer, Ronald Vinsant, Sergio Marti, Steve Simons, Steven Wilk, Terry Houlihan, Thomas Tilden, TJ Giuli, Tony Gaughan, Victor Buathier

Response: Appendix D of the Staff Report associated with the proposed rule amendments includes an electric infrastructure analysis prepared by Energy and Environmental Economics (E3). This analysis investigates the potential electric load increases that would result from the proposed amendments. This analysis also shows the expected incremental load increases over two state-wide planning scenarios in the coming decades.

This analysis also details the potential costs associated with these potential infrastructure upgrades. These costs are additionally incorporated into the socioeconomic analysis, which is included as Appendix C to the Staff Report.

The E3 analysis shows that under California Energy Commission (CEC) and California Public Utility Commission's (CPUC) planning scenarios, the Bay Area will see an increase in electricity demand due to building and transportation electrification. Relative to the Low Policy Reference in the E3 analysis, which assumes no major state policy changes in support of building electrification, the proposed zero NOx standards could result in 6.2 TWh (terawatt-hours) per year of additional electric load by 2050. For comparison, California's 2020 electric load was approximately 280 TWh/year⁹ and is modeled to grow to 338 TWh/year by 2045 in the Low Policy Reference.¹⁰ Relative to the High Policy Reference, which assumes major state policy support for building electrification by the 2030s, the zero NOx standards result in earlier load growth, seeing 1.5 TWh/year of incremental load in the 2030s. However, the incremental load falls to near zero load impact by 2050.

There is time to continue to make the necessary investments to add supply and ensure reliability and sufficient capacity at the state, regional and neighborhood level. Grid investments are being made by PG&E and supported by the State and federal government on a continuing basis. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with capacity, including generation capacity, transmission capacity, and all scales of distribution capacity with members including representatives from PG&E, the CPUC and the CEC.

⁹ California Energy Commission. <https://ecdms.energy.ca.gov/elecbycounty.aspx>

¹⁰ California Air Resources Board. <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

34) Grid Capacity: Air Conditioning

Comment: *Concerns about additional electric load associated with air conditioning that would come online as a result of heat pumps.*

Daniel Hachigian, Lisha Mainz, Rick Yost

Response: The electric infrastructure analysis prepared by Energy and Environmental Economics (E3), analyzed the potential electric load increases from space heating, water heating, and air conditioning as well as the associated electric grid impacts.

As laid out in the analysis, which is included as Appendix D of the Staff Report, air conditioning is a major source of electric load and a key driver of system peaks in warm climates. Heat pump heating ventilation and air conditioning (HVAC) units provide both space heating and space cooling in a single device. Some homes in the Bay Area do not currently have air conditioning. Since customers who install a heat pump are assumed to make use of the cooling function, heat pump adoption is modeled to result in new air conditioning load for these households.

Conversely, heat pumps installed in residential buildings that currently have air conditioning may decrease cooling loads for the building, as new heat pump technologies generally perform better than existing air conditioners. The E3 analysis lays out the incremental load associated with new space heating, water heating, and air conditioning load anticipated as a result of the proposed rule amendments.

35) Grid Capacity: Reliability

Comment: *Concerns regarding reliability of electrical grid, including power outages, length of power outages, rural concerns etc. Including reliability and safety concerns associated with decreased maintenance worker resources associated with lower natural gas usage.*

Adams Broadwell Joseph and Cardozo, AGC of CA, Alfred Who, Bill Hough, Bill Nugteren, Brian Johnson, Bruce Jackson, Bryce Vree, Chanel Harris, Chibby Alloway, Colin Daley, Dan Winter, Daniel Hachigian, David Luce, EJ Cire SMART Local Union 104, Families and Homes San Jose, Henry Riggs, Jason Biggs, Jason Friedrichs, Jeff Burke, Jeff Calcagno, Jo Ann Mandinach, Katherine Hughes, Kelly Porter, Kristie Eglsaeer, Lewis Paris, Lisha Mainz, Lynn Norris, Malcolm Post, Marilyn Barrett, Mark Reifkind, Mary Louise Donnici, Maureen Galindo, Michael DeMoss, Nancy Green, Nancy Westreich, Ned Kuypers, Niall Ferguson, Patricia M Daeley, Pearl Karrer, Peter Jon Shuler, Renee Alloy, Rick Yost, Robert Horstmeyer, Robert Sherwood, Rocky Fort, Ronald Vinsant, Sally Giese, San Mateo 19th Ave Homeowners, Steven Wilk, Susan Ferrone, Tamara Gabel, Terry Houlihan, Thomas Tilden, Tony Gaughan, Victor Buathier

Response: Staff recognizes the commenters concerns regarding the reliability of the electric grid and the potential for increased reliance on electricity as consumers may transition to heat pumps and other electric technologies in response to the proposed rule amendments. Staff notes that a transition to heat pumps is not required by the proposed amendments, and that the amendments would allow for the development of natural gas-fired zero NOx appliances should manufacturers choose to develop and offer them for sale. However, based on currently available zero-NOx technology, staff did assume for purposes of a “worst case” analysis on the electric grid that heat pumps would be adopted in response to the proposed amendments.

Appendix D to the Staff Report for the proposed rule amendments is the evaluation of electric infrastructure impacts performed by E3. This analysis includes an evaluation of maximum daily loads. The risk of blackouts is driven by high, inefficient AC demand and extreme heat and storm events. While the E3 analysis finds new peak load days associated with increased air conditioning uptake from heat pump adoption, heat pumps cool more efficiently than traditional AC and can thus reduce grid strain, rather than exacerbate it.

Potential electric grid impacts were evaluated in E3's report relative to two reference scenarios: a Low Policy Reference, which assumes no major state policy changes in support of building electrification, and a High Policy Reference, which assumes major state policy support for building electrification by the 2030s. The E3 study concludes that the Project would, under the "worst case" Low Policy Reference Scenario evaluated by E3, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. The E3 study estimates the amount of utility-scale solar capacity that would need to be developed to meet this demand and the Draft EIR describes the types of environmental impacts that would result from these energy projects, as well as the Project's potential contribution to this significant cumulative impact.

The E3 analysis in Appendix D to the Staff Report also describes the CPUC and CEC planning processes and the projected buildout of utility scale solar (or other renewable energy generation sources) through the state Integrated Resource Planning process.

Based on these evaluations, staff recognizes the need for expansion of the grid from existing infrastructure but believes that the required resource build out to support compliance with the proposed rule amendments is reasonable and will be supported by existing and developing state policies. The delayed implementation of the proposed rule amendments and appliance updates over time at the end of life will result in this increased load not being necessary immediately or all at once. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with reliability of the grid, including availability of trained workforce to continue appropriate maintenance of both gas and electric systems, with members including representatives from PG&E, the CPUC and the CEC.

Staff also recognizes that there may be more grid reliability concerns in rural communities, and that these communities have lost power for long periods of time recently. Staff commits to focus on these serious concerns in the implementation working group should the proposed amendments be adopted. Staff notes that use of propane appliances is more common in rural areas, and that the proposed amendments do not address propane-fired appliances. While staff does not encourage the use of propane-fired appliances due to their air quality and public health impacts, Air District rules do not currently regulate these appliances.

36) Grid Capacity: Statewide Planning

Comment: *Comment regarding CPUC planning proceedings and how Air District/E3 projections are integrated.*

*Adams Broadwell Joseph and Cardozo, AGC of CA, Bryce Vree, Dan Winter, Julia Wall,
Michael Kapolnek*

Response: The E3 analysis in Appendix D to the Staff Report also describes the CPUC and CEC planning processes and the projected buildout of utility scale solar through the state Integrated Resource Planning process. Based on these evaluations, staff believes that the required resource build out to support compliance with the proposed rule amendments is reasonable and complementary to existing state policies. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with reliability, with members including representatives from PG&E, the CPUC and the CEC. Any issues identified will be presented by staff to the Air District Board of Directors as appropriate.

The EIR, included as Appendix G to the Staff Report, also includes discussion of the potential impacts of additional utility buildout that is expected as a result of California's existing policies and utility planning processes as well as potential additional incremental need associated with the proposed rule amendments.

With respect to concerns about stranded natural gas assets, staff notes that the Proposed Amendments would not require the elimination of natural gas use, rather they would only regulate emissions from natural gas-fired appliances, and the proposed amendments do not address all appliances or other sources that use natural gas. The Proposed Amendments would not regulate gas stoves, gas dryers, or other natural gas-fired appliances. The proposed amendments additionally do not impact institutional, industrial or commercial boilers, steam generators, process heaters, cogeneration or any other natural gas-fired processes. Thus, adoption of the Proposed Amendments would not force or cause the stranding of natural gas assets. More widespread building decarbonization and other efforts at the state level may have an impact on natural gas assets, and staff understands that these important issues are being addressed by the state through the CPUC. See also Master Response 8 (Cost: Utility Costs).

Heat Pumps

37) Heat Pump: Noise

Comment: *Commenter expressed concern about noise associated with heat pump water heaters.*

Izmirian Roofing and Sheet Metal, Paul Frantz

Response: Staff recognizes the potential concerns associated with noise from heat pump technologies, which are compliant with the proposed rule amendments. Potential noise impacts resulting from the Project are addressed in the Draft EIR (see Impact 3.4-1). As described therein, the potential operational noise impacts associated with new heat pump units could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Additional explanation of potential operational noise impacts associated with new heat pump units can be found in Final EIR. The Draft EIR concludes that the Project's long-term operational noise impact would be potentially significant and unavoidable because the Air District does not have jurisdiction to monitor or enforce mitigation measures. Staff additionally notes that the Draft EIR identifies improvements to regional air quality and public health while also achieving co-beneficial greenhouse gas reductions. While it is difficult to balance competing environmental interests, staff strongly believes that the significant improvements to regional air quality and public health benefits of the Project outweigh the potential adverse environmental impacts of the Project.

38) Heat Pump: Availability/Delay

Comment: *Commenters assert that heat pumps may not be readily available.*

AHRI, Bradford White Corporation

Response: The Staff Report includes an evaluation of technologies that are currently available on the market that comply with the zero-NOx requirements included in proposed amendments to Rule 9-4 and Rule 9-6. Should the proposed amendments be adopted, the planned implementation working group's work will include tracking the cost and availability of zero-NOx technologies. This work will include an interim report to the Board of Directors that will report on accessibility factors for compliant appliances as laid out in Sections 9-4-405 and 9-6-404 of the proposed amendments. While staff does not anticipate issues with availability of compliant appliances, particularly with more than four years until the first zero-NOx compliance date, the implementation working group will include representation from manufacturers and distributors to provide up-to-date, best available information on appliance availability.

39) Heat Pump: Reliability

Comment: *Commenter asserts that heat pumps may not be reliable and proven technologies.*

Jeremy Wright

Response: Heat pumps are an energy-efficient alternative to air conditioning (heating and cooling) and water heating for all climates and function similar to a refrigerator – they use electricity to transfer heat from a cool space to a warm space, making the cool space cooler and the warm space warmer. Heat pump technologies have been in use for decades and installations continue to grow both internationally and in the US, with similar appliance lifetimes to traditional natural gas appliances.¹¹ This is discussed further in Master Response 35 (Grid Capacity: Reliability).

40) Heat Pump: Efficiency

Comment: *Commenters raise questions about efficiency as well as assertions about need to prioritize funding etc. of heat pumps over electric resistance technologies.*

Ashley Kline, Center For Sustainable Neighborhoods, Eric Frick, Hollenback Avenue Residents, Izmirian Roofing and Sheet Metal, Jan Stoeckenius, Maureen Galindo, Michael Kapolnek, Renee Alloy, Terry Houlihan

Response: The proposed amendments phase out emissions of nitrogen oxides from natural gas-fired space and water heating appliances, but do not mandate electric appliances. Any space and water heating appliances that are designed to have no nitrogen oxides emissions would comply with the rule proposal. Electric appliances are, however, the only currently available space and water heating appliances that do not emit nitrogen oxides, so much of Air District staff's analysis has focused on the potential proliferation of electric appliances in response to the rule proposal.

¹¹ Heat Pumps. IEA. <https://www.iea.org/reports/heat-pumps>.

Heat pumps are an energy-efficient alternative to natural gas-fired appliances and can be four times more energy efficient than natural gas fired appliances as they are simply moving heat from one place to another instead of creating it through combustion. Incentive programs prioritize efficient technologies over less efficient or older electrical appliances such as electric resistance technologies. However, both of these technologies would be compliant with the proposed rule amendments as they do not emit NOx upon operation. Electric hybrid systems which utilize resistance and heat pump technologies are also available and may be preferred by some consumers. Uptake of electric resistance appliances is not expected to be significant as the technology is less efficient and therefore considerably more expensive to operate than modern heat pump technologies. Electric resistance appliances also face the same potential electric upgrade challenges as 240V heat pumps and therefore do not offer a benefit or additional ease of installation over heat pumps.

For heat pump water heaters that are installed in response to the proposed amendments to Rule 9-6, the efficiency increase results in the expectation that residents, on average, will have less expensive utility bills. For heat pump space conditioning installed in the place of a furnace in response to the proposed amendments to Rule 9-4, it is expected that there will be an increase in utility bills associated with space heating. However, with a heat pump space conditioning system, air conditioning is automatically included and much more efficient than many existing air conditioning systems. Thus, Bay Area residents that don't currently have space cooling will have that added benefit and overall space conditioning bills could be lower depending on household usage and specific location within the Bay Area.

With regards to water heater capacity and efficiency, many heat pump water heaters have the same size tank as traditional natural gas appliances. In some cases, and depending on the specific installation, air flow and other factors, additional water can take longer to heat up than consumers may be accustomed to with their natural gas-fired water heater. These appliances still provide sufficient water for an average sized household and function with greater thermal efficiency. Additionally, the technology has improved greatly in recent years and is expected to continue this trend, which will be included in the interim report to the Board of Directors as appropriate.

41) Heat Pump: Cold Weather Operation

Comment: *Concerns expressed regarding the operation of heat pumps during cold weather.*

AGC of CA, Nancy Westreich

Response: In the past, there have been concerns about the ability of heat pump space conditioning units to continue to work during cold weather as there is less heat in the outside air to extract and move into the space to heat it. The technology of heat pump appliances has improved significantly over the past 20 years and recent evidence shows that newly manufactured heat pumps can work well in cold weather in Mountain West and Northeastern states. Modern cold weather heat pump technology is certified to operate in conditions as low as

-20 degrees Fahrenheit. This gives Air District staff confidence that the technology is well suited to the climate in the Bay Area and the technology is only expected to continue to improve.^{12,13,14}

42) Heat Pump: Operation

Comment: Comment asserting that lifetime of heat pumps and ability to repair is less than natural gas.

John Accinelli

Response: The commenter estimates that a heat pump space conditioning unit has an average lifespan of 20 years. While appliance lifetimes will vary with usage, setting and the specific unit, this is consistent with staff's understanding and is two years longer than the average lifespan of a natural gas furnace utilized in the Staff Report (initially determined by an E3 report referenced therein). Staff's understanding is that the anticipated lifetime of a heat pump water heater is also similar to that of an existing natural gas water heater. Therefore, staff disagrees that there is a significant difference in lifespan of appliances and therefore continued overall cost to a property owner. This is discussed further in Master Response 7 (Cost: General). Similarly, heat pump appliances can be maintained and repaired by qualified technicians to extend their lifetimes in a similar manner to natural gas appliances.

43) Heat Pump: Commercial

Comment: Concerns associated with commercial applications including questioning reasoning for longer timeline, concerns associated with high temperature needs for large boilers in hospitals and research centers, and commercial HVAC systems.

AHRI, Annette Ross, BOMA, Bradford White Corporation, Hollenback Avenue Residents, Michal Atz Brenzel, Rheem

Response: As a result of the more complicated installation scenarios associated with multifamily and commercial buildings that typically have water heaters with a heat input rating over 75,000 BTU/hr, staff has proposed a longer timeline for these larger units to ensure appropriate paths to compliance and implementation prior to 2031. With regards to Rule 9-4, the definition of a natural gas furnace preserves the existing size constraint of furnaces up to 175,000 BTU/hr.

Staff would also like to note that the proposed amendments to Rule 9-6 continue to only apply to water heaters up to 2 million BTU/hr. Units larger than 2 million BTU are covered under Air District Rule 9-7¹⁵ for which no amendments are currently proposed. Staff's current understanding is that many concerns associated with high temperature needs and other commercial and industrial applications are mainly served by larger water heaters and boilers

¹² Building Decarbonization Coalition. <https://switchison.org/news/how-cold-climate-heat-pumps-passed-a-winter-storms-test/>

¹³ Department of Energy. <https://www.energy.gov/articles/doe-announces-breakthrough-residential-cold-climate-heat-pump-technology>

¹⁴ BlocPower. <https://www.blocpower.io/posts/cold-climate-heat-pumps>

¹⁵ BAAQMD Regulation 9 Rule 7. <https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?la=en&rev=ab95f36c2dd146528f1cf3c10596bce3>

that are not subject to the proposed rule amendments. In a 2005 report released by the Department of Energy, the averaged sized boiler capacity at health care facilities in the U.S. was 20.9 Million BTU/hr.¹⁶ Additionally, with regards to hospital boiler systems, these are already presently engineered with redundancy in mind, and in the event of system failures the National Fire Protection Association requires available backup power via emergency backup generators.¹⁷ Air District Rule 9-8 Section 331 allows the use of emergency standby engines for essential public services, such as hospitals.¹⁸

Natural Gas

44) Natural Gas: Ban

Comment: *Commenter believes that rule intends to ban natural gas appliances.*

Andrew Morse, Andrew Pollack, Anne Prescott, Annette Ross, Anthony Pratali, Anthony Rondoni, Bill Nugteren, BOMA, Brian Johnson, Bryce Vree, Charles Getz, Colin Daley, Dan Winter, Eric Frick, Gary Stevens, Henry Riggs, Howard Crittenden, Jason Biggs, Jason Friedrichs, Larry Thompson, Linda Tolosano, Linnea Wickstrom, Lisa Cohen, Malcolm Post, Marilyn Barrett, Mark Reifkind, Marsha Adams, Mary Louise Donnici, Maureen Kennedy, Meg Minto, Michael DeMoss, Michal Atz Brenzel, Mike Thompson, Nancy Westreich, Niall Ferguson, Pat Marriott, Patricia M Daeley, Pearl Karrer, Renee Alloy, Rick Vujovich, Rob SS, Robert Horstmeyer, Robert Sherwood, Ronald Vinsant, Sally Giese, Sandra Pachaud, Steve Gazzera, Steven Wilk, Susan Ferrone, Terah James

Response: The proposed amendments are not a natural gas ban. Should a natural gas appliance demonstrate that it meets the standard(s), it would be allowed under the proposed amendments. As discussed in the Staff Report at Section IV.A., zero-NOx natural gas burners have been developed for use in certain industrial contexts, but have not yet been designed for residential or commercial space and water heating.

The Proposed Amendments include zero-NOx emissions standards for natural gas fired furnaces and water heaters that are typically found in residential and commercial buildings. Any subject space and water heating appliance manufactured after the compliance date will not be allowed to be sold or installed in the Bay Area if it emits NOx upon operation. The proposed amendments only apply to newly installed appliances.

45) Natural Gas: Continued Operation

Comment: *Commenter is concerned about operation of electric appliances during power outages vs. the perceived ability to utilize natural gas appliances during extended power outages. Commenters also commonly note need to use gas stoves during power outages.*

¹⁶ Department of Energy.

https://www.energy.gov/sites/prod/files/2013/11/f4/characterization_industrial_commerical_boiler_population.pdf

¹⁷ National Fire Protection Association. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=110>

¹⁸ BAAQMD Regulation 9 Rule 8. <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-8-nitrogen-oxides-and-carbon-monoxide-from-stationary-internal-combustion-engines/documents/rg0908.pdf?la=en&rev=29ec2b409134481a8d73a88f242e6f00>

AHRI, Alfred Who, Colin Daley, David Luce, Jeff Burke, Katherine Hughes, Melanie Bieder, Pedram Navid, Ronald Vinsant, Sally Giese

Response: Staff recognizes the concerns associated with operation during power outages. The proposed rule amendments only require compliance with the emissions standards for newly sold and installed space and water heating appliances (not stoves) that are manufactured after the compliance dates that are set forth. Modern gas and electric appliances have similar performance challenges when the power goes out. Most modern gas furnaces that would be installed when a replacement would be necessary require an electric fan to operate and for both modern natural gas-fired furnaces and water heaters, electric starters are common, in lieu of older technologies such as continuously lit pilot lights. Like gas water heaters, electric heat pumps store hot water, even when the power is out. Therefore, for appliance replacements that would be performed in 2027 and beyond, the functionality of electric and natural gas appliances would be expected to be similar. The reliability of the electric grid is discussed in Master Response 35 (Grid Capacity: Reliability).

Panel Upgrades

46) Panel Upgrades: Need

Comment: Commenters are concerned about the potential need for a panel upgrade – for emergencies in case of water heater installation as well as for furnaces. Concern includes need for panel voltage increase as well as lack of room on existing panel. Commenters additionally explain the need for an exemption for a situation where a panel upgrade is not feasible due to their home and/or neighborhood infrastructure being outdated and unable to accommodate upgrades.

AGC of CA, Ashley Kline, Bradford White Corporation, Brian Avery, Brian Johnson, Bryce Vree, Carolyn Mar, Dan Winter, Daniel Hachigian, Joseph Machado, Lisha Mainz, Lynn Norris, Malcolm Post, Michael Kapolnek, Mike Thompson, Niall Ferguson, Philip Ragozzino, Randy Breunling, Regan Avery, Rheem, Rick Yost, Robert Sherwood, Ronald Vinsant, Sergio Marti

Response: The proposed amendments focus on phasing out emissions of nitrogen oxides from these appliances, but do not mandate electric appliances. Any space and water heating appliances that are designed to have no nitrogen oxides emissions would comply with the rule proposal. Electric appliances are, however, the only currently available space and water heating appliances that do not emit nitrogen oxides, so much of staff's analysis has focused on the potential proliferation of electric appliances in response to the rule proposal.

Air District staff expects that, in some instances, the electric panel for a building may be required to be upgraded in order to install certain zero-NOx electric appliances. This is not the case for many instances and new technologies are being released, such as 120V heat pump water heaters and space conditioning systems which will reduce the number of upgrades required substantially, along with other load sharing devices. Data shared by Home Energy Analytics and SPUR (via SPUR's comment letter, available on the District website) show that only 15 percent of homes participating in an energy savings program used more than half of their panel's capacity.

The Staff Report associated with the proposed rule amendments includes a technology

evaluation of 120V appliances available on the market, some of which are new but are expected to continue to increase in variety and supply availability in the time between potential rule adoption and zero-NOx compliance dates. In addition, low amperage 240V appliances are available where electric service to the home is newer but panel space is at a premium. Many of these appliances have very similar functionality to traditional appliances that residents are used to and efficiency and functionality are expected to continue to increase over time.

Organizations such as the community choice aggregators and other groups that administer funding and training have developed different materials that outline options and strategies to avoid the need for electrical upgrades in homes. For example, Peninsula Clean Energy recently published design guidelines with breakdowns of available appliances and methodologies for electrifying pre-1985 homes up to 3,400 square feet on 100 amp service. Multiple solutions including circuit pauser on non-urgent functions such as EV charging, circuit sharing devices, and smart panels that share loads amongst different appliances as needed. Documentation such as this will be expanded as part of the public education component of the implementation working group, should the proposed rule amendments be adopted.

Finally, if home electrical infrastructure upgrades are needed, funding from the federal, state and local levels may be available. Consolidation of this information and facilitating access to these programs will also be included in the Air District's work during the implementation period of the proposed rule amendments and is discussed further in Master Response 48 (Panel upgrades: Cost).

47) Panel Upgrades: Time

Comment: *Time to get panel upgrade needed for installation is too long, in some cases can be months for PG&E to do the necessary work. Concerns also included potential building permits from cities and general electrician work in emergency scenarios for water heating.*

AGC of CA, AHRI, Bryce Vree, Dan Winter, Daniel Feldman, David Eichar, Eric Frick, Families and Homes San Jose, Jeremy Wright, Joseph Machado, Leif Ortengren, LR Jensen, Michael Kopolnek, Mitch Lerman, Pedram Navid, Randy Breunling, Regan Avery, Richard Staehnke, Sergio Marti, TJ Giuli, Western Propane Gas Association

Response: As noted in Master Response 46 (Panel upgrades: Need), there are many cases in which staff believes that panel upgrades and electric service requirements will not be necessary as they have been in the past for higher voltage and lower efficiency appliances. Therefore, a large surge in need for contractors and backlog of work is not expected. In addition, the rule amendments apply to the sale and installation of new appliances when they are replaced and does not require pre-emptive replacement of any existing appliance at any date. This allows for the proposed rule amendments to phase in over time, again avoiding a large surge in demand on the workforce.

In addition, the time required to receive electric upgrades and potential workforce shortages, in the cases that upgrades are needed, will be tracked by implementation working group and accessibility factors will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments. Pacific Gas and Electric would be a member of the implementation working group if the rule amendments are adopted, and its knowledge of wait times for requested work and neighborhood infrastructure needs will be key to the interim reporting process.

See also Master Response 22 (General Opposition: Emergency Situations) for a discussion of appliance replacements in emergency situations.

48) Panel Upgrades: Cost

Comment: *Panel upgrades and other electric work can be cost prohibitive. Commenters stated that costs for panel upgrades and electrical service work would be higher than the costs included in the Air District's analysis. Some commenters included cost estimates based on previous electrical upgrades or contractor quotes, with some figures indicating estimated total project costs of more than \$80,000 for newly installed heat pump HVAC and water heater systems and all required upgrades.*

AGC of CA, AHRI, Bryce Vree, Dan Winter, Daniel Feldman, David Eichar, Eric Frick, Families and Homes San Jose, Jeremy Wright, Joseph Machado, Leif Ortegren, LR Jensen, Michael Kapolnek, Mitch Lerman, Pedram Navid, Randy Breunling, Regan Avery, Richard Staehnke, Sergio Marti, TJ Giuli, Western Propane Gas Association

Response: Staff appreciates the concerns expressed by commenters regarding potential costs of panel upgrades and other electrical service work (groundwiring, rewiring and additional concerns). The socioeconomic analysis, included as Appendix D to the Staff Report, evaluates potential costs to consumers, including potential panel upgrade costs where applicable. Staff recognizes that individual contractor costs for a specific project can vary widely and acknowledges that there are specific situations in which panel upgrade costs will be higher or lower than those presented. The panel upgrade costs presented in the socioeconomic report and throughout the proposal package reflect staff's best estimate of average costs for these types of panel upgrades at the time of preparation. Additionally, the proposed rule amendments include a commitment from staff to provide an interim report to the Board of Directors discussing accessibility and cost factors, including costs for panel upgrades, as these continue to evolve.

As noted in Master Response 46 (Panel upgrades: Need), while panel and electric service upgrades were commonly needed for high voltage and lower efficiency electric technologies, these upgrades may not be necessary with the newer low voltage appliances coming to market and would not be needed if zero-NOx gas appliances are developed and chosen by consumers. In addition, funding may be available for any necessary panel upgrades and related costs. For example, the High Efficiency Home Rebate program under the Federal Inflation Reduction Act provides up to \$6,500 for electric panel or breaker upgrades and electric wiring updates. This program is income restricted with the funds available to households earning less than 80 percent of the area median income. California expects to receive \$280 million associated with this program. State programs, currently planned to be funded at \$835 million through the California Energy Commission, are also scheduled to come online in 2023.

Consolidation of this information and facilitating access to these programs will also be included in the Air District's work during the implementation period of the proposed rule amendments. The implementation working group will track accessibility factors including cost and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

Public Education

49) Public Education: Compass

Comment: *General comments regarding need for more public education on how homeowners can access funding, compliant appliances and for all citizens to be made aware of the proposed rule amendments.*

Annette Ross, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Catherine Su, Jason Biggs

Response: Air District staff appreciates comments and suggestions received regarding public outreach and education on the proposed rule amendments. Should the proposed amendments be adopted, staff views this as the beginning of a very important implementation period prior to the first zero-NOx compliance date in 2027, which would include a public outreach and educational campaign. The Air District has been involved in incentive programs for residential appliances as well as developing educational campaigns such as the Clean Building Compass and The Switch is On campaigns. Staff intends to build on this work through the implementation working group and call upon volunteer member cities, counties, community choice aggregators and community organizations, among others, to assist in spreading information on the requirements as well as other technical and logistical information for property owners.

Additionally, the structure of the regulations is intended to place the primary compliance obligation on retailers, distributors, and installation contractors, who are prohibited from selling or installing non-compliant appliances. Air District staff endeavors to ensure through the implementation working group that, if an appliance is available for sale within the Air District, a resident should be safe in assuming that it meets all requirements of the proposed rule amendments at that time.

For the reasons set forth in Master Response 24 (General Opposition: Necessity, Health), staff believes that the associated emissions and health benefits are important to realize as soon as practicable through regulatory action as opposed to allowing more polluting appliances to be installed, therefore delaying emissions reductions by the lifetime of another non-compliant appliance.

50) Public Education: Equity

Comment: *Commenter made a request for additional assistance with funding and education for low- and moderate-income households.*

BEI, Rising Sun, Greenlining, City of Berkeley

Response: Staff understands the need for more accessible information regarding funding sources, how to access them and how to take advantage of all of the programs available to residents, particularly low- and moderate-income households. While staff plans to include the development of public education materials as part of the implementation strategy, the details of this plan would be informed by members of the implementation working group, including community advocacy and environmental justice organizations. Through consultations with these groups, community listening sessions, and continued coordination with organizations that are distributing funding and financing mechanisms (BayREN, CPUC, community choice aggregators), Air District staff intends to produce materials that would facilitate access to and assist in navigating these programs.

Rule Language

51) Rule Language: Manufacture Date

Comment: *Request for clarification that emissions standards apply based on manufacture date, not sale or installation date.*

Rheem

Response: Staff agrees and believes this is clearly stated in Sections 9-4-301.1, 301.2, 301.3, as well as Sections 9-6.301.5 and 303.5. The emissions standards of the proposed rule amendments apply to appliances that are *manufactured after* the relevant compliance date. The date of sale or installation of the appliance is not relevant to determining compliance with the proposed rule amendments.

52) Rule Language: Certification Calculation

Comment: *Commenters request additional detail on how certification calculation should be completed, including potential averaging for dual fuel appliances.*

AHRI, BOMA, Rheem

Response: Staff appreciates comments regarding non-zero standards, however staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies currently available on the market that do not emit NOx upon operation.

With regards to certification calculations, models will be certified on a case-by-case basis and all natural-gas-fired appliances seeking to be certified for compliance with the ultra-low NOx requirements of 14 ng/J (Section 9-4-301.2) must demonstrate that the emissions standards will not be exceeded through the certification calculations as laid out in the Determination of Emissions (Section 9-4-601). All natural-gas-fired appliances seeking to be certified for compliance with the zero-NOx requirements pursuant to Sections 9-4-301.3, 9-6-301.5 or 9-6-303.5 must demonstrate the emissions standards will not be exceeded through the certification calculations as laid out in the Determination of Emissions pursuant to Sections 9-4-601 or 9-6-601, respectively. Electric appliances are not subject to Rules 9-4 or 9-6, as these rules only apply to natural gas-fired appliances. As such, no certification is needed for electric appliances.

53) Rule Language: Replacements

Comment: *Request for clarification that rule only applies to replacements and not repairs.*

BOMA

Response: The emissions standards of the proposed rule amendments apply specifically to the sale and installation of appliances that are manufactured after the relevant compliance date. Therefore, the proposed amendments will not impact the ability to repair an existing appliance at

any time. However, repaired appliances could not be relocated to (installed in) another building within the Air District to circumvent the proposed standard.

54) Rule Language: General

Comment: *Multiple comments regarding rule language and clarifications.*

AHRI

Response: Within the emissions standards section of proposed changes to Rule 9-4, there is a differentiation between a “Natural-Gas Fired Furnace” (defined in Section 9-4-203.1) and a “Natural-Gas Fired Fan Type Central Furnace” (defined in Section 9-4-203.2). The ultra-low NOx emissions standard as proposed in Section 9-4-301.2 is intended to only apply to natural gas-fired fan type central furnaces, in line with the scope of appliances to which the current Rule 9-4 applies. Thus, as proposed, NOx emissions standards through 2029 would apply only to natural-gas fired fan type central furnaces.

The zero-NOx standard as proposed in Section 9-4-301.3 would apply to an expanded universe of appliances beyond fan type central furnaces, which would include all natural gas-fired furnaces (Section 9-4-203.1). The definition of a natural gas furnace stated in Section 9-4-203.1 was developed with the intent to be complementary to the Department of Energy’s definition for a furnace. Should wall heaters and other direct vent units meet the specifications of the definition of a natural gas furnace in the proposed amendments (a product with a heat input rate less than 175,000 BTU/hr which is designed to be a source of interior space heating that utilizes single-phase, three-phase or direct current in conjunction with natural gas), then those units would be subject to the emissions standards in Section 9-4-301.3 as well. Should additional clarification be required by the industry prior to the implementation dates of the proposed rule amendments, Staff may develop guidance with input of members of the implementation working group that represent manufacturers and other industry segments.

AHRI also requests clarification regarding the exemption of mobile homes in Section 9-4-301 and how weatherized units will be treated. Other than units installed for use in mobile homes, staff has not proposed any differentiation in emissions standards for weatherized and non-weatherized natural gas furnaces in the proposed amendments to Rule 9-4. Mobile homes refer to homes that can be transported in one or more sections and designed without a permanent foundation.

AHRI also requests a definition for dual-fuel systems be included with control requirements to ensure the weighted average NOx emissions are below the requirements. Rule 9-4 applies to natural gas-fired furnaces and all natural gas-fired units must be able to demonstrate average compliance with the requirements of 9-4-30

1.2 through the certification methods of 9-4-601. Dual-fuel units are not intended to be exempted from the ultra-low NOx requirements and are therefore not treated or defined differently. As part of the Air District’s work during the implementation period of the proposed rule amendments, should they be adopted, the implementation working group will track technological advancements in the market, which may or may not include compliant dual-fuel appliances. The implementation working group will include representation from manufacturers and distributors to provide up-to-date, best available information on appliance availability and technological advancements. These updates will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

Suggestions

55) Suggestion: Funding

Comment: *Commenters suggest that funding and incentive mechanisms are a preferred method to regulatory action at this time.*

AHRI, Bradford White Corporation, Duncan Moody, Jan Stoeckenius, Jason Biggs, Kristie Eglsaer, Mary Porter, Maureen Galindo, Randy Breunling, Tom Kabat

Response: Staff appreciates all comments that suggest that funding and incentive mechanisms (of varying types) may be a preferred path forward for encouraging the installation of zero-NOx appliances over regulatory action at this time. However, for the reasons set forth in Master Response 24 (General Opposition: Necessity, Health), staff believes that the associated emissions and health benefits are necessary to realize as soon as practicable through regulatory action as opposed to allowing more polluting appliances to be installed, therefore delaying emissions reductions by the lifetime of another appliance.

Staff understands the need for more accessible information regarding funding sources, how to access them and how to take advantage of all of the programs available to residents, particularly low- and moderate-income households. While staff plans to include the development of public education materials as part of the implementation strategy, the details of this plan would be informed by members of the implementation working group, including community advocacy and environmental justice organizations. Through consultations with these groups, community listening sessions, and continued coordination with organizations that are distributing funding and financing mechanisms (BayREN, CPUC, community choice aggregators), Air District staff intends to produce materials that would facilitate access to and assist in navigating these programs.

56) Suggestion: Enforcement

Comment: *Partner with and provide guidance to local jurisdictions with regards to compliance with the proposed standards.*

BEI, City of Berkeley, Greenlining, Marin County, Rising Sun

Response: Staff has begun and intends to continue coordinating with local jurisdictions such as cities and counties on the proposed rule amendments. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted to align with the proposed rule amendments, if the local jurisdiction so chooses, should they be adopted. This also includes guidance for building inspections to ensure that new installations of equipment are in compliance with the proposed rule amendments. Air District enforcement of the proposed amendments is intended to be focused on retailers and distributors of appliances. Air District staff endeavors to ensure through the implementation working group that, If an appliance is available for sale from a retailer or distributor within the Air District, a resident should be safe in assuming that it meets all requirements of the proposed rule amendments at that time. See Master Response XX (Public Education: Compass) for additional information.

57) Suggestion: Equity

Comment: *Recommendations for continued consideration of equitable implementation of rule amendments through implementation working group.*

AHRI, BEI, Bradford White Corporation, City of Berkeley, Greenlining, Marin County, Pacific Gas and Electric, Rising Sun

Response: Staff appreciates comments including suggestions on how to continue to integrate equitable and community centered processes in all of our projects and rule-making efforts. Should the proposed rule amendments be adopted, staff looks forward to continuing to work with partners from many jurisdictions around the Bay Area, including organizations that distribute incentives and other funding as well as community based and environmental justice focused organizations. The intention of the delayed implementation date, the implementation working group and the interim reporting process included in the proposed rule amendments is to allow for time and checkpoints along the pathway to implementation to ensure that the proposed rule amendments are meeting the equity goals and accessibility standards of the Air District.

58) Suggestion: Advocacy

Comment: *Air District should communicate with other regional and local agencies to coordinate decarbonization policies.*

Center for Sustainable Neighborhoods

Response: Air District staff notes that the Proposed Amendments are not decarbonization policies and do not require building decarbonization. Zero-NOx natural gas space and/or water heating technologies may be developed and if so, they would be in compliance with the Proposed Amendments. However, staff appreciates the identification of cross-sectional issues where comment and other education could be provided to other governmental agencies in the Bay Area and will continue to consider potential comments on these issues in the future. Staff looks forward to continuing to coordinate with other agencies outside of as well as within the implementation working group, should the proposed rule amendments pass.

59) Suggestion: Zonal Electrification

Comment: *PG&E comments that zonal electrification is a more efficient method for supporting the installation of zero-NOx appliances.*

Pacific Gas and Electric

Response: Staff appreciates Pacific Gas and Electric's input on its approach to updating the electrical and natural gas utility systems on a neighborhood or zonal basis. Staff is not proposing to require electrification of building appliances, but rather elimination of harmful NOx emissions. The Air District is tasked with protecting regional air quality and public health, and the proposed amendments best address the Air District's regional air quality concerns by prohibiting the sale or installation of all new appliances that emit NOx after the proposed compliance dates, regardless of location in the Bay Area. This allows for the proposed rule amendments for emissions reductions to be achieved across all neighborhoods of the Bay Area without locking in additional emissions in certain neighborhoods with continued installation of

appliances that negatively impact health outcomes. However, the proposed amendments will not preclude a utility from taking a geographical approach to grid upgrades, incentives, and outreach.

Supply Chain and Timeline

60) Supply Chain: Appliances availability

Comment: Commenters express concern associated with appliance availability and potential supply chain shortages.

Bill Maimone, Chibby Alloway, Randy Breunling, Rheem

Response: Staff's research concluded the timeline included in the proposed rule amendments is viable and important to send a signal and provide a goal for the market as well as other agencies and organizations to facilitate compliance. Section IV of the Staff Report contains a technology evaluation that outlines the equipment that is currently available to consumers that would be allowed under the proposed rule amendments. As has been the trend in recent years, it is expected that the variety and number of zero-NOx technologies available will increase between potential adoption of the proposed amendments and the compliance dates contained therein, the first zero-NOx compliance date being for small water heaters manufactured after January 1, 2027. The implementation working group additionally includes representatives for appliance manufacturers and other organizations that can alert Air District staff to any potential issues associated with the appliance supply chain.

61) Timeline: Permits/Setbacks

Comment: Commenters express concerns associated with city permitting issues, specifically with regards to setbacks for heat pumps installed outdoors, and potential extended timelines associated with these processes in retrofit scenarios.

Carolyn Mar, Daniel Feldman, Eric Frick, Joseph Machado, Katherine Hughes, Linda Chin, Linnea Wickstrom, Michael Kapolnek

Response: Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided. The proposed rule amendments would require an upgrade to zero-NOx appliances at the time that currently installed covered appliances reach the end of their useful life. Not all appliances will need to be replaced immediately upon the proposed compliance dates. This will alleviate pressure on a large number of replacements (and therefore potential panel upgrades) to be required at once.

Staff understands that commenters are concerned about timelines associated with utility upgrades, specifically those that are required by Pacific Gas and Electric. Pacific Gas and Electric will be a key member of the implementation working group, should the proposed rule amendments be adopted. Data and information from Pacific Gas and Electric on its response times and workforce availability will be a key input to the interim report to the Board of Directors that is included in the proposed rule amendments. Staff additionally has begun and intends to continue coordinating with local jurisdictions such as cities and counties on how implementation

of the proposed rule amendments would be interpreted at the city level. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted to align with the proposed rule amendments, if the local jurisdiction so chooses, should they be adopted.

62) Timeline: Delay Implementation

Comment: *Commenters suggest that the compliance dates for the proposed rule amendments should be delayed in order to account for a variety of factors.*

AHRI, Bradford White Corporation, Jason Biggs, Jeremy Wright, Joseph Machado, Melodie Lew, Peter Jon Shuler, Randy Breunling, Rocky Fort

Response: The proposed amendments will improve regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances.

Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. The standards will also improve overall regional air quality. As a result, the timeline proposed in the rule amendments is a reasonable balance between achieving the health and air quality benefits for the region and its residents as soon as practicable while allowing sufficient time for market growth, supply chain and workforce response and to address equity considerations.

If the Proposed Amendments are adopted, staff will monitor the availability and cost of zero-NOx appliances, and infrastructure readiness concerns, in advance of the future compliance dates and report to the Air District Board of Directors through the interim reporting process on these issues.

Workforce

63) Workforce: Availability/Training

Comment: *Comment regarding potential lack of workforce to competently install compliant appliances and support related infrastructure such as utility maintenance and upgrades. Additional comments from unions regarding need to support appropriate workforce training.*

Adams Broadwell Joseph and Cardozo, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Dan Winter, EJ CIRE SMART Local Union 104, Kristie Eglsær, Leif Ortegren, Linnea Wickstrom, Lisa Taner, Michael Kopolnek, Ronald Vinsant, San Jose Community Energy Advocates, Victor Buathier

Response: Staff understands that the availability of trained workers for appliance installation, potential associated additional upgrades and utility upgrades and maintenance is key to a successful implementation of the proposed rule amendments. Workforce training and availability is an important issue that will be monitored by the implementation working group and will be a

focus of interim report. The implementation working group will include representation from unions and contractor trade associations as well as entities that provide workforce training such as BayREN. Electric heat pumps have been on the market for 75 years and have been commonly used since the 1970s. Many contractors have been installing heat pumps at residences and businesses for decades and are very experienced with installation and repairs. Workforce training for these appliances has increased significantly in recent years and this growth is expected to continue with the potential passage of the proposed amendments as an important signal in spurring this workforce growth. Should the amendments be adopted, Air District staff intends to work with the groups on the implementation working group as well as others in the coming years to assist in the facilitation of available and trained workforce that can efficiently and safely support the implementation of the proposed rule amendments.

64) Workforce: Transition

Comment: *Commenter is concerned about job guarantees for utility workers and ensuring a just transition.*

Adams Broadwell Joseph and Cardozo, Bradford White Corporation

Response: Staff appreciates the concern raised by the commenter regarding a just transition for the workforce including utility workers. While not within the direct control of the Air District, staff intends to continue working with unions, trade associations and organizations that administer training programs to help facilitate the transition of workers across different aspects of the industry to the extent needed to support deployment of zero-NOx appliances.

Attachment 1: Organizations and Individuals Who Submitted Written Comments on the Proposed Amendments to Rule 9-4 and Rule 9-6

Commenter	Organization/Affiliation	Date	Comment Category	Subcategory
350 Bay Area	Organization	2/6/2023	Support	General
A Yvette Huginnie	Public	2/5/2023	General opposition	Grandfathering
Abalone Alliance	Public	2/6/2023	Support	General
Abbot Foote	Public	2/6/2023	Support	General
Adam Buck	Public	1/18/2023	Support	General
Adam Sweeney	Public	2/4/2023	Support	General
Adams Broadwell Joseph and Cardozo	Organization	2/6/2023	Grid Capacity	Statewide planning
		2/6/2023	Cost	Renters
		2/6/2023	Grid Capacity	Reliability
		2/6/2023	Cost	Utility Costs
		2/6/2023	Grid Capacity	Insufficient capacity
		2/6/2023	Workforce	Transition
		2/6/2023	Workforce	Availability/Training
		2/6/2023	General opposition	Regional regulation
Aditee Kumthekar	Public	2/4/2023	Support	General
Adrienne Etherton	Public	2/6/2023	Support	General
AGC of CA	Organization/Labor	2/2/2023	General opposition	Electricity generation
			Heat Pump	Cold weather operation
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
			Grid Capacity	Statewide planning
			Panel upgrades	Need
			Panel upgrades	Time
			Heat Pump	Availability/Training
			General opposition	Emergency situations
AHRI	Organization/Manufacturer	2/6/2023	Cost	General
			Natural Gas	Continued operation
			Cost	Utility Costs
			Cost	Equity

			General Opposition	Emergency situations
			Panel upgrades	Time
			EIR	Alternatives
			Rule Language	Certification calculation
			Suggestion	Appliances availability
			Heat pump	Commercial
			General Opposition	Exemptions
			Rule Language	General
			Heat Pump	Availability/Delay
			Cost	Beyond panel
			Cost	Existing spaces
			Timeline	Delay implementation
			Suggestion	Funding
			Suggestion	Equity
AJ Cho	Public	2/6/2023	Support	General
Alan Chen	Public	2/6/2023	Support	General
Alan Peevers	Public	2/6/2023	Support	General
Alexander Pakter	Public	2/6/2023	Support	General
Alexis Georgiou	Public	2/3/2023	Support	General
Alfred Who	Public	1/19/2023	Natural gas	Continued operation
			Grid Capacity	Reliability
Alfredo Angulo	Public	2/6/2023	Support	General
Alice Polesky	Public	2/6/2023	Support	General
Allan Campbell	Public	2/3/2023	Support	General
Amanda Bancroft	Public	2/6/2023	Support	General
Amanda Rosenberg	Public	2/6/2023	Support	General
Amanda Zagara	Public	2/4/2023	Support	General
Andrea Gara	Public	2/6/2023	Support	General
Andrew Morse	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
Andrew Pollack	Public	1/23/2023	Natural gas	Ban
			Cost	Housing
			Cost	Market change
			Cost	Renters

			Panel upgrades	Cost
			Cost	Equity
			General opposition	Necessity, health
Angela Evans	Public	2/4/2023	Support	General
Angela Gantos	Public	2/6/2023	Support	General
Angele Price	Public	2/3/2023	Support	General
Anna Koster	Public	2/3/2023	Support	General
Anna Shurter	Public	2/6/2023	Support	General
Anne Prescott	Public	2/6/2023	Natural gas	Ban
Annette Ross	Public	2/6/2023	Cost	Funding
			Heat Pump	Commercial
			EIR	Noise
			Public Education	Compass
			Existing Spaces	Permits/Setbacks
			Existing Spaces	Exemptions
			Emissions	GHG co-benefits
			EIR	General
			Grid Capacity	Insufficient capacity
			Natural gas	Ban
			General opposition	Exemptions
Anthony Pratali	Public	2/6/2023	Natural gas	Ban
Anthony Rondoni	Public	1/18/2023	Cost	Utility Costs
			Natural gas	Ban
			Cost	Existing spaces
			Grid Capacity	Insufficient capacity
Arlene Baxter	Public	2/6/2023	Support	General
Ashesh Parekh	Public	2/6/2023	Support	General
Ashley Kline	Public	2/5/2023	Heat Pump	Efficiency
			Cost	General
			Panel upgrades	Need
			General opposition	Necessity, health
Aubrey Wilson	Public	2/6/2023	Support	General
Audrey Ichinose	Public	2/6/2023	Support	General
Barbara Hollenbach	Public	2/6/2023	Support	General
Barbara Kyser	Public	2/3/2023	Support	General
Barbara Sandow	Public	2/6/2023	Support	General

Barry Robbins	Public	2/6/2023	General opposition	Grandfathering
			Cost	General
BayREN	Organization	2/2/2023	Support	General
Becca Ya	Public	2/2/2023	Support	General
BEI, Rising Sun, Greenlining, City of Berkeley	Government	2/6/2023	Public Education	Compass
			Public Education	Equity
			Cost	Funding
			Suggestion	Equity
			Suggestion	Enforcement
			Workforce	Availability/Training
Belinda Chlouber	Public	2/1/2023	Support	General
Ben Martin	Public	2/3/2023	Support	General
Benjamin Bingaman	Public	2/3/2023	Support	General
Benjamin Keller	Public	2/6/2023	Support	General
Berkeley Electrification Working Group	Organization	2/4/2023	Support	General
Bhima Sheridan	Public	2/6/2023	Support	General
Bianca Molgora	Public	2/6/2023	Support	General
Bill Hough	Public	1/19/2023	Grid Capacity	Reliability
Bill Hough	Public	1/19/2023	General opposition	Necessity, health
Bill Maimone	Public	2/6/2023	General opposition	Exemptions
			General opposition	Necessity, health
			Supply Chain	Appliances availability
Bill Nugteren	Public	2/6/2023	Natural gas	Ban
			Emissions	Necessity, health
			Grid Capacity	Reliability
			General opposition	Necessity, health
Blaine Burgdtrom	Public	2/3/2023	Support	General
BOMA	Organization/Building Management	2/6/2023	Natural gas	Ban
			Rule Language	Replacements
			Heat Pump	Commercial
			General opposition	Exemptions

Bradford White Corporation	Organization/Manufacturer	2/6/2023	Timeline	Delay Implementation
			Rule Language	Certification Calculation
			General opposition	Emergency situations
			Heat pump	Availability/Delay
			Panel upgrades	Need
			Existing Spaces	General
			Suggestion	Equity
			Suggestion	Funding
			Heat pump	Commercial
			Cost	General
			Cost	Equity
			EIR	Alternatives
			Workforce	Transition
Brenda Wallace	Public	2/6/2023	Support	General
Brendan Moriarty	Public	1/21/2023	Support	General
			Cost	Funding
			Public Education	Compass
			Workforce	Availability/Training
Bret Andersen	Public	2/6/2023	Support	General
Brian Avery	Company	2/6/2023	General opposition	Necessity, health
			Panel upgrades	Need
			Grid Capacity	insufficient capacity
Brian Johnson	Public	1/18/2023	Panel upgrades	Need
			Natural gas	Ban
			Grid Capacity	Reliability
			Cost	Existing spaces
			Cost	Funding
Brittany Dhawan	Public	2/6/2023	Support	General
Bruce Adornato	Public	2/6/2023	General opposition	Necessity, health
Bruce Coston	Public	2/6/2023	Support	General
Bruce England	Public	2/3/2023	Support	General
Bruce J Burns	Public	2/6/2023	Support	General
Bruce Jackson	Public	2/6/2023	Grid Capacity	Reliability
Bruce Naegel	Public	2/6/2023	Support	General
Bruce Nilles	Public	2/6/2023	Support	General

Bryce Vree	Public	1/18/2023	Panel upgrades	Need
			Natural gas	Ban
			Panel upgrades	Time
			Panel upgrades	Cost
			Grid Capacity	Reliability
			Grid Capacity	Statewide planning
Caephren McKenna	Public	2/6/2023	Support	General
California Air Resources Board	Government	2/3/2023	Support	General
Carla Davis	Public	2/6/2023	Support	General
Carly Ritter	Public	2/6/2023	Support	General
Carol Benioff	Public	2/6/2023	Support	General
Carol Bettencourt	Public	2/6/2023	Support	General
Carol Mone	Public	2/4/2023	Support	General
Carol Savary	Public	2/6/2023	Support	General
Carol Schaffer	Public	2/6/2023	Support	General
Caroline Ayres	Public	2/6/2023	Support	General
Carolyn Mar	Public	2/5/2023	Grid Capacity	Insufficient Capacity
			Panel upgrades	Need
			Timeline	Permits/Setbacks
			General opposition	Equity
Caryn Graves	Public	2/6/2023	Support	General
Catherine Cameron	Public	2/3/2023	Support	General
Catherine Su	Public	2/6/2023	General opposition	Necessity, health
			Cost	Utility Costs
			General opposition	Stove Study
			Public Education	Compass
Cecile Mochnek	Public	2/6/2023	Support	General
Celeste Anacker	Public	2/6/2023	Support	General
Center For Sustainable Neighborhoods	Organization	2/6/2023	Heat Pump	Efficiency
			Suggestion	Advocacy
Chanel Harris	Public	1/30/2023	General opposition	Stove study

			Grid Capacity	Reliability
Charles Getz	Public	1/23/2023	Natural gas	Ban
			EIR	Benefits
			EIR	Grid Impacts
			Cost	Housing
			5th Amendment	Takings Clause
			EIR	General
			Cost	General
			General opposition	Authority
			Cost	Equity
			General opposition	Necessity, health
Charles Wieland	Public	2/6/2023	Support	General
Cheryl Schaff	Public	2/6/2023	Support	General
Cheryl Weiden	Public	2/3/2023	Support	General
Chibby Alloway	Public	2/1/2023	Cost	Equity
			Grid Capacity	Reliability
			Supply Chain	Appliances availability
			General opposition	Necessity, health
			Grid Capacity	Insufficient capacity
			Cost	Utility Costs
			Cost	General
Chris Lish	Public	2/5/2023	Support	General
Christina Nielsen	Public	2/6/2023	Support	General
Christine Goldin	Public	2/6/2023	Support	General
Christine Patel	Public	2/5/2023	Support	General
Christopher Ware	Public	2/6/2023	Support	General
Cindy Haag	Public	2/6/2023	Support	General
Cindy Sidaris	Public	2/3/2023	Support	General
Claire Broome	Public	2/6/2023	Support	General
Claudia Hevel	Public	2/3/2023	Support	General
Climate Action CA et al	Organization	2/6/2023	Support	General
Climate Reality Project Silicon Valley	Organization	2/2/2023	Support	General
Colin Daley	Public	1/18/2023	Grid Capacity	Reliability
			Natural gas	Continued operation
			Natural gas	Ban
Corwin Zechar	Public	2/6/2023	Support	General

Craig Husfeld	Public	2/3/2023	Support	General
Craig Talyor	Public	1/25/2023	Cost	Market change
			General opposition	Necessity, health
Cynthia Cima-Ivy	Public	2/6/2023	Cost	General
			Cost	Beyond Panel
D Pickham	Public	2/6/2023	Cost	General
			General opposition	Necessity, health
Damon Brown	Public	2/6/2023	Support	General
Dan Kalb	Public	2/6/2023	Support	General
Dan Winter	Public	1/18/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Panel upgrades	Need
			Panel upgrades	Cost
			Workforce	Availability/Training
			Panel upgrades	Time
			Grid Capacity	Statewide planning
Dani Zacky	Public	2/6/2023	Support	General
Daniel Feldman	Public	2/3/2023	Emissions	Necessity, health
			Emissions	Peer Review
			EIR	Grid Capacity
			Panel upgrades	Time
			Timeline	Permits/Setbacks
Daniel Hachigian	Public	2/6/2023	Grid Capacity	Reliability
			General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
Danielle Mieler	Public	2/6/2023	Support	General
Dave Clark	Public	2/2/2023	Support	General
David Bezanson	Public	2/4/2023	Support	General
David Boyer	Public	2/6/2023	Support	General
David Eichar	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
David Fairley	Public	1/19/2023	Support	General

David Gassman	Public	2/6/2023	Support	General
David Kaskowitz	Public	2/6/2023	Support	General
David Luce	Public	2/6/2023	General opposition	Necessity, health
			General opposition	Stove study
			Cost	General
			Grid Capacity	Reliability
			Natural gas	Continued operation
David Luu	Public	2/3/2023	Support	General
David Romano	Public	2/6/2023	Support	General
David Sowerwine	Public	2/6/2023	Support	General
Deanna Knickerbocker	Public	2/6/2023	Support	General
Debbie Mytels	Public	2/6/2023	Support	General
Deborah Holcomb	Public	2/6/2023	Support	General
Deborah St Julien	Public	2/3/2023	Support	General
Deirdre Fennessy	Public	2/6/2023	Support	General
Derrick Holt	Public	2/6/2023	Support	General
Diane Bailey	Public	2/6/2023	Support	General
Diane Perrone	Public	2/6/2023	General opposition	Necessity, health
			Cost	General
Don Jackson	Public	2/6/2023	Support	General
Don Meehan	Public	2/6/2023	Support	General
Don Weiden	Public	1/27/2023	Support	General
Donald Duggan	Public	1/18/2023	Cost	Cost vs. Benefits
			Cost	Air Conditioning
			EIR	Travel
Donna Davies	Public	2/3/2023	Support	General
Donna Sharee	Public	2/6/2023	Support	General
Douglas Brookes	Public	2/2/2023	Support	General
Du Ng	Public	2/3/2023	Support	General
Duncan Moody	Public	2/3/2023	Cost	General
			Suggestion	Funding
Dylan Ackerman	Public	2/2/2023	Support	General
East Bay Community Energy	Community Choice Aggregator	2/6/2023	Support	General
Edward Richardson	Public	2/6/2023	Support	General
Edwin Aiken	Public	2/3/2023	Support	General
Eihway Su	Public	2/6/2023	Support	General
Eileen Adams	Public	2/6/2023	Support	General

Eileen Lepera	Public	2/6/2023	Support	General
EJ Cire SMART Local Union 104	Organization/Labor	2/6/2023	Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Workforce	Availability/Training
Elena Engel	Public	2/2/2023	Support	General
Elizabeth Gioumousis	Public	2/3/2023	Support	General
Elizabeth Lee	Public	2/4/2023	Support	General
Elizabeth Levy	Public	2/6/2023	Support	General
Ellen Beans	Public	2/6/2023	Support	General
Ellen Leng	Public	2/2/2023	Support	General
Ellen Rosenblum	Public	2/6/2023	Support	General
Emily Wheeler	Public	2/6/2023	Support	General
Emma Hitzke	Public	2/3/2023	Support	General
Emy Baldwin	Public	1/29/2023	General opposition	Stove study
			General opposition	Necessity, health
Eric Brettner	Public	2/6/2023	Support	General
Eric Frick	Public	2/6/2023	Cost-Effectiveness	General
			Natural gas	Ban
			Cost	Beyond panel
			Cost	Existing spaces
			Panel upgrades	Time
			Timeline	Permits/Setbacks
			EIR	Noise
			Existing Spaces	permits/setbacks
			Emissions	GHG co-benefits
			EIR	General
			EIR	Alternatives
			General Opposition	Necessity, health
			Cost	Cost vs. Benefits
			Cost	Market change
			Heat Pump	Efficiency
			Existing Spaces	General
Erin Foret	Public	2/6/2023	Support	General
Ernie Walters	Public	2/6/2023	Support	General
Evan Jane Kriss	Public	2/6/2023	Support	General

Families and Homes San Jose	Public	2/6/2023	Cost	General
			Panel upgrades	Time
			Cost	Housing
			Grid Capacity	Insufficient capacity
			Panel upgrades	Cost
			Existing Spaces	General
			Cost	Funding
			Grid Capacity	Reliability
Felix Mbuga	Public	2/6/2023	Support	General
Fiona Hyland	Public	2/3/2023	Support	General
Flora Rosaa	Public	2/6/2023	Support	General
Floy Andrews	Public	2/6/2023	Support	General
Forest Frasier	Public	2/6/2023	Support	General
Fred Bialy	Public	2/6/2023	Support	General
Fred Ortiz	Public	2/3/2023	General opposition	Necessity, health
Gabriel Quinto	Public	2/6/2023	Support	General
Gary Farber	Public	2/6/2023	Support	General
Gary Stevens	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
			Cost	Existing spaces
			Cost	Utility Costs
			General opposition	Exemptions
Gary Troutt	Public	2/1/2023	Support	General
Genevieve Deppong	Public	2/6/2023	Support	General
Gerard Manning	Public	2/6/2023	Support	General
Ginnie Plato	Public	2/3/2023	General opposition	Necessity, health
Giovannina Fazio	Public	2/3/2023	Support	General
Gladwyn D'Souza	Public	2/6/2023	Support	General
Gloria Linda Maldonado	Public	2/3/2023	Support	General
Greg Ratkovsky	Public	2/6/2023	Support	General
Greg Spooner	Public	2/6/2023	Support	General
Gregory Bell	Public	2/6/2023	Support	General
Hala Al-Shahwany	Public	2/6/2023	Support	General
Hannah Quirk	Public	2/4/2023	Support	General

Harriet Harvey-Horn	Public	2/6/2023	Support	General
Harvest Thermal	Company	2/6/2023	Support	General
Henry Riggs	Public	2/6/2023	General opposition	Necessity, health
			Natural gas	Ban
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
			General opposition	Necessity, health
Hilary Glann	Public	2/6/2023	Support	General
Hollenback Avenue Residents	Public	1/19/2023	Panel upgrades	Cost
			Heat Pump	Efficiency
			Heat Pump	Commercial
Holly Lazzarini	Public	1/27/2023	General opposition	Necessity, health
Howard Cohen	Public	2/6/2023	Support	General
Howard Crittenden	Public	2/7/2023	Natural gas	Ban
Howdy Goudey	Public	2/6/2023	Support	General
Igor Tregub	Public	2/6/2023	Support	General
Ingrid Kallman	Public	2/6/2023	Support	General
Izmirian Roofing and Sheet Metal	Company	2/6/2023	Heat Pump	Efficiency
			Cost	General
			Heat Pump	Noise
			Grid Capacity	insufficient capacity
			Existing Spaces	Permits/Setbacks
			EIR	Noise
			Emissions	Necessity, health
J Angell	Public	2/6/2023	Support	General
J Barry Gurdin	Public	2/6/2023	Support	General
J Herbert	Public	2/4/2023	Support	General
J.W. Oman	Public	2/6/2023	Support	General
Jake Cosenza	Public	1/19/2023	Panel upgrades	Cost
James Wu	Public	2/6/2023	Support	General
Jamie Beckett	Public	2/4/2023	Cost	Equity
			Panel upgrades	Cost

			General opposition	Necessity, health
Jamie Nahman	Public	2/6/2023	Support	General
Jan Rhoades	Public	2/6/2023	Support	General
Jan Stoeckenius	Public	1/31/2023	General opposition	Necessity, health
			Emissions	GHG co-benefits
			Emissions	Necessity, health
			Heat Pump	Efficiency
			Cost	Utility Costs
			Suggestion	Funding
Janet Creech	Public	2/6/2023	Support	General
Janet Garcia	Public	2/3/2023	General opposition	Necessity, health
Janet Odell	Public	2/3/2023	Support	General
Jason Biggs	Public	2/6/2023	Cost	General
			Cost	Equity
			Cost	Utility Costs
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
			Natural gas	Ban
			Suggestion	Funding
			Timeline	delay implementation
			Public Education	compass
Jason Fish	Public	2/6/2023	Support	General
Jason Friedrichs	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
			Grid Capacity	Reliability
Jay Feldis	Public	2/6/2023	General opposition	Necessity, health
Jean Jackman	Public	2/6/2023	Support	General
Jeff Burke	Public	1/18/2023	Grid Capacity	Reliability
			Natural gas	Continued operation
Jeff Calcagno	Public	2/6/2023	Cost	General
			General opposition	Propane
			Grid Capacity	Reliability
Jeff Lindquist	Public	2/3/2023	Support	General
Jeffery Hurwtiz	Public	2/6/2023	Support	General
Jeffery Mann	Public	2/6/2023	Support	General
Jeffery Nigh	Public	2/6/2023	Support	General

Jeffery Suplica	Public	2/6/2023	Support	General
Jeffrey Perrone	Public	2/4/2023	Support	General
Jeffrey Spencer	Public	2/3/2023	Support	General
Jency James	Public	2/6/2023	Support	General
Jennifer Graber	Public	2/3/2023	Support	General
Jennifer Heggie	Public	2/5/2023	Support	General
Jennifer Huber	Public	1/20/2023	Panel upgrades	Cost
Jennifer Mazzon	Public	2/4/2023	Support	General
Jennifer Thilman	Public	2/3/2023	Support	General
Jennifer Thompson	Public	2/3/2023	Support	General
Jennifer Valentine	Public	2/3/2023	Support	General
Jenny Green	Public	2/2/2023	Support	General
Jeremy Wright	Public	2/4/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Cost	General
			Heat Pump	Reliability
			Cost	Equity
			Grid Capacity	insufficient capacity
			General opposition	Necessity, health
			5th Amendment	Takings Clause
			Timeline	Delay Implementation
Jessie Hagler	Public	2/6/2023	Support	N/A
Jim Beatty	Public	2/6/2023	cost	Equity
			General opposition	Necessity, health
Jim Clark	Public	1/18/2023	General opposition	Necessity, health
Jim Robbins	Public	1/18/2023	Cost	Existing spaces
			Existing Spaces	Permits/Setbacks
Jiro Yamamoto	Public	2/6/2023	Support	General
Jo Ann Mandinach	Public	2/6/2023	Grid Capacity	Reliability
			Cost	General
Joanna Smiley	Public	2/3/2023	Support	General
Joe Smith	Public	2/6/2023	Support	General
Joel Soloksky	Public	2/6/2023	Support	General
John Accinelli	Public	1/18/2023	Cost	General
			Heat Pump	Operation

			Grid capacity	Insufficient capacity
			General opposition	Necessity, health
John Accinelli	Public	1/25/2023	Grid Capacity	Insufficient capacity
			Cost	General
John Anderson	Public	2/5/2023	Support	General
John Becker	Public	2/4/2023	Support	General
John De Forest	Public	2/6/2023	Support	General
John McKenna	Public	2/6/2023	Support	General
John Neal	Public	2/4/2023	Support	General
John Oda	Public	2/3/2023	Support	General
John Sheakley	Public	2/6/2023	General opposition	Stove study
			EIR	Grid Impacts
Jonathan Eden	Public	2/6/2023	Support	General
Jordan Briskin	Public	2/3/2023	Support	General
Joseph Lam	Public	2/3/2023	Support	General
Joseph Machado	Public	2/3/2023	Cost	General
			Panel upgrades	Need
			Timeline	Permits/Setbacks
			Panel upgrades	Time
			Timeline	Delay Implementation
			General opposition	Necessity, health
Josephine Coffey	Public	2/6/2023	Support	General
Josh Dickinson	Public	2/6/2023	Support	General
Joslyn Baxter	Public	2/6/2023	Support	General
Judith Bushey	Public	2/4/2023	Support	General
Judith Weisman	Public	2/6/2023	Support	General
Judy Weatherly	Public	2/6/2023	Cost	Equity
			General opposition	Necessity, health
Julia Howlett	Public	2/3/2023	Support	General
Julia Wall	Public	2/3/2023	Grid Capacity	Insufficient capacity
			Grid Capacity	Statewide planning
			Cost	General
Julie Groves	Public	2/3/2023	Support	General
Julie Kloper	Public	2/3/2023	Support	General
Julie Lindow	Public	2/6/2023	Support	General
Justin Evans	Public	2/5/2023	Support	General
Kaela Plank	Public	2/6/2023	Support	General
Karen Kirschling	Public	2/6/2023	Support	General

Karl Peirce	Public	2/6/2023	Support	General
Kat Snyder	Public	2/6/2023	Support	General
Katherine Falk	Public	2/2/2023	Support	General
Katherine Hughes	Public	2/6/2023	General opposition	Necessity, health
			Natural gas	continued operation
			Grid Capacity	Reliability
			Grid Capacity	insufficient capacity
			Timeline	Permits/Setbacks
			Cost	Utility Costs
Katherine Robinson	Public	2/5/2023	Support	N/A
Kathy Battat	Public	2/6/2023	Support	General
Kathy Dervin	Public	2/6/2023	Support	General
Kathy Kerridge	Public	2/6/2023	Support	General
Katie Rueff	Public	2/4/2023	Support	General
Keith Rhinehart	Public	2/6/2023	Support	General
Kelly Porter	Public	2/6/2023	Grid Capacity	Reliability
			Panel upgrades	cost
			Cost	General
			General opposition	Exemptions
Kevin Branstetter	Public	2/6/2023	Support	General
Kevin Hearle	Public	2/4/2023	Support	General
Kevin Ma	Public	2/6/2023	Support	General
Kiana Chandruang	Public	2/6/2023	Support	General
Kim Messmer	Public	2/3/2023	Support	General
Kristel Rietesel	Public	2/6/2023	Support	General
Kristel Wickham	Public	2/6/2023	Support	General
Kristen Conner	Public	2/6/2023	Support	General
Kristie Eglisær	Public	2/3/2023	Workforce	Availability/Training
			Suggestion	Funding
			Grid Capacity	Reliability
Lacey Hicks	Public	2/3/2023	Support	General
Lada Adamic	Public	2/2/2023	General opposition	Necessity, health
Larry Thompson	Public	1/30/2023	Natural gas	Ban
			General opposition	Necessity, health
Laura Bernstein	Public	2/6/2023	Support	General
Laura Dill	Public	2/6/2023	Support	General
Lawrence Deng	Public	2/3/2023	Support	General
Leana Rosetti	Public	2/6/2023	Support	General

Leane Eberhart	Public	2/6/2023	Support	General
Leif Ortegren	Public	1/20/2023	Workforce	Availability/Training
			Panel upgrades	Time
			Panel upgrades	Cost
			Cost	Equity
			General opposition	Necessity, health
Leonie Terfort	Public	2/6/2023	Support	General
Lesley Hunt	Public	2/6/2023	Support	General
Lesley Shultz	Public	2/6/2023	Support	General
Leslie Smith	Public	2/6/2023	Support	General
Lewis Paris	Public	2/6/2023	Grid Capacity	Reliability
Lin Griffith	Public	2/6/2023	Support	General
Linda Chin	Public	2/5/2023	General opposition	Grandfathering
			Panel upgrades	Cost
Linda Chin	Public	2/5/2023	Timeline	Permits/Setbacks
Linda Ramey	Public	2/6/2023	Support	N/A
Linda Tolosano	Public	1/18/2023	Natural gas	Ban
			Panel upgrades	Cost
Linh Dan Do	Public	2/3/2023	Support	General
Linnea Wickstrom	Public	1/23/2023	General opposition	Necessity, health
			Natural gas	Ban
			Cost	Equity
			Workforce	Availability/Training
			Timeline	Permits/Setbacks
			Existing Spaces	Permits/Setbacks
			Grid Capacity	Insufficient capacity
			Existing Spaces	General
Lisa Cohen	Public	1/20/2023	Natural gas	Ban
			Cost	Equity
			Emissions	GHG co-benefits
			General opposition	Necessity, health
Lisa Segnitz	Public	2/6/2023	Support	General
Lisa Taner	Public	1/30/2023	Cost	Equity
			Cost	Landlord

			General opposition	Necessity, health
			Grid Capacity	Insufficient capacity
			Workforce	Availability/Training
Lisha Mainz	Public	2/6/2023	Grid Capacity	Reliability
			General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
Lori Kegler	Public	2/6/2023	Support	General
Louise Chegwiddden	Public	2/6/2023	Support	General
LR Jensen	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Cost	Landlord
			Cost	Funding
Luca Donisi	Public	2/6/2023	Support	General
Lucy Weltner	Public	2/6/2023	Support	General
Lynn Norris	Public	1/20/2023	Panel upgrades	Need
			Cost	Utility Costs
			Grid Capacity	Reliability
			General opposition	Necessity, health
Magi Amma	Public	2/6/2023	Support	General
Malcolm Post	Public	1/18/2023	Natural gas	Ban
			Panel upgrades	Cost
			Grid capacity	Reliability
			General opposition	Necessity, health
			Panel upgrades	Need
			Grid Capacity	Insufficient capacity
Manijeh Berenji	Public	2/6/2023	Support	General
Marcia Pratt	Public	2/6/2023	Support	General
Margaret Fowler	Public	2/6/2023	Support	General
Marianna Riser	Public	2/6/2023	Support	General
Marilyn Barrett	Public	1/23/2023	Natural gas	Ban
			Grid Capacity	Reliability

			General opposition	Necessity, health
Marilyn Price	Public	2/6/2023	Support	General
Marilynn Smith	Public	2/3/2023	Support	General
Marin County	Government	2/6/2023	Support	General
			Suggestion	Enforcement
			Cost	Equity
			Cost	Utility Costs
			Existing Spaces	General
			Grid Capacity	insufficient capacity
			Suggestion	Equity
Mark Grossman	Public	2/3/2023	Support	General
Mark Hoffberg	Public	2/4/2023	Support	General
Mark Hurst	Public	2/6/2023	Support	General
Mark Reifkind	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Marsha Adams	Public	2/6/2023	Natural gas	Ban
			General opposition	Necessity, health
Marsha Adams	Public	2/6/2023	Grid Capacity	Insufficient capacity
Martha Goldin	Public	2/6/2023	Support	General
Mary Ann Cramer	Public	2/6/2023	Support	General
Mary Dateo	Public	2/2/2023	Support	General
Mary Gilles	Public	2/6/2023	General opposition	Necessity, health
Mary Lou Meeks	Public	2/4/2023	Support	General
Mary Louise Donnici	Public	1/23/2023	Panel upgrades	Cost
			Cost	Utility Costs
			Grid capacity	Reliability
			Natural gas	Ban
Mary Noel	Public	2/6/2023	Support	General
Mary Porter	Public	2/6/2023	General opposition	Necessity, health
			Cost	Equity
			Suggestion	funding
			Cost	funding
			Existing Spaces	General
Mary Schumacher	Public	2/3/2023	General opposition	Necessity, health
Mats Lundgren	Public	2/6/2023	Grid Capacity	Insufficient capacity

			General opposition	Exemptions
Matt Passell	Public	2/6/2023	Support	General
Maureen Galindo	Public	2/6/2023	5th Amendment	Takings Clause
			Suggestion	funding
			Heat Pump	Efficiency
			Cost	Equity
			Cost	Utility Costs
			Grid Capacity	Reliability
			Natural gas	Ban
			Existing Spaces	General
			Cost	Housing
			General opposition	Stove study
Meg Minto	Public	2/6/2023	Natural gas	Ban
			General opposition	Necessity, health
			General opposition	Stove study
			Cost	Equity
Megan Micco	Public	2/6/2023	Support	General
Melanie Bieder	Public	2/6/2023	General opposition	Necessity, health
			Cost	Equity
			Grid Capacity	Insufficient Capacity
			Natural Gas	Continued Operation
Melanie Cross	Public	2/3/2023	Support	General
Meldan Heaslip	Public	2/6/2023	Support	General
Melissa Vierra	Public	2/6/2023	Support	General
Melissa Yu	Public	2/6/2023	Support	General
Melodie Lew	Public	2/4/2023	Timeline	Delay Implementation
			Cost	Equity
			Cost	General
Michael Closson	Public	2/5/2023	Support	General
Michael DeMoss	Public	2/6/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Cost	General
			General opposition	Necessity, health
Michael DeMoss	Public	1/20/2023	Natural gas	Ban

			General opposition	Electricity generation
			Grid Capacity	Insufficient capacity
			General opposition	Necessity, health
Michael Kapolnek	Public	1/7/2023	Panel upgrades	Cost
			Panel upgrades	Need
			Heat Pump	Efficiency
			Existing Spaces	General
			Cost	Panel upgrades
			Panel upgrades	Time
			Workforce	Availability/Training
			Cost	Housing
			Cost-Effectiveness	General
			Cost-Effectiveness	Emissions reductions
			General opposition	Necessity, health
Michael Kapolnek	Public	2/6/2023	Cost	Equity
			Grid Capacity	Statewide planning
			Timeline	Permits/Setbacks
			General opposition	Emergency situations
			Panel upgrades	Time
			Cost	housing
			General opposition	Safety
			General opposition	Necessity, health
			Panel upgrades	cost
			Cost-Effectiveness	General
			General opposition	Exemptions
Michael Kutliek	Public	2/4/2023	Support	General
Michael Mills	Public	2/6/2023	Support	General
Michael Wittig	Public	2/3/2023	Support	General
Michal Atz Brenzel	Public	1/19/2023	Natural gas	Ban

			Panel upgrades	Cost
			Cost	General
			Heat Pump	Commercial
			Cost	Renters
			General opposition	Necessity, health
Michele Hudson	Public	2/1/2023	Support	General
Michelle Hudson	Public	2/6/2023	Support	General
Michelle MacKenzie	Public	2/3/2023	Support	General
Michelle Orengo-Mcfarlane	Public	2/6/2023	Support	General
Michelle Peglau	Public	2/6/2023	Support	General
Mignon Moskowitz	Public	2/6/2023	Support	General
Mike Balma	Public	2/6/2023	Support	General
Mike Thompson	Public	1/24/2023	Natural gas	Ban
			General opposition	Emergency situations
			Panel upgrades	Need
Mira Chokshi	Public	2/6/2023	Support	General
Mitch Lerman	Public	1/25/2023	General opposition	Electricity generation
			Panel upgrades	Cost
			Panel upgrades	Time
			Grid Capacity	Insufficient capacity
Mohan Sakhrani	Public	2/6/2023	Support	General
Nancy Burke	Public	1/26/2023	Cost	Equity
Nancy Federspiel	Public	2/6/2023	Support	General
Nancy Green	Public	1/25/2023	Grid Capacity	Reliability
			Cost	General
			Cost	Utility Costs
			Grid Capacity	Insufficient capacity
			General opposition	Electricity generation
			Panel upgrades	Cost
			General opposition	Necessity, health
Nancy Haber	Public	1/31/2023	Support	General
Nancy Havassy	Public	2/6/2023	Support	General
Nancy Schneider	Public	2/3/2023	Support	General

Nancy Westreich	Public	1/23/2023	Natural gas	Ban
			Heat Pump	Cold weather operation
			Grid Capacity	Reliability
			Cost	General
			Panel upgrades	Cost
Nanlouise Wolfe	Public	2/6/2023	Support	General
Nate Sanchez	Public	1/28/2023	Cost	Equity
Ned Kuypers	Public	2/5/2023	General opposition	Grandfathering
			Cost	General
			Panel upgrades	Cost
			Existing Spaces	General
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
Niall Ferguson	Public	2/6/2023	Natural gas	Ban
			General opposition	propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Reliability
			General opposition	Necessity, health
Nicholas Cahill	Public	2/6/2023	Support	General
Nicholas Ratto	Public	2/6/2023	Support	General
Nicole Mo	Public	2/6/2023	Support	General
Nikki Nafziger	Public	2/6/2023	Support	General
Noah Armstrong	Public	2/6/2023	Support	General
Noel Poddanchik	Public	2/6/2023	Support	General
Nora Privitera	Public	2/6/2023	Support	General
O Mandrussow	Public	2/6/2023	Support	General
Pacific Gas and Electric	Utility	2/6/2023	Support	General
			Cost	Equity
			Suggestion	Zonal Electrification
			Cost	Utility Costs
			Suggestion	Equity
Palo Alto Green Gables Residents	Public	1/23/2023	Existing Spaces	Permits/Setbacks

			Panel upgrades	Cost
			EIR	Noise
Pam Brigg McKown	Public	2/4/2023	Support	General
Pamela Sieck	Public	2/6/2023	Support	General
Pascal Bruyere	Public	2/3/2023	Support	General
Pat Blackwell-Marchant	Public	2/6/2023	Support	General
Pat Lang	Public	2/3/2023	Support	General
Pat Marriott	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Grid Capacity	Insufficient capacity
Patricia Busk	Public	2/6/2023	Support	General
Patricia Linder	Public	2/6/2023	Support	General
Patricia M Daeley	Public	1/19/2023	Natural gas	Ban
			Cost	Funding
			Grid capacity	Reliability
Patrick Costello	Public	2/4/2023	Support	General
Patrick Mccully	Public	2/6/2023	Support	General
Paul Frantz	Public	1/31/2023	Panel upgrades	Cost
			Cost	Equity
			Heat Pump	Noise
			Cost	Utility Costs
			Cost	General
Paul Malkin	Public	2/6/2023	Support	General
Paul Meagher	Public	2/6/2023	Support	General
Paul Perez	Public	2/6/2023	Support	General
Paul Vesper	Public	2/6/2023	Support	General
Paula Rochelle	Public	2/3/2023	Support	General
Pearl Karrer	Public	2/6/2023	Grid Capacity	Reliability
			Natural gas	Ban
			Cost	Market change
Pedram Navid	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Natural gas	Continued operation
			Cost	General
Peter Belden	Public	2/6/2023	Support	General
Peter Booth Lee	Public	2/6/2023	Support	General
Peter Garrison	Public	2/6/2023	Cost	Equity
Peter Jon Shuler	Public	2/4/2023	Grid Capacity	insufficient capacity

			Grid Capacity	Reliability
			General opposition	Necessity, health
			Cost	Equity
			Cost	General
			Timeline	Delay Implementation
			EIR	General
Philip Haves	Public	2/6/2023	Support	General
Philip Ragozzino	Public	1/30/2023	Panel upgrades	Need
			General opposition	Necessity, health
Physicians for Social Responsibility SF Bay	Organization	2/3/2023	Support	General
Piper McNulty	Public	2/3/2023	Support	General
Portland Coates	Public	2/6/2023	Support	General
R D	Public	2/6/2023	Support	General
Rachel Townsend	Public	2/6/2023	Support	General
Rajan Narang	Public	2/3/2023	Support	General
Randy Breunling	Public	2/5/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Panel upgrades	Need
			Supply Chain	Appliances availability
			Suggestion	Funding
			Grid Capacity	insufficient capacity
			Timeline	Delay Implementation
			General opposition	Emergency situations
			General opposition	Necessity, health
			General opposition	Authority
Raphael Hitzke	Public	2/2/2023	Support	General
Rebecca Eliscu	Public	2/3/2023	Support	General
Rebecca Young	Public	2/2/2023	Support	General
Regan Avery	Company	2/6/2023	Panel upgrades	Need

			Panel upgrades	Cost
			Grid Capacity	Insufficient capacity
			Cost	General
			Panel upgrades	Time
			General opposition	Stove Study
			General opposition	Necessity, health
Renee Alloy	Public	1/27/2023	Cost	General
			Existing Spaces	Permits/Setbacks
			Heat Pump	Efficiency
			Grid Capacity	Reliability
			Panel upgrades	Cost
			Cost	Equity
			Natural gas	Ban
Rheem	Organization/Manufacturer	2/6/2023	Emissions	GHG co-benefits
			Supply Chain	Appliances Availability
			Heat Pump	Availability/Training
			General opposition	Emergency situations
			Panel upgrades	Need
			Existing Spaces	General
			Heat Pump	Commercial
			Rule Language	Certification Calculation
			General opposition	CARB
			Rule Language	Manufacture Date
Rich Waller	Public	2/6/2023	Support	General
Richard Gallo	Public	2/3/2023	Support	General
Richard Hallsted	Public	2/6/2023	Existing Spaces	Permits/Setbacks
			Panel upgrades	Cost
			Cost	General
Richard Probst	Public	1/24/2023	Support	General
Richard Staehnke	Public	2/6/2023	Panel upgrades	Cost

			Panel upgrades	Time
			Cost	Funding
Rick Edmondson	Public	2/6/2023	Support	General
Rick Vujovich	Public	2/7/2023	Natural gas	Ban
			General opposition	Necessity, health
			Cost	General
Rick Yost	Public	2/6/2023	General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
			Grid Capacity	Reliability
Rita Fanfelle	Public	1/23/2023	Cost	Equity
			General opposition	Necessity, health
RMI et al	Organization	2/6/2023	Support	General
Rob SS	Public	2/7/2023	Natural gas	Ban
			Cost	General
			General opposition	Necessity, health
Robert Horstmeyer	Public	2/6/2023	Natural gas	Ban
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			General opposition	Necessity, health
Robert Jardine	Public	2/3/2023	Support	General
Robert Kahn	Public	2/4/2023	Support	General
Robert Magarian	Public	2/6/2023	Support	General
Robert Mayo	Public	2/7/2023	Support	General
Robert Miller	Public	2/6/2023	Support	General
Robert Raven	Public	2/4/2023	Support	General
Robert Sherwood	Public	1/19/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Panel upgrades	Cost
			Panel upgrades	Need
			Emissions	GHG co-benefits
			General opposition	Necessity, health

Robert Whitehair	Public	2/3/2023	Support	General
Robert Zhou	Public	2/1/2023	Support	General
Roberta Stern	Public	2/6/2023	Support	General
Rocky Fort	Public	1/19/2023	Panel upgrades	Cost
			Timeline	Delay Implementation
			Grid Capacity	Reliability
			General opposition	Necessity, health
Roger Melen	Public	2/6/2023	General opposition	Necessity, health
Roman Capelli	Public	2/6/2023	Support	General
Ronald Dow	Public	2/6/2023	General opposition	Necessity, health
Ronald Vinsant	Public	2/7/2023	Natural gas	Ban
			Panel upgrades	Need
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Natural gas	Continued operation
			Workforce	Availability/Training
Ross Simkover	Public	2/6/2023	Support	General
Ryan Acebo	Public	2/6/2023	Support	General
Sally Giese	Public	2/6/2023	Natural gas	Ban
			General opposition	Stove Study
			Natural gas	Continued operation
			Grid Capacity	Reliability
Sam Reed	Public	2/3/2023	Support	General
Samantha Smith	Public	2/6/2023	Support	General
San Jose Community Energy Advocates	Organization	1/30/2023	Support	General
			Workforce	Availability/Training
San Mateo 19th Ave Homeowners	Public	2/6/2023	Grid Capacity	Reliability
Sandra Gamble	Public	2/6/2023	Support	General
Sandra Pachaud	Public	2/6/2023	Natural gas	Ban
			General opposition	Stove Study
			General opposition	Necessity, health
Sandra Slater	Public	2/6/2023	Support	General

Sara Syer	Public	2/6/2023	Support	General
Sara Theiss	Public	2/4/2023	Support	General
Sarah Gao	Public	2/3/2023	Support	General
Sarah Harper	Public	2/6/2023	Support	General
Sarah Hubbard	Public	2/6/2023	Support	General
Saran K	Public	2/6/2023	Support	General
Scott Barlow	Public	2/3/2023	Support	General
Scott Grinthal	Public	2/4/2023	Support	General
Scott Nelson	Public	2/6/2023	Support	General
Sergio Marti	Public	2/6/2023	Grid Capacity	Insufficient capacity
			Panel upgrades	Need
			Panel upgrades	Time
Sheila Barbato	Public	2/6/2023	Support	General
Sheila Tarbet	Public	2/6/2023	Support	General
Sherman Lewis	Public	2/6/2023	Support	General
Sherrill Futrell	Public	2/6/2023	Support	General
Shirley Lutzky	Public	2/6/2023	Support	General
Sierra Club	Organization	2/6/2023	Support	General
Silicon Valley Clean Energy	Community Choice Aggregator	2/6/2023	Support	General
SPUR	Organization	2/6/2023	Support	General
Stan Fitzgerald	Public	2/3/2023	Support	General
Steffen Rochel	Public	2/6/2023	Support	General
Stephanie Bloom	Public	2/5/2023	Support	General
Stephanie Nunez	Public	2/6/2023	Support	General
Stephanie Reader	Public	2/3/2023	Support	General
Stephanie Shindler	Public	2/6/2023	Support	General
Stephen Rosenblum	Public	2/2/2023	Support	General
Steve Gazzera	Public	2/6/2023	Natural gas	Ban
Steve Mann	Public	2/6/2023	Support	General
Steve Pease	Public	2/6/2023	Support	General
Steve Shuput	Public	2/6/2023	Support	General
Steve Simons	Public	2/6/2023	Grid Capacity	Insufficient capacity
Steve Smith	Public	1/19/2023	Cost	Beyond panel
			Cost	Existing spaces
Steven Mazliach	Public	2/6/2023	Support	General
Steven Schlansker	Public	1/18/2023	Support	General
Steven Schramm	Public	2/6/2023	Support	General
Steven Wilk	Public	2/6/2023	Natural gas	Ban

			General opposition	Authority
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Sue Blockstein	Public	2/6/2023	Support	General
Summer Rogers	Public	2/6/2023	Support	General
Susan Abby	Public	2/6/2023	Support	General
Susan Chamberlain	Public	2/3/2023	Support	General
Susan Ferrone	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Cost	Funding
			Grid Capacity	Reliability
Susan Green	Public	1/27/2023	Support	General
Susan Nakashima	Public	2/6/2023	Support	General
Susan Trivisonno	Public	2/3/2023	Support	General
Susanna Marshland	Public	2/6/2023	Support	General
Susannah Saunders	Public	2/4/2023	Support	General
Sven Thesen	Public	2/3/2023	Support	General
Sylvia De Baca	Public	2/6/2023	Support	General
Tamara Alexa	Public	2/4/2023	Support	General
Tamara Gabel	Public	1/24/2023	General opposition	Propane
			Grid Capacity	Reliability
Terah James	Public	2/6/2023	Natural gas	Ban
Teresa Cheng	Public	2/6/2023	Support	General
Terry and Martin Horwitz	Public	2/6/2023	Support	General
Terry Grasso	Public	1/18/2023	Panel upgrades	Cost
Terry Houlihan	Public	2/5/2023	General opposition	Necessity, health
			Existing Spaces	Permits/setbacks
Terry Houlihan	Public	2/5/2023	Heat Pump	Efficiency
			Grid Capacity	Statewide planning
			EIR	General
			Cost	Equity
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
Terry Nagel	Public	2/1/2023	Support	General
Thalia Lubin	Public	2/3/2023	Support	General
Thom Reinstein	Public	2/1/2023	Cost	Equity

			General opposition	Electricity generation
Thomas Carlino	Public	2/3/2023	Support	General
Thomas Graly	Public	2/6/2023	Support	General
Thomas Pfaeffle	Public	2/4/2023	General opposition	Necessity, health
Thomas Tilden	Public	1/18/2023	Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
TJ Giuli	Public	2/3/2023	EIR	Grid Emissions
			Grid Capacity	Insufficient capacity
			Panel upgrades	Cost
			Panel upgrades	Time
Todd Synder	Public	2/3/2023	Support	General
Tom Kabat	Public	2/2/2023	Support	General
			Suggestion	Funding
Tony Gaughan	Public	2/6/2023	General opposition	Propane
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Toph Kerpan Evans	Public	2/6/2023	Support	General
Travis Ramsey	Public	2/6/2023	Support	General
Trish Mulvey	Public	2/3/2023	Support	General
Tristia Bauman	Public	2/4/2023	Support	General
Urmila Padmanabhan	Public	2/6/2023	Support	General
Vansi Vallabhaneni	Public	1/18/2023	Support	General
Vasu Murti	Public	2/6/2023	Support	General
Victor Buathier	Public	2/6/2023	General opposition	Necessity, health
			Cost	Utility Costs
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
			Heat Pump	Cost
			Workforce	Availability/Training
			Cost	General
Victor Kamendrowsky	Public	2/6/2023	Support	General
Victoria Armigo	Public	2/3/2023	Support	General
Vince Augusta	Public	2/6/2023	Support	General
Virginia Leslie	Public	2/6/2023	Support	General
Wei-Tai Kwok	Public	2/6/2023	Support	General

Wendy Chou	Public	2/2/2023	Support	General
Western Propane Gas Association	Organization	2/6/2023	Heat Pump	Availability/Training
			Panel upgrades	Time
			Cost	General
			Cost	Funding
			Cost	Beyond panel
			Cost	Utility Costs
			Cost	Equity
			General opposition	Electricity generation
			General opposition	Propane
William Garrett	Public	2/6/2023	General opposition	Stove Study
William Williams	Public	2/5/2023	General opposition	Necessity, health
			Cost	General
Yael Kisel	Public	2/6/2023	Support	General
Yassen Roussev	Public	2/6/2023	Support	General
Yves Decargouet	Public	2/6/2023	Support	General
Zoe Jonick	Public	2/6/2023	Support	General

Attachment 2: Comments Received



February 6, 2023

Jennifer Elwell
BAAQMD
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6

Dear Ms. Elwell,

Please make this letter part of the public record and distribute to all BAAQMD Board Members. Thank you.

Dear BAAQMD Board members,

350 Bay Area is a Bay Area grassroots climate movement nonprofit that focuses on eliminating carbon pollution, promoting policies support healthy families and communities, safety, and the equitable transition to a vibrant, just, clean energy economy.

We commend Air District staff for the strong recommendations on Building Appliance Rules 9-4 and 9-6, and ask that all BAAQMD Board members vote in favor of the Air District's zero-NOx proposal. These proposed standards are a game-changer in improving air quality, community health, and environmental equity.

Though you have heard it elsewhere, it bears repeating that burning gas indoors produces nitrogen oxides (NOx) and particulate matter: air pollution that harms health. A number of studies demonstrate this health risk, including research from UCLA that found that replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution alone.

An environmental justice group, WE ACT, just published results from a small pilot where replacing gas stoves in 20 apartments in a public housing complex resulted in a 35% decrease in concentrations of nitrogen dioxide (which can contribute to or worsen asthma) and a 43% decrease in concentrations of carbon monoxide (which can cause flu-like symptoms, cognitive impacts, and even death). Pilot participants indicated that they appreciated cooking with the new stoves. ([The City](#))

The proposed changes to Rules 9-4 and 9-6 will not just curtail NOx emissions from building appliances, but they will also improve air quality in the communities most burdened by fossil fuel pollution. NOx, PM2.5, and ozone concentrations vary block-by-block, with a recent study

in the Bay Area finding that communities of color were exposed to [55% more NO2](#) than mostly white neighborhoods.

[99% of disadvantaged communities](#) in California live in an ozone nonattainment area, an area that does not meet Federal ambient air standards. Speeding the transition to electric heat pumps in our homes will tackle a key source of NOx pollution, improve air quality, and support the state in meeting federal air quality standards that protect health.

Beyond health and safety benefits, implementing these rules also brings strong climate benefits, helping our region meet our greenhouse gas reduction targets. Burning fossil fuels in homes for heating is responsible for [roughly 11%](#) of California's statewide climate emissions. The state cannot meet its climate targets without eliminating this pollution. BAAQMD's own data reports that electrifying Bay Area appliances could reduce climate-warming emissions from appliances [73% by 2046](#) from a 2019 baseline.

A particular advocacy priority for our organization is decarbonizing buildings. Using heat pump technology for heating also automatically adds air conditioning to buildings. As our days of consecutive high heat rise in CA, it is essential that we support climate resilience with air cooling in buildings. And, because these appliances are so energy efficient, they can cool homes at a fraction of energy load, assisting in our transition to an electric grid.

Please vote yes on the proposed changes to Rules 9-4 and 9-6 for zero NOx pollution from ranges and furnaces.

Thank you for your service,

A handwritten signature in cursive script, reading "Laura Neish".

Laura Neish
Executive Director
350 Bay Area

ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062

rkoss@adamsbroadwell.com

SACRAMENTO OFFICE

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6209

KEVIN T. CARMICHAEL
CHRISTINA M. CARO
THOMAS A. ENSLOW
KELILAH D. FEDERMAN
RICHARD M. FRANCO
ANDREW J. GRAF
TANYA A. GULESSERIAN
RACHAEL E. KOSS
AIDAN P. MARSHALL
TARA C. RENGIFO

Of Counsel
MARC D. JOSEPH
DANIEL L. CARDOZO

February 6, 2023

Via Email

Jennifer Elwell, Senior Air Quality Engineer
BAAQMD
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

Victor Douglas, Rule Development Manager
BAAQMD
375 Beale Street, Suite 600
San Francisco, CA 94105
vdouglas@baaqmd.gov

**Re: Comments on Proposed Amendments to Building Appliance
Rules 9-4 and 9-6**

Dear Ms. Elwell and Mr. Douglas:

We write on behalf of the Coalition of California Utility Employees (CUE) regarding BAAQMD's proposed amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6). Rule 9-4 applies to natural gas-fired space heating furnaces typically used in single-family residences and Rule 9-6 applies to natural gas-fired water heaters typically used in residential and commercial buildings. BAAQMD proposes to amend these rules to establish more stringent NOx emission standards for natural gas-fired space and water heating appliances in buildings in the BAAQMD's jurisdiction.

Specifically, BAAQMD proposes to amend Rule 9-4 to apply an "ultra-low" NOx standard for new natural gas-fired space-heating appliances in 2024 and a zero-NOx standard in 2029. Rule 9-6 would be amended to apply a zero-NOx standard for new natural gas-fired water heaters with compliance dates ranging

from 2027 to 2031 depending on the equipment type, use and size. These standards would apply to appliance retailers, wholesalers, installers and consumers when they replace existing space and water heaters. BAAQMD's Draft EIR for the proposed rule amendments assume that natural gas-fired appliances would be replaced with electric appliances.

CUE is a coalition of labor unions whose members make up the workforces of most of California's electric and combined electric and gas utilities. CUE has actively participated in California's decarbonization¹ and long-term gas system planning² proceedings at the CPUC where we have commented on the potential unintended adverse impacts of electrification on existing natural gas infrastructure safety, maintenance and maintenance costs, energy reliability, rates and workers. In those proceedings, CUE has explained the importance of a robust long-term natural gas system study and plan that considers technical, safety, economic and employment impacts, and reduces risks to workers, existing natural gas infrastructure safety, and energy affordability and reliability. The CPUC has not yet developed a robust study or plan for California's natural gas system. BAAQMD's proposed rule amendments are, therefore, premature and risky.

Californians rely on natural gas for electricity, to heat homes and businesses, to cook and heat water, and for industrial processes. There are more than 150,000 miles of utility-owned natural gas pipelines that deliver most gas used by Californians. The volume of natural gas used for electric generation has declined and will continue to decline as the Renewable Portfolio Standards in SB 100 are implemented. There also many efforts in the State, including these proposed amendments, to electrify buildings. Electrification of buildings will result in fewer gas utility customers and less gas running through the pipelines. Energy and Environmental Economics, Inc. (E3) estimates that widespread electrification could reduce gas demand by over 90% by 2050.³ Until then – and even then – there will still be some gas running through the pipelines and, therefore, the pipelines will still require investment and maintenance. As throughput diminishes, the cost to maintain the pipelines will be the same as before but will be paid by just the remaining customers. The decline in natural gas demand will likely lead to higher rates as fixed costs are spread over a declining base, creating a domino effect where more and more people with the means to electrify to avoid the rising cost of natural

¹ R.19-01-011.

² R.20-01-007.

³ Gridworks, California's Gas System in Transition: Equitable, Affordable, Decarbonized and Smaller (2019), p. 1, available at [Gridworks Report Phase I](#)

gas will do so and those who cannot afford to electrify or don't have the option to electrify will be stuck with exponentially higher gas rates.⁴ E3's societal least cost scenario estimates residential gas rates increasing from about \$1.50 per therm to as much as \$19 per therm by 2050.⁵ The California Energy Commission reports that 70% of California's low-income population are renters.⁶ Rising natural gas rates will disproportionately burden low-income customers.

Alternatively, if the utility has fewer customers but does not raise rates, it will have less revenue. The revenue won't be enough to cover the costs to pay workers to maintain the system. Fewer workers translates to a less safe and less reliable gas system. Some of the anticipated impacts include fewer leaks detected and repaired (impacting both safety and the climate), reduced customer response levels at call centers, extended response time from reconnections, longer service outages, deferred reliability maintenance projects, deferred gas pipeline replacements, and slower emergency response times. The State has not begun to consider how to manage the cost of the gas infrastructure with the reduced volume of gas using that infrastructure.

Similarly, the State has not analyzed the impact of electrification on the natural gas generation fleet. In 2017, the 578 MW Sutter Energy Center and the 1,200 MW La Paloma plant closed because they could not earn sufficient revenues in the CAISO wholesale market. Calpine also reported that operation of its Yuba City, Feather River and Metcalf Energy Center plants may not be economically viable. This trend will continue. As renewable generation increases, gas-fired generation will decrease. For at least the next decade or two, California will need at least some of its current gas fleet for flexible, fast ramping generation, statewide and local reliability. It is predicted that another 4,000 to 6,000 MW of plants in California face a significant risk of early retirement. The State has no plan to decide which plants will be needed, while accounting for location-specific aspects of natural gas generation including impacts on disadvantaged communities and air quality impacts, and has no mechanism to keep plants we need and retire those we don't. Instead, it has resorted to ad hoc emergency procurement orders.

⁴ *Id.*, p. 4. The Gridworks white paper refers to this phenomenon as a "death spiral," rate increases driving customers to exist the system via electrification or other alternatives, leading to further rate increases to make up the lost revenue, and so on.

⁵ *Id.*, p. 2.

⁶ *Id.*, p. 7.

Finally, the State has not analyzed the impact of electrification on the gas utility workforce. There are at least 10,000 people working in gas distribution in California.⁷ PG&E's gas system directly employs more than 3,000 full-time employees, the majority of whom were hired in the last 10 years. The State has not meaningfully considered the jobs that could be lost from electrification. There is no statewide plan to ensure a just transition for displaced workers or to ensure that good middle-class jobs are not replaced with low-wage, dead end jobs. The State cannot let workers in the gas utility industry be disproportionately and adversely impacted by electrification. Planning must encompass programs to retrain gas workers for other sectors and crafts, wage protection for retrained workers, and incentives for electric and water utilities to hire displaced workers. Further, the State has not analyzed how we retain a qualified workforce to operate the system safely in a potential future environment of gas throughput decline. As gas use declines, the gas transmission and distribution systems must still operate safely. An adequately trained workforce must be available to safely operate and maintain the system, and to safely and properly decommission gas infrastructure and install new technology. The State does not yet have a plan to ensure this occurs. Planning must encompass incentives for workers to continue working in gas until the system is retired.

Natural gas usage is already being reduced in a manner that will impose great cost burdens on those who cannot afford it and will threaten the livelihood of the gas utility workforce. While BAAQMD claims that its proposed rule amendments are not electrification measures per se, there is currently no widely available zero emission technology other than electric appliances to replace natural gas-fired space and water heaters. Adopting the proposed rule amendments will turbocharge the piecemeal, jurisdiction by jurisdiction electrification requirements that are already being adopted across California. These electrification requirements will exacerbate the negative impacts on the safety and reliability of California's gas system, the gas utility workforce and gas utility customers. We, therefore, urge BAAQMD to take a step back and coordinate its rule amendment process with the CPUC's planning efforts for reduced natural gas use.

⁷ Of these, there are more than 8,500 represented employees in bargaining units statewide.

February 6, 2023
Page 5

Thank you for attention to this important matter.

Sincerely,

A handwritten signature in blue ink that reads "Rachael E. Koss". The signature is written in a cursive, flowing style.

Rachael E. Koss

REK:acp



we make life better®

2311 Wilson Boulevard Suite 400 Arlington VA 22201 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street
Suite 600
San Francisco, CA 94105

RE: AHRI Comments on Staff Report for the Proposed Amendments to Building Appliance Rules Regulation 9: Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnace, and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

Dear Ms. Elwell:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) welcomes the opportunity to comment on the Bay Area Air Quality District's (BAAQMD or District) Staff Report (Report) for the Proposed Amendments to Building Appliance Rules Regulation 9: Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnace (Furnaces), and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers (Boilers) and Water Heaters (Water Heaters).

AHRI represents more than 330 manufacturers of air conditioning, heating, commercial refrigeration, and water heating equipment. It is an internationally recognized advocate and technical resource for manufacturers of heating, ventilation, air conditioning, and refrigeration (HVACR) and water heating equipment and certifies the performance of many of the products they manufacture. In North America, the annual economic activity resulting from the HVACR industry is approximately \$256 billion. In the United States alone, AHRI's members, along with distributors, contractors, and technicians, employ more than 1.3 million people.

AHRI and its members are committed to, and support, greenhouse gas (GHG) emission reductions, while promoting sustainable, safe, reliable, and affordable access to the essential air and water heating and cooling provided by the products they manufacture.

Product Cost

The BAAQMD Staff Report (Report) specifies that the upfront installed cost of a Heat Pump is \$8,027 and a Heat Pump Water Heater is \$2,824.¹ When reviewing the most recent data for

¹ Appendix C: Draft Socioeconomic Impact Report, of the BAAQMD Staff Report, at page 17.

installation costs of these products through the TECH Clean California webpage,² the numbers provided in the Report are significantly lower than the data provided by TECH for the Bay Area. When looking at all projects, TECH identifies an average project cost to replace bath space and water heating with heat pumps to be \$17,400 based on a total of 10,342 projects.³ In the Bay Area, the TECH data shows water heating a minimum project cost of \$3,355 and a maximum project cost of \$60,428 for water heating, with an average cost of \$8,577 per water heater replacement.⁴ Looking at the same data set for heat pumps, the TECH data shows a minimum project cost of \$3,500 and a maximum project cost of \$66,218 with an average cost of \$22,745.⁵ The data shows a significantly higher cost than that specified in the Report which will have a significantly greater impact on consumers.

In addition, the analysis shows only the annualized cost to consumers for these replacements, which would imply the ability to finance the project cost over the life of the product. While this may be true in some cases, low-to-moderate income (LMI) households with potentially lower credit scores may be unable to secure financing for these products at a favorable rate, or at all, which would, for these consumers, increase the upfront cost of these projects. If financing is not an option, many LMI families may not be able to afford to replace their current products and may instead choose to repair them. Such an outcome subverts the intent of rule as it will keep higher NOx products on the market in excess of their expected life.

Utility Savings

AHRI disagrees with the use of the E3 report⁶ as the basis for savings on a consumer's utility bill. The analysis in the E3 report looks at different service districts and climate zones, such as SoCal SMUD and Bay Area, which do not relate back to the claims made in the report, specifically the claimed \$150 annual energy cost savings for space heating and the \$45 annual energy cost savings for water heating. The E3 report shows that for common high efficiency HVAC equipment in Climate Zone 4, consumers can expect \$100 in annual bill savings.⁷ The same analysis for water heating shows that common high efficiency heat pump water heaters will have a net annual cost to consumers of more than \$75 in climate zone 4.⁸

In addition, PG&E did a cost study of switching from gas to electric water heating in their service territory⁹ and compiled the cost-effective cases in which switching would have result in net savings for consumers. In reviewing PG&E's analysis, it is important to note the effect that proper installation, water storage temperature, ambient temperature, and proper sizing of the

² <https://techcleanca.com/public-data/maps-and-graphs/>

³ *Id.*

⁴ *Id.*

⁵ *Id.*

⁶ Energy and Environmental Economics. "Residential Building Electrification in California". (April 2019)

⁷ *Id.* Figure 3-10 at page 59.

⁸ *Id.* Figure 3-12 at page 61.

equipment had on the cost/benefit of the installation. At standard installation conditions, PG&E found a net cost to consumers of \$28-\$87, depending on if the customer was a CARE or non-CARE customer and if the customer kept the same capacity water heater or increased its capacity. PG&E furthered its analysis by reviewing different efficiency heat pumps and lower tank set points. However, this scenario cannot be assumed as the base case for BAAQMD's analysis as it requires the use of high efficiency heat pumps and lower tank temperature set points. These specific requirements cannot be mandated in the proposed rule. The analysis needs to be performed with the base efficiency heat pump at standard water storage temperatures, such as those put forth in Tables 2-1 and 2-2 of the PG&E report.

Given the projections from both reports, costs to consumers will vary because of a transition to heat pump space and water heating. This variability makes it difficult to justify the use of annual energy costs or savings based on a technology switch. Therefore, BAAQMD should adopt a position that there will be no significant financial impact to consumers as a consequence of this rule.

Emergency Replacements

In most cases, space and water heating equipment is replaced upon failure of the appliance. If this occurs and the house needs a panel upgrade or other alterations to accommodate a zero-NOx solution, that house could without space- or water heating for several days if not weeks while the retrofits occur. If such an event were to happen during a cold snap, there could be significant concern for the health and safety of the occupant(s). The District needs to consider solutions to the emergency replacement issue, including proactive replacement programs, such that the impact of proposed Rules 9-1 and 9-6 does not compromise safe and reliable access to services.

The California Statewide Codes and Standards Reach Codes Team (Statewide Reach Code Team) performed a cost effectiveness study for upgrading existing buildings in 2019.¹⁰ In its report, the team recognized the challenges associated with emergency replacements of space and water heating when moving from gas to electric, and outlined specific exceptions for these issues:

Exception 1: Non-ducted space conditioning systems and systems without central air conditioning.

Exception 2: Ducted space conditioning systems where only the gas furnace is replaced.

Exception 3: The main service panel does not have the capacity or space to accommodate an additional 240V, 30 A circuit, and the cost to upgrade the main service panel and run required electrical service to the heat pump air handler is prohibitive as determined by the jurisdiction.

¹⁰ California Statewide Codes and Standards Reach Codes, "2019 Cost-Effectiveness Study: Existing Single Family Residential Building Upgrades" Prepared by: Frontier Energy, Inc. and Misti Bruceri & Associates, LLC. (2019)

For heat pump water heaters, the Statewide Reach Code Team identified the need for the following exceptions:

Exception 1: The proposed location of the new water heater is located within conditioned space.

Exception 2: The proposed location of the replacement water heater is not large enough to accommodate a HPWH equivalent in size and one-hour capacity rating to the existing water heater or the next nominal size available.

Exception 3: The main service panel does not have the capacity or space to accommodate an additional 240 V, 30 A circuit, or the cost to upgrade the main service panel and run required electrical service to the water heater is prohibitive as determined by the jurisdiction.

Exception 4: A solar water heating system is installed meeting the installation criteria specified in Reference Residential Appendix RA4.20 and with a minimum solar savings fraction of 60 percent.

These cases need to be considered and addressed as they were by the Statewide Reach Code Team.

Recommendation

The District should adopt Alternative 3

For reasons outlined above and further in these comments the District should adopt a form of Alternative 3 from its analysis that includes the larger, commercial equipment. The Report itself states that a 6-year delay of compliance -- until January 1, 2035 -- would be considered the environmentally superior option.¹¹ Such a shift would allow time for utility scale solar and battery storage to be committed to and implemented, as opposed to just speculated. In addition, more time will afford the heat pump market to move in equilibrium with customer needs, including financing programs for LMI consumers, and an increased global manufacturing capacity. Moreover, additional time will be needed to ensure that a sufficient number of contractors and technicians are trained, for the purpose of ensuring quality installation. In addition to this rule, robust outreach and incentives for energy audits and early adoption of zero-NOx space and water heating equipment can reduce the need for emergency replacements, provide continued NOx reductions as the market matures, and drive consumer trust for these products.

¹¹ Draft Environmental Impact Report, Page 4-14.

A. Comments specific to Regulation 9 Rule 4: Nitrogen Oxides from Fan-Type Residential Central Furnaces:

1. Scope of products in each phase:

As stated in our previous comments, the current requirements of this regulation are unclear, and clarification is required for proper understanding. Section 9-4-301 outlines the NOx standards for *Stationary Natural Gas-Fired Furnaces*; whereas, Sections 9-4-301.1 and 9-4-301.2 refer only to *Stationary Natural Gas-Fired Residential Natural Fan Type Central Furnaces*. In section 9-4-301.3, the scope is expanded to *Stationary Natural Gas-Fired Furnaces*, which excluding furnaces used in *Mobile Homes*. Neither *Stationary* nor *Mobile Home* is defined, which makes it difficult for manufacturers to understand which furnaces would need to follow this standard and which would be exempt.

Moreover, the inclusion of these products in section 9-4-301.3 presents additional questions as to requirements applicable to these types of furnaces prior to January 1, 2029. The products discussed in the staff report include wall heating and other direct-vented products. These products are not typically marketed as furnaces, and the expectation that these products fall under the furnace definition in section 9-4-203 will add confusion to the market. Proper definitions that align to the U.S. Department of Energy definitions should be used to ensure that the scope of the rule is clear.

Finally, there is no discussion of *weatherized* units in this section. *Weatherized* can be defined as “designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation.”¹²

2. Dual-Fuel Systems

AHRI requests that the District reconsider its exclusion of dual-fuel systems as a compliance pathway for the ultra-low NOx requirements in Section 9-4-301.3. Dual-fuel systems provide an ideal pathway to lower NOx emissions and a way to reach the average NOx emissions of less than 14ng/j required in the section. The Report specifies that it is not intending to specify technologies to meet these NOx goals; however, not allowing for a pathway to dual-fuel compliance is effectively specifying ultra-low NOx burners as the only path to comply with this section. Not only would a dual-fuel pathway limit NOx emissions but it also would help homeowners move to heat pumps sooner, at a reasonable cost, and provide increased resiliency to the grid by reducing winter peak loads.

BAAQMD should include a definition of dual-fuel systems in the proposed rule with control requirements to ensure the weighted average NOx emissions are below the requirements.

¹² SCAQMD Rule 1111-1 (b)(17).

Dual fuel systems also should be considered as an option in the environmental analysis, especially given the impact to low- and medium-income consumers.

B. Comments specific to Regulation 9 Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters:

1. Commercial Applications

The current proposed amendment to Regulation 9 Rule 6 specifies a zero-NOx requirement for water heaters greater than 75,000 BTU but less than 2,000,000 BTU by 2031. Currently the only solution on the market for zero-NOx water heating is heat pump water heaters (HPWHs). In commercial applications these products are nascent and typically designed to work at lower internal tank temperatures. Process applications in commercial settings such as hospitals, healthcare facilities, universities, commercial laundries, as well as large restaurants require water temperature up to and greater than 180°F for meeting sanitation requirements. Hence, HPWH-only systems are not currently commercially viable and may not prove to be cost-effective solutions for these commercial applications given the delivered cost of electricity in the Bay Area. The District needs to ensure that these applications can be met with current technology before putting this rule into place. The Report does not discuss the requirements of process applications and simply mentions that industrial product greater than 2,000,000 BTU would be addressed in a separate rulemaking for Regulation 9 Rule 7. While AHRI appreciates this distinction, there are products less than 2,000,000 BTU that are used in commercial sanitization applications. Waiting until 2 years prior to compliance to review and assess this market through the interim report is insufficient. If suitable analysis cannot be performed and a feasible solution identified for these applications, there needs to be an exception in place for these products to ensure that there safe, reliable, affordable access to critical hot water for public health. More specifically, an exception should be added for equipment covered in 9-6-303 that is used exclusively to provide service hot water at temperatures of 180° F and greater. In addition, similar to AHRI's request for space heating, BAAQMD should include a definition of dual-fuel systems in the proposed rule with control requirements to ensure the weighted average NOx emissions are below those requirements and include these products in their environmental analysis.

2. Residential Applications

As referenced in the Report, there are residential 120V HPWHs that have been announced and are undergoing field studies in California. However, these products are not yet widely available for consumers, and utilities are still compiling performance data on these units. While AHRI members remain confident that the 120V product class will have intended applications and be utilized in the marketplace, it is premature for the District to use this product class as an empirical justification for the Amendment. AHRI would remind the District that notwithstanding 120V HPWHs ability be "plugged in" to a standard 120V outlet, most utility closets, basements,

and garages do not currently have a 120V outlet located by the water heater. This means that even when these products are readily available, an electrician would be required to install a dedicated outlet for the water heater. Further HPWHs require condensate removal. If a drain does not exist near the water heater, a plumber would be required to install one. These are just a few of the technical barriers and costs that need to be considered for the wide-scale adoption of these products, which are not accounted for in the Report's analysis.

A rushed technology transition may lead to unintended consequences with respect to installation and performance of the products, which would only serve to damage public perception and slow the adoption in other jurisdictions. Given the current status of this market, the 2027 transition date is unreasonable. Furthermore,, having the compliance date for these products potentially moved forward to 2025 due to the interim report creates uncertainty for the entire supply chain. A reasonable timeframe must be established for these products to be developed and matured such that the supply chain can handle this regulation and contractors and technicians have time to be trained in proper installation and maintenance.

Additional Policy Observations:

A. Effective Dates and Review Period

AHRI reiterates concerns raised in our previously submitted comments¹³ that while AHRI is supportive of the evaluation process covered thoroughly in the interim report, 2-years is not sufficient for manufacturers and the supply chain to make the necessary adjustments in time to comply. Further, the 2-year window does not allow the BAAQMD Board sufficient time to properly review the report and make informed decisions. This process needs to have a concrete timeline for review and determination from the Board to provide manufacturers certainty and properly plan for implementation. Lack of a clear timeline for compliance or deviation from this rulemaking creates significant uncertainty for manufacturers, which need time to develop compliant products and initiate production. Less than two years between report publication and a compliance date is not enough time for industry to accommodate any equipment redesigns that may be necessary. For example, after publication of a U.S. Department of Energy final rule, two to five years¹⁴ is required before the compliance period for any new regulation, acknowledging the time needed to design compliant HVAC equipment and to retool necessary manufacturing equipment.

The effects of this moving target and shorter timeline were not evaluated in the Report and need to be fully considered prior to implementation of the amendments.

¹³ AHRI Comments on EIR for Proposed Amendments to Regulation 9 rules 4 and 6. Submitted on June 22, 2022

¹⁴ ASHRAE Products have 2 or 3 years in accordance with 42 U.S.C. 6313 § (a)(6)(D).
Residential Products have 5 years in accordance with 42 U.S.C. § 6295(l)(2).

Conclusion

Two fundamental pillars of industry are certainty and consistency. The above proposals address certainty for industry. Consistency can only be achieved by local air quality management districts working to align on NOx requirements so that there is one clear, consistent path forward for manufacturers in California. Incentives should be provided for early adoption, and programs should be put in place to help low-income households afford this transition. This approach will aid in an equitable transition and remove the main hurdle for emergency replacements, which is cost. This approach will also allow for optimal environmental benefits.

We appreciate the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me at kbergeron@ahrinet.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Kyle Bergeron", with a long horizontal flourish extending to the right.

Kyle Bergeron
Senior Regulatory Engineer

cc: Helen Walter-Terrinoni



PRESIDENT

Dina Kimble
Royal Electric Company

PRESIDENT-ELECT

Steve Rule
Turner Construction Company

**VICE PRESIDENT
BUILDING**

Brad Jeanneret
Hensel Phelps

**VICE PRESIDENT
HIGHWAY & TRANSPORTATION**

Ural Yal
Flatiron West, Inc.

**VICE PRESIDENT
UTILITY & INFRASTRUCTURE**

Jim Blois
Blois Construction, Inc.

**VICE PRESIDENT
SPECIALTY CONTRACTORS**

Greg Timmerman
ISEC, Inc.

TREASURER

Pat Kelly
Granite Construction Company

IMMEDIATE PAST PRESIDENT

Mike Blach
Blach Construction Company

CEO

Peter Tateishi
AGC of California

HEADQUARTERS OFFICE

3095 Beacon Blvd.
West Sacramento, CA 95691
Office: 916.371.2422
Fax: 916.371.2352
member_services@agc-ca.org

Jennifer Elwell

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Submitted electronically: jelwell@baaqmd.gov

February 2, 2023

RE: Comments on Amendments of 9-6 “Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters”.

Dear Jennifer Elwell,

On behalf of the Associated General Contractors (AGC) of California, we are submitting comments to the Bay Area Air Quality Management District in response to Rule 9-6 “Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters”.

AGC of California is a member-driven organization that statewide consists of over 900 companies. Our members provide commercial construction services on a broad range of projects within vertical building, highway & transportation, and utility. We believe the construction industry is vital to the success of California. Together, our members actively create opportunities to build and strengthen our state. We are passionate about shaping policy, improving industry relationships, and developing our workforce.

AGC of California appreciates the opportunities to participate in Bay Area Air Quality Management District’s regulatory process by submitting a comment letter to advocate on behalf of the construction industry. A summary of our concerns includes the lack of feasibility of heat pump water heaters and the lack of reliable electrical grid to support the increase in electrical energy demands. Please read below for more information.

1. Concerns surrounding the requirement of heat pump water heaters.

There are some challenges that heat pumps face during cold temperature conditions. Heat pumps need to maintain a stable ambient temperature,



which can be difficult to achieve when it is colder outside than the water temperature is. More specifically, heat pump water heaters need ambient air temperatures above 40 degrees Fahrenheit to extract heat from the air. Low ambient temperatures often require the heat pump water heater to use electric resistance elements to keep up with demand and thus reduces system efficiency resulting in increased consumer cost. Therefore, it is recommended to have a natural gas boiler to keep the heat pump system as efficient as possible. While there are electric boilers, those boilers are much bigger and react slower than gas-powered boilers. This is especially problematic in commercial settings (i.e. hospitals, restaurants, research facilities) where water temperatures need to maintain a temperature of 180 degrees F for sanitary purposes. Although one may argue that the Bay Area does not experience extremely cold temperatures, therefore needs not to worry about these issues, AGC of California asserts that this is an area of concern even for the Bay Area. Heat pumps start to become less efficient when the water is approximately 40 degrees F or lower. Amy Graff wrote an article in the SFGATE that the Bay Area has been experiencing record-low temperatures this winter; specifically, it reached 30 degrees F in Santa Rosa, 32 in Palo Alto, 35 in Concord, and 39 at the San Francisco International Airport. Temperatures are expected to become more extreme as weather conditions increasingly become more severe. AGC of California insists that the regulatory language should allow the use of natural gas-powered boilers to support heat pumps as needed.

2. Unprepared electrical grid to support increased demands.

Another significant challenge faced when installing a heat pump water heater, is the need to add electrical capacity to homes and businesses. As new regulations are adopted that will increase the demand for electricity, our electrical grid simply will not be able to accommodate. The peer-reviewed article, "Translating Climate Change and Heating System Electrification Impacts on Building Energy Use to Future Greenhouse Gas Emissions and Electric Grid Capacity Requirements in California," analyzed climate change and electrification impacts to system-wide endpoint impacts on future electric grid configurations (Tarroja, et al., 2018). They concluded that although electrification may decrease greenhouse gas emissions, it requires significant increases in electrical grid capacity. Specifically, that the large loads do not temporally align with daily renewable generation and therefore require increases in dispatchable electric grid capacity to support the electric grid configuration.

According to the CalMatter's article, "California's electric grid is not ready to meet climate goals," California's electrical grid was largely developed in the last century and was designed with natural gas fired generation located in urban areas, supplemented by remote hydro, nuclear, and geothermal energy (2022). The electrical grid was *not* designed to accommodate phasing out urban gas-fired generation and tripling the amount of energy delivered from remote wind and solar energy. The impacts of an unprepared electrical grid may result in increased blackouts which would affect millions of Californians. Bloom Energy released a California Power Outage Map based on data collected between 2017 and 2019. During that time there were over 50,000 significant power outages across the state that impacted approximately 51 million customers. Although it is commonly perceived that blackouts happen primarily in rural communities, they are becoming more common in cities as well. For instance, California's 5 largest cities including Los Angeles, San Diego, San Jose, San Francisco, and Fresno, experienced 10,417 outages impacting approximately 20% of the state's population. Additionally, San Bernadino alone experienced 1,208 backouts impacting 1.4 million



customers. What is perhaps more concerning is that electrical power outages are steadily increasing. In October 2019, the blackout events increased by 80% compared to the year before and the individuals it impacted increased by 204%.

On January 13, 2021, the California Independent Systems Operator, California Public Utilities Commission, and California Energy Commission released a report regarding the root-cause analysis of the mid-August extreme heat wave power blackouts. This report states that the root-cause was attributed to “extreme weather conditions, resource adequacy and planning processes, and market practices”. Additionally, it states “[t]he energy markets can help fill the gap between planning and real-time conditions, but the West-wide nature of this extreme heat wave limited the energy markets’ ability to do so”. Therefore, it expresses the need to have a carefully thought-out regulation that take California’s current resources into consideration, as opposed to initiating a plan that may not practical.

The Bay Area experienced numerous storms this winter resulting in thousands being without power. Sam Moore wrote in an SFGATE article that on New Years Eve, the Bay Area was slammed with nearly 30,000 power outages. While PG&E did their best to restore power as soon as possible, there were thousands that didn’t have power for days. The East Bay was the most impacted with over 20,000 power outages in that area alone. The above-mentioned examples demonstrate that the Bay Area should not rely too heavily on electrical appliances and should have alternative plans in place when power outages inevitably occur.

Lastly, many older homes do not have the electrical infrastructure to support a heat pump. Older homes tend to have only 100 amps of electricity and didn’t start incorporating 200 amps of electricity until the 1990s. This means that homes will need to upgrade their panels to be able to use heat pumps, however, there is currently a 4-6-month lead time due to transformer shortages. Not only are there lead times with upgrading the panels, but also with acquiring the heat pumps themselves. Heat pumps for commercial use are likely to be custom ordered to fit the specific needs of any given project. Due to the heat pumps being custom made, emergency replacements are extremely difficult to implement. It is important that Bay Area AQMD incorporates additional language that allows the installation of gas-powered water heaters and boilers in emergency situations.

Conclusion

AGC of California appreciates Bay Area Air Quality Management District for allowing AGC of California to comment on Rule 9-6 “Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters”. We assert that Bay Area Air Quality Management District consider the comments we have expressed above. If you have any questions regarding the comments, please contact Brian Mello at 603-770-9264 (email: mellob@agc-ca.org). We appreciate the opportunity to comment and hope these concerns are addressed.

Sincerely,

Brian Mello



Brian Mello

Associate Vice President of Engagement & Regulatory Affairs

Associated General Contractors of California



February 2, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
Submitted via email to: jelewell@baaqmd.gov

Re: Comments on Draft Amendments to Rules 9-4 and 9-6

Dear Board Members and Staff,

The San Francisco Bay Area Regional Energy Network (BayREN) Codes and Standards Program fully supports the proposed amendments to the Air District's Rules 9-4 and 9-6. BayREN is a collaboration of the Association of Bay Area Governments (ABAG) and the nine Bay Area counties, funded by California ratepayers under the auspices of the California Public Utilities Commission (CPUC). One of nine program administrators and four Regional Energy Networks (RENs) in the state, BayREN operates six programs and has awarded \$55.4 million in incentives and avoided 156 million tons of carbon since our inception in 2013.¹ BayREN's Codes and Standards Program works to save energy by supporting and encouraging energy policies, particularly at the regional and local levels, and by improving compliance with the California Energy Code.

The proposed amendments to Rules 9-4 and 9-6 establish zero-NOx point of sale emissions standards for small space and water heating systems, to take effect in 2027-2031 depending on the size and type of system. These amendments are aligned with BayREN's efforts and goals, as well as those established by the State of California in the California Air Resource Board's 2022 Scoping Plan and the California Energy Commission's 2021 Integrated Energy Policy Report on Building Decarbonization. Many local governments here in the Bay Area have also adopted energy and climate policies that would be supported by the adoption of the proposed amendments.

The key technology needed for implementation of the proposed amendments is heat pumps. These are very efficient because they move heat rather than create it. By increasing use of heat pumps rather than combustion-based systems, the proposed rules would improve

¹ 2021 BayREN Annual Report, available online at: <https://www.bayren.org/sites/default/files/2022-05/2021%20BayREN%20Annual%20Report-11x17.pdf>

overall energy efficiency in the Bay Area as well as reducing NOx and greenhouse gas emissions.

BayREN has been providing incentives and training for heat pump systems for several years, including through a regional heat pump water heater incentive program developed with the assistance of Climate Protection Grant from the Air District. We recognize that the Bay Area is experiencing supply chain issues as well as an increased need for workforce development and training, and we are working with state, regional, and local partners to address these issues. Indeed, as a program implementer of energy efficiency programs that prioritize electrification measures, we are aware of the existing market barriers and appreciate the thoughtful – and realistic approach – taken in this rulemaking. By setting the deadlines for when the proposed amendments will take effect several years in the future, the Air District will allow time for these challenges to be met. At the same time, the proposed interim reporting process provides opportunities for the Air District to adjust these deadlines as necessary and appropriate.

Thank you for the opportunity to provide this input, and for your consideration of these comments. We look forward to working with the Air District in the future on these issues.

Respectfully submitted,



Karen Kristiansson

BayREN Codes & Standards Program Manager

Jennifer Elwell

From: Tom Graly <[REDACTED]>
Sent: Saturday, February 4, 2023 2:10 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

The members of the Berkeley Electrification Working Group are dedicated to educating and assisting Berkeley residents electrify their homes. We are writing to you to express our support for Rule 9-4 and 9-6.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

The health of our residents is of prime importance. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

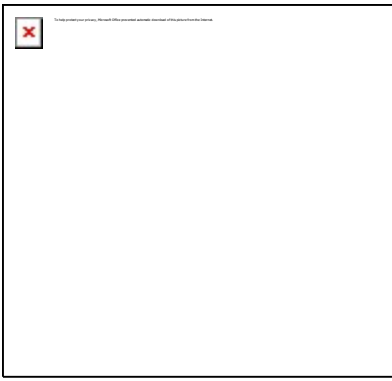
This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Rule 9-4 and 9-6 will deliver key climate benefits including reducing climate-warming emission from appliances by 73% from a 2019 baseline as determined by a BAAQMD study and help drive our statewide emissions to near zero.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Tom Graly
Co-Leader





February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Proposed Amendment to Regulation 9, Rule 6

Dear Ms. Elwell:

On behalf of Bradford White Corporation (BWC), we would like to thank you for the opportunity to comment on Bay Area Air Quality Management District's (BAAQMD) Proposed Amendment to Regulation 9, Rule 6, and supporting staff reports.

BWC is an American-owned, full-line manufacturer of residential, commercial, and industrial products for water heating, space heating, combination heating, and water storage. In the Bay Area, a significant number of individuals, families, and job providers rely on our products for their hot water and space heating needs.

Rule 9-6 Certification Procedure

In the proposed rule change, section 9-6-402.4, BAAQMD allows for manufacturers to certify compliance to the District through South Coast Air Quality Management District's (SCAQMD) certification process. With the entire state headed towards zero-emission water heating over the next decade, BWC believes alignment between air districts is critical for helping manufacturers plan transitioning to zero-emission product classes. While alignment between districts regarding certification requirements is logical, the transition dates proposed by BAAQMD and SCAQMD do not align. If BAAQMD proposes to transition to zero NOx on a different timeline than SCAQMD, it is not clear how manufacturers will be able to certify equipment. We respectfully request BAAQMD to clarify how the certification process will work if this occurs.

Additionally, BWC questions whether the District needs to require any emissions testing for products that are all electric. Section 9-6-301 Determination of Emissions, states that:

"Emissions of oxides of nitrogen from water heaters subject to Section 9-6-301, 303, 304, or 305 shall be tested in accordance with the following provisions:

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com



601.1 Each water heater model shall receive certification based on emission tests of a randomly selected unit of that water heater model. 601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance with EPA Reference Method 7, including 7A-7E.”

If manufacturers are required to test emissions on all electric products, rather than simply certify their fuel type is electric, this will place an additional cost and unnecessary burden on manufacturers to certify and sell products within the District.

Low Voltage Products

In the staff report, BAAQMD staff repeatedly references availability and affordability of residential water heating product. Staff further suggests that low voltage heat pump water heaters (HPWHs) will lower the cost barrier for homeowners, as they may avoid costly electrical upgrades. Low voltage products are currently only available through a couple of manufacturers, and furthermore, the products that were introduced to the market in 2022, have not been widely installed. The market for low voltage products is in its infancy, and it is premature to determine whether or not they are viable options for a wide range of applications. Until low voltage HPWHs become more widely adopted and determined to work well in a wide range of applications, we discourage the District from making policy decisions on a product type that is too new to the market.

Environmental Impact Report Alternative 3

Approximately 90% of residential water heater replacements are done on an emergency basis where the water heater has failed and cannot be necessarily easily or cost effectively replaced. It is essential that products are available locally, as customers need to be able to have these products installed in a timely manner to satisfy their needs. Local availability is not likely if manufacturers do not have the right product mix, and those products are not stocked by local distributors and retailers, forcing the consumer or business to go without hot water for an extended period of time.

Having the right products available for the right application is only one piece of the puzzle. Barriers, such as electrical infrastructure and space constraints can add to the complexity and replacement cost, may be overly burdensome to the customer. In particular, low- to medium-income homeowners and small business owners, who are simply trying to restore hot water service will be adversely affected. If BAAQMD chooses to adopt the proposed timelines, then BAAQMD must also ensure there is a robust program and funding in place to help property owners prepare for the transition well in advance of needing a new water heater.

While the state is off to a good start increasing adoption of residential HPWH technology, the commercial sector has not been addressed with the same level of attention. The commercial water heating sector has many different types of installations and water temperature needs and the industry needs ample time to understand these barriers in order to transition in this sector to zero NOx water heating. The recently adopted 2022 Title 24, California Energy Code does not address HPWHs in existing commercial and nonresidential buildings, largely because there are very few commercially available products on the market today.

A shift to require existing commercial and nonresidential buildings be retrofitted to use all electric water heating technology will require significant time, money, and collaboration between manufacturers and plumbing trade associations to train the workforce to ensure quality installations. This is an effort that will take several years to come to fruition, as new technology becomes commercially available, possibly extending beyond 2031. Like residential products, commercial HPWH technology will face similar

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com



challenges around product footprint, adequate air space and electrical capacity. In cases where challenges exist, requiring the water heater to be relocated, or in cases where an emergency replacement is not achievable, the District should have provisions in place to allow an Ultra-Low NOx alternative. While solutions to these challenges may emerge, the market for commercial HPWH equipment is even smaller than residential products and will take significant effort to develop practical solutions.

While it is reasonable to expect a building owner to plan around current laws and regulations surrounding NOx emission standards and commercially available compliant equipment, the cost to change from natural gas water heating to a heat pump water heater will be significant, especially when considering multiple HPWHs will be needed to replace a single gas-fired water heater. For low- and medium-income households and small business owners, it will particularly be difficult for them to plan the replacement of their equipment.

BWC believes that for the reasons outlined above, that Alternative 3, with a proposed implementation date of 2035, is the most appropriate path of three pathways proposed the District. The environmental impact report states that a 6-year delay of compliance until January 1, 2035, would be considered the environmentally superior option, as determined by CEQA guidelines. Furthermore, the shift will allow the state time to ramp up production of new clean energy sources to meet not only the needs of the Bay Area but the rest of the state as well. From a manufacturer's perspective, the additional time will allow the HPWH market to further develop with the help of incentives and allow more time to develop products to meet the multitude of field applications. As previously stated, proper training for contractors and technicians is critical to a successful transition. A longer transition period will help the workforce has the necessary skills, training, and recruitment of new members to support the transition

In closing, we would like to continue to invite BAAQMD staff to meet with BWC to discuss how we can assist in transitioning to zero-emission water heating equipment across all sectors. We understand the state and District's goals to reduce emissions and want to play a part in ensuring it is successful in doing so.

BWC thanks the Bay Area Air Quality Management District for the opportunity to provide feedback on the proposed Regulation 9, Rule 6. Please let me know if you have any questions or would like to schedule a meeting to discuss our comments further.

Respectfully Submitted,

Bradford White Corporation

Eric Truskoski
Senior Director of Government and Regulatory Affairs

Cc: R.B. Carnevale; R. Simons; B. Hill; L. Prader; C. VanderRoest; M. Corbett; B. Wolfer

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com





February 6, 2023

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

**Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report
for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6**

Honorable Chair Bauters, Board of Directors, and Executive Officer Fine,

On behalf of the Building Electrification Institute, City of Berkeley, The Greenlining Institute, and Rising Sun Center for Opportunity, please accept the following comments on the forthcoming Proposed Amendments to Building Appliance Rules 9-4 and 9-6. We appreciate the efforts of the Bay Area Air Quality Management District (BAAQMD) to work with stakeholders to develop new and innovative rules to protect public health, reduce greenhouse gas (GHG) emissions, and support a more equitable and prosperous economy. We offer our conditional support for the proposed amendments, provided that there is a strong commitment to ensure equitable implementation of the new rules, as we have recommended below.

This leadership is setting groundbreaking precedent for other air quality management districts, the state of California, and the nation as our communities work together toward broader, equitable decarbonization. That is why it is critical for BAAQMD to develop comprehensive policies and programs that model best practices in equitable building decarbonization to assemble and sustain a broad coalition of support for the transition, build a prosperous fossil fuel free economy, and create an all-electric future that leaves no household, worker, or community behind.

We provide the following recommendations to strengthen the proposed rulemaking:

Ensure equity in planning and implementation

We commend BAAQMD staff for their guiding equity questions and considerations as part of their effort to ensure equitable outcomes in the rulemaking process. It is critical for all regulatory bodies to consider how their actions may impact communities long afflicted by historical social,

economic, and racial injustice brought on by government. We offer the following recommendations to strengthen the planning and implementation of the proposed rules:

Adopt a community co-creation model for rulemaking implementation. BAAQMD and member jurisdictions should prioritize and enact a community co-creation model, either as part of or alongside the proposed Implementation Working Group. Community co-creation is a process of deep, iterative collaboration between government staff and leaders rooted in and accountable to historically marginalized communities. The goal of community co-creation is to move from a position of ignoring or informing community stakeholders to a practice of involving, collaborating with, and eventually deferring to these stakeholders in the policy development and implementation process. Community co-creation processes take time, flexibility, and patience, with the result being more effective and equitable policies. A community co-creation process will help policymakers and implementers:

- Gain critical expertise from historically marginalized communities and groups that government staff often do not have;
- Design policies and strategies more effectively to ensure they work for under-served communities who have been harmed by past government policies;
- Build political support for policies by allowing stakeholders to help design the approach;
- Address social and racial inequities that persist in local communities; and
- Develop new relationships based on mutual trust, respect, and shared power that contribute to productive, long-term collaboration between government and marginalized communities.

Support Low and Moderate Income Households

We applaud BAAQMD for taking socioeconomic impacts into consideration in the proposed rulemaking. Personal consumer and financial decisions are not merely based on preference, but rather, a myriad of individual social and economic factors that can be positively and negatively impacted by regulatory decisions. Appliances such as boilers, furnaces, and water heaters can be expensive and decades-long investments that can create cost burdens for low income households, small businesses, and under-resourced communities. Real risks exist to housing affordability as a result of these costs, and could lead to resident displacement or the closure of small businesses without adequate funding and programming. We offer the following recommendations to ensure low-income households and small businesses benefit from the transition:

Ensure building owners, decision-makers, and communities have access to technical support and sufficient funding and financing options. BAAQMD and member jurisdictions should undergo robust community engagement, outreach, and education to ensure that incentive programs are accessible, easily understood, and widely distributed. This can take the form of holding webinars and listening sessions to disseminate resources and provide additional opportunities for communities to provide input. The engagement also cannot end at feedback opportunities; BAAQMD should continually work to perform outreach to communities and

provide technical assistance. As the staff report notes, there are \$2.3 billion in state and local government, and utility incentives for BAAQMD communities to access, with potentially more available from the federal Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL). Additional steps are required to ensure this funding is accessible to those who need it most. BAAQMD or another entity responsible for equitable compliance and implementation should coordinate the distribution of this funding with local governments, utilities, and program implementers to support efforts to engage with and educate communities about available incentives, and structure new program offerings where these fall short.

Explore the “one-stop shop” retrofit hub model. “One-stop shop” retrofit hubs are designed to help residents and building owners determine their holistic building retrofit needs, access contractors, leverage multiple funding sources, and complete high-quality retrofits that deliver on promised energy and GHG reductions. These programs may be neighborhood-, city- or regional-specific, and are important for expanding access and coordinating funding and incentives from various federal, state, local, utility, and community sources. One-stop shops do this by simplifying both the financing and retrofit process for the end-user. Moreover, these programs can be nimble and adapt to changing national, state, and local conditions, so as new programs are launched or as funding sources evolve, building owners and decision-makers can navigate these changes. Including ongoing community engagement and iteration in the design of these programs will allow for this continuous iteration and improvement, resulting in a more equitable building retrofit process for communities. Examples of this model include the [NYC Accelerator program](#) and the [Denver Building Electrification Incentives program](#).

It’s important to recognize that whichever approach BAAQMD and member jurisdictions take, existing state programs are not necessarily geared for compliance with BAAQMD’s rules, and building owners are likely to be confused without substantial technical assistance and support. In many cases, electrification retrofits can require major changes to the building and may trigger costly health and safety upgrades that must first be addressed, and building owners and homeowners need a single place to go for help when this happens. This must include additional dedicated resources for low- and moderate-income households.

Ensure low- and moderate-income households have access to direct subsidies, rather than financing. While there are a number of financing and rebate programs that may be appropriate for higher-income households to cover the cost of the transition to healthy, all-electric appliances, many existing options are inequitable in their structure and deployment and are not appropriate for low- and moderate-income households. Requiring these households to provide substantial upfront costs and/or repay these costs with interest can lead to predatory lending, increased housing costs for residents, and other inequitable outcomes. It is critical that BAAQMD and member jurisdictions work to build trust with communities by committing to ensure appropriate funding is available given the social and economic realities for low- and moderate-income households. Additionally, well-positioned and targeted grants can help build market confidence in all-electric appliance technologies, increasing adoption and access in the broader community.

Protect Affordable Housing and Renters

All proposed policies carry risks and impacts. For communities in the San Francisco Bay Area, the housing affordability crisis is one that cannot be ignored. It is imperative that regulators understand potential risks of the proposed rule amendments to housing and impacts related to energy bills and housing affordability. Building owners and homeowners will need financial support to help ensure upgrade costs and energy bills do not pose undue burden or get passed on to tenants who cannot afford higher costs, and additional tenant protections may be necessary to avoid harm. While not under the normal purview of BAAQMD, the interlinking issues of gas appliance regulations, housing affordability, public health, safety, and socioeconomic impacts demands careful attention toward harm prevention and reduction from the new policies.

Coordinate with partners to develop solutions and track data on how proposed rules may influence housing costs. The recommendations above for supporting low- and moderate-income households are a first step to ensuring equitable implementation and preventing housing impacts, but other solutions may be necessary. We recommend BAAQMD lead a group of government agencies and community partners to understand risks and impacts, track data, and provide sufficient solutions to address potential housing and energy cost impacts related to the rules amendments. The Implementation Working Group (IWG) must have a work stream dedicated to housing affordability concerns, and ideally 50% or more of the stakeholders on the IWG represent low-income and disadvantaged communities that are most likely to face these risks and impacts.

Build a High-Road Jobs Workforce and High-Quality Installations

To avoid further exacerbating existing economic disparities between fossil fuel and clean energy workers, it is critical for BAAQMD, member jurisdictions, and relevant stakeholders to work with workforce partners in developing both supply and demand side policies that will create “high road” jobs for workers selling, installing, and maintaining this critical infrastructure—by which we mean jobs that include family-sustaining wages, benefits, career pathways and training opportunities, fair scheduling practices, and opportunities for worker voice. Supporting the creation of a high road workforce is also critical to ensure installations are high-quality and deliver on our air quality and GHG reduction goals. To achieve this, we recommend the following:

Coordinate with the Bay Area High Road Training Partnership on equitable electrification.

Coordinated by the [Rising Sun Center for Opportunity](#) and funded by the California Workforce Development Board’s High Road Training Partnership and California Climate Investments, the Bay Area Residential Building Decarbonization High Road Training Partnership is a partnership between 18 regional public agencies, workforce training entities, labor representatives, and supporting organizations that envision creating a residential building decarbonization industry that supports the creation of high road jobs, engages a qualified workforce, and provides stable career pathways for disadvantaged workers. Learn more [here](#) on the partnership’s efforts.

Require prevailing wage for all government subsidized installations and utilize agreements to foster high-road job creation. Any government funding for building electrification should require prevailing wage. This will help further build a more equitable and prosperous economy, ensuring that workers and communities benefit from government investments in an all-electric future, while setting a standard for broader market investments in a skilled and trained workforce. Where possible, BAAQMD and member jurisdictions should utilize Project Labor Agreements, Community Workforce Agreements, apprenticeship programs and other mechanisms to require prevailing wages and build a highly skilled and trained workforce for equitable building electrification efforts.

Conduct outreach and provide technical assistance to Minority and Women-owned Business Enterprises (MWBEs). Ensuring a diverse workforce is in place is an important way to equitably foster new economic opportunities for communities of color and other underrepresented communities that have historically been excluded from new clean energy industry jobs and businesses. Prioritizing and working with MWBEs will help grow this diversity, as will engaging partners in labor and workforce development to encourage their prioritization of MWBEs in their respective community outreach, training, and programs. Researching methods to help support or provide technical assistance to MWBEs in meeting and achieving high road standards is also critical to ensure firms who don't already have the necessary access, infrastructure, or capital can participate in the high road economy. We hope BAAQMD and member jurisdictions elevate and center MWBEs to achieve broader economic, racial, and social justice.

Ensure high-quality installations by partnering with local governments on compliance and enforcement. One challenge in the current enforcement mechanism for the proposed rules amendments is that it will not ensure high-quality installations of the new all-electric systems, which could result in maintenance issues, such as leaking refrigerant and faulty wiring. Contractors need to be trained and qualified to do proper installations to avoid these risks and build community trust that the all-electric transition will improve their buildings and homes. This also has the added benefit of helping to create high-road jobs, since when contractors must meet certain qualifications, they will compete on the basis of skill, rather than cost, avoiding a harmful “race to the bottom” on skills and wages.

An opportunity to address this may be to work with local governments directly on permitting processes and fund increased permitting capacity at their local building departments to increase compliance and enforcement of existing permits. Enforcement has historically been poor, often due to lack of resources for permitting and enforcement, with some local governments seeing their permit compliance rates for heating and hot water system replacements in existing buildings as low as 10% (based on internal BEI analysis).

Another avenue is to begin requiring qualifications or accreditations of contractors installing new systems. This will require working closely with community colleges, apprenticeship programs, and other entities to offer training and qualification programs for contractors.

Conclusion

We offer our conditional support for the proposed rule amendments provided that there is a strong commitment to ensure equitable implementation of the new rules as outlined above. We thank BAAQMD and member jurisdictions for taking bold action to address the very real threat of climate change and indoor air pollution from gas appliances. We look forward to working with the agency and community stakeholders to create a healthy, prosperous, and all-electric future for the Bay Area region and beyond.

Sincerely,

Fatima Abdul-Khabir
Energy Equity Program Manager
The Greenlining Institute

Julia Popolizio Hatton
President & Chief Executive Officer
Rising Sun Center for Opportunity

Billi Romain
Office of Energy and Sustainable Development Manager
Department of Planning and Development
City of Berkeley, Huichin Territory

Jenna Tatum
Executive Director
Building Electrification Institute



February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

Dear Ms. Elwell,

We write you on behalf of the Building Owners and Managers Association San Francisco and Oakland East Bay (BOMA SF and OEB) in regard to the Bay Area Air Quality Management District's (BAAQMD) proposed rule changes for Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6), which would prohibit the sale of NOX emitting natural-gas fired boilers and water heaters commonly found in commercial applications beginning January 1, 2031.

BOMA SF and OEB are proud to be a champion of sustainability and the effort to reduce emissions, to mitigate the impacts of air pollution, and, ultimately, to decarbonize the built environment. Through our efforts over the last several decades, the Bay Area boasts one of the most efficient commercial building stocks in the world. We offer the following comments with the hope of advancing local, regional, and statewide decarbonization policies that remain technically feasible and economically viable for our members. Please find the following concerns that we urge you to address in any final amendments to the rule.

BOMA SF and OEB support that this proposed rule change does not subject equipment to early replacement, but rather, mandates that systems be replaced at the end of their natural life. Given the large capital investments needed for commercial electrification projects, this policy will provide property owners with the necessary time to conduct the capital planning and amortization necessary to pay for these costs. BOMA SF and OEB do, however, request that BAAQMD clearly distinguishes the difference between system repairs versus system replacement in any final rule change. We firmly believe that the proposed amendments should only mandate system replacement at the end of a system's useful life and not when a repair is needed.

Due to the reality that the only current zero-NOx appliances available are electric, the proposed rule changes essentially mandate electrification of large commercial buildings at time of system replacement in 2031. From a technical standpoint, this poses challenges for larger commercial buildings. This is mainly due to building design, as typical office space heating designs in our market rely on a central boiler system to feed a hot water loop at ~ 180F supply temperature to deliver space heating through perimeter terminal units in the building.

The current market presents building owners with two mediocre options for all-electric heating and cooling systems. Buildings are forced to accept being constrained by the large space requirements and high capital costs associated with air source heat pumps or must select an electric resistance option that increases energy cost and may yield worse carbon performance than a natural gas boiler plant for the foreseeable future. Furthermore, many large commercial buildings in our market are not viable candidates for heat pump technology and have no pathway to electrification other than electric resistance heat.

From a thermal equivalency, a building that uses natural gas but records an ENERGY STAR score of 90 is much more efficient than any building that is utilizing electric resistance heat technology. We fear that the efficiency losses from a policy that will lead to installations of mostly electric resistance heat will lead to major unintended consequences, including significant increases in energy demand that the grid may not be able to sustain and tremendous increases in operating costs that will likely fall on tenants. Given this challenge, we urge BAAQMD's proposed rule change to provide an exemption for any building with no feasible pathway to electrification other than electric resistance heat, as certified by a California registered Professional Engineer. Sunset dates to this exemption should be determined by availability of viable heat pump technology for large commercial buildings as well as the availability of renewable electricity to the California grid.

In summary, we believe that any final rule changes should address the following areas of concern to the Bay Area commercial real estate industry:

- Proposed BAAQMD amendments to Rule 9-6 should clarify that the rule will not apply to system repairs, and that a system only need be replaced at the end of its useful life.
- Proposed BAAQMD amendments to Rule 9-6 should provide an ongoing exemption to buildings with no feasible pathway to electrification other than electric resistance heat, as certified by a California registered Professional Engineer.

Thank you for your consideration to BOMA SF and OEB's comments on this important issue. We stand ready to assist with any feedback or clarification requested from the commercial real estate industry as it relates to these rule changes. We look forward to our continued collaboration in pursuit of policies that build a more sustainable California.

Sincerely,

John R. Bryant
CEO, BOMA San Francisco

Julie Taylor
Executive Director, BOMA Oakland/East Bay

February 3, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, California 94105
Jelwell@baaqmd.gov

Dear Ms. Elwell,

Thank you for the opportunity to provide comments on the Bay Area Air Quality Management District (Air District) staff proposal to amend Regulation 9, Rules 4 and 6 to reduce emissions of nitrogen oxides from residential and commercial buildings. CARB commends the Air District for its leadership to advance zero-NOx emission limits for space and water heaters in California, and for proactively addressing the proposed particulate matter standard in the Bay Area.

CARB supports the Air District's proposed amendments to these rules and applauds Air District efforts to take action in this area where there is demonstrated technology ready to deploy at scale with tremendous health benefits. Bay Area's adoption of zero-NOx emission limits for space and water heaters will be an essential contribution to California's strategy for attainment of air quality standards. CARB staff look forward to coordinating with the Bay Area on implementation of the rule amendments.

Sincerely,



Jennifer Gress, Ph.D., Division Chief
Sustainable Transportation and Communities Division

cc: (via email) See next page.

cc: Steven S. Cliff, Ph.D., Executive Director
California Air Resources Board
Steve.cliff@arb.ca.gov

Edie Chang, Deputy Executive Officer for Planning, Freight, and Toxics
California Air Resources Board
Edie.chang@arb.ca.gov

Annalisa Schilla, Assistant Division Chief
Sustainable Transportation and Communities Division
Annalisa.schilla@arb.ca.gov

Melanie Zauscher, Air Resources Supervisor I
Sustainable Transportation and Communities Division
Melanie.zauscher@arb.ca.gov

Dana Waters, Staff Air Pollution Specialist
Sustainable Transportation and Communities Division
Dana.waters@arb.ca.gov



February 6
To: BAAQMD

RE: Rules 9-4 and 9-6, Draft EIR Comments

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

I am writing regarding the proposed heating appliance rules (Rules 9-4 and 9-6) because we would like to see these rules succeed both at the environmental goals set by the district and at improving economic opportunities for targeted communities. These rules hold the potential to contribute to these goals, but only under the right circumstances.

If these rules become part of a coordinated effort across multiple responsible agencies to facilitate the rapid transition towards utilization of high efficiency heat pumps that are correctly sized and flawlessly installed and maintained by skilled workers and backed by rapidly scaling production of renewable energy generation, then they will achieve the greenhouse gas and criteria pollutant reductions you hope for. We share that goal. But meeting that goal is a big and complex challenge that will require more coordination among the responsible agencies than is currently happening.

We want to be very clear that we are not discouraging your setting a deadline for ending sales of new gas heating appliances in the Bay Area. The timelines that staff have proposed could work if complemented by the right programmatic choices, not just of the BAAQMD, but of other agencies responsible for managing decarbonization. What we would like the BAAQMD to commit to is communicating with other agencies about their programmatic choices that would enhance the probability of success in decarbonizing water and space heating and cooling in the Bay Area.

Electrification is not a panacea for decarbonization. Inefficient electrical appliances such as electrical resistance heaters remain the low cost option and can produce enough demand from what is still a mixed fuel grid to compensate for the reduction in end user gas consumption associated with the electrification of heating and cooling appliances. Even low efficiency heat pumps are better than resistance heaters, but high efficiency heat pumps are best. Moreover, all heating and cooling devices work most efficiently when correctly installed.

The EIR acknowledges that the success of the Air District's proposed rules depends on other agencies to incentivize the adoption of electric heating appliances. The EIR references programs managed by the CEC, CARB and CPUC. These programs would

be most successful if they emphasized high efficiency heat pumps and addressed the need for skilled installation and maintenance to realize the full efficiency potential of these technologies. We would like the Air District to join us in emphasizing this point. This is both an environmental imperative and a necessary contribution towards making the transition just.

The EIR also acknowledges that electrification of heating appliances will create more demand for electricity from the grid and asserts that the increment will be balanced entirely by renewable energy and mostly by expanded utility scale solar. We agree with your contention that utility scale renewable projects are a key piece of the puzzle, but not that they are somehow inevitable. When counties in the Bay Area tell us that there is no need for utility scale renewable energy and storage projects, we would like your help in telling them that there is in fact real need.

Just this last year, the Alameda County Building Trades worked hand in hand with the Sierra Club, the Center for Sustainable Neighborhoods and other groups in a successful effort to prevent adoption of a moratorium on utility scale solar projects by Alameda County. That policy campaign was precipitated by NIMBY opposition to a project that the Sierra Club and the Building Trades Council both approved. The County supervisors responded well to our joint campaign, but we would have appreciated your help in highlighting the need for expanded renewable and storage capacity.

The Contra Costa Building Trades Council is currently asking the county to reconsider the Solar siting policy in its draft general plan that for the most part prohibits utility scale energy projects anywhere where they would be practical. County staff have recently asserted that roof top capacity should be sufficient to accommodate all future renewable energy needs. Here again is an opportunity for you to help educate a local government partner about what they can do to help decarbonize our energy economy. Your rule is going to increase the need for utility scale renewable energy projects. Letting local governments responsible for entitling such projects know about the expanded need would help mitigate the impact.

We understand that utility scale renewable projects can have impacts of their own, and are committed to seeing that those be mitigated to the extent possible. The Building Trades councils of the Bay Area have joined forces with environmental and environmental justice organizations to mount a coordinated campaign to ensure that utility scale renewable energy procured by all of the CCAs in the CCPOWER service area, including all of the Bay Area Counties, is produced in accordance with a consistent package of labor, environmental and environmental justice practices. We think that counties that are considering restrictive policies that unduly discourage utility scale renewable and storage should pivot to an approach aligned with this package of labor, environmental and environmental justice policies. Overall, this will result in a cleaner environmental and less global warming. We think it would be in the interest of the Air District to support this effort.

Tim Frank
Executive Director



February 6, 2023

Jennifer Elwell Lam, Sr. Air Rule Development Specialist
Members of the Board
Bay Area Air Quality Management District (BAAQMD)
375 Beale Street, Suite 600
San Francisco, CA 94105

**Supporting amendments to Regulation 9, Rules 4 and 6,
reducing NOx emissions from small furnaces and appliances**

Ms. Lam and Board Members:

Climate Action California, with more than 5,000 supporters around out state, is a coalition of climate groups and individuals who advocate for science-based solutions to our climate crisis. Peninsula Interfaith Climate Action is a coalition of Bay Area faith groups, working for a just transition to a low-carbon economy. We are pleased to support proposed amendments to [Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces](#) and [Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters](#), which govern point-sale emission standards for small space-and water-heating systems.

Adoption of these amendments will put the Bay Area in the lead in California's essential transition away from natural gas for heating and cooling, and toward our all-electric future, powered by renewables. In the short term, the public health will benefit significantly from elimination of NOx pollution indoors, and local and regional air quality will improve as formation of ozone and particulate matter are reduced. If as anticipated, adoption and implementation of these rules leads to replacement of gas appliances with electric, the effect will also be to significantly reduce methane emissions from California buildings.

Thank you for proceeding with this rulemaking. We greatly appreciate BAAQMD's initiative.

Sincerely,

Janet Cox, President and CEO
Climate Action California

Deborah Mytels, Chair
Peninsula Interfaith Climate Action (PICA)



Date: January 31, 2023

RE: Comments for the proposed amendments to Rules 9-4 and 9-6
To: Jennifer Elwell, Bay Area Air Quality Management District (jelwell@baaqmd.gov)
From: The Climate Reality Project: Silicon Valley chapter

Climate Reality: Silicon Valley supports the proposed amendments to Rules 9-4 and 9-6 to reduce nitrogen oxide emissions from natural gas-fired furnaces, gas-fired boilers and water heaters intended to significantly reduce environmental and health impacts. We recognize the proposed rules will break new ground for the nation to assure air quality meets health standards for the Bay Area residents and also to address the role that NOx and the resulting pollutants, generated from NOx, have regarding global warming with the resulting negative climate impacts.

Given this approach has not been taken before, we urge you to continue thoroughly analyzing all the factors necessary to successfully implement this program. An important element of program success requires wide acceptance by our residents and careful consideration of the implementation's socio-economic impacts on our residents, especially on the disadvantaged population.

SUGGESTIONS FOR RULES IMPLEMENTATION

- **Public Outreach/Education.** We encourage you to also consider the role a broad public education campaign can play to encourage community support and increase adherence to the spirit of the proposed rules. How you inform all sectors of the public, including low-income and disenfranchised residents, landlords and business owners along with staff of the agencies that will participate in the program is essential to program success.
- **Assure Key Agencies Provide Expected Results.** PG&E's process to shift infrastructure from gas fired appliances to electric and their infrastructure must be confirmed to support a rapid shift to heat pump appliances. Rules implementation must assure PG&E can move quickly with system upgrades. Similarly, to assure successful and expedited installation the Aire District's program needs to validate all collaborating organizations, like BayREN, have effective systems and staff in place that support effective contractor/installer programs. All the organizational components need to be tuned for efficient operation to assure program success.

The Bay Area Air Quality Management District has the opportunity and the obligation to protect our air quality which in turn plays a central role to mitigate climate change and to protect California from the ever-growing climate impacts we face. Thank you for your willingness to take this monumental step forward.

Karen Warner Nelson

A handwritten signature in dark ink, appearing to read "Karen Warner Nelson". The signature is fluid and cursive, with the first name "Karen" being more prominent.

Co-Chair and Founder, The Climate Reality Project: Silicon Valley chapter



Date: February 6, 2023

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

RE: Support of the Proposed Amendments to Regulations 9-4 and 9-6

Dear Jennifer,

East Bay Community Energy (EBCE) supports the proposed amendments as outlined in Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces, and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters.

BAAQMD proposed two amendments aimed to improve overall public health of Bay Area residents and regional air quality. EBCE supports advancing Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces, and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters because it not only aligns with the State's bold environmental direction, but it also directly addresses health concerns that environmental justice communities historically have faced. For example, the reduction of NOx and particulate matter, including PM2.5 exposure would directly impact communities of color who are disproportionately affected by poor air quality and the lack of resources to combat such issues. Research has shown that people of color and lower-income groups in the United States are at a higher risk of premature death due to the exposure of PM2.5 compared to other populations.¹ It is in the best interest of the region's regulatory body to protect its constituents from harmful air pollutants, therefore EBCE supports BAAQMD's policy proposals, signaling advance electrification measures for the building industry as noted in Regulation 9-4 and 9-6.

The proposed amendments would prohibit the sale of methane-fueled residential water heaters by 2027, methane-fueled residential and commercial furnaces by 2029, and methane-fueled commercial water heaters and boilers by 2031. EBCE is concerned that leaning on the market could leave those who cannot afford this expensive transition away

¹ Jbaily, A., Zhou, X., Liu, J. *et al.* Air pollution exposure disparities across US population and income groups. 2022



1999 Harrison Street, Suite 800
Oakland, CA 94612



1-833-699-EBCE (3223)



fboediarto@ebce.org

from methane-fueled appliances to carry the gas infrastructure costs. Particularly, the costs and availability of labor and installation could be factors in preventing residents from adopting all-electric appliances. Therefore, EBCE asks that the Air District staff continue to consider the questions and guiding principles, as well as adopt the proposal for a formal Working Group as listed in the Staff Report issued in December 2022 ensuring the accessibility of these products and considerations of low-income communities.² Additionally, EBCE proposes that BAAQMD amplify some of the programs that many Community Choice Aggregators including EBCE have deployed that can be complementary to these market changes.

Because of the shift in the market, EBCE can provide support to our residents by offering programs and services to help our customers transition to clean electric appliances. For example, EBCE offers the Health-e Home Program in partnership with BlocPower and Revalue.io. This program provides low- to moderate-income homeowners with affordable financing options to gain access to the health and safety benefits of a transition to clean energy and electric appliances. This includes energy-efficient whole home upgrades including installation of clean heating, cooling, hot water systems, and electric appliances. The program is income-based, available to EBCE customers who earn up to 120% of area-median income. EBCE's incentives range from \$4,000 to \$15,000 based on annual household income.

Thank you for considering our comments and for your leadership on this important matter. EBCE is available for any further discussions aimed to prioritize the public health of our communities and residents.

Sincerely,

Feby Boediarto

Regulatory Analyst

² Staff Report – Proposed Amendments to Building Appliance Rules – Regulation 9, Rule 4 and Rule 6 posted on December 19, 2022 on 44.

Jennifer Elwell

From: Families & Homes San Jose [REDACTED]
Sent: Monday, February 6, 2023 8:55 PM
To: Jennifer Elwell
Cc: Terri Henry' via F&H Executive Team
Subject: Opposing Ban On Natural Gas Home Furnaces and Water Heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Sirs/Madams

We oppose the air district's ban on home furnaces and water heaters that emit any nitrogen oxides. Because there are no natural gas furnaces or water heaters that meet this standard, residents would be required to switch to electric appliances. We also consider the public outreach of the air board to be inadequate.

Some of the reasons for our opposition are listed below.

1. **Significant Costs to Homeowners**

Gas-to-electric conversion costs for residential HVAC (heating, ventilation and air conditioning) and water heaters are significant (\$30K to \$60K or more depending on scale of project.) We have cost estimates from Santa Clara County Association of Realtors (SCCAOR); City of San Jose Climate Smart staff; and individuals who have completed upgrades or are obtaining quotes for installing heat-pumps which support our cost range. Costs can be expected to increase due to labor shortages, supply chain issues, inflation, and the mandate itself.

2. **Elapsed Time to Complete Replacement**

Gas-to-electric conversion may also require extensive electrical work. If panel upgrades, service upgrades, trenching, and/or plumbing re-routing are required, the time for replacing could be weeks. Residents may have to move out of their home if your furnace or water heater is being replaced. Often PG&E transformers cannot support additional load and their transformer would have to be replacement before a homeowner could upgrade a panel. This will increase schedules and costs.

3. **Heat-Pump Water Heaters Will Not Fit in Water Heater Closets**

Heat pump water heaters require a minimum of [1000 cubic feet](#) (typically a 10 ft x 10 ft room x 10 ft height). Residences and commercial buildings with water heater closets do not have adequate space for current heat pump water heater designs. This means that piping will have to be re-routed and/or alternate locations (if available) found to install a replacement. This will significantly increase the amount of time and cost needed to replace a water heater.

4. **Rebate and Incentive Program Inadequately Funded**

While there are some rebate programs and incentive programs, several are not currently available nor adequately funded. None of the current rebate programs will cover the bulk of the impacted homeowners or cover most of the expected cost. Most of the programs are income based. Generally, an incentive or rebate will be considered taxable income. This limits the advantage of the rebate or incentive.

5. **Grid Reliability**

Grid and electric power supply are not adequate. We have not seen adequate information from PG&E and/or SJCE regarding grid upgrades and improvements that would be necessary to handle the additional load caused by the conversion of natural gas appliances to electric appliances. A large number of San Jose residents experience power outages on a regular basis and even more during heat waves or high wind conditions. With unaddressed grid reliability issues and increasing electric power rates, homeowners may find it necessary to install solar and battery systems to address the inevitable electric shortage. This will further increase home ownership costs.

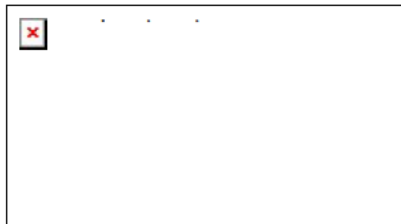
These are only a few of our concerns.

We request to be placed on your mailing list and notify us of meetings.

Sincerely,
Sandra A. Delvin, PE

--

Families & Homes San José



About Families and Homes SJ

Families and Homes SJ is a 100% volunteer-staffed grassroots coalition of San José residents and organizations joining together to defend the rights of single-family residential neighborhoods within the city of San José. Neighborhoods zoned for single-family residences cover just 34% of San José land. The organization supports the city's Urban Village housing strategy, which will produce large numbers of affordable and market-rate housing that is both environmentally and fiscally sustainable.

February 6, 2023

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

Harvest Thermal Inc is a Bay Area-based developer and manufacturer of smart heating, cooling, and hot water solutions using thermal energy storage and heat pump technologies to reduce the climate impacts and energy costs of residential space and water heating. After less than a year of commercial operation, we have deployed more than 40 systems in the Bay Area and expect to grow sales to hundreds of units in 2023 and thousands beyond that.

We strongly support the Air District's proposed zero-NO_x appliance standards and urge the Board of Directors to adopt them. We applaud the Air District for its policy leadership in seeking to limit emissions of nitrogen oxides (NO_x) from furnaces (Rule 9-4), water heaters, and boilers (Rule 9-6) and are proud to have launched our product in the same ecosystem that seeks to spur innovation and job creation while protecting the health and economic wellbeing of its residents.

Harvest Thermal's smart, all-electric heating and hot water system uses a single heat pump for both heating and hot water. Our innovation is the development of a smart controller that operates the heat pump mostly during the day when solar electricity is low-cost and plentiful, and utilizes a thermal battery to distribute heat and hot water to the home at all other times.

Benefits of Harvest Thermal System in Achieving Air District Objectives

As an all-electric, heat pump-based system, ours is compliant with the draft rule today. It consistently cuts carbon emissions by 90% compared to gas equipment, 50% compared to standard heat pump-based systems, and saves homeowners up to 45% on their monthly heating bills.

The staff report noted the prevalence of heat pump space and hot water heaters that operate on a 240 volt circuit, typically requiring a main panel upgrade thus raising installation costs. At the heart of our system is a SanCO2 hot water heater that uses a 15 amp/240 volt circuit which most older homes can handle with no panel upgrade.

The Air District evaluated the impact of the proposed rule on the electric grid including capacity, load, and infrastructure needs. The study found different levels of impact depending on whether the rule occurred in either a Low or High Policy Reference case. Regardless of the reference case, Harvest Thermal's ability to decouple the time when the heat pump operates from the time when it delivers heat and hot water results in a lower-cost and cleaner electric grid. By limiting the operation of the heat pump mostly to mid-day, our system when deployed at scale will result in utilizing more emissions-free solar electricity that would otherwise have been curtailed. Similarly, Harvest Thermal's use of stored thermal energy for delivery of heat and hot water to the home will reduce dependence on peaking combined cycle gas plants and attendant emissions of NO_x and other criteria pollutants in winter mornings and evenings when heating needs are highest and renewable energy less abundant.

harvest thermal

A priority of the Air District is the affordability and accessibility of zero NOx appliances and here again, Harvest Thermal's smart, load-shifting capability supports finalizing the rules as proposed. Our system today has the lowest operational costs of any heat pump-based system on the market. By operating the heat pump primarily when time-of-use rates are lowest, our customers save as much as 45% on their monthly heating bills. These bill savings enable financing solutions that are the key to unlocking scale and enabling widespread adoption of zero-NOx heating and hot water solutions for all customers including middle- and low-income households.

Conclusion

We urge the Board to adopt the proposed zero-NOx appliance standards outlined in the Staff Report. Predictability and certainty is the hallmark of a well-functioning market. Provide clear policy signals and the market will respond with products and services that achieve intended outcomes typically with lower costs, greater benefits, higher rates of adoption than predicted.

With just one heat pump for both heating and hot water and a factory-assembled Pod that integrates sensors and controls, Harvest Thermal is designed to be easy and cost-effective to install. Market development policies that support innovation to meet critical societal needs will increase sales volumes and lower equipment and installation costs making our zero-NOx, ultra-low carbon system become even more affordable.

The Air District has the opportunity to demonstrate to the rest of the nation that it can both protect public health and air quality by reducing fossil fuel appliance pollution while at the same time spurring innovation and job creation. We urge the Board to act without delay.

Sincerely,

Pierre Delforge
Head of Product Development, Operations, and Policy
Harvest Thermal
pdelforge@harvest-thermal.com

Jennifer Elwell

From: [REDACTED]
Sent: Thursday, January 19, 2023 5:00 PM
To: Jennifer Elwell
Subject: Opposing proposed amendments to Rules 9-4 & 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please reflect our oppositions to the proposed amendments to Rules 9-4 & 9-6. The replacement of residential central furnaces or natural gas-fired boilers and water heaters are not only costly with conversions and also with questionable effective efficiencies as well as problematic capacity concerns such as for larger water heaters in the over 100 gal sizes on the quick-heating capabilities. We oppose to your proposed in regulating them. Thanks.

Residents in the 600/700/800 blocks of townhouse/condos of Hollenbeck Avenue, Sunnyvale, CA 94087.

[Sent from Yahoo Mail on Android](#)

LAW OFFICE OF
PETER HENRY LIEDERMAN

2442 Russell Street
Berkeley, CA 94705
Voice (510) 681-6916
Fax (510) 842-1716
berkeleylawfirm@gmail.com

February 17, 2023

Bay Area Air Quality Management District
375 Beale Street
Suite 600
San Francisco, CA 94105

Dear Sirs:

I hope you will consider the following as a comment regarding your proposed amendments to Regulation 9 Rule 4 and Regulation 9 Rule 6.

I first learned of plans to enforce conversion to heat pump technology at the California Lawyer's Association, Environmental Law Conference, last October.

While I think going to all electric technology is a good idea as a path to reducing greenhouse gas emissions, I was quite concerned that the authorities, including BAAQMD were seriously underestimating the economic imposition they were making on the huge number of owners of older homes in the Bay Area.

Reading the Socio-economic Impact Report on these rule changes was not only unconvincing but I had the feeling that it was, a somewhat self-deceptive analysis intended to sell, rather than describe, a product.

The Bay Area Air Quality Management District (BAAQMD) is proposing Rules^a that would require any household replacing its gas powered space heater or even water heater with an electric powered heat pump device.

Supposedly the purpose is to reduce emissions of Nitrogen Oxides (NOx) a respiratory irritant, though greenhouse gas reduction is also obviously a good purpose. In fact, a couple of years ago, wanting to do my small bit reducing methane and CO₂, I hired a contractor to tell me the cost of converting a smaller part of my duplex to all electric. The small unit now serves as an office, but it has its own gas heat and electric supply, kitchen and bathroom. It is 110 mostly non-grounded, knob and tube wiring that would not support an induction electric stove top of more than one burner. The contractor said I would need a new service panel. But the new service panel would have to be bigger. But I could not enlarge the panel because it would then

^a Regulation 9 Rule 4 and Regulation 9 Rule 6

be too close to a window. So I would have to rebuild that part of the house. To do any of it I would need a city permit. I would be looking at far more than \$14,000 before even considering buying the new electric heater, stove, and water heater.

This last October at an environmental law conference, I first learned of the proposal to enforce all-electric on homeowners replacing broken equipment, or in another proposal to require this whenever property changes hands. The proponents proudly described their success converting homes in generally poor sections of the central valley. I questioned about the burden they were prepared to impose in places such as the east and south bay, dense with older housing wired for pre-1970 demands. They did not seem to have considered the economic burdens seriously. In the central valley communities, the owners hadn't minded the change, substantially because they did not have to pay for it, the heat pump systems would also be used to provide air conditioning, and often the service being replaced was propane.

BAAQMD published a report by Applied Development Economics, an Oregon entity headquartered in Walnut Creek, that does not appear to have a working website, entitled: **"Socioeconomic Impact Analysis of Proposed Amendments to Regulation 9, Rule 4: Residential Central Furnaces; and Regulation 9, Rule 6, Natural Gas-Fired Boilers and Water Heaters"**.

The most concise, if not accurate statement they make is:
"This combined cost of equipment to comply with both Rule 9-4 and 9-6 is estimated at \$10,851 of which \$8,027 is for space heating and \$2,824 is for water heating. This is about \$3,783 more expensive than equivalent gas powered appliances. In addition, older homes would need to upgrade their electric service, at a cost of \$4,256 for single family units and \$2,744 for multi-family units."

So one gas to electric conversion is \$15,100 in yesterday's dollars. That is if you don't have to modify the structure of the dwelling, if you don't count the permit fees that the local government will charge, if your taxes don't get reassessed, and if you don't have to move out while the work is being done. Moreover, it assumes the market for installers and equipment will not rise when these suppliers discover they have a market forced by law to make the purchases to keep their dwelling habitable.

Also, if I am reading the AEM report correctly, the \$2824 water heater cost was from a Lawrence Berkeley Laboratory study that for some reason included in its calculation the much less costly replacing at least some existing heat pump equipped electric water heaters. So the real average figure will be higher.

In addition, the study predicts that "distributors and construction trades will see an increase in the cost of doing business for higher priced appliances, but this will be offset by higher prices to the customers for the equipment." It does not mention that for many such customers the replacement will be an emergency necessary to keep a home habitable. Careful shopping will not be an option.

Yet more: "In addition, the appliance costs can vary considerably depending on the performance characteristics of the particular model chosen by the consumer...In general, electric heat pumps *operate with a lower heating capacity* than comparatively priced gas-fired furnaces." In other words, you will get what you pay for, but it will buy less warmth and comfort.

The offsetting savings are exaggerated. The report paraphrases a study by a San Francisco consultancy: Energy Environmental Economics "E3", that a heat pump user who now uses air conditioners would save \$600 per year in utility bills. That however is for houses served by the Sacramento Municipal Utility District where air conditioning is going to be used most of the summer. For the Bay Area, the prediction is an annual savings of \$100 to \$400 for a single-family home, and only \$10 to \$90 for multi-unit dwellings. The costs net out to a loss.

The Report suggests that landlords will simply pass their net increased costs onto their tenants. The report doesn't mention how this will work in rent control jurisdictions.

The report mentions that the proposal will probably increase the cost to users of gas appliances as the user base for gas decreases. Increasing the supply of electricity will also cost: "The CA Independent System Operator (CAISO) is planning \$11 billion in transmission capacity projects over the next 20 years, which covers 80 percent of the entire state service area, and PG&E is planning to spend \$400 million **per year** on distribution projects." It opines that solar generation capacity would need to be added along with battery storage at a combined cost of \$1.95 billion. "It is possible that these investments will result in some future rate increases, which would reduce the cost savings to households from converting to all electric appliances."

"It is possible"? Well really it is certain, if you will notice that PG&E invariably seeks to translate any increase in capital or operating costs into higher rates. The paragraph adds: "Air District staff may report on rate changes as part of its Implementation Working Group and interim reporting process to the Board of Directors." Translation: After this mandate is imposed, we "may" ask for a report on what it really costs the people on whom we have imposed the requirement to replace your water heater or furnace.

Much of the remaining economic analysis in the report is based on a theory that water heaters must be replaced every seven years, and furnaces every 18 years, and so if you smear out these costs over these time periods, they don't look so bad, especially given the purported, if unlikely, savings in utility costs. But the report's data suggests that 44.5 percent of Bay Area households make less than \$100,000, and so a one time expenditure of more than \$15,000 is a profound hit, particularly at the lower income levels.

A more benign approach would require studying how codes, permits, and electrical service itself might be modernized to make service upgrades quicker and less expensive. A cost benefit analysis should be applied to put some reasonable balance on the scale as to whether this substantial non-progressive "tax" on unlucky building owners and their tenants, is really the best health and environmental benefit for the dollars involved.

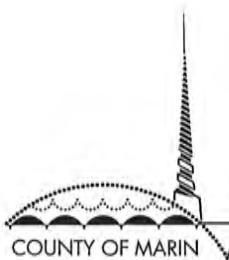
Finally, BAAQMD should build in flexibility for changing technology. Around fourteen years ago my wife and I installed a new bathroom. The light fixtures required by the city demanded use of a particular compact florescent bulb with two prongs for the unique socket. This was, I presume, environmentally friendly, but the technology immediately became obsolete, and the compact fluorescent bulbs are now considered energy-wasting hazardous waste. LED bulbs are better in every respect and use regular screw-in sockets. (I hate to think how many City of Berkeley person-hours would be needed to legally change the socket to screw in a different lightbulb.)

It is predictable that 17 years from now, in 2040, our 2023 cutting edge technology will be obsolete. The bureaucracy now making expensive and intrusive demands on Bay Area households, should be prepared to alter course as soon as appropriate.

Yours sincerely



Peter H. Liederman



COMMUNITY DEVELOPMENT AGENCY

Thomas K. Lai
DIRECTOR

Marin County Civic Center
3501 Civic Center Drive
Suite 308
San Rafael, CA 94903
415 473 6269 T
415 473 7880 F
415 473 2255 TTY

Building and Safety
Environmental Health Services
Planning
Environmental Review
Housing
Sustainability
Code Enforcement
GIS
Federal Grants

www.marincounty.org/cda

Jennifer Elwell
Bay Area Air Quality Management District (BAAQMD)
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

February 6, 2023

Dear Ms. Elwell,

Thank you for this opportunity to provide comments on the proposed changes to BAAQMD Regulation 9, Rules 4 and 6. The County of Marin is committed to conserving energy and decarbonizing our built environment. In 2018, we received a grant from BAAQMD to launch the Electrify Marin program to encourage homeowners to voluntarily replace natural gas burning appliances (including space and water heaters and ranges/stoves) with high efficiency electric versions. While the initial BAAQMD grant ended in 2020, the County continues to fund and maintain the program given its importance in reducing emissions from the built environment and improving indoor air quality.

We are writing in support of BAAQMD taking the lead on regulating the sale and installation of equipment that burns fossil fuels across the region. Given that contractors work across county boundaries, regionally consistent rules and guidance are critical to successful implementation of any program of this kind. Additionally, the timeline and transition plan provide certainty and clarity to the market to support the transition.

We also recognize the complexity and challenges that face a proposal of this kind and therefore share these specific concerns:

- **Enforcement.** Will guidance be given to local building departments on how rules will be enforced locally and actions to be taken when a non-compliant unit is installed? Has BAAQMD done any studies on how these rules could potentially lead to permit avoidance and potential remedies for that?
- **Equity.** Care should be given to both potential higher up-front capital costs of compliant equipment and installations, but also the operating costs. The costs of natural gas and electricity should be monitored to ensure that the new equipment does not increase the energy burden of our low-income and vulnerable communities.
- **Stranded Gas Assets.** The State and utilities have decarbonization goals in which natural gas demand will shrink. We are concerned that those holding onto fossil fuels will only pay more later, especially our low-income renters who are likely to be the last to transition away from natural gas. As gas demand curtails, it will only

become more expensive as the pool of ratepayers shrink and gas infrastructure becomes more expensive to maintain for utilities such as PG&E. Utilities will have to turn to ratepayers and charge more per unit of gas. We would like BAAQMD to address in its scoping plan and articulate solutions or guardrails to minimize the impact of stranded assets especially as it pertains to low-income and vulnerable communities.

- **Installation challenges.** While heat pump water heaters can work in most residential applications, there are still challenges with replacing water heaters that are located within the home or in homes with electrical challenges. Additionally, some neighborhoods require distribution system upgrades before homes can be full electrified. We have seen several projects derailed or significantly delayed due to grid constraint issues.

We fully support the development of interim reports provided two years ahead of compliance dates to ensure that technological feasibility, capital and operating costs, equitable transition, and enforcement challenges are fully considered. We are looking forward to working with BAAQMD as you move towards these new rules thoughtfully and considerately.

Sincerely,



Sarah Bernstein Jones
Acting Director

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94015

RE: Pacific Gas and Electric Comments on the Draft Amendments to Regulation 9, Rule 4 and Rule 6

Pacific Gas and Electric Company (PG&E) appreciates this opportunity to comment on the Bay Area Air Quality Management District (BAAQMD)'s proposed amendments to Regulation 9, Rule 4 (Rule 9-4) and Regulation 9, Rule 6 (Rule 9-6). PG&E supports the goals of these proposed amendments to improve regional ambient air quality and health outcomes, as well as indirectly reducing greenhouse gases (GHG) through implementation of zero-NOx appliance standards.

While the proposed amendments do not specify emission control methods to meet zero-NOx standards, the only currently existing appliances that could achieve this standard use electric heat pump technology. The rules would thus require electrification of furnaces and water heaters which are primarily fueled today by natural gas. The effect of such a requirement would reduce gas usage (e.g.: therm use) but, critically, *not* reduce PG&E's relatively fixed costs of maintaining safety and reliability of the gas delivery system. As Energy and Environmental Economics, Inc (E3) highlights in their report *The Challenge of Retail Gas in California's Low-Carbon Future*, "Absent a policy intervention, low-income customers who are less able to electrify may face a disproportionate share of gas system costs."¹ From an equity and affordability standpoint, PG&E urges BAAQMD to prioritize comprehensive building decarbonization opportunities that achieve both building emission reductions and gas system cost reductions. This could be achieved through the expansion of appliance-based regulations to all gas appliances in a building or by using zonal electrification as a tool to electrify whole communities while retiring gas infrastructure assets. While cooktops, dryers, or decorative fireplaces do not have considerable NOx emissions when compared to furnaces or water heaters, there is both a financial and environmental benefit to customers who fully electrify their homes or businesses.

¹ [The Challenge of Retail Gas in California's Low-Carbon Future \(ethree.com\), Page 5](#)

As PG&E seeks to define how the gas system can continue to provide safe, affordable, reliable service while meeting California decarbonization goals, we have met with a number of BAAQMD staff and board members throughout the rule amendment process to discuss our early progress and investigation into potential geographic zones where electrification may mitigate future gas customer rate impacts by decommissioning portions of the gas system. Through this approach—which we have termed “zonal electrification”—we can both decrease NOx and carbon emissions in California and also reduce the long-run costs of the gas system addressing affordability for those customers continuing to use gas. We urge BAAQMD to continue to consider incorporating zonal electrification into this and future Board actions.

The California Air Resources Board (CARB) also discussed the need to shrink the natural gas system in their 2022 Scoping Plan Update (SPU). As staff states in Appendix F, the inability to provide comprehensive (i.e.: whole-building or zonal-based) decarbonization solutions to customers presents a key challenge in long-term gas rate affordability. Staff writes, “As more households move away from using natural gas, those remaining on the natural gas system are likely to pay an increasingly larger share of systemwide costs, which could further widen the affordability gap between households that are able to decarbonize early and those that are not.”²

In closing, PG&E applauds the efforts of BAAQMD to reduce NOx emissions. To promote further decarbonization and affordability for all Bay Area residents, we urge BAAQMD to work towards extending these rules to all gas appliances. Furthermore, we ask that BAAQMD work closely with PG&E, its member cities, towns, and counties, to prioritize zonal electrification solutions in tandem with the roll out of Rules 9-4 and 9-6. We look forward to working together with BAAQMD in the Implementation Working Group for these rules, as well as on other solutions to help achieve California’s decarbonized future.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

/s/

Fariya Ali

Air & Climate Policy Manager
State Agency Relations
Pacific Gas and Electric

² California Air Resources Board, 2022 Scoping Plan Update, Appendix F – Building Decarbonization, p. 15

Jennifer Elwell

From: QQQ PAL [REDACTED]
Sent: Monday, January 23, 2023 3:03 PM
To: Jennifer Elwell
Subject: No to proposed natural gas rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Today's Palo Alto Daily Post has three articles related to the proposed natural gas facilities. The costs in new installation of proposed facilities with electrical systems are not only excessively expensive but also possibly affecting building outside spaces with the setback requirement. It may require the upgrading of electrical panel: also the equipment outside could generate high noises. Please vote NO to the proposed rules. Thank you.

Palo Alto Green Gables neighborhood residents

[Sent from Yahoo Mail on Android](#)



February 3, 2023

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

My name is Robert M. Gould, MD. As background, after practicing as a pathologist at San Jose Kaiser for over 30 years, I've been an associate adjunct professor at UCSF School of Medicine, working in the Program on Reproductive Health and the Environment. Since 1989, I've also been president of San Francisco Bay Physicians for Social Responsibility (SF Bay PSR), representing hundreds of health professionals throughout our region, for whom I'm submitting this message. SF Bay PSR speaks for the health of our patients and communities, who are increasingly impacted by the unfolding public and environmental health impacts of global warming, and clearly connected issues of air pollution.

In this context, I first want to thank the Air District for showing policy leadership in the rulemakings to limit emissions of nitrogen oxides (NO_x) from furnaces (Rule 9-4), water heaters, and boilers (Rule 9-6).

By voting for these rule amendments, you will greatly contribute to improving the health of communities that we health professionals strive to serve in our practices throughout our careers. In addition, your vote will have a ripple effect across the nation, for the health and air quality benefits of these rules will be a model for other air districts around the country that have been examining similar standards as an emissions reduction strategy.

We strongly support the Air District's proposed zero-NO_x appliance standards and urge the Board of Directors to adopt them.

We agree with the Bay Area Clean Air coalition that the Board should move forward with these rule amendments because of the following reasons:

1. The proposed standards significantly improve air quality, community health, and environmental equity;
2. Electric heat pumps can lower energy costs and boost resiliency;
3. Electric appliance replacements will create jobs;
4. The interim report and Implementation Working Group will drive equitable implementation;

5. The market for plug-in ready products is growing; and
6. The proposed timeline will maximize captured benefits.

The Proposed Standards Significantly Improve Air Quality, Community Health, and Environmental Equity

Fossil fuel appliance emissions harm the air quality, health, climate, and economy of the Bay Area, and phasing out the sale of NO_x-emitting furnaces, water heaters, and boilers will be a historic step toward becoming a cleaner, healthier, more prosperous, and more just region.

The Bay Area's residential gas appliances alone emit more NO_x than all passenger vehicles in the Bay Area — and more than seven times as much NO_x as all the power plants in the region combined.

This fact shows how large an impact your vote could have on creating a healthy environment for all.

Also, this fact demonstrates clearly how much the emissions from gas furnaces and water heaters contribute to the Bay Area's ongoing failure to attain National Ambient Air Quality Standards and California Ambient Air Quality Standards for both fine particulate matter (PM_{2.5}) and ozone, both of which are formed by chemical reaction of NO_x with other pollutants.

Gas appliances emit hundreds of pollutants. Most harmful are particulate matter (PM_{2.5}), ozone, nitrous oxides (NO_x), carbon monoxide (CO), formaldehyde, and [benzene](#). All of these are associated with serious health impacts, collectively including respiratory, cardiovascular, cognitive, reproductive, and developmental harms; cancer; and premature death.

- [A 2020 UCLA](#) study (p.7) found that in California: "If all residential gas appliances were immediately replaced with clean electric alternatives, the reduction of outdoor NO_x and PM_{2.5} would result in 354 fewer deaths, as well as 596 fewer cases of acute bronchitis, and 304 fewer cases of chronic bronchitis annually in California. This is equivalent to approximately \$3.5 billion in monetized health benefits over the course of one year. These numbers only account for exposures from outdoor air as a result of residential electrification; a full exposure assessment accounting for indoor exposures would increase the total health benefits and the associated economic benefits of residential electrification.
- In the Bay Area, moving to zero-emission electric appliances would be a significant boon to community health in the region, with Air District modeling estimating that PM_{2.5} reductions from these rule amendments will avert 37 to 85 premature deaths and about 110 new cases of asthma each year in perpetuity. The valuations of health benefits from the rule, estimated between \$400 million and \$890 million annually, represent ER visits skipped; lost days of work and school avoided; family members' lives extended.

We also want to emphasize that studies demonstrating the health harms of gas appliances are widely accepted within the health and research communities. There is no doubt that the gas emitted from these appliances is a serious health hazard. Please do not let the corporate-sponsored misinformation in the testimony of Dr. Julia Goodman to BAAQMD sow doubt about the science. The gas industry is using the same tactics as the tobacco industry, and we must not fall for it.

Pollution from gas appliances disproportionately harms children and communities of color.

The proposed rules are a step forward in ensuring safe, healthy homes for all residents, but particularly those in frontline communities who are affected by the intersection of race, disproportionate housing insecurity, increasing cost of living, and harmful indoor pollution.

- African-American and Hispanic children with asthma are likely the most disproportionately burdened by indoor air pollution from gas appliances.
- Lower-income and communities of color are three times more likely to live in an area with poor outdoor air quality, which compounds indoor air pollution health harms.
- Inequity in exposure to air pollution from gas appliances is reinforced by housing conditions which exacerbate exposure, such as: smaller unit size, greater occupant density, old or unmaintained and often inadequate ventilation which contributes to elevated concentrations of NO₂ in lower-income, multifamily buildings, and the reality that renters often do not want to ask landlords to change or repair appliances for fear of a rent increase or eviction.

The Staff Report's health modeling, focused exclusively on PM_{2.5}, does not even capture the full benefits from these rule amendments, which will also include averted harm from reductions in many pollutants, as mentioned above.

In summary, SF Bay PSR, representing the voices of hundreds of health professionals, urges the Board to adopt the proposed zero-NO_x appliance standards outlined in the Staff Report. Moving to clean, efficient, zero-emission appliances will reduce the many health harms from pollutants; help the Air District attain the federal and state air quality standards; move the region and the state toward climate goals; and save lives, with benefits greatly improving the health of the poor and communities of color disproportionately burdened by pollution.

Once approved, the Air District will highlight its role as a national leader in reducing fossil fuel appliance pollution to protect health and air quality.

Sincerely,

A handwritten signature in dark ink, reading "Robert M. Gould, MD". The signature is fluid and cursive, with the first name "Robert" and last name "Gould" clearly legible, followed by "MD" in a smaller, more compact script.

Dr. Robert M. Gould
President
San Francisco Bay Physicians for Social Responsibility

Physicians for Social Responsibility, San Francisco Bay Chapter
548 Market Street, #90725, San Francisco, CA 94104-5401



February 6, 2023

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

The 56 individuals and organizations signed below write in support of an equitable transition to a clean-energy economy in the Bay Area and beyond, and we applaud the Air District for the policy leadership it has shown in the rulemakings to limit emissions of nitrogen oxides (NO_x) from furnaces (Rule 9-4), water heaters, and boilers (Rule 9-6). The health and air quality benefits of these rule amendments will truly reach every corner of the region and much further, as the agency's action spurs onward other jurisdictions around the nation that have been examining zero-emission appliance standards as an emissions reduction strategy.

We strongly support the Air District's proposed zero-NO_x appliance standards and urge the Board of Directors to adopt them.

The Board should move forward with these rule amendments because:

- 1) The proposed standards significantly improve air quality, community health, and environmental equity;
- 2) Electric heat pumps can lower energy costs and boost resiliency;
- 3) Electric appliance replacements will create jobs;
- 4) The interim report and Implementation Working Group will drive equitable implementation;
- 5) The market for plug-in ready products is growing; and
- 6) The proposed timeline will maximize captured benefits.

1. The Proposed Standards Significantly Improve Air Quality, Community Health, and Environmental Equity

Fossil fuel appliance emissions harm the air quality, health, climate, and economy of the Bay Area, and phasing out the sale of NO_x-emitting furnaces, water heaters, and boilers will be a historic step toward becoming a cleaner, healthier, more prosperous, and more just region.

The Bay Area's residential gas appliances alone emit more NO_x than all passenger vehicles in the Bay Area¹ — and more than seven times as much NO_x as all the power plants in the region combined.² These emissions contribute to the Bay Area's ongoing failure to attain National Ambient Air Quality Standards and California Ambient Air Quality Standards for both fine particulate matter (PM_{2.5}) and ozone,³ both of which are formed by chemical reaction of NO_x with other pollutants.⁴ The expected release shortly of a more stringent

¹ Bay Area Air Quality Management District (BAAQMD), "[Workshop Report: Draft Amendments to Building Appliance Rules](#)," September 2021, p.3.

² Environmental Protection Agency (EPA), [2017 National Emissions Inventory](#), January 2021.

³ BAAQMD, "[Staff Report: Proposed Amendments to Building Appliance Rules](#)," December 2022, pp.17-18,24.

⁴ Ibid., p.2.

federal air quality standard for PM_{2.5} only makes more salient the need for the Air District to pursue these rule amendments, as the Staff Report indicates.⁵

Fossil fuel appliance pollution is also insidiously harmful to human health. PM_{2.5}, ozone, and nitrogen dioxide (NO₂, a primary component of NO_x) are all associated with grievous health impacts, including respiratory, cardiovascular, cognitive, reproductive, and developmental harms; cancer; and premature death.^{6,7,8} Indeed, buildings are now the leading cause of premature death from combustion emissions in California.⁹ And this pollution disproportionately impacts communities of color.

Nationwide, residential gas combustion is associated with a greater disparity of exposure for people of color than any other source studied — higher than power plants, industrial facilities, or vehicles.¹⁰ Air District modeling confirms that PM_{2.5} pollution resulting from the covered appliances disproportionately impacts residents of color throughout the nine Bay Area counties as well.¹¹ These communities already experience higher rates of asthma, which makes them particularly vulnerable to negative health impacts from NO_x pollution.^{12,13} The proposed rules are a step forward in ensuring safe, healthy homes for all residents, but particularly those in frontline communities who are affected by the intersection of race, disproportionate housing insecurity, increasing cost of living, and harmful indoor pollution.

Moving to zero-emission electric appliances would be a significant boon to community health in the region, with Air District modeling estimating that PM_{2.5} reductions from these rule amendments will avert 37 to 85 premature deaths and about 110 new cases of asthma each year in perpetuity.¹⁴ The economic health benefits from the rule are estimated to range between \$400 million and \$890 million annually, including ER visits skipped; lost days of work and school avoided; and family members' lives extended.

The Staff Report's health modeling, focused exclusively on PM_{2.5}, does not even capture the full benefits from these rule amendments, which will also include averted harm from reductions in NO_x and ozone pollution – as well as avoided negative health outcomes from the resiliency upgrades that efficient electric appliances offer (referenced later in these comments).

Further, the report's analysis accounts for NO_x emissions from the additional electricity that will be consumed by electric replacement appliances; however, it assumes the Bay Area power mix of today rather than a forward-looking and increasingly renewable power mix,¹⁵ very likely underestimating the true net reduction of NO_x emissions from a transition to efficient electric appliances. As the report calls out repeatedly, the Air District's

⁵ Ibid., p.24.

⁶ American Lung Association, "[Particle Pollution](#)," 2020.

⁷ American Lung Association, "[Ozone](#)," 2020.

⁸ EPA, "[Basic Information about NO₂](#)," 2022.

⁹ Irene C. Dedoussi et al., *Premature Mortality Related to United States Cross-State Air Pollution*, Nature 578:264 (2020), <https://doi.org/10.1038/s41586-020-1983-8>. These impacts include wood combustion.

¹⁰ Christopher W. Tessum et al., *PM_{2.5} Polluters Disproportionately and Systemically Affect People of Color in the United States*, Sci. Adv. 7:18, 2021, Supplementary Data File S2, <https://advances.sciencemag.org/content/suppl/2021/04/26/7.18.eabf4491.DC1>.

¹¹ BAAQMD, "Staff Report," pp.2,25-29.

¹² California Air Resources Board (CARB), "[Asthma & Air Pollution](#)."

¹³ Crystal Gammon, "[Pollution, Poverty and People of Color: Asthma and the Inner City](#)," Environmental Health News, June 19, 2012.

¹⁴ BAAQMD, "Staff Report," p.3.

¹⁵ Ibid., p.19.

analysis represents a "'worst case' conservative estimate of emissions reductions, costs, and environmental impacts of the proposed amendments."¹⁶

2. Electric Heat Pumps Can Lower Energy Costs and Boost Resiliency

In addition to improving air quality, bettering community health outcomes, and alleviating racial/ethnic inequities in exposure to PM_{2.5} pollution, efficient electric heat pumps – considered in the Staff Report as the most likely zero-NO_x replacement for gas-fired appliances – are a superior technology to fossil fuel alternatives and can provide consumer savings, resiliency, and energy services benefits to users.

Electric heat pumps are more efficient than gas-fired devices, which can generate bill savings to Bay Area residents over the operational life of the appliance.¹⁷ An RMI analysis showed that heat pumps ranged from 2.2 to 4.5 times more efficient than an Energy Star gas furnace in the widely varying climates of the continental U.S.¹⁸

In addition, heat pumps efficiently generate both heating and cooling, providing a critical opportunity to broaden access to life-saving air conditioning across a region that historically hasn't needed it but increasingly will in a future of climate-fueled extreme heat and wildfire events. Access to cooling will especially benefit disadvantaged communities and communities of color that have historically had less access to air conditioning.¹⁹ Heat pump technology also allows appliance owners to take advantage of grid connectivity benefits, which can generate additional bill savings by using energy at cheaper times of the day and by offering demand response capacity to strengthen grid reliability.

3. Electric Appliance Replacements Will Create Jobs

The Staff Report includes a socioeconomic impact analysis,²⁰ but this report does not include the socioeconomic impacts resulting from the manufacturing, distribution, sales, and retrofitting/installation of efficient electric appliances that would be driven by these rule amendments — impacts which might reasonably be expected to include increases in employment.

A report produced by the UCLA Luskin Center for Innovation found that electrifying all the state's buildings by 2045 – a goal aligned with Governor Brown's 2018 Executive Order B-55-18 and the 2022 California Climate Crisis Act – would result in net annual job creation of over 100,000 full-time equivalent positions, with approximately 60% of those being "high-road" jobs that require a skilled and trained workforce and offer family-sustaining wages, benefits, and job security for workers.²¹ With almost one-fifth of the state's population, the job impact of these rule amendments in the Bay Area should be substantial.

As the Air District delves into the Implementation Working Group process, it should design the rules' implementation to maximize the positive impacts of these rule amendments on labor. Fully realizing the labor benefits of electrification will require cooperation across multiple agencies, including the state Energy

¹⁶ Ibid., p.3.

¹⁷ Energy and Environmental Economics, "[Residential Building Electrification in California](#)," April 2019.

¹⁸ Claire McKenna et al. (RMI), "[It's Time to Incentivize Residential Heat Pumps](#)," June 2020.

¹⁹ Legislative Analyst's Office, "[Climate Change Impacts Across California: Housing](#)," April 2022.

²⁰ BAAQMD (Applied Development Economics), "[Socioeconomic Impact Analysis of Proposed Amendments to Regulation 9, Rule 4 and Regulation 9, Rule 6](#)," December 2022.

²¹ Betony Jones et al. (UCLA Luskin Center for Innovation), "[California Building Decarbonization: Workforce Needs and Recommendations](#)," November 2019, pp.ES-iv–ES-viii.

Commission and Public Utilities Commission, regional community choice energy programs, and the investor-owned utility.

The Air District should commit itself to working with these partners to promote program design that includes labor standards and appropriate workforce development strategies. In this work, agencies should follow the lead that Congress set with the Infrastructure Investment and Jobs Act by incorporating strong labor standards into their programs,²² both to ensure quality work and to set the stage for growth of this workforce at the pace that is needed.

4. The Interim Report and Implementation Working Group Will Drive Equitable Implementation

Staff have included thoughtful design elements to ensure these rule amendments are implemented equitably and affordably. The Air District will produce an interim report for the Board of Directors two years prior to implementation with an update on market changes and equity considerations. To support this effort, staff have created a formal Implementation Working Group composed of diverse stakeholders that will meet regularly to assess technology and equity considerations. This group can also help drive progress in the region to ensure necessary action is taken to help maximize the benefits of these rules before they take effect.

The equitable implementation of these rules as proposed by the Air District's staff – paired with energy efficiency, weatherization, and safety measures – provides an unprecedented opportunity to advance home and community health for the Bay Area's most vulnerable populations. The interim report and Implementation Working Group are exemplary components of the rule amendments that other agencies will likely look to when considering equitable appliance rule design.

5. The Market for Plug-in Ready Products Is Growing

The Staff Report helpfully discusses the ongoing development in the zero-emission electric appliance market, most notably the presence on the market of "low-voltage" products for both space and water heating that can plug into the same electric outlet as a cell phone charger or a microwave, with more such devices to come.²³ Allowing manufacturers and suppliers sufficient time for continued innovation, zero-emission product development, and market scaling is one of the primary reasons that the compliance dates of the rule amendments are not until 2027-2031.²⁴

This lead time will allow additional low-voltage zero-emission products to come online prior to compliance, which will reduce the need for building electrical panel upgrades currently associated with electrification. The availability of these products, and their affordability, will be reported to the Board of Directors well in advance of compliance dates going into effect.

6. The Proposed Timeline Will Maximize Captured Benefits

As recommended by the Staff Report,²⁵ the Air District should adopt the rules on the proposed timeline in order to achieve the greatest benefits from the program. While the Draft Environmental Impact Report (EIR) finds "slightly less" impact on energy resources from a delayed compliance timeline because "a slightly smaller amount

²² Karla Walter and Mike Williams (Center for American Progress), "[3 Major Wins for Workers in the Bipartisan Infrastructure Package](#)," November 29, 2021.

²³ BAAQMD, "Staff Report," pp.11-13.

²⁴ Ibid., pp.2,13.

²⁵ Ibid., pp.4,47.

of new solar, new batteries, new transmission capacity, and distribution capacity" would be allocated to this "Project" under the California Environmental Quality Act²⁶ – that work would instead be allocated to a different Project somewhere else. Essentially, the expanded energy resources noted will be developed either way, and any reduction in impacts identified in the EIR is simply an accounting exercise.

Rightfully, the EIR and the Staff Report both highlight that the slight reduction in impacts described above is greatly surpassed in beneficial magnitude by the rule amendments' huge emissions reduction benefits arriving sooner, as provided by the original compliance timeline in the Staff Report.^{27,28} As described above, the Implementation Working Group's reporting process will provide an opportunity to evaluate compliance if the rule amendments cannot be implemented feasibly and equitably. No delay is called for – to the contrary, it is critical that a market signal be laid out as soon as possible in order for the promise of these rule amendments to be effectively fulfilled.

Conclusion

We urge the Board to adopt the proposed zero-NO_x appliance standards outlined in the Staff Report. Moving to clean, efficient, zero-emission appliances will reduce a cavalcade of health harms from NO_x, PM_{2.5}, and ozone; help the Air District come into attainment with federal and state air quality standards; move the region and the state toward their climate goals; boost access to in-home cooling; and save lives, with benefits primarily going to communities of color. Once approved, the Air District will become a national leader in reducing fossil fuel appliance pollution to protect health and air quality.

Thank you for your service to the region and to the Air District's mission.

Respectfully,

Jed Holtzman, Senior Associate, **RMI**

Megan Leary, Community Engagement and Policy Manager, **Emerald Cities Collaborative Bay Area**

Diane Bailey, Executive Director, **Menlo Spark**

Jim Dennison, Associate Attorney, **Sierra Club**

Melissa Yu, Energy Campaign Representative, **Sierra Club SF Bay Chapter**

Laura Feinstein, Sustainability and Resilience Policy Director, **SPUR**

Dan Johnson, Architect, CEA, **Beyond Efficiency Inc.**

Abhishek Dash, VP, Engineering, **BlocPower**

²⁶ BAAQMD (Ascent Environmental), "[Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules](#)," December 2022, p.ES-7.

²⁷ Ibid., pp.ES-7–ES-8.

²⁸ BAAQMD, "Staff Report," p.42.

Bret Andersen, **Carbon Free Palo Alto**

Elaine Salinger, San Mateo County Chapter Leader, **Citizens Climate Lobby**

Matt Malinowski, Director of Climate Research, **CLASP**

Woody Hastings, Phase Out Polluting Fuels Program Manager, **The Climate Center**

Caroline Beckman, **Climate Resilient Communities**

Lisa Altieri, **Community Climate Solutions**

Ann Edminster, **Design AVEnues LLC**

Leslie Alden, Executive Director, **Drawdown Bay Area**

Fernando Gaytan, Senior Attorney, **Earthjustice**

Lena Moffitt, **Evergreen Action**

Connie Miller, VP and Clean Air Lead, **GreenTown Los Altos**

Jenny Green, Leadership Team Volunteer, **Mothers Out Front Silicon Valley**

Kim Cheslak, Director of Codes and Policy, **New Buildings Institute**

Kathleen Kramer, MD, Co-Founder, **Project Green Home**

Chance Cutrano, Director of Programs, **Resource Renewal Institute**

Sage Briscoe, **Rewiring America**

Suzanne Henderson Emerson, **San Carlos Green**

Dr. Robert M. Gould, President, **San Francisco Bay Physicians for Social Responsibility**

Michelle Hudson and Megan Strain, **San Mateo Climate Action Team**

Gary Latshaw, Chair of the Air Quality Committee and the Guadalupe Regional Group, **Loma Prieta Chapter of the Sierra Club**

Shoshana Wechsler, Coordinator, **Sunflower Alliance**

Christine Kohl-Zaugg, Executive Director, **Sustainable San Mateo County**

Bruce Naegel, Director, Metrics, **Sustainable Silicon Valley**

Diane Schrader, CEO, **thirdACT PBC**

Laura Neish, Executive Director, **350 Bay Area**

Cheryl Weiden, Steering Committee Member, **350 Silicon Valley**

Nicole Kemeny, Past President, 350 Silicon Valley, **350SV Menlo Park Team**

Bill Hilton and Kevin Ma, Co-Chairs, **Green Sanctuary Committee of the Unitarian Universalist Church of Palo Alto**

Constance Beutel, Air Watch Bay Area, **Benicia resident**

Ralph Dennis, **Benicia** resident

Vicki Dennis, **Benicia** resident

Bodil Fox, **Benicia** resident

Larnie Fox, **Benicia** resident

Terry Scott, **Benicia** resident

Danielle Chiaro, **Burlingame** resident

Gerard Manning, **Burlingame** resident

Fred Bialy, **El Cerrito** resident

Kathy Battat, **Hillsborough** resident

Nancy Tierney, **Pacifica** resident

Jason Mendelson, **Redwood City** resident

Rob Kahn, **San Carlos** resident

Dylan Ackerman, **San Mateo** resident

Sue Blockstein, **San Mateo** resident

Wendy Chou, **San Mateo** resident

Sarah Hubbard, **San Mateo** resident

Mary Rose LeBaron, **San Mateo** resident

Robert Zhou, **San Mateo** resident

Kristel Wickham, Chair, Sunnyvale Sustainability Commission, **Sunnyvale** resident



February 6, 2023
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

**Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report
for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6**

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

SPUR applauds the Air District's leadership on the transition to zero-nitrogen oxide furnaces, boilers and hot water heaters. We have signed on and fully endorse the views expressed in the coalition letter of 56 organizations and individuals shared earlier today from RMI.

This letter is to address some of the understandable concerns regarding electrical service and panel upsizing. SPUR has been conducting in-depth research on how to address the challenge of electrical service upsizing, including electrical panel upsizing, during the transition to clean appliances. Attached is a memo providing a summary of our findings and recommendations. Electrical service upsizing is acting as a barrier to the uptake of clean appliances, but an underappreciated solution for many homes is to avoid service upsizing with careful design choices and the use of load management devices.

Electrical service and panel upsizing is the type of equity and affordability challenge that should be addressed through the Bay Area Air Quality Management District's Implementation Working Group (IWG). We hope the IWG will include our research on how to avoid unnecessary electrical service upgrades as a key strategy to solve the problem of service upsizing.

If you have any questions, please don't hesitate to reach out.

Sincerely,

Laura Feinstein, Ph.D.
Sustainability and Resilience Policy Director
SPUR

Memo: Preventing unnecessary electrical service upsizing, including panel upsizing

Panel upsizing increases the electrical capacity of a building's breaker panel to allow for greater peak electrical demand. Larger panels in turn can trigger electrical service upsizing - increasing the capacity of utility infrastructure, such as the service wires and transformer that service a building. Avoiding panel upsizing whenever possible is quicker and less expensive for building owners, and it prevents costly upstream infrastructure upgrades that are borne by utility ratepayers.

Electrical service upsizing, including panel upsizing, is expensive and time-consuming for the property owner. Obtaining a permit and electrical service upgrade from the energy utility can cause delays in the range of weeks to years, effectively preventing electrification. They also are expensive for the utilities and their ratepayers.

A common but erroneous belief among many building energy experts and contractors is that building electrification requires homes to have at least a 200-amp panel. Given that many buildings have smaller panels installed, this belief has sparked a great deal of concern that electrical panel and service upsizing will act as a major bottleneck to building electrification.

Common mistaken assumptions are that most homes have 100 amp panels, and that all homes require a 200 amp panel to fully electrify. On the first point, the TECH Clean California program data for over 9,000 homes showed that 52 percent of all homes (and 42 percent of homes in disadvantaged communities) already had 200 amp panels.

Whether a home can fully electrify without panel upsizing depends on a host of building-specific factors. While there's no universal answer as to what size panel an electrified home requires, it's clear that many - if not most - homes can fully electrify on a 100 amp panel without compromising safety or comfort. Opting for lower-power appliances and use of load-management devices can allow homes to electrify within smaller panel sizes.

Redwood Energy's Watt Diet Calculator provides in-depth information on design choices that minimize the need for panel upsizing, and case studies of how homes up to 3,000 square feet can fully electrify without a panel capacity increase (Exhibit 1).¹ San Mateo County Office Of Sustainability conducted in-depth case studies of ten homes and found that only one home, which had a 60 amp panel, needed to increase panel capacity before electrifying every device in the home.²

¹ Redwood Energy. "Watt Diet Calculator," 2022. <https://www.redwoodenergy.net/watt-diet-calculator>.

² Gaillard, Josie, and Tom Kabat. "CASE STUDIES: COSTS FOR DECARBONIZING EXISTING SINGLE-FAMILY HOMES." County of San Mateo Office of Sustainability, January 2023. <https://www.smcsustainability.org/energy-water/decarbonizing-homes/cost-plans/>.

Exhibit 1. Thoughtful design can allow homes to electrify with a 100-amp panel.
Redwood Energy's case study of a 3,000 square foot home that fully electrified all appliances.

Example 2



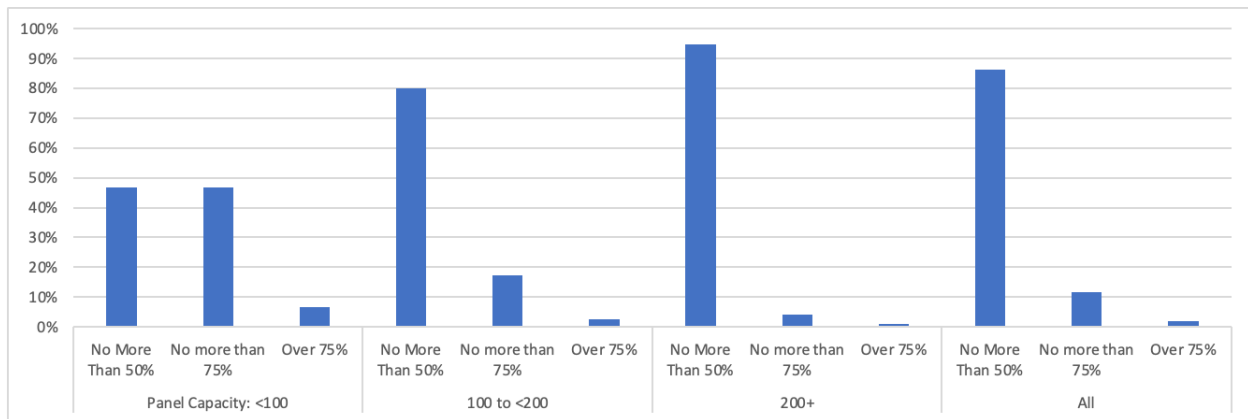
Load calculations per the National Electrical Code Section 220.82(B) and 220.83(B)

	Neo Charge ¹²⁷ Smart Splitter	BSA Electronics ¹²⁸ Dryer Buddy	SimpleSwitch ¹²⁹ 240V Circuit Switch	Splitvolt ¹³⁰ Splitter Switch	Thermolec ¹³¹ DCC	Evduty ¹³² Smart Current Sensor
						
Cost (\$)	\$500 (Appliance) \$550 (Dual Car)	\$200 – 365 (several outlet versions)	\$550 (240V) \$650 (EV) \$550 (120V)	\$319	\$1,050 (DCC-9), \$945 (DCC-10)	\$500

Source: Images reproduced from Redwood Energy. "Watt Diet Calculator," 2022.
<https://www.redwoodenergy.net/watt-diet-calculator>.

The assumption that most homes require a panel size increase to fully electrify is belied by work from electrification experts showing that it is feasible to comfortably electrify many homes on 100 amps, and by data showing that most homes have a great deal of unused panel capacity. For example, Home Energy Analytics has compiled a dataset on residential panel capacity utilization for 359 of their customers. Among customers of Home Energy Analytics, the majority of electrical panels, even those in the 100 amp range, use no more than half their capacity (Exhibit 2). For a 2000 square foot home, it would be typical for a heat pump water heater plus central heat pump HVAC to require 23 amps. More than 95% of homes in their dataset had at least 25 amps of unused capacity.

Exhibit 2. Many homes, even those with panels in the 100 amp range, can fully electrify without upsizing the panel. Only 15% of homes participating in an energy savings program used more than half their panel's capacity.



Source: Home Energy Analytics (HEA). "Dataset on Residential Panel Capacity and Utilization." Shared by Steven Schmidt of Home Energy Analytics, October 13, 2022.

Preventing unnecessary panel upsizing and minimizing the increase when the panel needs additional capacity can make it easier for a large swath of the building stock to convert to clean appliances. As the old saying goes, "The best way to solve a problem is not to have it."

Recommendations

The driving forces behind unnecessary panel upsizing are a lack of awareness of load-management technologies, problems with the California Electrical Code, and electrification incentive programs that offer subsidies for panel upsizing without requiring due diligence to explore alternatives.

Incentive programs should be updated to cover the costs of offering customers an analysis of how to fully electrify without panel upsizing and offering discounts on load management technology. Devices such as circuit switches, smart circuit splitters, and smart current sensors

can manage electrical demand to prevent the need for electrical service upsizing (see Technology Case Study: Load Management Devices).

Meanwhile, workforce education programs should cover how and why to electrify without upsizing panels. Load management devices and power-efficient appliance selections minimize or erase the need to upsize panels.³

The state of California could greatly improve its understanding of how many electrical panels are likely to require upsizing as it converts to clean appliances by gathering a representative sample of information on panel size. The California Energy Commission could update its Residential Appliance Saturation Study and include panel size in the next version.⁴

Last, the National Electrical Code (NEC) and California Building Electrical Code are badly in need of an update. The California Building Code largely follows the NEC, but the Building Standards Commission can choose to deviate from the NEC. The code has two sections on how to satisfy panel capacity standards during retrofits. One section is easy to follow but tends to produce a substantial overestimate of panel requirements. The other section yields more accurate estimates, but its language is confusing and complicated. In addition, the NEC allows for the electrical panel to be sized according to non-coincident loads, but doesn't clarify that load management devices can satisfy that requirement. The California Building Standards Commission should modify the state's electrical code to make it simpler to follow the more accurate pathway to estimate necessary panel size, and to clarify that the use of load management devices can allow the panel to be sized for non-coincident loads. The Building Standards Commission can act on its own, or the legislature could direct it to take action.

The Bay Area Air Quality Management District can play a pivotal role in persuading local, state and federal government to solve the underlying drivers of unnecessary panel upsizing.

³ Gaillard, Josie, and Tom Kabat. "Case Studies: Costs For Decarbonizing Existing Single-Family Homes." County of San Mateo Office of Sustainability, January 2023.

<https://www.smcsustainability.org/energy-water/decarbonizing-homes/cost-plans/>.

⁴ California Energy Commission. "2019 California Residential Appliance Saturation Study (RASS) Executive Summary," July 2021.

https://webtools.dnv.com/CA_RASS/Uploads/CEC-200-2021-005-ES.pdf.



Date: Jan 30, 2023

Re: Letter of Support for proposed Zero-NOx amendments for BAAQMD Reg Rules 9-4 & 9-6

To: Jennifer Elwell, Bay Area Air Quality Management District

From: San Jose Community Energy Advocates*

We strongly support the proposed amendments for appliance rules 9-4 and 9-6 (Bay Area Air Quality Management District). These rules will assure solid progress in reducing both

- GHG emissions, and
- NOx, PM2.5 and related pollution emissions, from most buildings in the Bay Area.

Emissions from natural gas furnaces and water heaters in residential and commercial buildings is a significant source of NOx and other emissions in the Bay Area. The BAAQMD ruling will phase out the sale and installation of NOx emitting residential water heaters starting in 2027, furnaces in 2029, and larger commercial appliances starting in 2031. After those dates, heat pumps or electrical appliances will effectively be required whenever existing gas appliances burn out and are replaced; there is no mandate to replace existing functioning gas appliances, and the ruling does not apply to indoor cooktops. We are in agreement with all these aspects of the ruling, and the proposed timeline gives adequate ramp up lead-time (4 years for more easily installed residential water heaters, and 6-8 years for furnaces and larger commercial units).

Given the relatively clean electricity in the Bay Area, and the high efficiency of heat pumps, the conversion from gas to heat pump appliances will result in a substantial reduction in GHG emissions on average; as grid GHG emissions improve year over year, the heating related emissions will eventually be carbon neutral. Conversion to heat pumps will reduce building emissions of CO2, methane, and NOx, which are the top three GHG gases. Completion of the conversion will result in 4.8 million metric ton CO2e annual emission reduction, equivalent to removing about 1 million cars, or almost half of all cars, in the Bay Area.

The BAAQMD ruling as written is primarily focused on eliminating outdoor NOx, PM2.5, ozone, and other pollutants resulting from natural gas burning space and water heaters. These smog causing pollutants are known to be associated with increased health issues, including asthma and other serious respiratory issues, and we support this clean air goal of the ruling as well. The zero NOx ruling will significantly reduce NOx, secondary PM2.5, ozone, and SOx pollutants.

The economic impact was studied by BAAQMD, with relatively mild impact projected for many cases. IRA and other incentives, especially for low and moderate income households, can make the gas to electric conversion much more attractive. While we expect the marketplace to expand to meet the increased demand for the electrical and HVAC workforce, and the utilities and municipalities have already established numerous programs to facilitate this transition, we recommend BAAQMD, municipalities, and the utilities to *closely monitor* workforce availability and backlogs, and provide timely support if needed. Electrical load increases due to the ruling have been reasonably modeled by BAAQMD, and should be integrated into the CPUC IRP load requirements (in parallel with EV and other expected statewide load increases).

San Jose Community Energy Advocates*
Glen Garfunkel (Legislative Chair)

*We are a volunteer community group that advocates for the San Jose Clean Energy program and GHG emission reductions.

Jennifer Elwell

From: J W [REDACTED]
Sent: Monday, February 6, 2023 8:02 AM
To: Jennifer Elwell
Subject: Please vote no to the proposed electrifying (natural gas) furnace and water heater

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The New Year's atmospheric river storms and last few years' wild fire events forced many families without electricity. PG&E also shut down electric powers during severe storms sometimes for days due to safety concerns. We need basic supply of heat and hot water and therefore requesting the committee to vote no on the proposal. Thanks.

San Mateo 19th Avenue Park home owners.

[Sent from Yahoo Mail for iPad](#)

EJ Cire
POLITICAL AND PUBLIC RELATIONS
REPRESENTATIVE

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
jelwell@baaqmd.gov
cc: jbauters@gmail.com

Re: Reg 9 Rule 4 Comment Letter

Dear Mrs. Elwell,

I am writing on behalf of Sheet Metal Workers' Local Union No. 104 which currently represents over 10,000 men and women living and working in California's Northern 49 Counties. Founded in 1903 in San Francisco, we've been the premiere labor union for Heating, Air Conditioning, and Ventilation (HVAC), and we've helped tens of thousands of members over the years create good middle-class careers for themselves and stability for their families. Our Union advocates for helping disadvantaged communities with traditional barriers to employment access career opportunities through our trade pathways, and it's important for us to support policies that increase equity and promote sustainability. In addition, we believe in a worker-led "Just Transition" to ensure that future decisions increase worker protections and support pathways into the apprenticeship.

The proposed amendments to Regulation 9 Rule 4 are bold and we commend BAAQMD for leading the way to curb emissions caused by gas furnaces. Throughout California, our state-of-the-art joint labor-management training facilities are currently the premiere facilities training in heat pump installation and maintenance. In addition, to meet the current market demands which far outweigh heat pumps, we're training in gas heating installation and maintenance as well. When it comes to heat pump education, our apprentices learn refrigeration theory and move on to heat pump mechanics. Once the concepts of reversing the refrigeration process are realized in a classroom setting, apprentices experience hands-on lab instruction. We have multiple heat pump units within each of our training facilities, oftentimes with students learning the mechanics of one running in heat mode vs. running in cooling mode. The apprentices are able to monitor temperature and pressure with gauges. They also evacuate and pressurize system refrigerant.

We also provide training in ancillary areas to heat pumps. For example, we instruct in EPA refrigerant codes to enable and facilitate the obtaining of EPA 608 refrigerant certificates for handling and purchasing of refrigerants. Each of our service apprentices in the Bay Area receive the 40-hour HVAC Excellence Heat Pump ESCO Certification.

We have concerns about the current state of the replacement HVAC market in California, with installations being performed over 90% of the time without permits, often by unlicensed contractors. These installers are likely to continue installing cheaper gas replacement appliances even after this rule goes into effect.

In moving forward with this regulation, it is important to note that it is not sufficient just to replace gas appliances with heat pumps. We need to ensure that these systems are installed correctly. The efficiency of HVAC systems is highly dependent on the quality of installation. California Energy Commission studies have found that poor quality installation of HVAC systems can result in a 20-30 percent increase in energy use. Moreover, poor quality installation is pervasive. The California Energy Commission found up to 85% of replacement HVAC systems are installed incorrectly. This can be directly correlated with the lack of rigorous training in the non-unionized side of this industry. Utility studies have found that the majority of HVAC installers have inadequate training and expertise, resulting in high failure rates on even routine tasks. These installation issues will just increase as the industry moves to newer and more complex systems.

Addressing installation quality is even more important as we transition from gas to electric heating appliances. The move to electrify HVAC and water heating appliances, combined with the transition to electric vehicles is going to put tremendous pressure on the state's electric grid, especially during peak use periods. This can increase the use of GHG-intensive "peaker" power plants, which can undercut the very goal of electrification. In addition, installing heat pump systems in existing buildings puts additional strain on the building electric system, which can create safety and performance issues if not done correctly.

Local 104 has already committed to ensuring its workforce is trained and able to make this transition. We look forward to helping the District identify ways to ensure that this transition is effective, safe and equitable for the communities we serve.

We would like to be a valuable thought-partner and collaborator to help you problem solve and to create buy-in from our Labor Union, which would be directly impacted as a result of this ruling. Our relationships are far ranging in lifting standards in the industry, including working with the CSLB, ASHRAE, and IAPMO.

We ask that you please consider us to be a helpful labor partner and a forward-thinking organization that's collaborative and problem solving the betterment of the Bay Area.

Sincerely,

A handwritten signature in black ink, appearing to read 'EJ Cire', with a stylized flourish at the end.

EJ Cire
Political and Public Relations Representative
Sheet Metal Workers' Local Union No. 104



February 6, 2023

Jennifer Elwell,
Bay Area Air Quality Management District,
375 Beale Street, Suite 600,
San Francisco, CA 94105

Emailed to jelwell@baaqmd.gov

RE: Support for Amendments to Rule 9-4 and 9-6

Dear BAAQMD Boardmembers,

The Sierra Club and the 259 undersigned members, strongly support the proposed amendments to appliance rules 9-4 and 9-6, requiring the sale of zero-emissions residential space and water heaters beginning in 2027. These rules have been extensively analyzed by BAAQMD, with robust findings that they will improve public health and contribute to the Bay Area meeting its air quality objectives. The rules are equitable, economically feasible, and consistent with the capacity of the electric grid to meet the increased demands brought by electric appliances. Implementation will result in 240-540 million dollars per year of avoided health impacts from secondary Fine Particulate Matter (PM_{2.5}), and 400-890 million¹ dollars per year from total PM_{2.5}, with additional avoided negative health impacts from the reduced combustion of natural gas.

The implementation timeline has been well thought out and methodical, with intermediate regulation on natural gas emissions before this final implementation of zero emissions appliance standards. The rule amendments would go into effect between 2027 to 2031 for Rule 6, and 2024 to 2029 for Rule 4.²

¹ Tables E-2 (page 9) and E-3 (page 8) in Assessing Ambient Air Quality and Health Impacts from Natural Gas Building Appliances in the Bay Area: Supplemental Information for Proposed Amendments to Regulation 9, Rule 4 and Rule 6, BAAQMD publication No. 202212-025-PM, December 2022

² Pages 2-6 and 2-7 in Draft Environmental Report for the "Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9; Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides from Natural Gas-Fired Boilers and Water Heaters, Ascent Environmental, Mike Parker, December 2022

We applaud the District in promulgating rules that have the potential to significantly improve public health as outlined above and in additionally areas outside the scope of the analysis. In particular, zero-emissions appliance standards impact the environment and economic resiliency in the ways listed below:

- A co-benefit of reducing and eventually eliminating the use of natural gas is reduction in greenhouse gas emissions. Emissions associated with the combustion of natural gas go beyond carbon dioxide emitted during combustion. Methane, with a global warming potential 86 times that of carbon dioxide, will inevitably leak from the system.
- The gas extraction, transmission, and distribution process result in several percent leakage of toxic gas into the environment. Along the way, the public is exposed to toxic components of fossil gas, including benzene, a well-known carcinogen, and other poisonous gases.³
- Fossil gas also includes multiple volatile organic compounds (“VOCs”), including benzene, hexane, toluene, and others. Several VOCs, including benzene, are also known carcinogens.⁴
- California’s vast gas pipeline system is a serious detriment to our energy resiliency—it is aging and vulnerable, requires enormous, costly upgrades and will not be able to withstand the erratic and intensifying impacts of climate change.
- The dangers posed by California’s aging gas pipelines—such as the the [PG&E pipeline explosion](#) that killed eight people in San Bruno in 2010, and the [massive methane leak](#) at SoCalGas’ Aliso Canyon storage field in 2015-16 - have made the state’s gas system less and less reliable in the wake of disasters. Utilities have recognized that supplying natural gas must be eliminated on the grounds of both its climate impacts and health impacts. PG&E sent formal letters to Cities as they considered their climate action plans.⁵
- The gas system takes [30 times longer](#) to restore than the electric system after natural disasters as seen by the 2019 Kincadee wildfire⁶ and as stated by Southern California Gas

³ Shao, Elaine, *Gas Piped Into Homes Contains Benzene and Other Risky Chemicals, Study Finds*, New York Times, June 28, 2022

⁴ Michanowicz, Drew R., et al., *Home is where the Pipeline Ends: Characterization of Volatile Organic Compounds Present in Natural Gas at the Point of the Residential End User*, *Envir. Sci. Technol.* 2022,56,10258-10268

⁵ Letter dated October 22, 2019, sent to the Cupertino Sustainability Commission

⁶ Schmitt, Will. “Some Sonoma County PG&E Customers Who Had Gas Cut off May Not Get It Back until next Week.” *Santa Rosa Press Democrat, The Press Democrat*, 1 Nov. 2019, https://www.pressdemocrat.com/article/news/pge-gas-shut-off-leaves-thousands-of-sonoma-county-residents-in-the-cold/?utm_source=onesignal&utm_medium=webpush&utm_campaign=pd_breaking.

and San Diego Gas & Electric Company as there are specific challenges of recovering from a large scale gas outage⁷.

Thank you for the opportunity to support this invaluable set of rules that is necessary to improving the health and safety of Bay Area residents.

Sincerely,

Jim Dennison
Associate Attorney,
Sierra Club Environmental Law Program
jim.dennison@sierraclub.org

Brandon Dawson
Director
Sierra Club California
brandon.dawson@sierraclub.org

⁷ In The Matter of the Application of San Diego Gas & Electric Company (U 902 G) and Southern California Gas Company (U 904 G) for a Certificate of Public Convenience and Necessity for the Pipeline Safety & Reliability Project. September 2015. J. Kikuts.
https://www.sdge.com/sites/default/files/A.15-09-013_Prepared_Direct_Testimony_of_J._Kikuts_3-21-16.pdf



333 W El Camino Real, Suite 330 | Sunnyvale, CA 94087 | 1-844-474-SVCE (7823) | SVCleanEnergy.org

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

RE: Proposed Amendments to Regulations 9-4 and 9-6

Dear Jennifer,

I write on behalf of Silicon Valley Clean Energy to express our support for the proposed amendments to Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces, and Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters.

SVCE was founded to address and reduce carbon pollution in our member communities. We do this by providing clean electricity at competitive rates and by supporting a suite of community program investments. As buildings are responsible **for roughly 50% of our region's carbon emissions, electrifying space and water heaters** which are currently powered with methane gas is fundamental to meeting our mission.

BAAQMD's proposed amendments would prohibit the sale of methane-fueled residential water heaters by 2027, methane-fueled residential and commercial furnaces by 2029, and methane-fueled commercial water heaters and boilers by 2031. This sends a clear and necessary market signal that will spur contractors, manufacturers, developers, local governments, and retailers to begin to prepare for electrification. It is essential that this work begins now as delayed action would result in a steeper and likely more expensive transition away from methane-fueled appliances in the future to meet the 2050 state target. For these reasons, SVCE strongly supports this timely policy direction that will reduce harmful NOx and PM2.5 emissions which are increasingly being linked to adverse respiratory conditions including asthma.

SVCE stands ready as a partner to BAAQMD on the implementation of these rules. We have programs and services to help our customers transition to clean electric appliances. This includes Future Fit Homes, which offers up to \$8,000 in rebates for heat pump water heaters, heat pump space heating and cooling, electrical panel



333 W El Camino Real, Suite 330 | Sunnyvale, CA 94087 | 1-844-474-SVCE (7823) | SVCleanEnergy.org

upgrades, rewiring for future electrification, and removal of the gas meter. For low-income customers, SVCE offers an additional \$5,000 in rebates. SVCE has recently committed \$9.5M to fund an **"electrification discount" rate available to** customers who install a heat pump space or water heater to help reduce on-bill impact of home electrification. SVCE is also working on a direct install program to provide efficient heat pump furnaces and water heaters at multifamily locations to replace inefficient and outdated technologies and provide air conditioning for the first time to these homes. SVCE is also developing commercial programs designed to support small-to-medium sized businesses through rebates for heat pump water heaters and heat pump packaged rooftop units. Finally, our eHub website includes an appliance assistant that helps customers shop for an efficient electric appliance for their home. These programs can help SVCE and BAAQMD reduce the impact of these rules on customers, especially low-income customers, in early years as financing and federal and state funding rolls out to support this policy direction.

We know there are concerns about whether the grid is ready for electrification. We have invested \$1.8 billion in 18 clean energy projects including geothermal and energy storage to ensure affordable, clean, and reliable supply for our customers. Additionally, here are some points to consider:


- 1) Electrification is key to transitioning to a cleaner, safer, and more reliable grid. Electric appliances are flexible, which means they can be controlled and timed to help reduce strain on the grid at critical times – like during heat waves. Additionally, modern electric heat pumps provide efficient air conditioning, critical to protecting lower-income renters in a time when we are experiencing record-setting temperatures year after year;
- 2) The California Energy Commission and the California Public Utilities **Commission expect that SVCE's territory will** only see a 9% energy consumption increase by 2030 due to building and transportation electrification. There is time to continue to add necessary supply and ensure reliability; and
- 3) Climate-fueled extreme heat, wildfires, and drought are already straining the energy system. The only long-term solution is to reduce dependence on the fossil fuels that are causing climate change.

Thank you for considering our comments and for your leadership on this important issue. We firmly believe that both incentives *and* regulations will be necessary to create the transformation in local buildings that is so clearly **needed to promote our region's health and sustainability.**



333 W El Camino Real, Suite 330 | Sunnyvale, CA 94087 | 1-844-474-SVCE (7823) | SVCleanEnergy.org

Sincerely,

DocuSigned by:

5CA64B9AC4C24C3...

Girish Balachandran
CEO

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

VIA ONLINE SUBMISSION

RE: Gas-powered Space & Water Heater Appliance Ban – March 15th Public Hearing

The Western Propane Gas Association (WPGA) is pleased to submit its comments in response to the proposed amendments to Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Furnaces.

We acknowledge the air quality concerns about global nitrogen oxide and dioxide (NO_x) emissions and their impact on public health. We believe it is equally important to acknowledge the various avenues that can be taken to reach reduced emission goals and protect public health, including providing avenues for ultra-low NO_x and low-carbon fuels like propane to provide resources that will drastically and immediately reduce emissions across the housing sector without significant financial impact to consumers.

We would ask that the Board consider amendments explicitly exempting propane-fueled appliances from the 0.0 NO_x tiers as proposed to be amended in Rules 9-4 and 9-6 until staff and stakeholders can ensure that propane consumers, largely in rural, unincorporated Bay communities, will not be adversely affected.

RURAL NEEDS IGNORED

With only electric heaters qualifying for purchase and installation in Rule 9-6, rural communities reliant on propane heating are not considered in this decision. The proposed rule completely ignores Bay Area communities that rely on propane heating to service their homes or businesses, largely in unincorporated areas that have a focus on agriculture. These rural communities have different needs than the majority of highly urbanized Bay Area communities and face significantly greater barriers to electrification of their homes and businesses. This rule creates accessibility and cost barriers for rural constituents within the Bay Area Air Quality Management District (BAAQMD).

LIMITATIONS OF ELECTRIC-ONLY EQUIPMENT AND DELAYS IN INSTALLATIONS

As acknowledged within the staff report, BAAQMD analysis hand-waves away the current supply shortages of electric-only equipment by basing their analysis on unidentified projections, and later acknowledges that this is a tacit technology ban. Staff projects an increase in equipment availability, yet proposes an extension to the compliance date of 2027 to 2031, dependent on equipment type, use, and size. This demonstrates that electric-only appliances required to meet this Rule are not as readily available as implied.

It is unreasonable to demand constituents replace gas-fired appliances with electric appliances when the true supply shortage of said equipment is not acknowledged in the analysis. The Rule is expected to impact two-thirds of households in the Bay Area. BAAQMD staff reports they do not intend to mandate specific zero NOx technology solutions, yet with electric heat pump technology being the only currently available technology that emits 0.0 NOx in alignment with the proposed Rule, two-thirds of Bay Area households will struggle to comply due to the lack of access to the types of electric-only equipment required. These amendments also ignore the historic wait times for utility-side implementation measures, such as equipment for increased voltages on existing transmission infrastructure, site-specific interconnections, and challenges with access to a trained and skilled workforce to carry out such projects within a timely manner.

BURDENSOME COST TO CONSUMERS

The staff report notes that “[s]taff anticipates that topics related to implementation costs will be a focus of the [Implementation Working Group] as the status of low voltage technology development and availability, as well as financing and incentive programs, continues to evolve”; however, that focus would only come long after the market has mandated technologies that consumers would be obliged to purchase. Any solution would require a more significant unwinding of the policy than ensuring the amendments are more soundly based in advance.

Subsequently, the rulemaking ignores the true accounting of direct consumer costs. The increased electricity demand and cost of procurement alone will drive up bills across the Bay Area. The rule does not acknowledge several upfront direct costs to consumers, including:

- 1) Cost to finance purchased equipment: As the staff report and appendices note, the initial cost of equipment, particularly electric-only appliances, is significantly more costly than comparable ULNOX equipment. Since many of the expected consumers mandated to purchase a new appliance would be those from lower strata of the socioeconomic spectrum (as noted in the "Socioeconomic Impact Analysis" report), most (if not all) of those families would be required to finance the purchase of this equipment. The cost of finance, either in monthly payments for homeowners or increased rents for those renting, has not been factored into the economic analysis.
- 2) Decreased consumer rebates and incentives: Also acknowledged within the staff report, but with its impacts ignored, is the availability for consumers to receive some financial support or cost-offsetting measures from local governments or utilities for the installation of this new electric-only equipment. Within the last few years, there has been a significant decrease in programs targeting consumer rebates at the state level. The funding that has been available is typically targeted at low-income consumers – of which, the Bay Area has much fewer than its neighbors. The report ignores that the majority of these funds would be unavailable to the majority of Bay Area families, and that these funding streams are also linked to the strength of the state and regional economies, which are facing a recession for the first time since many of the Rule 9-4 and 9-6 updates have been implemented.
- 3) Rewiring of homes (particularly those with knob & tube): While the staff report acknowledged the direct cost of installation of upgraded electric panels to handle greater loads, it ignored the other major necessity of electric-only equipment installation of the need to install new wiring in the home or dwelling for those appliance, or, in certain cases, the rewiring of an entire home that predates 1950 which may contain knob & tube

wiring. This cost is entirely borne by the owner of the property, and is also entirely dependent on the cost of raw goods (including copper for wiring) and labor costs. These are not insignificant, and further ignore the historic shortage of skilled trades to complete electric projects at a residential or small commercial project in a timely manner.

Pacific Gas & Electric alone is expected to increase their utility rate by 39% in upcoming years. Electricity cost increases must be considered before placing an undue burden on consumers by requiring them to purchase electric-only space and water heaters. In cases such as this, where the cost of compliance is borne by individual property owners, equity considerations must be kept at the forefront. The impact of these Rule amendments on interest groups such as renters, affordable housing administrators, and others must also be adequately considered. Since there are a variety of utility providers in the Bay Area, including numerous community choice aggregators (CCA), and these amendments would constitute a de facto technology ban, a more thorough electricity cost analysis must be considered before voting on Rule amendments.

MORE AFFORDABLE ULNOX OPTIONS AVAILABLE FOR IMMEDIATE AIR QUALITY BENEFITS

While the regulation of large utility electric generation is outside of the purview of BAAQMD, the reality that the staff report does not acknowledge is that the expected decreased emissions from local sources will not mean a commensurate reduction in regional emissions. Several local CCAs have made a goal of accelerated 100% renewable, non-emitting targets for their electric generation; however, baseload energy when demands spike during high need seasons, such as the Summer, is derived from increased natural gas-fired powerplants. This is in addition to the approved usage of industrial-scale diesel backup generators during PSPS events or outages, and the overall emissions from increased production of batteries, solar cells, and turbines. We note that BAAQMD can only regulate what operates within its service territory, but would hope that you acknowledge the reality of “green energy generation” in the current market.

We do believe, though, that there are significant gains that can be made in transitioning older gas and propane appliances from dirtier, higher emitting technology to ultra-low-NOx (ULNOX) appliances, as the current rules require. A focused effort at transitioning out older equipment would bring a significant decrease in NOx and PM2.5 emissions at a **far-lower cost per ton** of NOx reduction than any aspect of the current proposal, and would **not obligate** property owners to address the unaccounted costs as detailed above. They would also **not require** significant upfront consumer financial investments and equitably address the current supply shortage of electric-only heaters.

Staff analysis in the Greenhouse Gas Emissions Reductions section completely ignores the rapid decarbonization of propane from renewable production that has **a lower net carbon intensity than the California grid** and continues to rapidly decarbonize. The same goes for renewable natural gas and green hydrogen. Renewable energy appliances are an effective and accessible pathway to reach the intended reduced NOx and PM2.5 emission rates in the Bay Area at an accelerated rate, while remaining affordable and accessible to consumers.

CONCLUSION

WPGA appreciates the opportunity to submit comments on the upcoming Bay Area Air Quality Management District public hearing. We look forward to working with Air District staff to further clarify any concerns and provide technical data.

Sincerely,

A handwritten signature in black ink that reads "Krysta Wanner". The signature is fluid and cursive, with the first name "Krysta" and last name "Wanner" clearly distinguishable.

Krysta Wanner
Manager of Government Affairs, WPGA
krysta@westernpga.org

Dear BAAQMD Boardmembers,

As a concerned citizen of the Bay Area I'm of course concerned about the health effects of gas appliances on my local citizens. However of even greater concern are the health effects throughout the rest of the country. By taking action you can present a clear example to regulators everywhere that this is an important issue. Your impacts can be multiplied 40-fold or more but you need to take this crucial step.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Paul Meagher
Sunnyvale, 94086

[REDACTED]

Dear BAAQMD Boardmembers,

As a former chef I understand that there are many toxic substances in the kitchen Gas appliances are part of the PROBLEM!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Robert Miller
Santa Rosa, 95404-3427

[REDACTED]

Dear BAAQMD Boardmembers,

As a mother of 2 young children and a believer that the planet - and all the animal and plant life on it - is sacred I urge you to take action to create a livable environment!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Linh Dan Do
Menlo Park, 94025

[REDACTED]

Dear BAAQMD Boardmembers,

As a Palo Alto resident a retired physicist and a grandfather I urge you to support Rules 9-4 and 9-6 to ensure breathable air for all. Thank you.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mark Hoffberg
Palo Alto, 94303

[REDACTED]

Dear BAAQMD Boardmembers,

As a retired health care provider and with families suffering from COPD we must ensure that we all have breathable air.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sara Syer
San Francisco, 94131-3048

[REDACTED]

Dear BAAQMD Boardmembers,

As a senior and grandmother I am very concerned about the health hazards of gas appliances in the homes on my lungs and those of my grandchild.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Cheryl Weiden
Los Altos, 94022-2327

[REDACTED]

Dear BAAQMD Boardmembers,

As per usual this issue is likely to disproportionately impact low-income communities where the housing stock is older and more likely to go unrepaired when something goes wrong. Let's make the air we breathe free of nitrogen oxide for everyone.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Judith Weisman
Walnut Creek, 94598

[REDACTED]

Dear BAAQMD Boardmembers,

At this point the science is clear: climate change is happening and it has numerous highly damaging effects on humans and the Earth. I have kids and I,Äôd like them to inherit a livable world. I don,Äôt know if you do but if you do you should consider how your current employment and positions on these issues will impact your children and grandchildren.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jeffrey Perrone
San Francisco, 94131-2658

[REDACTED]

Dear BAAQMD Boardmembers,

Bad indoor and outdoor air quality hits under-served and underrepresented communities worst. We need to find ways to reduce childhood asthma and other respiratory problems among children who are already heavily impacted!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kat Snyder
Palo Alto, 94303



Dear BAAQMD Boardmembers,

Breathable Air for All! Protect Climate. Eliminated dangerous gas pipelines.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Floy Andrews
Richmond, 94801

[REDACTED]

Dear BAAQMD Boardmembers,

Burning fossil fuels under all circumstances is a danger to people and the planet. Please take steps to end fossil fuel burning.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Steve Mann
BERKELEY, 94710



Dear BAAQMD Boardmembers,

Climate crisis is the most important issue facing our society today. I believe that it is existential.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

J.W. Oman
Oakland, 94618-1104

[REDACTED]

Dear BAAQMD Boardmembers,

Don't you think it's time to STOP burning toxic substances?

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Emily Wheeler
Concord, 94520

[REDACTED]

Dear BAAQMD Boardmembers,

duh

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Cecile Mochnek
Berkeley, 94709-1927

[REDACTED]

Dear BAAQMD Boardmembers,

Everyone deserves healthy air in their homes. Please prioritize a mandate to transition all gas appliances and heating/cooling systems to electricity. Lives depend on it. Terry Nagel Former Mayor City of Burlingame Chair Sustainable San Mateo County

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Terry Nagel
BURLINGAME, 94010

[REDACTED]

Dear BAAQMD Boardmembers,

Gas appliances like stoves are so bad for our indoor air quality and that is something we can not escape. Unfortunately as a renter I have little say in the matter. Please pass this legislation so that cleaner appliances are required in residences and we can feel safe in our homes.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Rachel Townsend
El Cerrito, 94530-3823



Dear BAAQMD Boardmembers,

Gas stoves also emit CO₂, CO, and particulate matter - all of which are toxic in sufficient concentration. Recent research indicates that over a dozen toxics are emitted even when methane stoves are not in use. Also, other methane appliances like laundry and fireplace inserts may emit harmful amounts of toxins. Promulgate regulations that require new construction to be free of methane infrastructure and require electrification retrofits of existing methane buildings. Prohibit permitting to develop new methane pipelines.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NO_x) and harmful indoor air pollution. NO_x are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM_{2.5} pollution.

This rule is not about just limiting NO_x emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

David Bezanson
Santa Cruz, 95060-3097

[REDACTED]

Dear BAAQMD Boardmembers,

Health is my number one priority. This is similar to when we learned about the dangers of second hand smoke.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Matt Passell
Palo Alto, 94306

[REDACTED]

Dear BAAQMD Boardmembers,

Health!!!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Saran K.
Los Angeles, 90035-4110

[REDACTED]

Dear BAAQMD Boardmembers,

Homes need to be a safe place for everyone's health.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mary Ann Cramer
Oakland, 94611

[REDACTED]

Dear BAAQMD Boardmembers,

I am a local resident and a local architect. I have been working through getting rid of gas appliances on all my projects as part of decarbonization. I know we all need to take this next step in getting rid of gas appliances let's move in this direction for our future for our children for the drought and wildfire problems we all face.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Brittany Dhawan
Oakland, 94605-1407

[REDACTED]

Dear BAAQMD Boardmembers,

I am a physician and I want to protect the health of my patients and all Bay Area residents. Unfortunately the Bay Area already has some of the unhealthiest outdoor air in the country as noted by the American Lung association annual surveys. It is critical that we do everything we can to protect our indoor air. Limiting gas appliances protects my patients from methane nitrous carbon monoxide and other harmful gases.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jeffrey Mann
Lafayette, 94549-2332

[REDACTED]

Dear BAAQMD Boardmembers,

I am very concerned about the climate effects of gas appliances. This ruling will help pave the way for a switch to clean green appliances that are healthier for us and the planet!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Andrea Gara
Palo Alto, 94301

[REDACTED]

Dear BAAQMD Boardmembers,

I converted my gas cooktop to induction electric in 2019 when I learned about the hazards of gas stove indoor air pollution which to my shock is not regulated by the EPA. Though we did a lot of Chinese stir-fry and had thought "gas is the best " we have loved the many benefits of induction electric which is so much easier to clean up and cooks Chinese stir-fry just as well. It's common sense for me not to use my gas BBQ grill indoors even with a vent so I really can't understand why regulators would not move swiftly to educate the public on the hazards of indoor gas combustion and protect consumers health. I encourage you to provide necessary regulations.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Wei-Tai Kwok
Lafayette, 94549

[REDACTED]

Dear BAAQMD Boardmembers,

I have asthma and want a healthier more comfortable home.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Gladwyn D'Souza
Belmont, 94002-3819

[REDACTED]

Dear BAAQMD Boardmembers,

I have lungs!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Katherine Falk
Oakland, 94611

[REDACTED]

Dear BAAQMD Boardmembers,

I implore you to think about vulnerable groups such as children the elderly and the immunocompromised who are especially impacted by the dangerous chemicals leaking out of our building appliances. You have the power to keep the community safe. With the ever-present health harms of wildfires and outdoor air pollution BAAQMD has a responsibility to help our homes be sanctuaries of healthy air. What can we do if we can't even be safe in our own homes?

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jency James
Concord, 94518

[REDACTED]

Dear BAAQMD Boardmembers,

I need more oxygen.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

John De Forest
San Francisco, 94121-1119

[REDACTED]

Dear BAAQMD Boardmembers,

I suffer from asthma healthy air shouldn't require a petition. Clean air should be available to all. Stepping outside during the winter is a hardship. Staying inside in my apartment with a gas furnace is a hardship. Help us insure Healthy air in the Bay Area.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Leane Eberhart
San Mateo, 94401-2849



Dear BAAQMD Boardmembers,

I want clean air for health and also to use clean energy to power electric appliances to reduce climate change.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Travis Ramsey
Mill Valley, 94941-3715

[REDACTED]

Dear BAAQMD Boardmembers,

I went 40 years without a gas stove. There is one in the house I live in now. Bad effects.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Marcia Pratt
Oakland, 94606-3553

[REDACTED]

Dear BAAQMD Boardmembers,

I'd like to see cleaner air in the Bay Area ASAP/

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Gregory Bell
Palo Alto, 94306

[REDACTED]

Dear BAAQMD Boardmembers,

I'm a grandmother who cares about the air my (and everyone else's) grandchildren are breathing. This issue matters!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Laura Bernstein
Alameda, 94501-5987

[REDACTED]

Dear BAAQMD Boardmembers,

I'm a homeowner who is making the change from gas to electric because I care about our future and want to do anything to help slow climate change. We need our government to support and encourage people to do their part to make changes.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Summer Rogers
El Cerrito, 94530-2903



Dear BAAQMD Boardmembers,

I've got asthma!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sherrill Futrell
Davis, 95618-5421

[REDACTED]

Dear BAAQMD Boardmembers,

I,Âm thinking of all the residents who suffer from asthma COPD emphysema and other breathing difficulties.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Virginia Leslie
Milpitas, 95035-3532

[REDACTED]

Dear BAAQMD Boardmembers,

Indoor air pollution needs to be regulated... I've gotten sick from a faulty gas stove

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Abalone Alliance
San Francisco, 94103

[REDACTED]

Dear BAAQMD Boardmembers,

Let's help make this an easy effective and not-unpopular measure as easily duplicated across the country as possible. And-why wait until '27 and '29??

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

David Sowerwine
Menlo Park, 94025

[REDACTED]

Dear BAAQMD Boardmembers,

Methane is a hazard to health and the climate. Buildings contribute significantly to methane emissions. Please support an equitable transition from gas appliances to electric ones as fast as possible.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Cheryl Weiden
Los Altos, 94022-2327

[REDACTED]

Dear BAAQMD Boardmembers,

My daughter has asthma and I can see it, it's a terrible disease.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kristel Rietesel
Kensington , 94708

[REDACTED]

Dear BAAQMD Boardmembers,

My elderly husband has asthma and I'm concerned about the impact upon him when I use the stove and our gas heater. We need to change them but it's expensive especially to change the heater. There needs to be financial support based on ability to pay for making these changes in residential homes. Eliminating the sale of gas appliances will be a good start in cutting air pollution for people who are replacing their equipment.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Debbie Mytels
Palo Alto, 94303-3901

[REDACTED]

Dear BAAQMD Boardmembers,

Nitrogen oxides (NOx) are toxic highly reactive gasses that endanger human health by causing or exacerbating respiratory conditions such as asthma wheezing decreased lung functioning increased likelihood of hospital visits heart disease and even early death. NOx are produced by burning gas propane and wood. In the Bay Area gas appliances in homes produce more toxic NOx pollution than all of the region's passenger cars. This is incredibly dangerous for both our indoor and outdoor air quality. What is needed is an equitable and affordable plan to convert to electric. Zero-NOx standards will ensure a transition from polluting appliances to clean healthy alternatives. Transitioning to pollution-free electric appliances is key to reducing air pollution and protecting public health.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Patricia Busk
San Francisco, 94131-1639

[REDACTED]

Dear BAAQMD Boardmembers,

Not only would this help with air quality but also noise pollution and increase the quality of living in our residential areas.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Stephanie Shindler
San Francisco, 94103-3330

[REDACTED]

Dear BAAQMD Boardmembers,

Our air is precious and free but protecting it is not free and failing to protect it costs lives. Zero NOX standards as soon as possible will also help the transition off of fossil fuels. This will not be easy but it is necessary. Please ensure support for low and moderate income people to help them transition provide job training for the trades and prioritize the largest emitting systems first.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kristel Wickham
Sunnyvale, 94086-7348

[REDACTED]

Dear BAAQMD Boardmembers,

Phasing out fossil gas appliances and infrastructure is the smart thing to do in terms of public health and reducing GHG emissions. I support the proposal to transition to all-electric

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Dan Kalb
Oakland, 94618



Dear BAAQMD Boardmembers,

Please be assertive in setting regulations for emissions and pollution reducing policies. We need affordable housing and the main way changes in design will happen is with regulations. We need to stop proliferating gas stoves and water heaters along with utilizing solar electric generation with batteries. Climate change is happening NOW and it imperative we be doing everything we can to reduce the disaster that's coming. I am already sad for life my grandchildren will have due to delayed efforts to do better.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Steve Pease
Pleasant Hill, 94523



Dear BAAQMD Boardmembers,

Please do the right thing for the health of our world and its people.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Susanna Marshland
Kensington, 94707-1301

[REDACTED]

Dear BAAQMD Boardmembers,

Please pass this to improve everyone's health.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Caroline Ayres
San Francisco, 94110-4308

[REDACTED]

Dear BAAQMD Boardmembers,

Please protect everyone's lung health. I have a lung condition and I understand the concern.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Cindy Haag
Berkeley, 94705-1845

[REDACTED]

Dear BAAQMD Boardmembers,

Protect lungs from NOx and saving our climate are required.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ellen Rosenblum
Palo Alto, 94301-3939

[REDACTED]

Dear BAAQMD Boardmembers,

Protect our most vulnerable populations by approving Rules 9-4 and 9-6.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Melissa Vierra
San Jose, 95133

[REDACTED]

Dear BAAQMD Boardmembers,

Save lives & save our AIR!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Toph Kerpan Evans
San Francisco, 94132-2426

[REDACTED]

Dear BAAQMD Boardmembers,

Stop the insanity and use Schulze voting ; because Marcus did a great job reducing MAM. regret .

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bruce Coston
Sunnyvale, 94087-1749

[REDACTED]

Dear BAAQMD Boardmembers,

Taking these steps to improve air quality as well as educating residents on the dangers of natural gas is an important step to improving the health of California residents and of the planet.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Hilary Glann
Palo Alto, 94306

[REDACTED]

Dear BAAQMD Boardmembers,

The Democratic Party platform should support: Animal Rights Defending the Affordable Care Act
Ending Citizens United Ending Marijuana Prohibition Giving Greater Visibility to Pro-Life Democrats
Gun Control Net Neutrality Raising the Minimum Wage to \$15 an Hour Responding to the Scientific
Consensus on Global Warming and a Sustainable Energy Policy. Democrats for Life of America 10521
Judicial Drive #200 Fairfax VA 22030 (703) 424-6663

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Vasu Murti
Oakland, 94611-1166



Dear BAAQMD Boardmembers,

The health of my children and grandchildren require us to wean ourselves off of fossil fuels. Now that there are ample and more efficient ways to heat/cool our homes and cook we need to begin the transition to a cleaner greener and healthier way of life. PLEASE get us onto the right path before it's too late.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sandra Slater
Palo Alto, 94301

[REDACTED]

Dear BAAQMD Boardmembers,

The problem with most less desirable environments is that they affect the less fortunate among us the hardest. So we expect to see less healthy air in East Palo Alto than in its neighbor Palo Alto. We see that in the rates of asthma.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bruce Naegel
Mountain View, 94040-2546

[REDACTED]

Dear BAAQMD Boardmembers,

The recent research shows that NOx from burning gas within the home is causing more asthma among children and elders. We need to improve indoor air quality and protect human health. There are great alternatives now available for cooking food using clean electricity.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Debbie Mytels
Palo Alto, 94303-3901



Dear BAAQMD Boardmembers,

There is no planet B. Thank you very much.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

John Oda
San Francisco, 94115-3500

[REDACTED]

Dear BAAQMD Boardmembers,

This issue matters to me because I have learned second hand via a dear friend who has had breathing difficulties for many years. High quality air has become rare and is very precious so everything we can do to make everyone's air clean is worth it! People like Valarie should not have to work so hard just to breathe!

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ellen Beans
Moraga, 94556

[REDACTED]

Dear BAAQMD Boardmembers,

This transition must be affordable to all affected all people who will need to replace their gas water heaters and furnaces.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Howard Cohen
Palo Alto, 94306-3004

[REDACTED]

Dear BAAQMD Boardmembers,

We have to do all that we can to help stop climate change.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Eileen Adams
Berkeley, 94708-1949

[REDACTED]

Dear BAAQMD Boardmembers,

We must have clean air for our health and our survival. My family is depending on you to assure healthy air for all of us.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Martha Goldin
San Francisco, 94118-3912

[REDACTED]

Dear BAAQMD Boardmembers,

We need to do all that we can to reduce pollution. Our planet is in a crisis and we must work toward sustainability in all areas.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Susan Nakashima
Martinez, 94553

[REDACTED]

Dear BAAQMD Boardmembers,

We need to stop burning toxic substances in our homes. That seems kind of obvious.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Emily Wheeler
Concord, 94520

[REDACTED]

Dear BAAQMD Boardmembers,

We urgently need to make the switch we need the help of our lawmakers to phase out of these toxic emissions and keep our families safe and healthy.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Michelle Peglau
Menlo Park, 94025

[REDACTED]

Dear BAAQMD Boardmembers,

WHY ARE YOU SO INEFFECTIVE?

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sherrill Futrell
Davis, 95618-5421

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Erin Foret
Martinez, 94553-6121



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Terry & Martin Horwitz
San Francisco, 94122-1608

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Joel Soloksky
Walnut Creek, 94595-2310

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

AJ Cho
San Leandro, 94579-1963

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carly Ritter
Oakland, 94605-3018

A solid black rectangular box used to redact the signature of Carly Ritter.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ernie Walters
Union City, 94587-4331

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

J Barry Gurdin
San Francisco, 94122-4617

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carol Schaffer
San Pablo, 94806-1648

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

r d

San Francisco, 94122-4419

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Roman Capelli
Larkspur, 94939-1529

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Leslie Smith
Oakland, 94611-1806

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Joslyn Baxter
Mill Valley, 94941-3860

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Leonie Terfort
Mill Valley, 94941-3449

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Rich Waller
San Francisco, 94116-1924

A solid black rectangular box used to redact the signature of Rich Waller.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Noah Armstrong
San Jose, 95123-3814

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Evan Jane Kriss
Sausalito, 94965-2066



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mary Noel
Berkeley, 94703-1136

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Thomas Graly
Berkeley, 94705-1004

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Marilyn Price
Mill Valley, 94941-2074

A solid black rectangular box used to redact the signature of Marilyn Price.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Portland Coates
Berkeley, 94704-3008

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kristen Conner
San Pablo, 94806-4058

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Christine Goldin
Berkeley, 94709



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jeffrey Hurwitz
San Francisco, 94121-2531

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Joslyn Baxter
Mill Valley, 94941-3860

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Edward Richardson
San Jose, 95129-3309

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mark Hurst
Orinda, 94563-3922



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ellen Leng
Walnut Creek, 94597-3110

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Greg Ratkovsky
Oakland, 94619-3111



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Josephine Coffey
San Francisco, 94112-2836

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Gabriel Quinto
El Cerrito, 94530-1613

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Vince Augusta
Antioch, 94509-0095

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

David Romano
San Francisco, 94121-3358

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Benjamin Keller
Oakland, 94608-1314



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Amanda Rosenberg
Oakland, 94606-1535



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Eric Brettner
Novato, 94949-5913

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carly Ritter
Oakland, 94605-3018



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carol Schaffer
San Pablo, 94806-1648

A black rectangular redaction box covering the signature area.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sherman Lewis
Hayward, 94542-1616

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Marianna Riser
Novato, 94949-6305



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sheila Barbato
Concord, 94521-3546



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Karen Kirschling
San Francisco, 94117-2655

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

r d

San Francisco, 94122-4419

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Abbot Foote
Berkeley, 94702-1150



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Linda Ramey
San Francisco, 94110-5655

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Deirdre Fennessy
Mill Valley, 94941-2559

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Paul Malkin
Fremont, 94555-3312

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Shirley Lutzky
Oakland, 94611-4248



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nancy Havassy
Oakland, 94611-2149



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Brenda Wallace
Berkeley, 94707-1702



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Steve Shuput
Fremont, 94539-5660



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sheila Tarbet
El Cerrito, 94530-3220

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

John Oda
San Francisco, 94115-3500



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Steffen Rochel
Burlingame, 94010-5635

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Rick Edmondson
Danville, 94526-3934

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lucy Weltner
Berkeley, 94704-3324

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Paul Vesper
Berkeley, 94703-1237



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

AJ Cho
San Leandro, 94579-1963

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Dani Zacky
Berkeley, 94702-0663

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Barbara Hollenbach
Lafayette, 94549-5524



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mignon Moskowitz
Cloverdale, 95425-3338

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Angela Gantos
Tiburon, 94920-2010

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jeffrey Nigh
San Francisco, 94127-2137

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Margaret Fowler
San Francisco, 94122-2804

A solid black rectangular box used to redact the signature of Margaret Fowler.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Terry & Martin Horwitz
San Francisco, 94122-1608

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Elizabeth Levy
Richmond, 94805-1136



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ross Simkover
Piedmont, 94611-4331

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ernie Walters
Union City, 94587-4331

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bruce Nilles
Oakland, 94618

A solid black rectangular box used to redact the signature of Bruce Nilles.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Paul Perez
Moraga, 94556-1603

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lin Griffith
Oakland, 94619-2211

A solid black rectangular box used to redact the signature of Lin Griffith.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Barbara Sandow
Richmond, 94804-1520

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jonathan Eden
Berkeley, 94707-1702

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Eihway Su
San Francisco, 94117-4251

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Susan Abby
San Francisco, 94122-1534



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mohan Sakhrani
Dublin, 94568-4722

A solid black rectangular box used to redact the signature of Mohan Sakhrani.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Julie Lindow
San Francisco, 94102-5025

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carol Bettencourt
San Francisco, 94109-3977

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Robert Magarian
Berkeley, 94701-1126



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Manijeh Berenji
Long Beach, 90803

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jennifer Thompson
Palo Alto, 94301

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Christopher Ware
Fremont, 94539-6850



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Pamela Sieck
Tiburon, 94920-1452

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

O Mandrussow
San Francisco, 94114-1804

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kathy Dervin
Pacific Grove, 93950-4127

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ryan Acebo
Oakland, 94602-3444

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Genevieve Deppong
Los Altos, 94024-7408

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

David Kaskowitz
San Francisco, 94110-5911



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Louise Chegwidden
Oakland, 94609-2733



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Corwin Zechar
Albany, 94706-1126

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Samantha Smith
Napa, 94558-5341

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Luca Donisi
Walnut Creek, 94598-4860

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Danielle Mieler
Alameda, 94501

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Teresa Cheng
Oakland, 94602-3876

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jessie Hagler
Lafayette, 94549-5365

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carol Benioff
Berkeley, 94710-1718

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Supporter Unknown
Oakland, 94611

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Victor Kamendrowsky
San Francisco, 94114-3127

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jiro Yamamoto
San Francisco, 94114-2021

A solid black rectangular box used to redact the signature of Jiro Yamamoto.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Melissa Yu
San Francisco, 94112-2461

A black rectangular redaction box covering the signature area.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Donna Davies
Mountain View, 94040-3015

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nicole Mo
Irvine, 92620-2706

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Steven Mazliach
San Francisco, 94118-2990



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Deborah Holcomb
Los Angeles, 90025-6314



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jaime Nahman
Topanga, 90290-3508

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Stephanie Nunez
Van Nuys, 91405-3142

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Donna Sharee
San Francisco, 94112-2829

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Keith Rhinehart
Santa Clara, 95050-6420

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Caephren Mckenna
Oakland, 94609-2225

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Joe Smith
El Cajon, 92020-3909

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Karl Pierce
Sacramento, 95829-8733

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Damon Brown
Los Angeles, 90016-5229

A solid black rectangular box used to redact the signature of Damon Brown.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sandra Gamble
Ridgecrest, 93555-5118

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Richard Gallo
Santa Cruz, 95062-3561

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

David Boyer
Palo Alto, 94304-2418

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Celeste Anacker
Santa Barbara, 93105-3024

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Don Meehan
San Jose, 95124-5939



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

AJ Cho
San Leandro, 94579-1963

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nicholas Ratto
Alameda, 94501-5417



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Flora Rosaa
Los Angeles, 90038-1458

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kiana Chandruang
San Diego, 92127-6805

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Alan Chen
Los Angeles, 90025-3715

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sylvia De Baca
San Dimas, 91773-3151

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Benjamin Keller
Oakland, 94608-1314

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nanlouise Wolfe
Santa Cruz, 95060-6823

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Yael Kisel
Santa Cruz, 95060

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bruce Nilles
Oakland, 94618

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

James Wu
Berkeley, 94704

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Sarah Harper
San Francisco, 94117

A black rectangular redaction box covering the signature area.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Adrienne Etherton
Half Moon Bay, 94019

A solid black rectangular box used to redact the signature of Adrienne Etherton.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Alfredo Angulo
Berkeley, 94704



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Laura Dill
Berkeley, 94706

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Amanda Bancroft
San Jose, 95125-4153

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jeffrey Suplica
Oakland, 94618-1804

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Anna Shurter
San Francisco, 94123-3205

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

J Angell
Rescue, 95672-9411

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

AJ Cho
San Leandro, 94579-1963

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Patricia Linder
San Jose, 95136-1804

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Karen Kirschling
San Francisco, 94117-2655

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carla Davis
Corte Madera, 94925-1742

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Terry & Martin Horwitz
San Francisco, 94122-1608

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Caryn Graves
Berkeley, 94702-1329

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Carol Savary
San Francisco, 94131-1631

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nikki Nafziger
Vallejo, 94590-7907



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Forest Frasier
Benicia, 94510-3288

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Roberta Stern
Oakland, 94618-1532



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jason Fish
Fair Oaks, 95628-3228

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Alice Polesky
San Francisco, 94107-2644

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Peter Booth Lee
San Francisco, 94118-3548

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Todd Snyder
San Francisco, 94115

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Aubrey Wilson
Orem, 84058

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Charles Wieland
San Ramon, 94583-1683

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Scott Grinthal
San Mateo, 94402-3924



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Todd Snyder
San Francisco, 94115

A solid black rectangular box used to redact the signature of Todd Snyder.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nicholas Cahill
Visalia, 93291



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lori Kegler
San Pedro, 90731-6213

A black rectangular redaction box covering the signature area.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Yassen Roussev
Oakland, 94608

A solid black rectangular box used to redact the signature of Yassen Roussev.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kathy Battat
Hillsborough, 94010-6708

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jan Rhoades
Bishop, 93514-2944

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bruce J Burns
San Diego, 92108-5514

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Hala Al-Shahwany
Mountain View, 94040-3119

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Deanna Knickerbocker
Santa Clara, 95050-5572

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Michelle Hudson
San Mateo, 94402-2203

A solid black rectangular box used to redact the signature of Michelle Hudson.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

SARAH HUBBARD
San Mateo, 94403

A solid black rectangular box used to redact the signature of Sarah Hubbard.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Christina Nielsen
San Jose, 95120-3907

A solid black rectangular box used to redact the signature of Christina Nielsen.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lesley Hunt
Walnut Creek, 94598-3213

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Leane Eberhart
San Mateo, 94401-2849

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Janet Creech
Millbrae, 94030

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lisa Segnitz
Santa Cruz, 95060-3433

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

J Angell
Rescue, 95672-9411

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

AJ Cho
San Leandro, 94579-1963

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Yves Decargouet
Lucerne, 95458-8502



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Roberta Stern
Oakland, 94618-1532



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Kevin Branstetter
Lotus, 95651-0521

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nora Privitera
Oakland, 94602-3917



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Jean Jackman
Davis, 95616-0417

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Patrick McCully
Berkeley, 94702-2406



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Michael Mills
San Francisco, 94115-4509

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Felix Mbuga
Milpitas, 95035-4639

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Lesley Shultz
Oakland, 94610-2121

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Terry & Martin Horwitz
San Francisco, 94122-1608

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Karen Kirschling
San Francisco, 94117-2655

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Mike Balma
Mountain View, 94040

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Urmila Padmanabhan
Pleasanton, 94588-3410

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Howard Cohen
Palo Alto, 94306-3004

A solid black rectangular box used to redact the signature of Howard Cohen.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Scott Nelson
Bethel Island, 94511-1075



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Ingrid Kallman
Stanford, 94305

A solid black rectangular box used to redact the signature of Ingrid Kallman.

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bianca Molgora
San Francisco, 94110-6138

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Michelle Orengo-Mcfarlane
El Sobrante, 94803-1612

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Anna Shurter
San Francisco, 94123-3205

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Nancy Federspiel
Menlo Park, 94025-6605



Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Pat Blackwell-Marchant
Castro Valley, 94552-1708

[REDACTED]

Dear BAAQMD Boardmembers,

Burning gas, propane, and wood in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Peter Booth Lee
San Francisco, 94118-3548

[REDACTED]

Jennifer Elwell

From: A Yvette Huginnie [REDACTED]
Sent: Sunday, February 5, 2023 7:37 PM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ms. Elwell --

I am a soon-to-retire public school teacher who is fortunate (ie., lots of hard work and sacrifice) to own a home in San Francisco. I own an electric car which I charge near work or at public fee-based facilities. And while I support the clean air mission of the proposals, there needs to be some sort of "grandfathering" for older buildings.

My spouse and I do not want to be priced out of our home due to mandated and costly upgrades. I think about my elderly neighbor who has lived on the block since the 1950s; she and her daughter could not afford mandated changes. None of us are tech workers with mega salaries and stocks. We all are or have been city and county workers.

I think it would be fair that when older-stock homes are purchased then the switch from gas to electric is mandated at that point.

Please don't mandate and price out long-term SF residents.

Thank you.

A Yvette Huginnie

Jennifer Elwell

From: Adam Buck [REDACTED]
Sent: Wednesday, January 18, 2023 9:49 AM
To: Jennifer Elwell
Subject: public comment on Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I support the proposed regulation to ban the installation of new or replacement natural gas water heaters or furnaces. This move towards clean energy is not only important for the health of our planet, but also for the health of our communities. Natural gas is a major source of air pollution, which can lead to a variety of health issues such as asthma, heart disease, and cancer. By transitioning to clean energy sources, we can reduce the amount of harmful pollutants in the air and promote healthier communities. Additionally, an all-out ban is justified because it ensures that we are taking a comprehensive approach to reducing our dependence on fossil fuels and transitioning to clean energy. It also sends a clear signal to the market that we are committed to making this transition and can accelerate the development and deployment of clean energy alternatives.

Sincerely,
Adam Buck
[REDACTED]
San Francisco, CA

Jennifer Elwell

From: Adam Sweeney [REDACTED]
Sent: Sunday, February 5, 2023 3:35 PM
To: Jennifer Elwell
Subject: Comments on Rule 9-4 and 9-6 changes

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I'm writing to submit my support for the changes proposed to rules 9-4 and 9-6 for air and water heating appliances in our Bay Area buildings. I look forward to the day when the air here in the Santa Clara Valley isn't polluted with smog and our children are not developing asthma, because we'll have finally stopped inefficiently burning gas for purposes better served by electrical appliances anyway. I also look forward to the end of pollution from these appliances that warms our atmosphere as much as the emissions from half of the automobiles in the Bay Area.

Thank you for the deep and detailed analysis in the staff report and associated appendices of the social, economic, and environmental impacts of the changes that will come with these rule changes. We are setting an example for the entire state and country to follow, so it is important that we get this right along all of these dimensions. I am confident that the results will be dramatic and positive. I've already replaced the gas-fired air and water heating systems in my home in San Jose, and the change is all-around better.

When the natural gas industry arrives to say that we've over-stated the negative impacts of burning methane and understated the impacts of electrifying our buildings, please treat their self-serving messaging as the manipulative attempt to maintain the status quo, no matter what the negative impacts on the Bay Area and the world, that it is. It is time for us to do better.

Sincerely,

Adam Sweeney
[REDACTED], San Jose, CA 95129

Jennifer Elwell

From: Aditee Kumthekar [REDACTED]
Sent: Saturday, February 4, 2023 7:14 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Aditee Kumthekar
[REDACTED]

[REDACTED]

Palo Alto, California 94303

Jennifer Elwell

From: Alan Peevers [REDACTED]
Sent: Monday, February 6, 2023 2:22 PM
To: Jennifer Elwell
Subject: Yes to bans on natural gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

This is vitally important and you have my full support and that of my wife and especially my kids. Thank you for all you do!

Alan Peevers
[REDACTED]
95060 Santa Cruz

Jennifer Elwell

From: Alexander Pakter [REDACTED]
Sent: Monday, February 6, 2023 12:39 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I'm writing to express my support for the amendments above to require Zero NOx emissions from heaters and water heaters. I was raised in the bay area and watched as it became more congested, and the smog has been getting worse and worse. We owe it to our future to do everything we can to support clean air for better health.

Please help to pass these amendments to rules 9-4 and 9-6.

Alexander Pakter

Jennifer Elwell

From: Alexis Georgiou [REDACTED]
Sent: Friday, February 3, 2023 7:02 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Alexis Georgiou

[REDACTED]

[REDACTED]

Santa Clara, California 95054

Jennifer Elwell

From: Alfie Who [REDACTED]
Sent: Thursday, January 19, 2023 7:11 AM
To: Jennifer Elwell
Subject: Comment on banning gas boilers and furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Is this realistic?

When PGE has a grid event, at least we still have hot water and can cook food. If all home energy sources are from electricity only, the results can be hazardous to residents' health.

We are already worrying about how to charge all the new EVs -- another government mandate -- in coming years, and now we are adding more burdens on the grid?

I myself has solar panels and power walls. I am part of the lucky few. Can u imagine in the future, (unlucky) people need to choose among taking a hot shower or warming up or cooking their food simply because there just isn't enough electricity coming through, in a frigid winter??

Jennifer Elwell

From: Allan Campbell [REDACTED]
Sent: Friday, February 3, 2023 5:41 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Allan Campbell

[REDACTED]

[REDACTED]

San Jose, California 95132

Jennifer Elwell

From: amanda zangara [REDACTED]
Sent: Saturday, February 4, 2023 12:17 PM
To: Jennifer Elwell
Subject: I support the proposal for clean energy in homes

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from amandarosy@yahoo.com. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I recently became informed of the BAAQMD's proposed rules package that would require residential water heaters and furnaces to be zero-NOx emitting by 2027 and 2029, respectively. I completely support this proposal, as we need to everything possible to continue to limit emissions of any form that negatively impact the health of our community and environment. I have great hope that the district will support the proposal for stronger safeguards with these concerns in mind.

Thank you,

Amanda Zangara

Jennifer Elwell

From: Andrew Morse [REDACTED]
Sent: Thursday, January 19, 2023 7:57 AM
To: Jennifer Elwell
Subject: Comment on proposal to ban gas water heaters/furnaces

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

I wanted to submit a comment against the proposal to ban gas water heaters and furnaces, specifically it's impact on older homes with less electric capacity. As an owner of a plug-in hybrid, we explored upgrading the electrical to our home at on Shotwell Street. It was quoted as a \$15-20k electrical upgrade as our capacity is 50 Amps. We ended up buying the electric car and just using a standard slow charging outlet and nearby fast chargers, since it was important to us to do what we can for the environment. Unfortunately if this ban passes we will be forced to perform this upgrade which we may not be able afford. I beg you to exclude replacements or find money to help homeowners like myself pay for this electrical upgrade. I am all for replacing these appliances with better alternatives, but need assistance.

Thank you,
Andrew Morse

Jennifer Elwell

From: Andrew Pollack [REDACTED]
Sent: Monday, January 23, 2023 2:58 PM
To: Jennifer Elwell
Subject: Comment re: Proposed Ban on Gas Fueled Water Heaters and Furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello

I write in opposition to BAAQMD's proposed new rules to ban the sale and installation of gas fueled water heaters and furnaces. This ill-considered proposal is directly at odds with the imperative to reduce housing costs in the Bay Area, by adding dramatically to the cost to build new and maintain existing housing. While I note that the District has said that such costs "could" come down by the time the proposed rules would take effect, passing a rule now that, based on known data, would impose dramatically increased costs on to homeowners and prospective homeowners (and renters to whom these costs would be passed on by landlords) based upon speculation 4-6 years in the future, or indeed on nothing more than hope, is poor public policy.

Further, there are many homeowners on fixed incomes and with limited non-home equity resources who could well find the dramatically increased costs of replacing a furnace or water heater (which could require a full panel upgrade at a cost that we know will not be any less in 4-6 years due to the inevitable rise in labor cost) unaffordable. Such individuals could find themselves having to forego heat, or hot water, or other life necessities, due to these ill-conceived rules.

While the BAAQMD board is made of up members elected to other posts in the Bay Area, no board members are actually elected to the BAAQMD board directly by the public offered choices for the board. These proposed rules should be a matter for the public to consider through the electoral process, either through direct election of board members or a public ballot measure. Having an, in-effect, unelected body impose such a dramatic measure upon Bay Area residents would be deeply unwise and would undermine public support for more important and effective environmental measures.

For context, I support reasonable measures to maintain and improve air quality, and have been an environmentalist and financial contributor to California and national environmental organizations for many decades. I have no ties of any sort to industries or businesses which would be positively or negatively impacted by the proposed rules.

I urge the Board to reject these proposed rules.

Thank you.

Regards
Andrew Pollack
[REDACTED]

Belmont, CA 94002

Jennifer Elwell

From: Angela Evans [REDACTED]
Sent: Sunday, February 5, 2023 4:44 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-4

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

I urge you to please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

As a mother of two young children, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Thank you,
Angela Evans
Menlo Park Resident

Jennifer Elwell

From: Angele Price [REDACTED]
Sent: Friday, February 3, 2023 10:18 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Angele Price

[REDACTED]

[REDACTED]

Capitola , California 95010

Jennifer Elwell

From: Anna Koster [REDACTED]
Sent: Friday, February 3, 2023 8:51 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Anna Koster

[REDACTED]

[REDACTED]

San Jose, California 95112-4062

Jennifer Elwell

From: Anne Prescott [REDACTED]
Sent: Monday, February 6, 2023 4:12 PM
To: Jennifer Elwell
Subject: Gas vs. Electricity

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

In my household, we think gas should be prohibited from new construction. People who have it now should be able to keep using it.

Anne Prescott

[REDACTED]
Los Altos, CA 94024

Sent from my iPhone

Jennifer Elwell

From: Annette Ross [REDACTED]
Sent: Monday, February 6, 2023 2:33 PM
To: Jennifer Elwell
Subject: Changing from gas to electric

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I have more questions than comments:

1. Why a ban instead of an incentive program that encourages property owners to make the change?
2. Why a more lenient schedule for commercial property owners and owners of multi-family properties?
3. Why not wait until you are certain about the potential other impacts such as noise from compressors and possible setback changes?
4. Is there a model set up that shows an installation with a compressor that property owners can see?
5. Has this plan been integrated with other ordinances and the numerous pieces of housing legislation so the property owners who make the change aren't hit with some sort of expensive surprise such as a violation of setback requirements or a noise violation?
And what if the property owner cannot achieve (or afford) the setback change should one be necessary? Is there a mechanism for exemptions?
6. How about taking overall carbon footprint into account before adding another onerous rule to the already too-thick law books?
7. The article references AN EIR. As in one? Is anyone looking at the big picture and the capacity of our electrical grid? The grid is challenged now but that is not stopping city and state leaders from pushing electric cars, trains, water heaters, furnaces, ranges, and significant housing growth. Claims that the grid can handle that level of increased demand lack credibility.
8. Is there a sunset clause that accounts for tech changes that, for example, improve gas furnaces and water heaters, making them roughly equivalent to electric appliances?
9. Is there a mechanism for exemption generally (not just w/regard to setbacks)?

I know the planet needs protecting, but it often seems that homeowners are the equivalent of low hanging fruit for the implementation of government mandates.

Regards,

Annette Ross
Palo Alto

Sent from my iPhone

Jennifer Elwell

From: Anthony Pratali [REDACTED]
Sent: Monday, February 6, 2023 5:02 PM
To: Jennifer Elwell
Subject: gas appliances

Follow Up Flag: Follow up
Flag Status: Completed

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

lets keep all sources of gas appliances into our residences!

Jennifer Elwell

From: Anthony [REDACTED]
Sent: Wednesday, January 18, 2023 8:16 AM
To: Jennifer Elwell
Subject: Gas Water Heater, & Gas Furnace Ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Our family home and household water is heated with gas.

My family is opposed to the proposed ban on household gas appliances for the following reasons:

- 1) The increased cost to heat our home (and household water) solely utilizing electricity.
- 2) The cost to retrofit to an all electric home;
- 3) The electrical grid capacity in California and the Bay Area is insufficient to implement these changes.

Anthony D. Rondoni
[REDACTED]
Meadow Vista, CA 95722

Jennifer Elwell

From: Arlene Baxter [REDACTED]
Sent: Monday, February 6, 2023 1:51 PM
To: Jennifer Elwell
Subject: support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board members,

I am writing to ask you to Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

My name is Arlene Baxter, and I am a California native. I care deeply about the air quality of our beautiful state! I am also a long-term member and former Chair of Green Councils and most recently of a Climate Action Committee to encourage sustainable building practices in our community. I actively urge my clients and friends to Get off their Gas, and switch to electric appliances.

As I am sure you are all aware, burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

It seems so clear that in a state that values science, that we should listen to those results, and do what we can to replace our gas appliances quickly with clean electric ones. The rule that is being proposed is a smart one! It is not about just limiting NOx emissions from building appliances but **improving air quality** in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

In addition to tackling a major source of air pollution, BAAQMD's appliance standard will deliver key climate co-benefits.

-
-
- Burning fossil fuels in homes for heating is
 - responsible for [roughly](#)
 - [11%](#) of California's statewide climate
 - emissions. The state cannot meet its climate targets without eliminating this pollution.
-
-

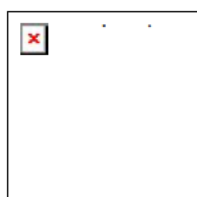
-
- Moving to electric appliances like heat pumps
- – and powering these appliances with renewable energy – is the ticket to zeroing out climate emissions from heating homes entirely.
-

According to BAAQMD, electrifying Bay Area appliances could reduce climate-warming emissions from appliances [73% by 2046](#) from a 2019 baseline.

I sincerely hope you will vote to adopt a zero-NOx emissions standard for home furnaces and water heaters in the Bay Area.

Thank you,

Arlene



Arlene Baxter, CRS, GREEN,

2012 REALTOR of the Year, Berkeley Association of REALTORS

[REDACTED] Berkeley CA 94707

• **GOOD MOVE.**



See my 38 Five Star reviews on [my Yelp page](#), as well as 5 more 5-star reviews on the Red Oak site. (Be sure to read the so-called "not recommended" reviews, too. Some of my clients don't use Yelp much so their reviews get downgraded, but they are definitely real.)

In top 3% of East Bay agents by sales volume.

Member TOP Agent Network

I have not and will not verify or investigate the information supplied by third parties.

Jennifer Elwell

From: Ashesh Parekh [REDACTED]
Sent: Monday, February 6, 2023 7:51 AM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To:

To BAAQMD Board of Directors,

RE: <https://www.baaqmd.gov/rules-and-compliance/rule-development/building-appliances>

I urge you to please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious public health damage, especially in the lungs of children.

The time for strong leadership to protect public health is now.

Thank you,
Ashesh Parekh
Menlo Park Resident

--

Cheers,
Ashesh

Jennifer Elwell

From: Ashley Kline [REDACTED]
Sent: Sunday, February 5, 2023 1:08 PM
To: Jennifer Elwell
Subject: Public comment re gas appliance ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am a San Mateo County resident, and I would like to make a public comment related to the potential ban on new gas appliances, specifically furnaces and hot water heaters.

I completed an addition and extensive remodel to my home in 2021-2022. I upgraded all of my mechanicals during that project, including the hot water heater and furnace. I researched the output and speed of heat production, and also energy efficiency and environmental impact as part of the process, which also included the important variables of costs related to installation, maintenance, and operation over the lifetime.

I also had the benefit of having an electric hot heater used in the same house, by the same people, for a month, before it was replaced by gas.

The electric model was installed by mistake. It was TERRIBLE. With my gas model I am warm and toasty regardless of how long my teenage daughters spend in the bathroom each morning. With the electric one I had a cold shower every morning, and fought endlessly with my kids.

In our single-family-home experiment, we found that a gas hot water heater can deliver a higher volume of hot water quickly, enabling all of us in our 3-person household to shower simultaneously or in quick succession, without the last person getting cold water.

The electric model we had (briefly), could not produce heat with the same speed, and at the same volume, as gas.

I also feel strongly that the County should STOP putting regulations in place that are out of step with what residents want and can afford, and contribute to making it harder for people to live here.

Certain older homes may not have electrical panels that can accommodate the load for new electric appliances, turning an already-expensive emergency with a broken system into a financial disaster requiring multiple tradespeople to address.

A similar well-meaning regulation mandating residential fire sprinklers is already in effect. I am curious to know the extent of the preservation of life or property that has been documented as a result of this onerous demand by local cities. A ban on gas appliances sounds eerily similar; well-intentioned but also potentially with benefits that are rarely commensurate with the associated homeowner burden.

Costs for new construction are completely outrageous already, and can only be borne by the very wealthy, with new homes in Burlingame frequently listed in at \$4M. Adding an increasing list of requirements only makes it more expensive for new families to move here.

Stop adding new regulations that are wanted by a fraction of the people, and cannot be afforded by many. Trust residents to make their own decisions, based on their individual circumstances.

I am vehemently opposed to any further regulation related to construction in the county, and to this regulation specifically.

Ashley Kline
Burlingame, CA
[REDACTED]

Jennifer Elwell

From: Audrey Ichinose [REDACTED]
Sent: Monday, February 6, 2023 12:30 PM
To: Jennifer Elwell
Subject: I Support Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I'm a 76-year old resident of south Berkeley along the Oakland border.

I strongly support the proposed rule changes.

Thank heaven our gas-powered central heating system broke down two years ago! It forced my husband and me to make the transition to the cleaner, more efficient heat-pump space heater. We are both long retired and may not have invested in the new technology had we not be forced to. But we're glad it happened!

The proposed rule changes give us all another little nudge to do our bit, not just for ourselves but for everyone in the community.

Thank you.
Audrey Ichinose

Jennifer Elwell

From: Barbara Kyser [REDACTED]
Sent: Friday, February 3, 2023 8:52 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Barbara Kyser

[REDACTED]

[REDACTED]

Los Altos, California 94024

Jennifer Elwell

From: Barry Robbins [REDACTED]
Sent: Monday, February 6, 2023 12:21 PM
To: Jennifer Elwell
Subject: Proposed rule regarding natural gas fueled furnaces and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern: I disagree with the proposed rules on the use of natural gas devices such as a furnace, water heater or stove in the home. Yes, I do think that such rules would be applicable in newly built homes or in homes undergoing extensive electrical modernization or upgrade. However, in older homes, with electrical systems not designed for such a heavy electrical load, the cost of upgrade to a modern electrical system is prohibitive and places undue financial burden on those residents. Surely, those older homes should be able to simply replace a gas burning device with a newer gas burning device without having to spend additional money to upgrade the electrical infrastructure in the home in addition to the cost of replacing a failed natural gas device. Yes, prohibit natural gas devices in newly built homes or in older homes already undergoing substantial electrical modernization. But no, do not force homeowners to spend additional funds to modernize their home electrical infrastructure in addition to replacing their natural gas stove, gas water heater or gas furnace. Barry Robbins, [REDACTED]
[REDACTED] Menlo Park, 94025
Sent from my iPad

Jennifer Elwell

From: Becca Ya [REDACTED]
Sent: Thursday, February 2, 2023 9:18 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. Thank you!

Becca Ya

[REDACTED]

[REDACTED]

Mountain View, California 94040

Jennifer Elwell

From: Belinda Chlouber [REDACTED]
Sent: Wednesday, February 1, 2023 2:51 PM
To: Jennifer Elwell
Subject: Feedback for gas appliance ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

Thank you for working on the ban for gas appliances. We recently went through electrifying our older home and I'm so happy we did it. I understand people's hesitation but I don't think they fully understand the issues surround it. I am particularly upset at many landlords who don't maintain their gas appliances properly (my daughter's landlord doesn't even have a hood over the gas stove.) And, I've spoken with people who are afraid to confront their landlord because of fear of losing their rental.

If you get to much push back for the ban I would suggest that you use a more targeted approach and work on identifying gas leaks and fining people and cities out of compliance. I know that's harsh but this is a really serious issue. EDF and Google Earth can help pinpoint leaks—I'm sure there are other ways too.

Best and thank you for all you do,

Belinda Chlouber

Sent from my iPad

Jennifer Elwell

From: Ben Martin [REDACTED]
Sent: Friday, February 3, 2023 8:43 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Ben Martin

[REDACTED]

[REDACTED]

Mtn View, California 94040

Jennifer Elwell

From: Benjamin Bingaman [REDACTED]
Sent: Friday, February 3, 2023 7:31 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Benjamin Bingaman

[REDACTED]

[REDACTED]

San Jose, California 95138

Jennifer Elwell

From: Bhima Sheridan [REDACTED]
Sent: Monday, February 6, 2023 1:32 PM
To: Jennifer Elwell
Subject: Support for zero-NOx emissions standards

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am a realtor living and working in Berkeley and I am passionate about transitioning to a green economy. Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

My wife and daughter both experience respiratory distress when neighbors burn wood in fireplaces and even when we operate our own gas insert. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

Burning fossil fuels in homes for heating is responsible for [roughly 11%](#) of California's statewide climate emissions. The state cannot meet its climate targets without eliminating this pollution. This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Bhima Sheridan
[REDACTED] Berkeley

Jennifer Elwell

From: Bill Hough [REDACTED]
Sent: Thursday, January 19, 2023 3:16 PM
To: Jennifer Elwell
Subject: NO on amendments to Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I strongly object to amendments to Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters.

1

We are constantly being warned about blackouts due to an overstressed electrical grid. These "reach codes" will only make this matter worse. And all this virtue signaling will have no impact on global warming as long as China and India continue burning fossil fuels.

I'll believe global warming is a problem when the rich people who are telling me it is a problem start ACTING like it is a problem. They can start by getting rid their carbon-spewing private jets.

The bottom line is that I do NOT support ANY gas ban and I oppose adopting codes more stringent than those set out by the state. Whether or not the BAAQMD is considering any major changes to gas appliances in today's meeting is immaterial. The District must immediately terminate discussion of any restrictions beyond state requirements.

Bill Hough
Los Altos resident and taxpayer

Jennifer Elwell

From: Bill Maimone [REDACTED]
Sent: Monday, February 6, 2023 2:46 PM
To: Jennifer Elwell
Subject: proposed ban on gas/propane furnaces & water

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Wow, a friend just pointed out that this BAAQD proposal would apply also to replacement units. Switching from propane to electric could make sense on a major house or kitchen remodel, but it's a difficult and expensive proposition where wiring isn't in place to accommodate the 30-40 amp service these things require. And for those of us in the rural communities along Skyline Blvd, having heating and cooking on propane allows us some degree of comfort during our frequent power outages. So far this winter I've had a total of 12 days of grid outage, basically any time the wind blows along the Skyline ridge it's somewhere between 12 hours and 3 days of grid outage, and in my 25 years of living here I've not had a single year without at least a few multi-day outages. I've made a sincere effort to reduce energy consumption -- insulation beyond code, radiant floor heat, solar hot water, PV array & backup batteries, and a kitchen for which the electric half was way beyond my backup capacity. This proposition needs at the very least some exception for rural areas with frequent outages. Another reasonable direction would be to apply more pressure on appliance manufacturers to improve efficiency and reduce emissions, following this [DOE proposed rule](#). I'd be happy to upgrade any and all appliances for cleaner and more efficient ones, if only they were available.

Bill Maimone
[REDACTED], Woodside CA

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 4:58 PM
To: Jennifer Elwell
Subject: Ban on gas fired home furnaces and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To the Bay Area Air Quality Management District Board,

As a resident of Palo Alto I am aware that you intend to hold hearings in the near future on the bright idea to prohibit certain replacement appliances in about 5 years. I would like -- on the grounds of having survived World War II under German occupation, and life experiences until deep in my eighties -- to take issue with this idea for the following reasons, among others::

1. It is not necessary
2. It serves no purpose except those in this society who wish to ban natural gas altogether, for political reasons
3. To generate the electricity as replacement, more than the equivalent on natural gas (or say fossil fuel) will have to be consumed elsewhere.
4. The gas grid is much more reliable than the electrical grid., even this civil engineer understands that. A matter of exposure of wires and encountering yearly power outages.
5. Don't touch the principle of the benefits of having alternative choices, and let the citizens of this country decide for themselves which one, or both.
6. It is senseless, if not stupid.
7. Many better ways to improve air quality in the Bay Area, among which: nuclear power.
8. These regulations would exploit the "Not in my backyard philosophy".

Respectfully submitted,

Bill Nugteren.

Jennifer Elwell

From: Blaine Burgdtrom [REDACTED]
Sent: Friday, February 3, 2023 2:08 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Blaine Burgdtrom

[REDACTED]

[REDACTED]

San Jose, California 95124

Jennifer Elwell

From: Bob March [REDACTED]
Sent: Tuesday, February 7, 2023 5:20 PM
To: Jennifer Elwell
Subject: Gas-fueled appliances proposal

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

A neighbor just informed me of the proposed changes to District rules to require the replacement of gas-fired heating systems in residents starting in 2029. I understand from him that the opportunity for members of the general public to comment closed yesterday at 5:00 PM, but I hope that even if my comment can't be included in your report due to missing the deadline, someone may read it someday.

In short, I think the proposal in its present form should be rejected.

The benefits as presented don't seem certain enough and large enough to warrant the imposition of enormously costly changes on the general population. If there are about 1.5 million single-family homes in the Bay Area, as I've read, and with purchase and installation of a heat pump system estimated by the District to cost roughly \$3,000 more than a gas-fired furnace, then over time this proposal could eventually cost the public as much as \$4.5 billion more than they would otherwise have spent as they replace their home heating and water heating systems.

Some counter that subsidies may be available to help individuals with this transition, but it's beside the point, I think; such assistance would also have to be funded by taxpayers.

Thanks,
Bob March
Palo Alto

Jennifer Elwell

From: Brendan Moriarty [REDACTED]
Sent: Saturday, January 21, 2023 8:35 AM
To: Jennifer Elwell
Subject: Support for proposed amendments to building appliance rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

As a resident and homeowner in Oakland, I'd like to register my family's support for the proposed changes to building appliance rules governing nitrous oxide emissions from central furnaces and gas-fired boilers and water heaters (Regulation 9, Rule 4 and Rule 6). We are in a climate crisis and we must pursue every opportunity to reign in emissions, including of NO and greenhouse gases. As a father of two young children, this will have great bearing on the quality of their lives for decades to come. Reducing emissions from buildings is a huge opportunity space for emissions reductions. The technology is there and now we need our regulations to catch-up quickly. Our home is full of gas appliances and we are on-board with doing what it takes to electrify. I would just ask for more support from BAAQMD and the public and non-profit sectors at large in helping families like mine figure out how to make the conversion. It's confusing and overwhelming. We've also found that contractors need training, support and encouragement as well. Most of the contractors we've consulted have encouraged us to stick with gas appliances. Thank you for your time,

Brendan

--

.....
Brendan Robert Moriarty
[REDACTED]

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 5:14 PM
To: Jennifer Elwell
Subject: FW: Please adopt Zero NOx Emission Standards for Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Forwarding in case I had the wrong emails the first time.

From: [REDACTED]
Sent: Monday, February 6, 2023 3:27 PM
To: [REDACTED]
Subject: Please adopt Zero NOx Emission Standards for Appliances

Dear BAAQMD Boardmembers,

As a resident of Palo Alto and advocate for building decarbonization I urge you to adopt Zero NOx Emission Standards for Appliances.

By the health impacts and associated costs to our communities of the NOx and other indoor pollution alone, these standards cannot arrive too soon. Establishing the zero NOx standard will let everyone know that our state agencies also agree on the sound, science-based case to deem indoor methane gas appliances an obsolete technology and health hazard. That is, that such products are not a worthy investment from now on.

Add to the health benefits the enormous co-benefit of establishing a health based standard that is also a zero GHG emissions standard. From top to bottom, California has recognized that we are in the midst of a climate change crisis. But we must go further recognize that the science tells us that the crisis now leaves us staring at a minimum of 1.5 degrees warming by as early as 2030 and 2 degrees by 2050. Please consider an earlier phase-in for the standards for equipment that meets objective criteria for ease of implementation in terms of feasibility and cost. This, in the interest of minimizing ghg emissions.

A zero emissions standard will support every city across the Bay Area that is grappling with the daunting costs and complexity of drastically reduce local fossil fuel use to limit warming to just 2 degrees. It is a gargantuan task that cannot be done piecemeal with local incentives and ordinances. A regional, catch all, clean, electric-only standard will clear the path for many communities to more effectively deploy their scarce local resources to reduce gas use.

Sincerely,

Bret Andersen, Carbon Free Palo Alto

Jennifer Elwell

From: Brian Avery [REDACTED]
Sent: Monday, February 6, 2023 3:50 PM
To: Jennifer Elwell
Subject: WE STRONGLY OPPOSE eliminating gas-fueled furnaces and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bay Area Air Quality Management District,

Our family business of 98 employees is strongly opposed to eliminating gas-fueled furnaces and water heaters. We manage 2,400 garden apartment homes built in the 1960's and 1970's in 12 properties.

HONESTLY, you have NOT thought it through for people like us. We would need to file for bankruptcy.

1. THOUSANDS of properties like ours do NOT HAVE THE ELECTRICAL CAPACITY to handle your proposal.
2. Residents have used up excess capacity with televisions, hair dryers, chargers, video games, portable air conditioners, fans, white noise machines for babies, printers and office equipment for remote office work etc.
3. In the future we will be required to add EV (Electrical Vehicle) CHARGERS. We do not have capacity for that either.

Who would pay the cost for re-building electrical capacity in these thousand of properties: \$ hundreds of millions for PG&E to run additional electrical capacity throughout our properties?

- (a) trenches through an occupied community. Have you seen PG&E's per lineal foot construction cost?
- (b) have you seen the prices for PG&E Substations
- (c) trenches through trees, bushes, lawns, tree roots
- (d) trenches needing special boring under sidewalks & community patios
- (e) trenches through paving and base rock in driveway areas

Lastly, the Cities then begin to require new breaker boxes throughout the complex, and often new wiring. You know that. Ask any city.

We are grappling with the replacement of any potentially weak balconies over the next few years to meet the new California law: SB721.

This is costing us \$millions, and we are always working on ADA Upgrades, Environmental work inside the apartment homes (removal of asbestos, lead paint, mold & mildew from wet winters, termites etc.)

We can not handle your wishlist. This is the straw on the camel's back. Please do not crush our family business OR force us to pass along very high cost figures to the apartment residents in our apartment homes.

Sincerely,

Brian Avery, Co-President

ACCO MANAGEMENT

Avery Construction

[REDACTED]

Mountain View, CA 94041

[REDACTED]

Jennifer Elwell

From: Brian Johnson [REDACTED]
Sent: Wednesday, January 18, 2023 4:55 AM
To: Jennifer Elwell
Subject: Natural gas water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning,

I oppose your desire to ban natural gas water heaters, for the reasons stated and dismissed about panel upgrades, reliable power, fit and finish into existing spaces and many many more.

PG&E can't even keep the power on consistently and we want to mandate all electric?

If you'd like to make policy changes you should incentivize them and not mandate them.

Heat pumps, all electric everything sounds great, and if it is, the market should decide with a helpful push via incentives.

Well intended bureaucrats have a long history of failure due to unintended consequences.

I'd rather Elon make an electric car and meaningful efficiency gains than some silly well intended bureaucrats.

Boooo!

Brian Johnson

Jennifer Elwell

From: Bruce Adornato [REDACTED]
Sent: Monday, February 6, 2023 1:53 PM
To: Jennifer Elwell
Subject: Do not ban gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

too expensive to ban them and replace with electric. not
necessary. and the grid is fragile

--

bruce

bruce adornato

Jennifer Elwell

From: Bruce England [REDACTED]
Sent: Friday, February 3, 2023 6:22 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Bruce England

[REDACTED]

[REDACTED]

Mountain View, California 94043

Jennifer Elwell

From: Bruce Jackson [REDACTED]
Sent: Monday, February 6, 2023 5:08 PM
To: Jennifer Elwell
Subject: 2 East Palo Alto residents vote no on all-electric

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

PG&E does not yet have a strong enough grid to support all-electric appliances. Most recently, we were out of electricity for more than 15 hours from before Midnight, 12/31/22 to 3:30 PM, 1/1/23. Our average age is 78, we do not do well in the cold. With our gas range, at least we could cook and have hot beverages. PG&E loses power at least twice a year, perhaps not for 15+ Hours. It has nothing to do with hot Summer peak use, just a weak grid.

Bruce Jackson

[REDACTED] Palo Alto Gardens, East Palo Alto

Jennifer Elwell

From: Bruce Naegel [REDACTED]
Sent: Monday, February 6, 2023 10:43 AM
To: Jennifer Elwell
Subject: Support and Pass Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer Elwell jwlwell@baaqmd.gov

- To BAAQMD Board members
- From Bruce Naegel
- Date 2/6/2023
- Re: Support Rule 9-4 and 9-6 for Environmental Justice"
-

Thank you for the opportunity to talk to you about BAAQMD support for Rule 9-4 and 9-6.

I am an active member in several sustainability groups in the Bay Area including Fossil Free Buildings Silicon Valley and Carbon Free Silicon Valley. These organizations are addressing climate change and health issues. They do this by supporting REACH codes and legislation to lower or eliminate GHGs (Green House Gases) like NOx (Nitrogen Oxides). This is the aim of Rule 9-4 and 9-6 which move to electric heat pump technology to eliminate GHGs.

The combustion byproduct causing substantial damage to people is NOx (Nitrogen Oxide)

There are many studies that show burning fossil gas in appliances for water and space heating leads to dangerous levels of Green House Gases. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. These results show the key benefits of Rule 9-4 and 9-6 to move to a healthier environment.

Low / Middle Income (LMI) Families are the ones hit the hardest by high concentrations of GHGs like NOx. They are more likely to live in homes with poor ventilation, so gases are concentrated. Eliminating GHGs from LMI (Low Middle Income) housing becomes a priority due to the lack of ventilation in many LMI homes and the small space for kitchens.

Asthma is another respiratory disease with connections to NOx. My wife has asthma. When it is aggravated, she gets into extensive coughing bouts. I get to see what other people suffer when they get asthma attacks. We are lucky that we have all electric cooking appliances and room heat. Those who live homes with gas will aggravate any situation with asthma. Note that COVID is a respiratory disease, and the youth and elder populations are more likely to have challenges with fossil gas combustion.

We are thankful BAAQMD is taking these bold steps with Rule 9-4 and 9-6. When a residential gas water heater or space heater fails in 2027 or later, it will need to be replaced by an electric heat pump model.

BAAQMD support of Rule 9-4 and 9-6 for Environmental Justice is key to addressing respiratory problems due to NOx from combustion appliances. Starting with the Bay Area in 2027. Rule 9-4 and 9-6 experience in the

Bay Area provides the experience for CA 's ban across the entire state in 2030. We strongly support BAAQMD's strong stand for Rule 9-4 and 9-6 for Environmental Justice. We will breathe a bit easier with this law in place.

Articles to learn more about the dangers of burning natural gas which generates GHGs.

<https://www.cbsnews.com/news/gas-stoves-igniting-a-new-range-war/>

<https://www.vox.com/policy-and-politics/23550747/gas-stove-health-concerns-new-history>

Jennifer Elwell

From: bryce vree [REDACTED]
Sent: Wednesday, January 18, 2023 9:42 AM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer,

I write to oppose the new rules. In San Francisco, the city I reside, almost all single family homes were built before the 1970s and do not have **sufficient** electric capacity to switch from gas to electricity for their water heaters and furnace. Furthermore, getting a PG&E upgrade takes several months to years and costs around \$6,000. Many homeowners and landlords will not be able to afford this upgrade and even if they can they will be forced to wait for months or even years without heat or hot water once their equipment needs to be replaced.

Furthermore, the state of California has frequent blackouts during heatwaves, this rule change will extend this risk to cold fronts also. the state needs to expand its **electric** generation capacity before changes like this can be made. This kind of change is better left up to the state legislature who can attach public works money to it's implementation. This regulation is too blunt and will harm homeowners and have too many **unattended consequences**.

Thank you for reading my comment,

Bryce Vree
[REDACTED]

Jennifer Elwell

From: Carol Mone [REDACTED]
Sent: Saturday, February 4, 2023 1:07 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Carol Mone
[REDACTED]

[REDACTED]

Woodside, California 94062

Jennifer Elwell

From: Carolyn Mar [REDACTED]
Sent: Sunday, February 5, 2023 1:04 PM
To: Jennifer Elwell
Subject: Comment on: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Ms. Elwell,

I would like to comment on the proposed amendments to Rule 9-4 and 9-6.

I understand the moving towards zero NOx emissions; however, the current infrastructure simply can't support a conversion where homeowners are going to have to start as soon as 2027 for gas water heaters and 2029 for gas furnaces for replacement with electrical. The timeline is too aggressive.

2027 – only zero NOx water heaters can be sold or installed in the Bay Area.

2029 – only zero NOx furnaces can be sold or installed in the Bay Area.

2031 – only zero NOx large commercial water heaters can be sold or installed in the Bay Area

We have had rotating electrical power outages and brown outs as it is. Plus, with older homes, that means the homeowner will need to upgrade their electric panels. I'm sure that PG&E will also need to approve/permit this plus the city permit process. It sounds like this could easily cost a homeowner between \$2,000-\$5,000—starting. I'm not sure how a retired or fixed income owner can afford this? Is there going to be low interest loans or grants for them? And what happens if a retired or fixed income owner can't afford this—are they going to be fined until they are compliant?

Before rolling out something like this, there should be a study to see if the infrastructure can support this type of massive upgrade.

Thank you for time in allowing me to comment.

Sincerely,
Carolyn J. Mar

Jennifer Elwell

From: Catherine Cameron [REDACTED]
Sent: Friday, February 3, 2023 7:16 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

We need clean air! I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Catherine Cameron

[REDACTED]

[REDACTED]

San Jose , California 95125

Jennifer Elwell

From: Catherine Su [REDACTED]
Sent: Monday, February 6, 2023 8:40 PM
To: Jennifer Elwell
Subject: ban on new gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bay Area Air Quality Mgmt District,

A ban on new gas appliances doesn't make any sense. This introduces unnecessary expense without any scientific benefit. Per your calculation, a new heat pump system today will cost significantly more for an electric system versus a gas system.

While you state the cost of an electric heater is \$3000 more than a new gas heater, that isn't its only cost. Running the electric heater is also more expensive so my heating bill will also go up considerably.

When I bought my home, I specifically didn't want an all-electric house since the energy expenditure for all-electric is much higher. Of all the hundreds of houses for sale we went to see before we purchased our current home, only one was all-electric. The price of electricity has continued to increase in the time I've owned my home so I'm supposing the price differential has gotten worse. The demand is for gas so most homes in the area are currently gas. Your mandate would affect the vast majority of homes in the area.

I understand that various cities were trying to ban gas stoves and then they discovered that most of the legislators owned gas stoves. Now they're trying to take away our gas water heaters and gas heaters. The reasoning is different. People like to cook with a gas stove since you have better control over the heat. People want gas heating because electricity is far more expensive.

Why not begin with an educational campaign? I'd suggest that the members of the BAAQMD change their own gas appliances to electric first. Then, they can work on convincing others to make the change rather than making others make the switch without full knowledge. You can learn the pros and cons and let the public know what you've learned. This shouldn't be difficult. What do you like about electric? Does it cost less? Does the electric appliance need less maintenance? Does it have a longer lifespan? In the case of my gas heater, it doesn't require any maintenance other than new air filters and it's never broken down. I upgraded it when I turned the closet where it resided into living space and moved the new one into the attic. What percent of homes have gas heating? I'm guessing it's 95%+. That alone should end your campaign. See how many people you can convince to voluntarily change from gas to electric. If the information is compelling, people will do it. If it isn't particularly compelling, few will make the switch. You can't just come up with an idea and make everyone follow suit.

I vote no.

Thanks.
Cathy Su

Jennifer Elwell

From: Chanel Harris [REDACTED]
Sent: Monday, January 30, 2023 1:05 PM
To: Jennifer Elwell
Subject: Save Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer,

My name is Chanel Harris. I'm a resident of San Mateo County, CA. I'm writing to you and all others in behalf of the administration of this state to please reconsider banning gas appliances. A lot of people prefer gas over electric for various reasons. 1. Gas stoves heats up faster than electric ones. We're not having to wait wait and wait for any of our pots and pans to heat up, thus saving more energy. And 2. Whenever we have power outages, we would still have the gas on our stoves that we could just light with regular lighters and we'd still have that to cook with during an outage, whereas an electric stove doesn't work AT ALL during power outages. Many of us are opposing the ban. I hear you guys are wanting to ban them because y'all think they cause cancer, but tobacco is the leading cause of cancer and yet y'all don't or won't ban tobacco products. Makes zero sense. I was told to send you an email for my feedback on this matter. Thank you, but please reconsider. And if y'all really want to help prevent more cancer, y'all really should be banning tobacco products instead. Thanks.

-Chanel

Jennifer Elwell

From: CharlieMargaret [REDACTED]
Sent: Monday, January 23, 2023 4:00 PM
To: Jennifer Elwell
Subject: Objection/opposition to Ban of natural gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

My name is Charles W. Getz in San Carlos CA, within the jurisdiction of the BAAQMD. My wife and I **STRONGLY** oppose this idiotic rule to ban gas furnaces/water heaters.

1. The assumption this will materially improve the environment is flawed and unsupported by any defensible science or studies. The negative impact far outweighs the "positive" impact. The US already leads in carbon reduction; this will add negligible amounts to that "improvement" while causing immeasurable economic harm
 2. A comprehensive EIR under CEQA must include cumulative impacts on the Grid factoring in the equally idiotic proposal to ban gas powered vehicles plus the speculative unproven "solar energy" additions to the grid. Also the economic impacts on households of fixed income, low-income and people of color. Also the impact on future housing costs, commercial space and public facilities.
 3. The taking under the 5th Amendment of property by forcing conversion to electric higher-priced and inferior products.
 4. The impact on the environment of added electrical generation, added solar farms, disrupted businesses and many other elements.
 5. The negative impact on property values, gas-related professions and businesses, interstate commerce, and people of color by these proposals.
 6. This fundamental of a change **MUST** be voted upon by the people. Not by an unelected board albeit with "locally" elected officials. When they serve on BAAQMD, they are **not** elected by the people. They reflect their underlying political organization. This is indirect taxation/regulation without representation.
 7. We are Seniors on a fixed income. This will adversely affect us and we cannot afford the proposed changes.
 8. Natural Gas is an effective, affordable and environmentally friendly source of energy.
- Please deny or withdraw this truly ridiculous idea!!

Charlie and Margaret Getz

Jennifer Elwell

From: Cheryl Schaff [REDACTED]
Sent: Monday, February 6, 2023 1:55 PM
To: Jennifer Elwell
Subject: I support Rule 9-4 and 9-6 for environmental justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you, Bay Area Air Quality Management District, for taking the lead in helping protect all Bay Area residents from nitrogen oxides. We desperately need your insight, authority and action to protect our health and well-being.

I'm a 34-year resident of this beyond-beautiful Bay Area, mother of two sons and passionate environmental advocate, three significant motivations for supporting your important work in eliminating nitrogen oxides from burning gas in buildings. I support Rule 9-4 and Rule 9-6. Please act quickly!

Cheryl Schaff
Menlo Park, CA

Cheryl Schaff
Menlo Park Climate Team
Chair, Peninsula Clean Energy Citizens Advisory Committee
Climate Reality Project Leader, Bay Area Chapter
[REDACTED]

Individually we are a drop, but together we are an ocean.
Ryunosuke Satoro, Japanese writer

”

75

Jennifer Elwell

From: Cheryl Weiden [REDACTED]
Sent: Friday, February 3, 2023 9:03 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. We need your action as soon as possible to help move contractors to get trained and be ready to install electric appliances.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Cheryl Weiden

[REDACTED]

[REDACTED]

Los Altos, California 94022

Comments on Regulation 9, Rule 4 & 6.

Climate change is real. It will negatively affect the world population. And is always the case – the least able to mitigate will be the most effected. It is therefore unconscionable that we in the Bay Area will contribute to this and use pseudo-science as reasoning.

The BAAQA proposed regulations will:

- Cost \$ 8, 000 - 12,000 for every Bay Area home owner. This equates to 250-750% of a low, medium, and fixed income homeowners' monthly payment (2023 \$'s)
- Have no regulatory peer anywhere in the United States – not even California
- Have no guarantee that the local transmission electric grid can deliver the required electrical power - Power outages during winter months with low solar output
- Openly acknowledges that no commercial technology exists to meet the Net Zero standard required by Regulation 9, Rule 4 and 6.
- There exist no equipment suppliers which can provide the equipment which BAAQMA will require
- The scientific basis to support the health benefits to our community are miniscule - .001% of affected Bay Area population. BAAQM fails at its basic tenet: to lead with science.
- None of the 50 states, none of the California Air Boards, California cities, California counties, nor the Federal government are considering anything similar Regulation 9, Rule 4 & 6
- Let's be honest - This is Peacock Politics at its worse.

Details

1. Based on BAAQA's Board Report the direct health risks this regulation will potential avert are incredible small even in our marginalized communities. The regulation proposes it can save between 23-52 lives per years. COVID, cigarette smoking, alcohol consumption, and vehicle accidents – to name but a few - contribute orders of magnitude greater tragedy to our community. Without the additional fiscal impact.
2. BAAQMA openly admits that there are NO current residential nor commercial alternatives which meet their proposed regulatory standards.
3. The report highlights a significant shortfall in available grid electrical power to support this conversion. It takes no responsibility for solving this shortfall.
4. Rather It acknowledges this power shortfall can only come from some new sources which are outside the State of California.
5. The report does not discuss nor confirm that PG&E's transmission grid can deliver this increase in total electrical load. It should be realized that our lowest daily solar electrical input will occur when we have our highest daily heating requirements.
6. The net capital cost to a residence or commercial site poorly estimated, but would range from \$ 8,000 – 12,000 in 2023. The economic analysis averages the capital cost over the equipment life expectancy. This is not the reality for home owners. They will pay 100% of this cost the day the equipment is installed. BAAQMA math is not real world, especially to marginalized and fixed income households.

7. The report does not discuss the on-going electrical vs. natural gas cost. Currently the cost to heat a home with electricity is significantly higher to the average home owner. Does this board believe PG&E rates will decrease in the years ahead?
8. When one calculates the total cost to for the entire Bay Area, we are talking Billions of Dollars. If you assume 7.8 Million people and 4 person per home the total cost is \$ 160 Billion. For just Contra Costa County the total is \$ 2.3 Billion. Many of our community members struggle to pay the high cost of groceries, schooling, gasoline and electrical power – some of the highest in the United States.

The Regulation's Report documents the health benefits to our community are miniscule - .001% of affected population. When compared to the very real and daily cost of 2023 - COVID, cigarette smoking, childhood health care needs, educational opportunities, alcohol consumption, and vehicle accidents, a reasonable Bay Area resident will question the Why for Regulation 9, Rule 4 & 6.

Given these facts it is hard to understand BAAQ's logic, thinking, and community health commitment. The Board should reject the recommendations of the Interim Director. Rather they should pass a resolution an update to this report in 2025.

Resist Peacock Politics. Support science and an equal and vibrant community.

Jennifer Elwell

From: Chris Lish [REDACTED]
Sent: Sunday, February 5, 2023 7:17 PM
To: Jennifer Elwell
Subject: Support Rules 9-4 and 9-6 to Ensure Breathable Air for All -- Notice of Availability of a Draft Environmental Impact Report for Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces and...

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Sunday, February 5, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Subject: Support Rules 9-4 and 9-6 to Ensure Breathable Air for All -- Notice of Availability of a Draft Environmental Impact Report for Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (State Clearinghouse Number: 2022050430)

Dear BAAQMD Boardmembers:

I strongly urge Bay Area Air Quality Management District Boardmembers to support our Air District's proposed changes to rules 9-4 and 9-6 requiring only zero NO_x water heaters, furnaces, and large commercial water heaters be sold and installed by 2027, 2029, 2031 respectively, as well as the introduction of an ultra-low NO_x standard to Rule 9-4 for furnaces starting in 2024. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

Burning gas, propane, and wood in buildings produce nitrogen oxides (NO_x) and harmful indoor air pollution. NO_x are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NO_x emissions from building appliances but improving air quality in

the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

The risk raised in the Environmental Impact Report regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional, and state electrification targets and reach zero net greenhouse gas emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed through the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. I urge the BAAQMD Board to certify the EIR and adopt these proposed rule changes as quickly as possible.

Thank you for your consideration of my comments. Please do NOT add my name to your mailing list. I will learn about future developments on this issue from other sources.

Sincerely,
Christopher Lish
San Rafael, CA

Jennifer Elwell

From: Christine Patel [REDACTED]
Sent: Sunday, February 5, 2023 7:30 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-4

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

I urge you to please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

As a mother of two young children, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Thank you,
Christine Patel
Tiburon Resident

Jennifer Elwell

From: Cindy Sidaris [REDACTED]
Sent: Friday, February 3, 2023 3:39 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Cindy Sidaris

[REDACTED]

[REDACTED]

Los Altos, California 94024

Jennifer Elwell

From: Claire Broome [REDACTED]
Sent: Monday, February 6, 2023 1:56 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Air Quality, Health, and Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

As a public health professional and resident of Alameda county, I strongly urge the Bay Area Air Quality Management district to adopt the proposed amendments to building appliance rules 9-4 and 9-6. This is an important step to improving the air quality in the Bay Area, and the health of Bay Area residents, while demonstrating leadership in the transition from toxic air pollution due to methane gas.

Regulating standards for emissions and efficiency will not only benefit the health of the inhabitants of the buildings where such appliances are installed but will also help drive the market and the expertise of contractors and installers, so the impact of the regulations will be magnified.

Please approve this meaningful step forward to address air quality, health, and our ability to address the climate crisis.

with regards,
Claire Broome, MD
Assistant Surgeon General, US Public Health Service (retired)

--

[REDACTED]
Berkeley, CA 94708

Jennifer Elwell

From: Claudia Hevel [REDACTED]
Sent: Friday, February 3, 2023 3:53 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Claudia Hevel

[REDACTED]

[REDACTED]

Los Altos, California 94024

Jennifer Elwell

From: Colin Daly [REDACTED]
Sent: Wednesday, January 18, 2023 7:46 AM
To: Jennifer Elwell
Subject: Oppose gas water heater bans

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi,

I am strongly opposed to the ban on sale of gas water heaters. Blackouts happen all too often in the Bay Area (I was without power for 6 days last week due to the storms), but at least we have hot water and can clean ourselves and our dishes. No hot water in addition to no power would make a house uninhabitable during a blackout. Please leave this decision up to individuals.

Thank you,
Colin

Jennifer Elwell

From: craig husfeld [REDACTED]
Sent: Friday, February 3, 2023 2:31 PM
To: Jennifer Elwell
Subject: Full Support of Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jen,

I am writing for my families full support of Rules 9-4 and 9-6 Building Appliances (the Air District's process for amending Regulation 9, Rules 4 and 6 to reduce emissions of nitrogen oxides from residential and commercial furnaces and water heaters in buildings in the Bay Area.)

Keeping this simple, this is critical to send a message that clean air is extremely important and we must push regulations to support this goal!

Thanks,
Craig Husfeld
[REDACTED] San Mateo

Jennifer Elwell

From: Craig Taylor [REDACTED]
Sent: Wednesday, January 25, 2023 11:29 AM
To: Jennifer Elwell
Subject: Natural Gas Restrictions

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Has the commission considered that as the cost of renewable electricity comes down relative to natural gas, and the price of suitable electric appliances drops due to greater production and perhaps innovation, that the transition to electric will occur naturally. There is likely no need for intrusive, likely expensive regulations such as those being proposed.

Craig Taylor

Jennifer Elwell

From: Cynthia Cima-Ivy [REDACTED]
Sent: Monday, February 6, 2023 5:00 PM
To: Jennifer Elwell
Subject: Public comment on Rules 9-4, 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Jennifer,

Thanks for returning my call today. Since the time before the deadline is short, I just wanted to commit to writing a couple of the concerns I raised today.

The cost estimates quoted in various newspapers today, as I mentioned to you, seemed out of line with the reality of getting anything done on a home in my city. One article said the difference between gas and electric house heaters averaged only \$2931, and that between gas and electric water heaters was only \$852. As I mentioned, they can't be accurate if you account for the labor of an electrician, dealing with older post-war construction and infrastructure, an upgrade to the box. cost associated with permit delays, etc.

Just to give a concrete example, as with most houses in our 1950s-built neighborhood, our electrical drop line is at the far back of the house and the gas line comes in on the front, going to the garage--the farthest corner from that electric box in the back. A few years ago, during an unplanned bath remodel due to water damage, the electrical contractor cost to run a couple of lines to that bath (about 20 feet), was over \$1000, and that was half what I was originally told when they thought they would have to go through the attic. (Fortunately, we found a workaround.) To get to the garage to, say, replace a gas water heater with an electric one, optimistically a distance of five times that much, the attic is unavoidable. More recently, I was informally quoted \$25,000 to \$30,000 for an upgrade of our HVAC system to electrical using heat pump technology. While I'm sure that includes new ductwork because we don't have AC, it also did not include a box upgrade. (I have been told more than once that our electrical box is now maxed out.) Obviously, my own experience is anecdotal, but without knowing the underlying data for those consultant numbers, I remain skeptical. The District should obtain the underlying data sources for the numbers, which I believe come from Lawrence Berkeley Lab and E3 studies.

Thanks again for being responsive today,

Cynthia Cima-Ivy

Jennifer Elwell

From: D Pickham [REDACTED]
Sent: Monday, February 6, 2023 8:38 AM
To: Jennifer Elwell
Subject: Gas appliances.

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Strongly opposed.

Electric pump = \$8,027
Furnace upgrade = \$10,000
Panel upgrade = \$4,256

TOTAL = \$22,000

On top of \$30,000 in property taxes, inflation, child care, mortgage, etc. where is the money coming from?

- This will have zero impact on carbon emissions
- diversified energy is good for all and prevents monopolistic pricing
- our electrical grid will have greater blackout periods when every house and car is expected to draw from the grid

Ban private jets before taking away a families heat sources.

Sent from my iPhone

Jennifer Elwell

From: Dan Winter [REDACTED]
Sent: Wednesday, January 18, 2023 8:47 AM
To: Jennifer Elwell
Subject: DO NOT BAN GAS FURNACES AND WATER HEATERS

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am contacting you to voice my strong opinion to stop these proposals. Gas is cheap and reliable while our electrical grid continues to be unreliable in storms and fires and hit days. In addition, houses built before the 1980s do not have service panels capable of providing service to these major loads, and will require \$5,000+ to upgrade service panels, creating a significant burden to retirees with older homes whose furnaces and heaters reach the end of their useful lives.

Local papers in the Bay Area have covered how the cost of upgrading panels has made the switch to electric nit only financially impossible but sometimes puts too much load for existing transformers and utility lines.

In addition, all these electrical upgrades will requires electrical contractors to do the work. Contractors frequently are booked months weeks and months in advance for service panel upgrades, which may leave residents without hot water or heat in the middle of winter, leading to habitability issues and health risks, or thousands of dollars in hotel bills while new services are run.

If its not broken, don't fix it. The gas distribution system and lines in current installations are working fine. Leave it alone. Make changes in new construction where the impact to people can be managed and mitigated, and make sure the entire grid and production systems are in place before you push thousands of people down this dangerous road.

Dan Winter
Home owner
San Jose, CA

Jennifer Elwell

From: Daniel Feldman [REDACTED]
Sent: Friday, February 3, 2023 11:26 AM
To: Jennifer Elwell
Subject: Public Comment on proposed amendment to Regulation 9 Rule 6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I would like to register a public comment regarding [the proposed amendment to Regulation 9 Rule 6 of the Bay Area Air Quality Management District](#).

As a practicing environmental scientist (B.S. in the subject from MIT and Ph.D. in the subject from Caltech, led the first paper measuring the greenhouse effect of methane, currently leading the production of the temperature and precipitation projections for the Fifth National Climate Assessment), I support the need for reducing indoor air pollution and greenhouse gas emissions.

However, I am concerned about the proposed Amendments for two primary reasons:

1. The Amendments appear to have been created without any indoor air monitoring whatsoever in homes in the San Francisco Bay Area to show what NOx and PM2.5 concentrations result from new water heaters and furnaces that comply with existing BAAQMD standards. The findings of the Staff Report on premature deaths, asthma, and economic analysis require both an observational basis and peer-review. Therefore, the claims listed in the Fact Sheet about premature deaths avoided and PM2.5 exposure would not and should not withstand scientific scrutiny.
2. No information is provided about whether Pacific Gas and Electric (PGE) has affirmed that they have the capacity to support the mandated upgrades to electrical water heaters and furnaces/heat pumps after the Amendments go into effect in a timely manner. Residential electrical panel upgrades require load analyses, PGE electrical infrastructure upgrades and PGE permitting. As a point of reference, PGE currently requires more than a year and a half to perform a transformer upgrade to service a neighborhood when residential solar generation is installed and the existing transformers are inadequate to support those upgrades. Permits and analysis for electrical panel upgrades take more than 3 months. Since BAAQMD estimates that 2/3 of all homes in the Bay Area will need to be upgraded, PGE would need a much larger number of personnel to support permitting and electrical panel upgrades than they now have, or the time required for new panels and permitting should be expected to be much longer than it currently is. No information has been provided in the proposed amendment as to PGE's plans to support these Amendments.

Thanks for your consideration of these comments and I would be happy to answer any questions you have.

Daniel

Jennifer Elwell

From: Daniel Hachigian [REDACTED]
Sent: Monday, February 6, 2023 4:03 PM
To: Jennifer Elwell
Subject: Comments on BAAQMD ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The following comment supersedes my prior submission to the BAAQMD; please remove my prior comment from submission.

Thank you, Jennifer.

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

(I)

My home is located in the heavily forested area of San Mateo County relatively near Skyline Rd. As such, annually we have historically experienced a consequential number of power outages due to trees falling during inclement weather, roadway accidents which affect power poles, and more recently during PG&E shutdowns due to elevated fire risk. These outages frequently take more than 24-48 hours to resolve. For example, since the last day of this past December, I count eleven (11) days during which my home experienced an outage, virtually all exceeding 12 hours with the longest exceeding 84 hours (yes, 3+ days without electricity).

During these outages, I am able to keep the house in a habitable state by running a modest propane home generator which powers the fan on my 95% efficient propane furnace (which includes a secondary heat exchanger to accomplish that level of efficiency) and my propane gas water heater which only needs electricity for the control system and to power the pilotless ignition system.

If in the future I am forced to replace these appliances with electric versions (even efficient heat pump systems), these appliances will require high amperage 220V electricity which would require a whole home generator installation that reasonably could be expected to provide 20+ kW of service as opposed to my modest portable generator. This is not to mention that my home has a second furnace on the second story which is not remotely close 220V panel access so is going to require very significant wiring cost to upgrade along with necessitating an even larger home backup generator.

If the district chooses to move forward with this appliance ban, I urge the commission to consider those of us who are less than fully served by 100% or even 99% PG&E power uptime during the year. I would suggest a simple rule amendment would be that if, over the previous 2-5 years, a home has experienced an average of at least 24 hours of outage annually then it may receive an appliance installation waiver permitting gas/propane appliances. Surely less than 1-2% of PG&E customers are in a similar position with so much electricity downtime, so such a rule would have a negligible impact on the district's goals.

(II)

I do have a secondary observation which perhaps the commission has not considered: there are many of us who have gas/propane furnaces for heating who do not have home air conditioning installed. Those of us in this situation have heretofore simply tolerated the hot weather which has become more frequent due to global warming. But virtually every home furnace heat pump of which I am aware is designed to be run as an air conditioner (cooling system) during warm weather by simple reversal of the pump direction. A heat pump is just an air conditioner running the opposite direction. Surely an unintended consequence of this proposal significantly underestimates the amount of new peak Summer cooling demand which all of these newly installed A/C units will require. That is to say, by mandating electric heat pumps, the district will effectively be mandating that every home have an installed central air conditioner which is likely to be used at the very time that PG&E most wishes to lower peak electricity demand.

Thank you for your consideration,
Daniel Hachigian
San Mateo County homeowner

Jennifer Elwell

From: Dave Clark [REDACTED]
Sent: Thursday, February 2, 2023 7:32 PM
To: Jennifer Elwell
Subject: i support the ban on gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I hope that a ban on the sale of gas-fires residential appliances takes hold in 2030.

Gas Appliances contribute to GHG and emit fumes that are harmful to humans.

I have studied this with others. We need to set 80% EOF in 2030z

Dave Clark
Fossil Free Buildings
San Mateo

Jennifer Elwell

From: David Bezanson PhD [REDACTED]
Sent: Sunday, February 5, 2023 9:44 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. The proposed ruling applies to water heaters and furnaces, which is a good start. Rulings are called for for other methane appliances including fireplace inserts, laundry equipment, air conditioners, stoves, and space heaters. All are subject to leaking fugitive emissions of CH₄ even when not in use. And during operation there is a wider variety of toxics including CO, CO₂, black carbon, NO_x, and PM. Each of these has a GWP and the latter 3 have a GWP that is higher than that of CH₄. In short, establish all-electric building codes for new buildings and for retrofits of existing buildings. Industry has failed to effectively curtail fugitive emissions from its pipeline infrastructure. The short term plan should be to set a standard of 1% or less of CH₄ distributed to consumers. The long term plan should decommission and permanently plug this network.

Burning methane gas in buildings produces toxic nitrogen oxides (NO_x) and harmful indoor air pollution. This proposed zero-NO_x rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM_{2.5} pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

David BezansonPhD

[REDACTED]

[REDACTED]

Santa Cruz, California 95060

Jennifer Elwell

From: David Eichar [REDACTED]
Sent: Wednesday, January 18, 2023 3:27 PM
To: Jennifer Elwell
Subject: Comments on updates to rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I oppose the change in both rule 9-4 and 9-6 Building Appliances for existing residential buildings. We own a single family house, built in 1966. As such, the electrical system is maxed out. Our circuit breaker box is full. We would have to get a new circuit breaker box installed and relocated, even to add one 15 amp, 120 V circuit. We have a 100 amp service from PG&E, which would have to be upgraded, which I understand takes months. Months without hot water is unacceptable. The economic report and draft EIR did not take these additional costs into account.

We are 2 seniors, soon to be retired and as such will be on a fixed income.

David Eichar
Josette Brose-Eichar
[REDACTED]
Sonoma, CA

Jennifer Elwell

From: David Fairley [REDACTED]
Sent: Thursday, January 19, 2023 7:26 PM
To: Jennifer Elwell
Subject: in support of proposed changes to reg 9-4 and 9-6

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I am writing to support the changes the District is proposing for Regs 9-4 and 9-6. In addition to ambient air quality benefits, adoption of these rules will provide health benefits for the home as well. And sizeable benefits for the climate, reducing the use of natural gas, which not only burns to CO₂, but also is largely methane, a greenhouse gas itself. Upstream natural gas leakage doubles the climate impact of NG use in the short term.

Although there are legitimate concerns with equity -- the costs of heat pumps are substantial -- that shouldn't dissuade the District from adopting the rule. Rapid electrification is good public policy. Our elected officials will be able to make it work in a fair way.

These rules are among the most important the District has ever considered. Our society needs to end its natural gas use and electrify as quickly as possible. Natural gas use in buildings is one of the largest contributors to greenhouse gas emissions in the Bay Area and, unlike transportation, is wholly our responsibility to control. Time is of the essence.

Sincerely yours,

David Fairley

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 1:46 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am quite concerned about climate change & air quality.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

In addition to tackling a major source of air pollution, BAAQMD's appliance standard will deliver key climate co-benefits such as

Burning fossil fuels in homes for heating is responsible for [roughly 11%](#) of California's statewide climate emissions. The state cannot meet its climate targets without eliminating this pollution.

Moving to electric appliances like heat pumps – and powering these appliances with renewable energy – is the ticket to zeroing out climate emissions from heating homes entirely.

According to BAAQMD, electrifying Bay Area appliances could reduce climate-warming emissions from appliances [73% by 2046](#) from a 2019 baseline.

Thank you very much.

David F. Gassman

[REDACTED]

Oakland, CA 94610

[REDACTED]

Jennifer Elwell

From: David Luce [REDACTED]
Sent: Monday, February 6, 2023 3:55 PM
To: Jennifer Elwell
Subject: Don't ban natural gas appliances!

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board,

I am completely opposed to any ban on appliances that burn natural gas for the following reasons:

- 1) I believe that Natural gas is a clean burning fuel that is efficient and cheaper to produce than electricity.
- 2) My understanding is that studies being used by BAAQMD to justify the ban on natural gas were not conducted by persons with verified scientific credentials, or based on actual empirical data.
- 3) I believe that the cost of converting a home's heating and hot water from gas to electric will be financially prohibitive for many people.
- 4) We already have rolling blackouts, and I believe that the capacity of our electrical grid will be completely overwhelmed if natural gas is banned.
- 5) During a recent storm we lost our electrical power for more than 30-hours, but thanks to natural gas we were able to cook our meals and we had hot water. This would not be the case if electric power is the only alternative.

I hope that you will not vote to ban natural gas appliances during your March 15th meeting, or during any subsequent meetings.

Very truly yours,
David Luce
Portola Valley, CA

Jennifer Elwell

From: David Luu [REDACTED]
Sent: Friday, February 3, 2023 11:50 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

David Luu

[REDACTED]

[REDACTED]

San Jose, California 95122

Jennifer Elwell

From: Deborah St Julien [REDACTED]
Sent: Friday, February 3, 2023 8:28 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Deborah St Julien

[REDACTED]

[REDACTED]

San Jose, California 95136

Jennifer Elwell

From: Derrick Holt [REDACTED]
Sent: Monday, February 6, 2023 5:32 PM
To: Jennifer Elwell
Subject: I Support Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members

My name is Derrick and I am asking you to support action steps to reduce levels of harmful indoor air pollution. Please support amendments to Rule 9-4 and 9-6 that will reduce NOx emissions from home furnaces and water heaters.

I've been affected by pulmonary challenges, and I have several friends and family members that struggle with asthma. I realize that the Bay Area is failing to meet federal limits for safe levels of ozone pollution, which puts residents' health at risk.

Please help keep the air clean inside and outside by setting strong safeguards for furnaces and water heaters through amendments to Rule 9-4 and 9-6.

--

Derrick Holt
Solar Energy Systems of California

[REDACTED]



Jennifer Elwell

From: Diane Bailey [REDACTED]
Sent: Monday, February 6, 2023 5:00 PM
To: Jennifer Elwell
Subject: Support for Proposed Clean Air Rules 9-4 and 9-4 and Design Guidelines Resources from Peninsula Clean Energy to help avoid Electrical Upgrades Where Possible
Attachments: Whole Home Design Guidelines[1].pdf

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I'm writing to express my strong support for Rules 9-4 and 9-6 to ensure that we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

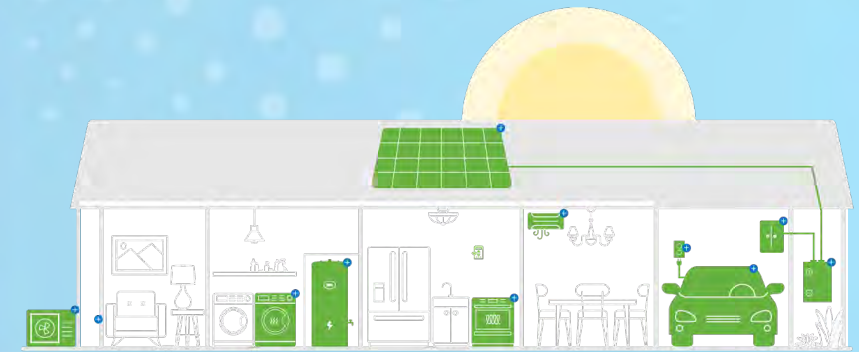
As a parent, scientist, and Bay Area resident, this issue is a top priority for me. Thank you for leading with these important clean air standards.

In addition, I'd like to share these resources created by Peninsula Clean Energy to help home and building owners avoid electrical upgrades where ever possible, when replacing gas heating or water heaters with clean electric models.

Sincerely,
Diane Bailey

Design Guidelines for Whole Home Electrification

Solutions for electrifying homes without
upgrading electrical service capacity



Disclaimer: actual implementation should be
done in consultation with licensed professional

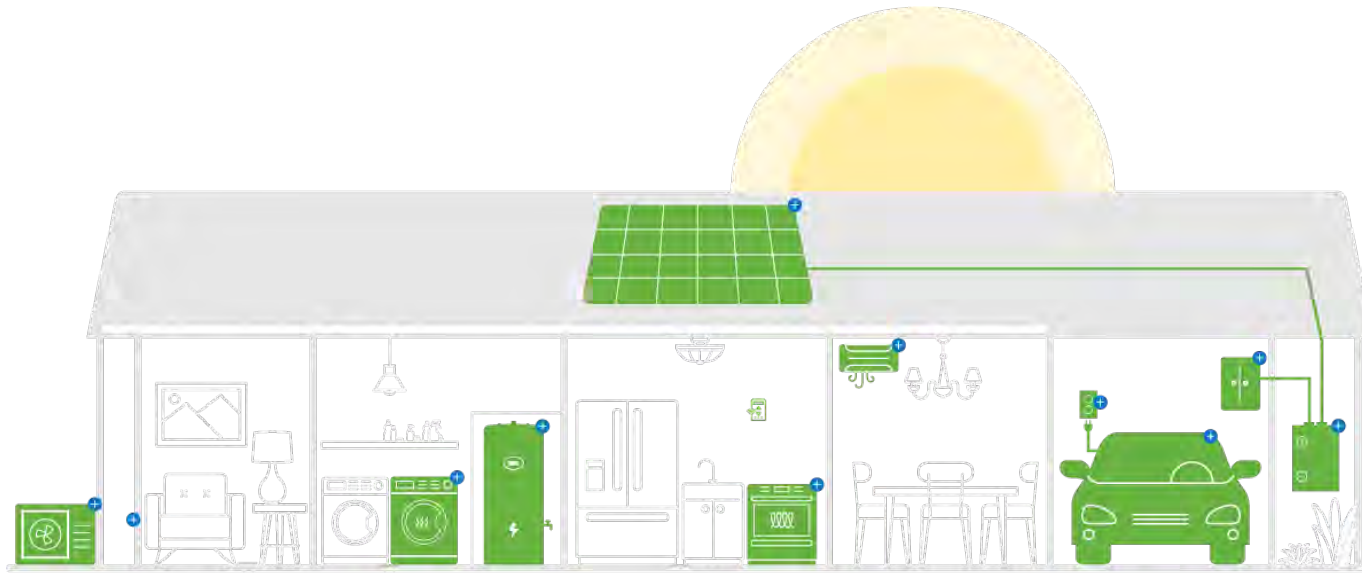
Table of Contents

Contents

1. Background	
• Design guidelines overview	Page 2
• What homes need this guide?	Page 3
• Three reasons panels are replaced	Page 4
• Common Pitfalls	Page 5
2. Going all-electric on 100A	Pages 7-12
3. Going all-electric on 200A	Pages 13-14
4. Equipment examples	
• 120V equipment	Pages 15-24
• 240V, low-watt, equipment	Pages 25-32
• Circuit controllers	Pages 33-37
• Breaker consolidation	Pages 38-41
5. Resources	Pages 42-43



Design Guidelines Overview



When considering total home electrification coupled with EV charging, the total size of the electrical panel and service should be considered to ensure lowest cost of electrification.

This document goes through a host of home types to help homeowner or contractor plan-ahead to enable the all-electric life without forcing a service upgrade.

Nothing Over-abundant

We have not analyzed non-typical, high-load home equipment – home theaters, private tennis courts, crypto mining operations, etc.

Nothing unrealistic

While low-amp strategies, such as combo-washer dryers and 120V EV chargers can be useful in avoiding upgrades, we have used only standard equipment in our examples

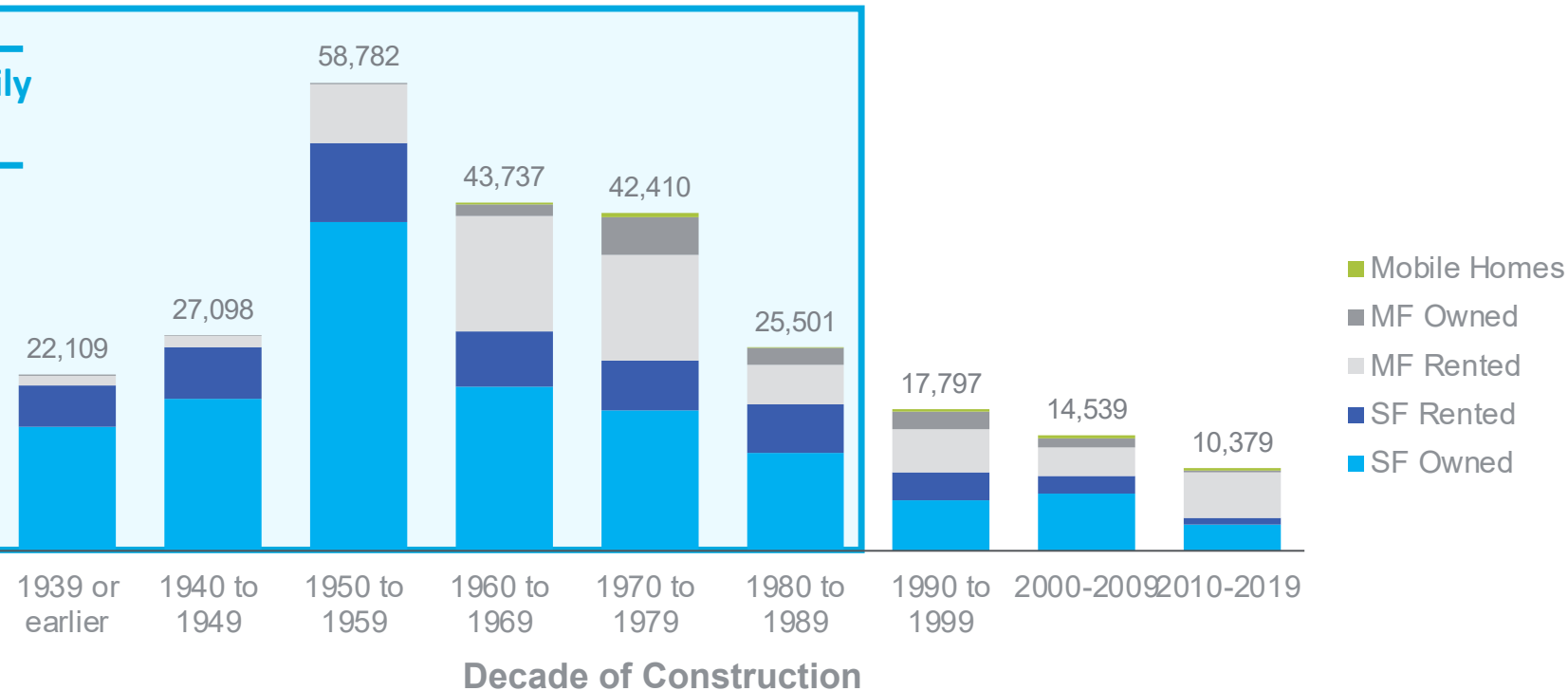
What Homes will Need This Guide?

Number of Households in San Mateo by Vintage, Type, and Tenure

This guide is primarily aimed at single-family homes built before the mid 1980s.

Single-family homes are often built with their own panels, whereas multi-family buildings have shared electrical and mechanical services.

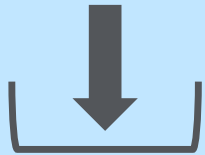
In modern times, homes are built with 200A service – more than enough capacity to go all-electric with ease. This changed sometime in the 1980s. Older homes, which represent a majority of San Mateo County’s housing stock, will benefit most from this guide.



Three Reasons Panels are Replaced

Capacity Constrained

Capacity, measured in Amps, is too low to add equipment



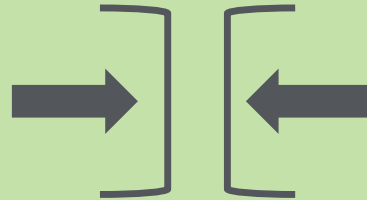
Max. 100A

Solutions to avoid upgrade:

- Circuit splitters
- Circuit pausers
- Smart panel
- Low-amp equipment

Space Constrained

There are no longer spare breaker spaces in the panel



Solutions to avoid upgrade:

- Subpanels
- Circuit splitters
- Smaller breakers
- Breaker re-use

Unsafe to Use

The panel is unsafe to work on, sometimes found on panels from the 1970s or earlier



Solutions to avoid update:

The panel must be replaced for your safety. However, it may be worth avoiding a service upgrade using solutions for capacity-constrained panels, and planning ahead by providing breaker space for an all-electric life.

Common Pitfalls

There are common mistakes that owners make while electrifying homes and vehicles which could result the need to upgrade the panel at a later date. While planning ahead is the best strategy, these issues have been identified as the most likely to create a need for a service upgrade at a later date:

Pools and Spas

Adding a heated pool or spa will often result in a 200A service size requirement by the time a house is fully electrified

Consider circuit sharing or pausing

Separate Oven & Cooktop

Due to the increased load and wiring needs of separate units, separating your range into two components will often require a complicated electric design or an upgrade above 100A service.

Consider buying a combination range

60-80A EV Charging

Including high-capacity EV charging will require careful design to stay under 100A.

Consider lower capacity home EV chargers, or a circuit pauser. (simple switch make a pauser up to the higher level?)

Multiple EV Charging Circuits

Including multiple Level 2 EV charging stations may require multiple instances of circuit sharing to enable total electrification on 100A panels.

Consider circuit sharing or L1 charging

Going All-Electric on 100A

Solutions for homes with safe panels,
limited by 100 Amp service capacity

Typical Pre-1985 Single Family up to 2,800 sqft, up to 4-ton Heat Pump

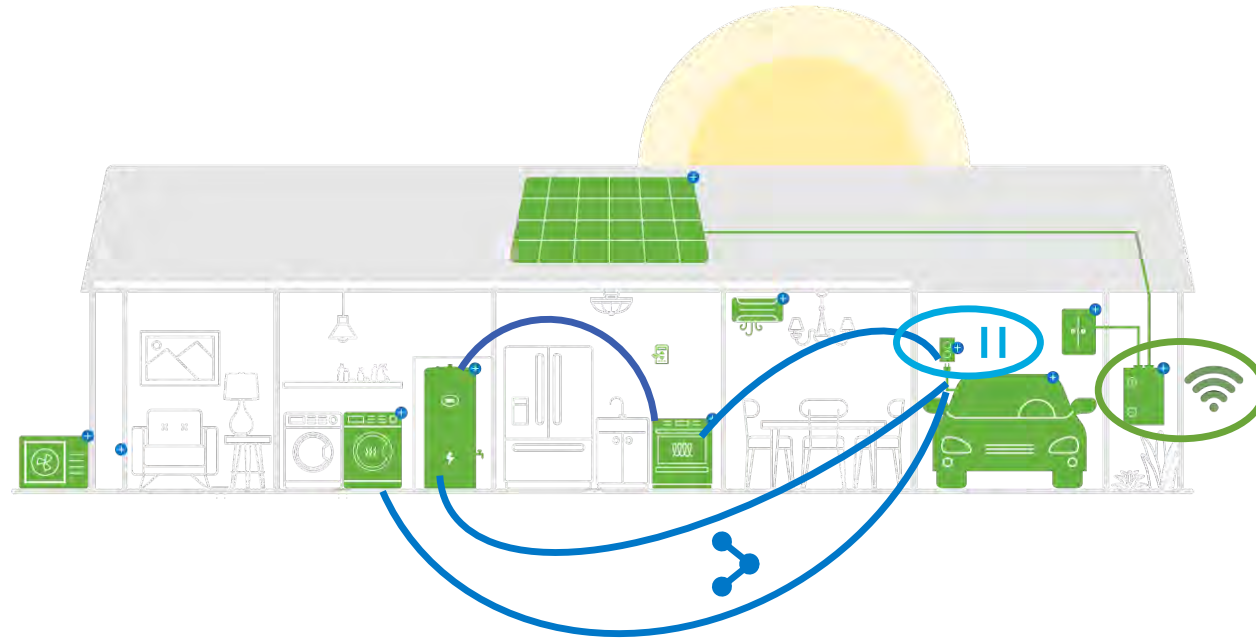
Home description:

- Up to 2,800 sqft
- 100A service and panel
- No pool or spa
- Slide-in range/oven combo
- One (1) 4-ton heat pump space heater

Summary:

It is relatively easy to electrify the typical single-family home up without upgrading above 100A service.

Focusing on circuit controls for EV charging is the easiest path to avoiding an upgrade.



Option 1

Control



Use a circuit pauser on the Level 2 EV charger

Option 2

Control



Use a **circuit-sharing** device with

- EV charger + range
- EV charger + water heater
- EV charger + clothes dryer
- Range + water heater

Option 3

Control



Use a smart panel

Typical Pre-1985 Single Family up to 3,400 sqft, 5-ton Heat Pump

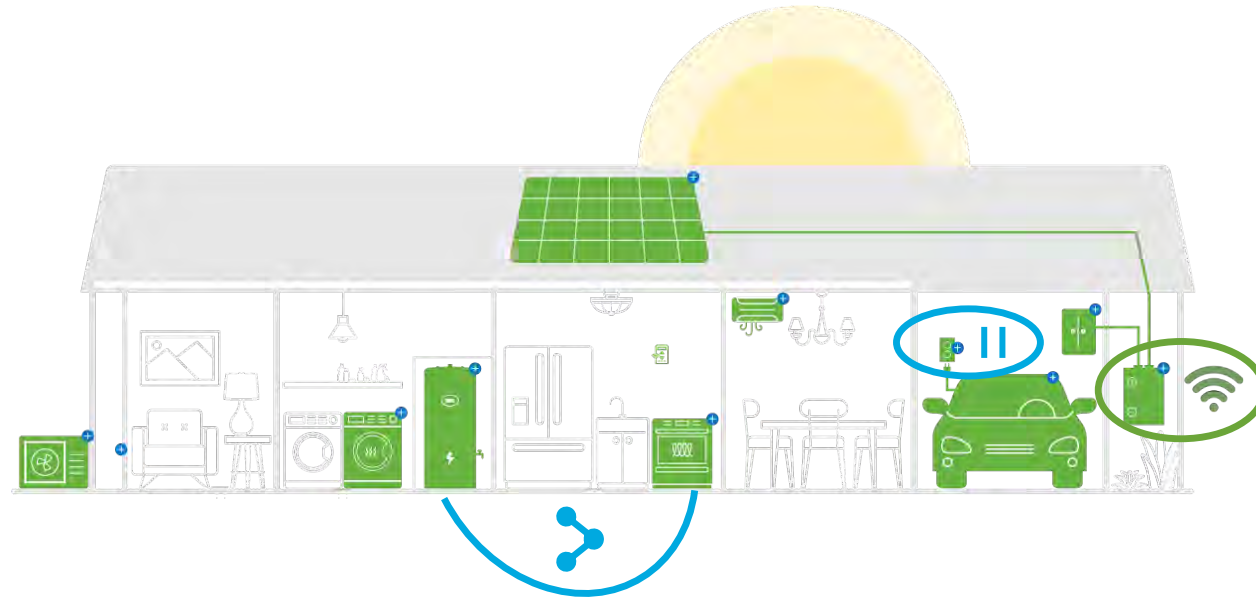
Home description:

- Up to 3,400 sqft
- 100A service and panel
- No pool or spa
- Slide-in range/oven combo
- One (1) 5-ton heat pump space heater

Summary:

It is relatively easy to electrify the typical single-family home up without upgrading above 100A service.

Larger homes or a larger, 5-ton space heater in a large home, will need two circuit controls



Option 1

Control 1



Use a circuit pauser on the Level 2 EV charger

Control 2



Use a circuit-sharing device with the Range and water heater

Option 2

Control



Use a smart panel

Typical Pre-1985 Single Family up to 2,500 sqft with Two (2), 3-Ton Condensing Units

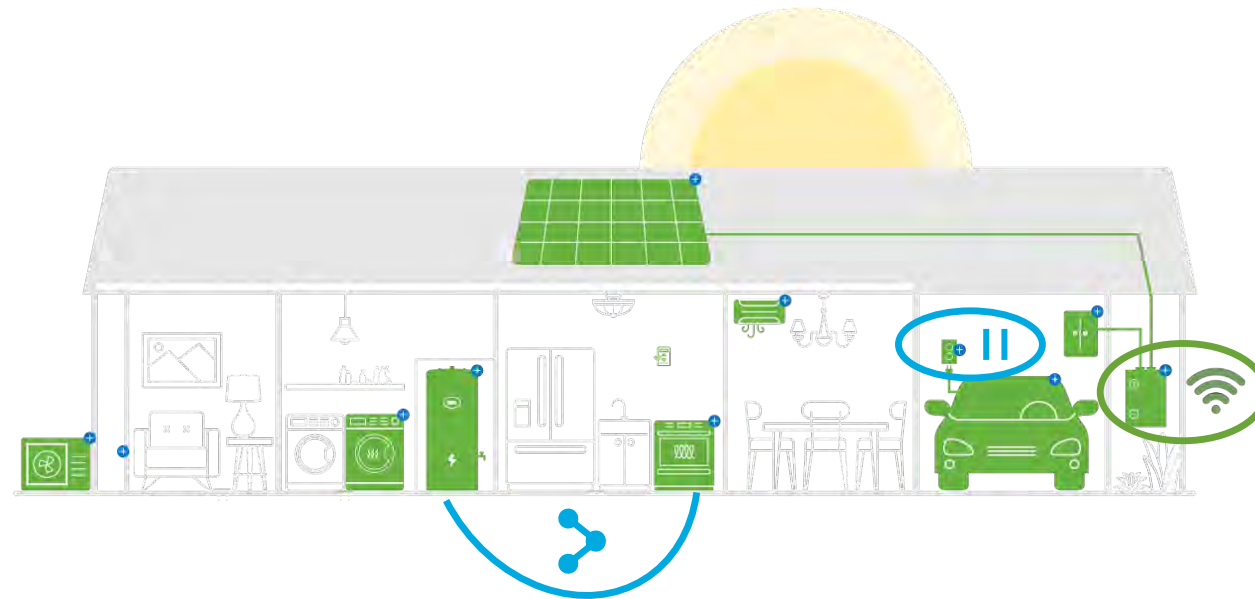
Home description:

- Up to 2,500 sqft
- 100A service and panel
- No pool or spa
- Slide-in range/oven combo
- Two (2) 3-ton heat pump space heater

Summary:

It is relatively easy to electrify the typical single-family home up without upgrading above 100A service.

Homes with two (2) 3-ton condensing units will need two circuit controls.



Option 1

Control 1



Use a circuit pauser on the Level 2 EV charger

Control 2



Use a circuit-sharing device with the Range and water heater

Option 2

Control



Use a smart panel

Staying under 100A with a Split Oven / Cooktop

Why the Split Oven /Cooktop can be difficult:

Cooking equipment tends to demand the highest electric demand in a an all-electric home. Combination, slide-in ranges are able to load share within the unit to ensure that the panel never sees a draw higher than roughly 8 kilowatts. Separate units are not yet capable of integrated power management across appliances. Circuit sharing between the two cooking appliances is also not an option – ovens and cooktops are often used in the same meal prep.

Make a decision on your home’s priorities:

If you have not already installed the separate appliances, is the separation a priority for you? It may be, but it will make electrification harder. If they are already separate, would you consider combining the two during a renovation? Is your kitchen built such that it is easy to combine these units?

How important is it for you to stay on your current 100A service? Is your electric service underground? If so, there is a cost component. Are there future renovations you are considering that would benefit from more service? An Accessory Dwelling Unit (ADU,) a heated pool, a spa?

I still want separate units, and I still want to stay under 100A

This is possible, but will require long-term planning and a skilled electrician. Two circuit controllers and a smart panel will be required. The square footage and electric draw of your space heating systems will also play a critical role. See the table below for example homes which can go all-electric, with two circuit controllers as listed to the right, based on maximum square footage and heat pump size. These are merely examples, and specific and precise calculations will be required to see what is possible at your particular home.

Oven kW	Range kW	Max Square Footage	Max Heat Pump Tonnage
8,000	7,600	3,200 sqft	3 tons
8,000	7,600	2,200 sqft	4 tons
8,000	11,600	1,800 sqft	3 tons

Working draft as of 2/6/2025

Option 1

Control 1



Use a circuit pauser on the Level 2 EV charger

Control 2



Use a circuit-sharing device with the Range and water heater

Option 2

Control

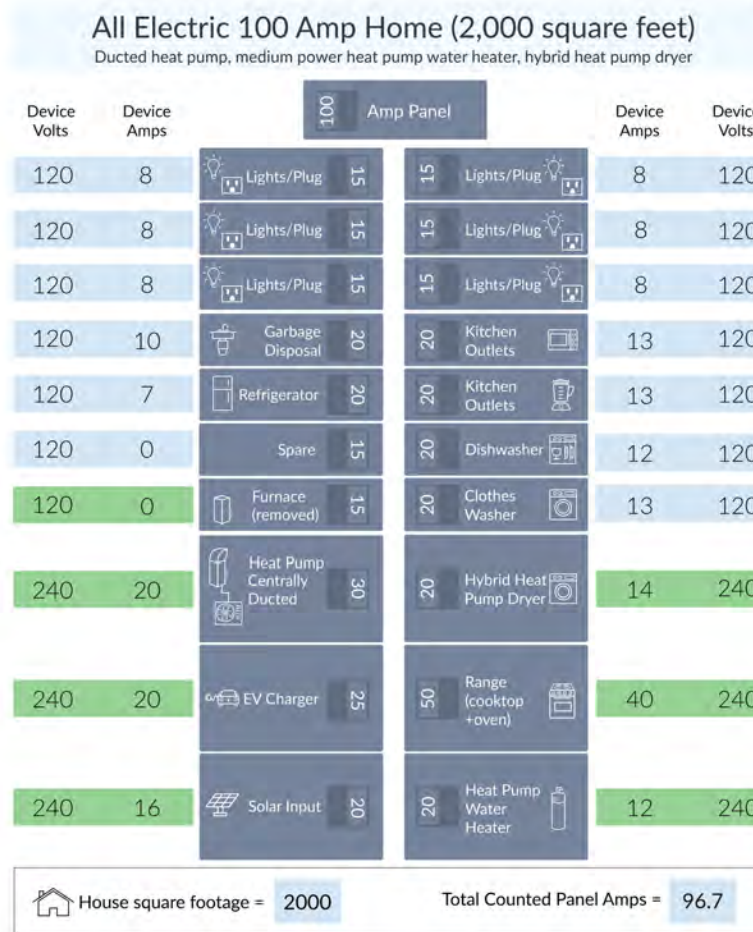


Use a smart panel

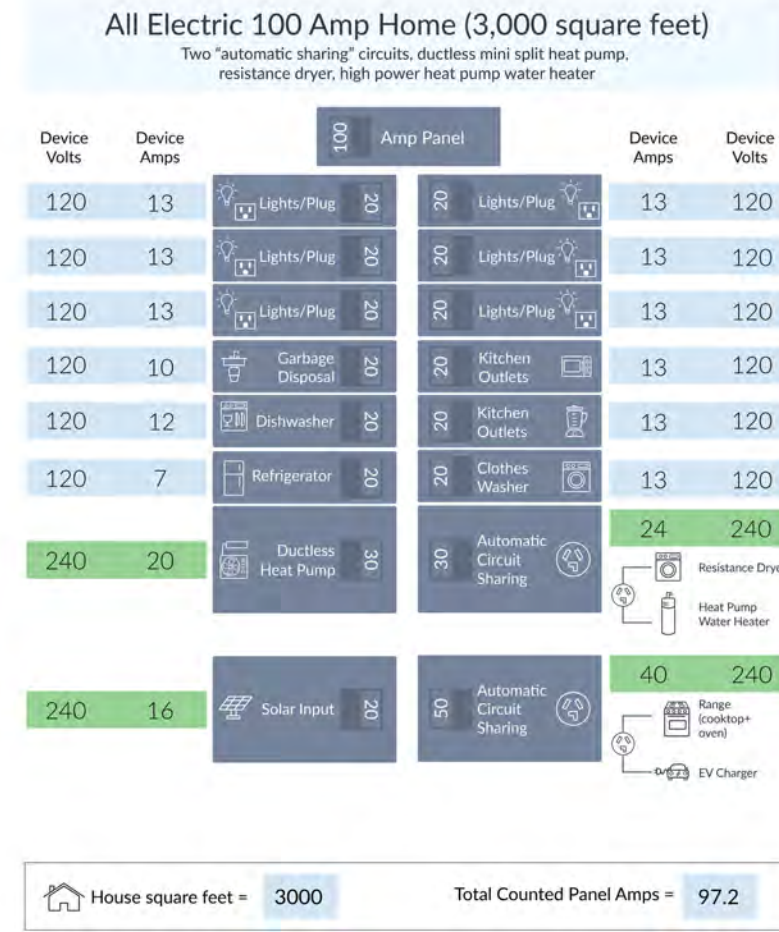
Watt Diet Examples (Courtesy Redwood Energy)

Redwood Energy and San Mateo County resident, Tom Kabat have pioneered work in the field of retrofit electrification without service upgrades, a strategy they have coined the “Watt diet.”

The two examples to the right display panel layouts for full electrification of 100A homes, with typical quality appliances, at both 2,000 and 3,000 sqft of home area.



- Additional House Information**
- 4 occupants
 - EV charging up to 19 miles/hr
 - Located in California climate zone 3 (SF Peninsula)
 - Some insulation
 - 38,000 Btu/h heating and cooling
 - 60-80 gallon heat pump water heater
 - 4-burner induction or standard electric range
 - 7.4 cu. foot hybrid heat pump dryer
 - A 20-amp circuit will support a 3.8 kW inverter. (Many 3.8 kW inverters can support up to a 5.8 kW solar array depending on inverter load ratio)



- Additional House Information**
- 4-6 occupants
 - EV charging up to 38 miles/hr
 - Located in California climate zone 3 (SF Peninsula)
 - Some insulation
 - 48,000 BTU heating and cooling
 - 40-80 gallon heat pump water heater
 - 4-burner induction or standard electric range
 - 7.4 cu. foot standard resistance dryer
 - A 20-amp circuit will support a 3.8 kW inverter. (Many 3.8 kW inverters can support up to a 5.8 kW solar array depending on inverter load ratio)

Going All-Electric on 200A

Solutions for larger homes or homes
with heated pools and spas

200A Single Family up to 5,000 sqft, with a Heated Pool

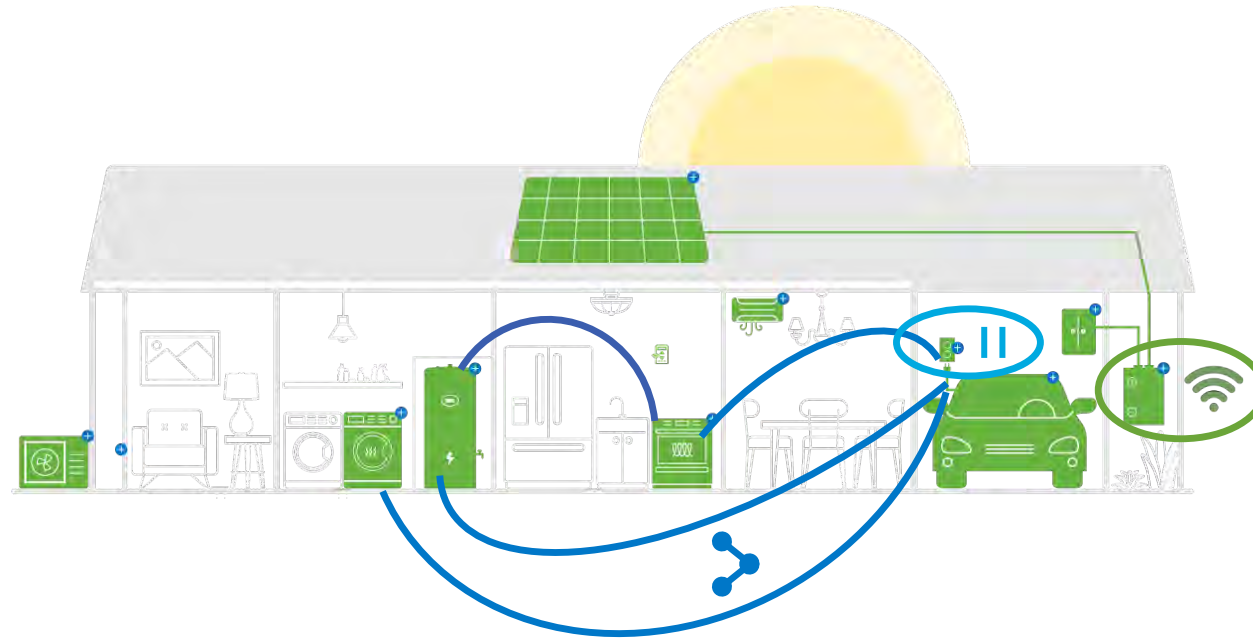
Home description:

- Up to 5,000 sqft
- 500A service and panel
- Heated pool or spa
- Slide-in range/oven combo
- Two (2) 3-ton heat pump condensing units

Summary:

It is relatively easy to electrify the typical single-family home up without upgrading above 200 service.

One circuit control or smart panel may be necessary in larger homes.



Option 1

Control



Use a circuit pauser on the Level 2 EV charger

Option 2

Control



Use a **circuit-sharing** device with
EV charger + range
EV charger + water heater
EV charger + clothes dryer
Range + water heater

Option 3

Control



Use a smart panel

Equipment Examples

Example technologies to electrify
without upgrading panels

120V Equipment Examples

120V technologies can save energy, save costs, avoid the need to call an electrician, and reduce the impact on the local workforce

Plug-in Heat Pump Water Heater (15A, 120V)



**Professional Prestige
Hybrid**
50, 65 and 80-Gallon Capacities
208-240 Volt / 1 PH
Electric

New to the market in 2021, low amp heat pump hot water heaters do not require a circuit upgrade and plug right into a normal 120V outlet.

Pros	Avoids infrastructure upgrade, no electrician needed
Cons	Reduced capacity (12,000 BTUh)
Market Readiness	Available from 1 manufacturer
Which Customer Types is This Applicable for?	Residential customers with 1 bedrooms or less, as well as commercial with low hot water demand, such as retail or office.
How Many Amps Does it Save?	30A
Co-Benefits	None
Customer Experience	Equal, unless a household of 4 or more
Incremental Cost	Incremental cost equivalent on equipment, savings on electric capacity.
Training Opportunities / Issues	Not well-tested. Released in 2020.
Hyperlink	Not yet available

120V Heat Pump Space Heaters



120V heat pump space heaters provide efficient heating, low-to-no installation costs, and avoid the need for a dedicated 240V circuit.

Pros	Avoids infrastructure upgrade, no electrician needed
Cons	Reduced capacity (12,000 BTUh)
Market Readiness	Available from a few manufacturers
Which Customer Types is This Applicable for?	Residential customers who want to save money on their heat pump installation, want low electricity costs, and do not mind the aesthetics
How Many Amps Does it Save?	30A
Co-Benefits	None
Customer Experience	Increased noise
Incremental Cost	Savings on equipment, ,installation, and savings on electric capacity.
Training Opportunities / Issues	Market experience needed for the newer products.

Level 1 EVSE



Source: [ClipperCreek](#)

Level 1 chargers have a slower charge rate than level 2 chargers, but do not necessitate a dedicated circuit

Pros	Avoids need for dedicated circuit for EVSE
Cons	Slower charging rate than level 2 equipment
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with electric vehicles
How Many Amps Does it Save?	30A
Co-Benefits	None
Customer Experience	Potentially less convenient than level 2 EVSE
Incremental Cost	\$0. Less expensive than level 2 EVSE
Training Opportunities / Issues	None
Hyperlink	https://store.clippercreek.com/level1/level-1-12-amp-ev-charging-station-ac-15

Combo Condensing Washer/Dryer



Source: [LG](#)

Installing these units is a simple way to reduce amperage and save breaker poles at the panel. It is recommended to use the larger capacity 4.5 cu. ft. unit.

Pros	Space-efficient, ventless design
Cons	Longer drying time, reliability (?)
Market Readiness	Models available from several manufacturers
Which Customer Types is This Applicable for?	Residential customers with modest laundry needs, especially those with space restrictions
How Many Amps Does it Save?	30A. Rated for 10A, but since it plugs into 120V circuit there is no need for a dedicated circuit and breaker
Co-Benefits	None for condenser dryer types, heat pump dryer types are gentler on clothes
Customer Experience	Reported reliability problems with combo units in general, longer drying times
Incremental Cost	\$0. This unit listed at \$2000 which is generally comparable to buying separate units
Training Opportunities / Issues	Simpler to install than typical setup, can be used anywhere that has water hook-up and 120V power
Hyperlink	https://www.lg.com/us/washer-dryer-combos/lg-LUWM101HWA-washer-dryer-combo-lgsignature

Countertop Microwave



Source: [Breville](#)

Microwaves on dedicated circuits can be replaced with countertop models with the same functionality, resulting in a free 20A circuit

Pros	Does not require a dedicated circuit, can be put away when not in use
Cons	Takes up counter space, doesn't have venting capabilities of over-the-range models.
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with microwaves on a dedicated circuit
How Many Amps Does it Save?	20A
Co-Benefits	None
Customer Experience	Same as built-in microwave
Incremental Cost	\$0
Training Opportunities / Issues	None
Hyperlink	https://www.breville.com/us/en/products/microwaves/bmo650.html

Electric Kettle



Source: [Bodum](#)

Substituting instant hot water devices with electric kettles is a straightforward way to reduce the amount of panel space dedicated to kitchen equipment.

Pros	Frees up amps by transferring equipment to plug load, kettle can serve multiple purposes
Cons	Less streamlined solution for those who want hot water in their sink
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with instant hot water devices
How Many Amps Does it Save?	20A
Co-Benefits	None
Customer Experience	See pros and cons
Incremental Cost	\$30
Training Opportunities / Issues	None
Hyperlink	https://www.bodum.com/us/en/11883-57us-melior?__store=us_en

Countertop Induction Hot Plate



120V induction hot plates may be the right solution for smaller kitchens. They save space, increase useable counterspace, and can easily be stored.

Pros	Does not require a dedicated circuit, can be put away when not in use
Cons	Requires storage
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with no space for a range, or with electric resistance range that want an induction option for some meals
How Many Amps Does it Save?	20A
Co-Benefits	None
Customer Experience	Top notch
Incremental Cost	\$0
Training Opportunities / Issues	None

120V Electric Fireplaces



Electric fireplaces are good solutions for guest rooms or offices, where heating may rarely be needed. While they do not provide heat pump capability to increase efficiency, they do provide ambience and ease of installation.

Pros	Does not require a dedicated circuit, can be put away when not in use
Cons	Higher energy cost than heat pump, does not put off as much heat as a fossil fuel or wood-burning fireplace
Market Readiness	Readily available
Which Customer Types is This Applicable for?	Customers who want the ambience of a fireplace and may not use much heat in the associated room or space
How Many Amps Does it Save?	20A
Co-Benefits	Ambience
Customer Experience	Medium
Incremental Cost	\$0
Training Opportunities / Issues	None

120V Plug and Play Hot Tub



Plug and play hot tubs are efficient, easy to install, and provide a relaxing experience. 120V hot tubs take longer to warm up, but provide the same level of experience as a 240V hot tub at a fraction of the cost.

Pros	Does not require a dedicated circuit
Cons	Takes longer to heat up to temperature, cannot operate high pressure jets and heater simultaneously
Market Readiness	Readily available
Which Customer Types is This Applicable for?	Customers who want a hot tub without calling an electrician
How Many Amps Does it Save?	20A
Co-Benefits	Peace, comfort, relaxation, and muscle relief
Customer Experience	Medium
Incremental Cost	Saves money
Training Opportunities / Issues	None

240V, Low-Watt, Equipment Examples

Low watt, 240V technologies can provide amenities above 120V while avoiding the high power use associated with typical 240V equipment.

Low-Amp Heat Pump Water Heater (15A, 240V)



New to the market in 2020, low amp heat pump hot water heaters provide similar efficiency and form factor to 30A units, while avoiding costly electric upgrades.

Pros	Avoids infrastructure upgrade
Cons	Half the recovery in GPH in first hour as compared to 30A unit (16 gallons)
Market Readiness	Available from 1 manufacturer
Which Customer Types is This Applicable for?	Residential customers with 2 bedrooms or less, as well as commercial with low hot water demand, such as retail or office.
How Many Amps Does it Save?	15A
Co-Benefits	None
Customer Experience	Equal, unless a household of 4 or more
Incremental Cost	Incremental cost equivalent on equipment, savings on electric capacity.
Training Opportunities / Issues	Not well-tested. Released in 2020.
Hyperlink	https://s3.amazonaws.com/WebPartners/ProductDocuments/B68404C8-F5F0-4033-A295-761DCACBBE05.pdf

Slide-In Induction or Electric Range



Source: [LG](#)

Modern induction ranges with power management functionality have lower breaker requirements than traditional models. Manufacturers include: Samsung, GE, LG, and Children Frigidaire.

Pros	Energy efficiency, improved cooking dynamics and ease of cleaning
Cons	None
Market Readiness	Readily available from multiple manufacturers
Which Customer Types is This Applicable for?	Customers with slide-in ranges
How Many Amps Does it Save?	20A-40A
Co-Benefits	Improved indoor air quality
Customer Experience	Same as other units
Incremental Cost	\$0 versus comparable product.
Training Opportunities / Issues	None
Hyperlink	https://www.lg.com/us/cooking-appliances/lg-LSE4616ST-electric-range

Level 2 EVSE Downsizing



Hardwired

Source: [ClipperCreek](#)

Level 2 charging equipment is available at a range of different amperages. Customers may consider downsizing their charging equipment to allow space for other electrical needs

Pros	Frees up panel capacity
Cons	Slower charge rate than higher-amp equipment
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with electric vehicles, especially those that have access to EV charging during the day
How Many Amps Does it Save?	30A, if downsizing from 50A to 20A breaker (see pt. 2)
Co-Benefits	None
Customer Experience	Adequate charging capacity for many EV owners
Incremental Cost	\$0
Training Opportunities / Issues	None
Hyperlink	https://store.clippercreek.com/lcs-15-12-amp-level-2-charging-station

Level 2 EVSE Downsizing, Pt. 2

Required Circuit / Breaker Rating	Charger Amperage	Estimated Driving Range Added Per Hour of Charging
20A	16A	12 mi (19 km)
30A	24A	18 mi (29 km)
40A	32A	25 mi (40 km)
50A	40A	30 mi (48 km)
60A	48A	36 mi (58 km)
70A/80A	50A	37 mi (60 km)

Source: [chargepoint](#)

Range of popular EV models:
Tesla Model 3: 315 miles
Nissan Leaf: 150 miles
BMW i3: 153 miles

Conservative estimate for overnight charging: 8 hours

During an overnight charge, a 16A charger will provide 96 miles of range while 40A charger will provide 240 miles of range.

By saving 30A of panel capacity, a customer can expect to lose about 144 miles of daily range regeneration.

This is less of a sacrifice for customers that have access to EV charging during the day, or for those that own EV's with a shorter range.

High-SEER Heat Pump Condensing Unit



Source: [Mitsubishi Electric](#)

Customers may be able to downsize the breaker for their condensing unit by upgrading to a high-SEER heat pump model

Pros	Energy efficient, allows for retirement of gas furnace
Cons	None
Market Readiness	Widely available, mature technology
Which Customer Types is This Applicable for?	Customers with older or inferior condensing units
How Many Amps Does it Save?	10A
Co-Benefits	None
Customer Experience	No difference
Incremental Cost	\$1500
Training Opportunities / Issues	None
Hyperlink	http://www.mylinkdrive.com/usa/Ventilation/LOSSNAY_ERV/RVX_Series/LGH_F300RVX_E?product

Working draft as of 2/6/2023

Combo Air-to-water Heat Pump



Source: [Daikin](#)

Air-to-water heat pumps offer a highly efficient turnkey solution for space conditioning and hot water needs in residential buildings. A single outdoor unit provides HVAC and hot water.

Pros	Compact design, energy-efficient, water heating and space conditioning functionality in one unit
Cons	Cost is currently not known
Market Readiness	Options available from several manufacturers, though not commonly used in the US
Which Customer Types is This Applicable for?	Customers with hydronic distribution systems (Chiltrix claims it can work with central forced air??)
How Many Amps Does it Save?	25A fuse recommended for outdoor unit
Co-Benefits	Air-to-water heat pumps offer a highly efficient turnkey solution for space conditioning and hot water needs in residential buildings. A single outdoor unit provides HVAC and hot water
Customer Experience	If used appropriately, same as separate heat pumps for space conditioning and DHW
Incremental Cost	Unknown
Training Opportunities / Issues	Uncommon design, possible contractor issues
Hyperlink	https://www.daikinmea.com/en_us/product-group/air-to-water-heat-pump-low-temperature/daikin_altherma_3.html

Energy Recovery Ventilation



Source: [Mitsubishi Electric](#)

Especially in homes that have undertaken envelope upgrades, ERV systems can allow for downsizing of HP capacity

Pros	Improves energy efficiency of HVAC system as a whole, can allow for downsizing HVAC equipment
Cons	Less benefit for homes with poor air sealing
Market Readiness	Available from multiple manufacturers
Which Customer Types is This Applicable for?	Customers that are also considering installing a heat pump
How Many Amps Does it Save?	5A, see notes
Co-Benefits	Improved indoor air quality
Customer Experience	Improved comfort
Incremental Cost	\$675
Training Opportunities / Issues	Mature technology, but not especially common in the United States
Hyperlink	http://www.mylinkdrive.com/usa/Ventilation/LOSSNAY_ERV/RVX_Series/LGH_F300RVX_E?product

Circuit Controllers

Circuit controllers can uncompromisingly leverage typical 240V equipment while avoiding panel upgrades.

Smart Panels



Source: [Leviton](#)

Loads can be prioritized to ensure that panel capacity is not exceeded. These products also present a slew of co-benefits

Pros	Can control which loads interface with battery at any given time, provides granular info about electricity usage
Cons	Large initial investment for early retirement scenarios
Market Readiness	Emerging technology, new in 2019. Electrical codes are a barrier for electrification benefits
Which Customer Types is This Applicable for?	Any customer with an electrical panel
How Many Amps Does it Save?	No outright reduction potential with current electrical codes
Co-Benefits	TOU optimization, Avoided cost of additional controls and monitoring for customers considering battery storage.
Customer Experience	Emerging technology without substantial track record
Incremental Cost	\$500-\$3,000 over standard panel, less if considering PLP upgrade as baseline
Training Opportunities / Issues	Necessary contractor training will depend on manufacturer/equipment in question
Hyperlink	https://www.leviton.com/en/products/residential/load-centers

Circuit Sharers



Source: [BSA Electronics](#)

These devices allow a customer to share two 30A, 40A, or 50A devices on a single circuit

Pros	Allows for double duty from single 30A, or 50A outlet
Cons	Cannot utilize both pieces of equipment at once. Requires nearby location for easy wiring
Market Readiness	Available from multiple manufacturers
Which Customer Types is This Applicable for?	Customers with electric vehicles and electric dryer units
How Many Amps Does it Save?	50A
Co-Benefits	Some units provide additional safety by including a breaker within the device
Customer Experience	Alleviates need for installing additional circuit or regularly plugging and unplugging dryer
Incremental Cost	\$200-\$400
Training Opportunities / Issues	None
Hyperlink	https://www.bsaelectronics.com/collections/dryer-buddys

Circuit Pausers

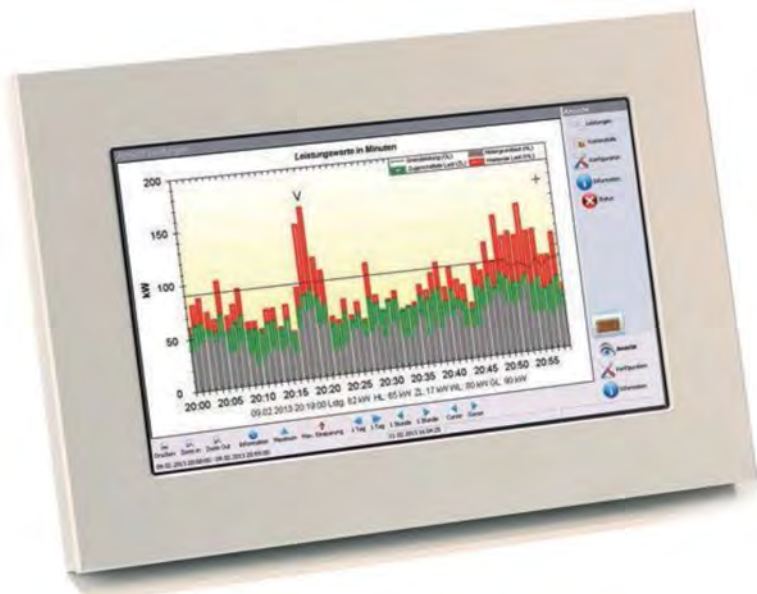


Source: [Simple Switch](https://simpleswitch.io)

Circuit pausers read the instantaneous electric demand of the entire home, then discontinue use of the associated appliance when peak load is measured

Pros	High savings on panel capacity
Cons	Uncommon in practice, may need innovate electrician
Market Readiness	Available from multiple manufacturers
Which Customer Types is This Applicable for?	Customers with electric vehicles, or other electric equipment, who are close to capacity on their appliance
How Many Amps Does it Save?	Up to 50A
Co-Benefits	
Customer Experience	
Incremental Cost	\$750-\$1,750
Training Opportunities / Issues	None
Hyperlink	https://simpleswitch.io/collections/all

Commercial Kitchen Smart Circuits



Source: [Bodum](#)

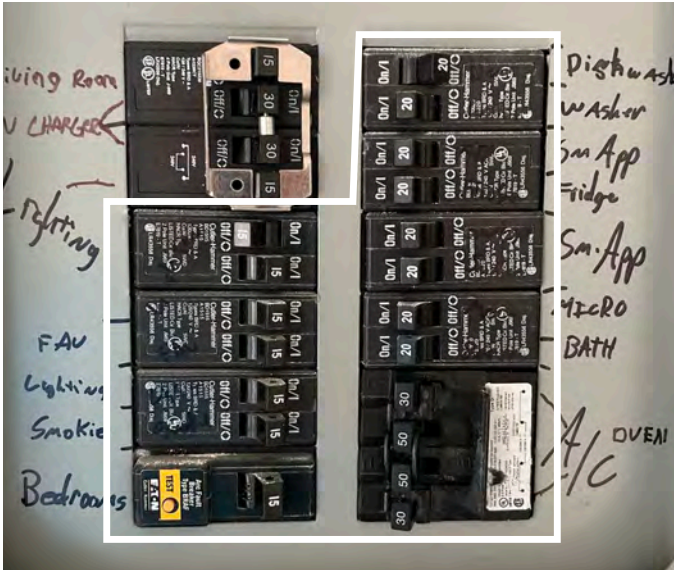
European smart circuit systems are capable of reducing connected loads by up to 50%. Micro-second control allows power to be shared between kitchen equipment.

Pros	Reduced peak loads, peak demand, and ampacity without impacting cooking temperatures and process.
Cons	Not available in US market as of 12/30/2020
Market Readiness	Not available in US market. Market ready for years in Europe. Requires UL listing.
Which Customer Types is This Applicable for?	Commercial kitchens
How Many Amps Does it Save?	200A
Co-Benefits	Opportunity for demand response programs
Customer Experience	Same as typical design
Incremental Cost	Unknown
Training Opportunities / Issues	Yes
Hyperlink	

Breaker Consolidation

Space constrained breakers can benefit from breaker consolidation strategies.

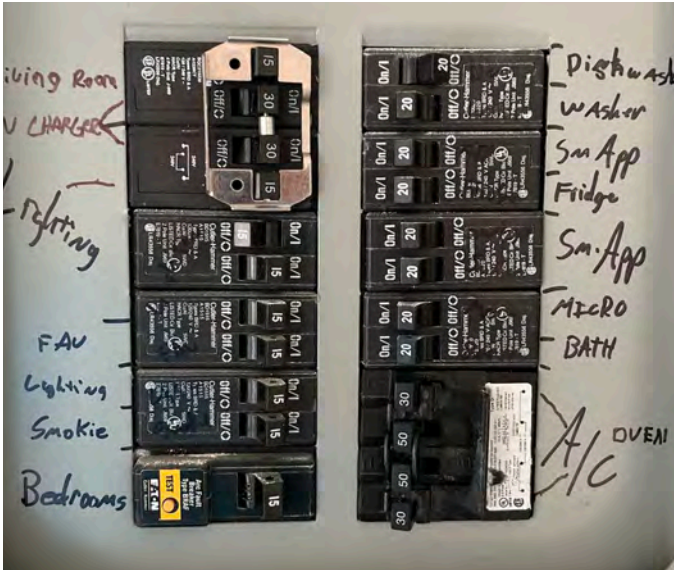
Skinny Breakers



Thinner breakers enable two circuits in the space that may have been reserved for a single breaker. This can essentially double the available breakers per vertical panel-inch.

Pros	Avoids infrastructure upgrade, can avoid panel replacement, aesthetic benefit to only one panel.
Cons	N/A
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with spare service capacity but limited on breaker space in the panel
How Many Amps Does it Save?	0
Co-Benefits	None
Customer Experience	Equal
Incremental Cost	Negligible
Training Opportunities / Issues	N/A

Slot management



Slot management requires a whole-panel approach by the electrician, to determine how to best use space. Treating a panel like a jigsaw puzzle can avoid the need for a new panel.

Pros	Avoids infrastructure upgrade, can avoid panel replacement, aesthetic benefit to only one panel.
Cons	N/A
Market Readiness	Widely available
Which Customer Types is This Applicable for?	Customers with spare service capacity but limited on breaker space in the panel
How Many Amps Does it Save?	0
Co-Benefits	None
Customer Experience	Equal
Incremental Cost	Negligible
Training Opportunities / Issues	N/A

Radiant Baseboard Re-Capture



Customers with other means of space heating may consider retiring their radiant heaters. This a straightforward way to free up panel capacity and a breaker space

Pros	Costs nothing, frees up a breaker space
Cons	Customer must have other means of heating
Market Readiness	N/A
Which Customer Types is This Applicable for?	Customers with radiant heating on a dedicated circuit
How Many Amps Does it Save?	20A per circuit
Co-Benefits	None
Customer Experience	Increased comfort if replaced with heat pump
Incremental Cost	None
Training Opportunities / Issues	None
Hyperlink	N/A

Resources

Space constrained breakers can benefit from breaker consolidation strategies.

Other Resources

[All-electric retrofit guides](#) and the **Watt Diet calculator** from Redwood Energy:
<https://redwoodenergy.net/all-electric-retrofits/>

[Smart grid technologies](#) — Rewiring America

[Load sharing & related devices](#) — Canary Media

[PG&E class on How to electrify without upgrading your panel](#)

[Building Electrification Institute](#)

Electrification Retrofit Consultants & Contractors in California

There are many, but here are a few to get you started:

- [All-Electric California](#)
- [Electrify My Home](#)
- [QuitCarbon](#)
- and many others at the **Switch Is On Contractor Directory:**
<https://switchison.cleaneergyconnection.org/>

Jennifer Elwell

From: Diane Perrone [REDACTED]
Sent: Monday, February 6, 2023 3:08 PM
To: Jennifer Elwell
Subject: Ban of gas appliances! No!

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To the Bay Area Air Quality Management District. Once again, my husband and I find this type of action on removing gas appliances to be fearmongering, over reach of power and another unnecessary regulation. Let the market and people lead their own way and make their decisions that work best for them. Americans have always had choices but little by little our choices are being taken away. The cost is an issue with upgrading electrical panels, permits and you know there will be hidden cost on everything. To say that costs "Could" go down with "incentives".....(Don't hold your breath!) is definitely a far reach. In the long run we the American tax payers pay for all these environmental actions, which are getting way out of hand. Lets stop giving our freedom away! Thank you and sincerely, Diane and Sett

Jennifer Elwell

From: Don Jackson [REDACTED]
Sent: Monday, February 6, 2023 3:16 PM
To: Jennifer Elwell
Subject: Proposed ban on home furnaces and water heaters that emit nitrogen oxides

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Honorable Bay Area Air Quality Management District board members,

I strongly support the proposed ban on gas furnaces and water heaters.

It is crucial and imperative that we begin the transition away from all use of natural gas, and prohibiting the installation of NEW gas furnaces and water heaters is an important first step.

I first learned of the environmental and health impacts of natural gas when I served as a commissioner on the Palo Alto Utilities Advisory Commission, and as a consequence, became a proponent of electrification.

In order to "practice what I preach" and "lead by example", I vountarily undertook the total electrification of my home, which is now complete, and I have since disconnected from the CPAU gas utility.

My all-electric heat-pump-water-heater and heat-pump-HVAC units perform just as well (and in some cases, better!) than the gas-powered units they replaced, and my new induction (electric) cooktop is every bit as good as the gas cooktop I used previously.

As part of my electrification projects, I added the ability to monitor and measure the real-time demand/load of each electrical circuit in my home and my experience and data demonstrate that the additional demands that electric water heaters and HVAC systems are easily managable, and not nearly as impactful/alarming as some suggest.

Given the timetables for the district's bans, and taking into account the annual replacement rate of water heaters and HVAC systems thereafter, we will have many years (if not decades!) to incrementally improve our electrical grids to support the increased electric power usage, as our transition to electrification proceeds.

I urge the Bay Area Air Quality Management District to enact the proposed ban on gas furnaces and water heaters.

Respectfully,

Don Jackson

Palo Alto
Former CPA-UAC Commissioner (6/2019-5/2021)

Jennifer Elwell

From: Don Weiden [REDACTED]
Sent: Friday, January 27, 2023 6:18 PM
To: Jennifer Elwell
Subject: Proposed Rules for Space and Water Heating

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I fully support BAAQMD staff recommended rules for Space and Water Heating. The sooner these rules are adopted, announced and become common knowledge, the more time equipment suppliers, contractors, installers, building owners and electric grid operators will have to prepare for the related impacts.

I encourage you to keep moving forward to protect the Bay Area.

Don Weiden

Jennifer Elwell

From: Donald Duggan [REDACTED]
Sent: Wednesday, January 18, 2023 11:19 AM
To: Jennifer Elwell
Subject: Amendments to Rules 9-4 and 9-6 banning the sale of new gas-fired furnaces and water heaters - Comment

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell:

These are my comments on the proposed rule changes:

1. I read through the linked document and expected to find a benefit-cost analysis that shows a benefit/cost ratio greater than one. There was a lot of discussion of how much these rules would cost homeowners, especially for homes that were built pre 1945 (like the one I live in). And a lot of discussion about how the proposal will reduce bad stuff in the air, the benefit of which is estimated at somewhere between \$240M and \$890M per year (Figure 6-1, 2020 \$). The economic impacts are reported in terms of cost per ton of nitrogen oxide and particulates avoided (costs up to \$590,000 per ton!), but no attempt is made to compare costs and benefits in a rational manner. Without a peer-reviewed benefit-cost analysis, how can the Board expect the homeowners (who have to pay for this change) to support it? If there is a benefit-cost analysis that shows benefit exceeding costs in the documentation, please point me to it.
2. The cost analysis talks a lot about the benefit that new electric heat pumps will bring to existing air conditioning users, but I live in Oakland and I don't know anyone who has air conditioning.
3. The EIR does not seem to account for the increased travel to purchase replacement appliances after these rule changes are imposed. For example, I will have to drive to Sacramento to buy a replacement water heater if mine dies, similarly for a replacement furnace.
4. In summary, although it is evident that the proposed rule changes have good intentions, I would need to see a lot more evidence of their benefit before I could support the additional cost that would be imposed on me and my neighbors.

Thank you for consideration of my comments.

Donald Duggan
[REDACTED]

Jennifer Elwell

From: Donna Davies [REDACTED]
Sent: Friday, February 3, 2023 8:05 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Donna Davies

[REDACTED]

[REDACTED]

Mountain View, California 94040

Jennifer Elwell

From: Douglas Brookes [REDACTED]
Sent: Thursday, February 2, 2023 10:07 AM
To: Jennifer Elwell
Subject: Eliminating gas appliances in the Bay Area

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am a longtime homeowner in Oakland, and am writing to support the proposed changes to replace gas appliances in the Bay Area.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Many thanks indeed for your consideration.

Kind regards,
Douglas Brookes

Jennifer Elwell

From: Du Ng [REDACTED]
Sent: Friday, February 3, 2023 10:36 AM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Beside NOx, BAAQMD should also strengthen applicable rules to address other toxic constituents or byproducts of natural gas, particularly benzene, a carcinogen. Recent research

has revealed that natural gas is constantly leaking along the entire distribution infrastructure and inside of buildings, whether or not appliances are in use.

Du Ng

[REDACTED]

[REDACTED]

san jose, California 95123

Jennifer Elwell

From: Duncan Moody [REDACTED]
Sent: Friday, February 3, 2023 10:12 AM
To: Jennifer Elwell
Subject: Opposition to proposed amendments to Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning Ms. Elwell,

I hope you are doing well and I appreciate your work to keep the Bay Area's air quality among the best in the world for a metropolitan area. I have lived here my whole life and remember very well how it used to be.

I am writing to you because your name was provided as a contact for feedback on the proposals.

In the case of subject proposed amendments to residential and commercial natural gas appliances, I strongly oppose further restrictions or any requirements to move to electric sources at this time. Before any such amendments are put forward, viable and affordable solutions must be available to consumers - without taxpayer participation via Government assistance. Cost/benefits are not reasonable for the consumer. Certainly the increased revenues of electricians, plumbers, appliance manufacturers and City permits would be substantial, and be putting them in favor of these changes. If individuals wish to utilize zero NOx equipment for themselves, there's nothing preventing them from doing that on their own.

Let's get our supply of affordable energy issues solved before pushing this burden on Californians. Further, encouraging technological developments to the gas appliances themselves to reduce or control NOx, whether retrofit or at replacement, in parallel with educating the public on proper ventilation would provide more immediate and feasible benefits.

I respectfully urge you to NOT support these amendments.

Thank you,
Duncan Moody
[REDACTED]
San Mateo, CA 94403

Jennifer Elwell

From: Dylan Ackerman [REDACTED]
Sent: Thursday, February 2, 2023 11:29 AM
To: Jennifer Elwell
Subject: Support Proposed Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am a long-time Bay Area resident and father who wants my children to have the opportunity to grow up in a healthy and thriving environment. I consider myself incredibly lucky to call the Bay Area home, and am inspired by the desire to make our communities as secure as possible.

The Bay Area Air Quality Management District Board has the opportunity to protect our communities by implementing stronger safeguards for furnaces and water heaters. I emphatically encourage the Board to adopt the Zero NOX Emissions rules (9-4 and 9-6) currently being considered.

The proposed rules would greatly improve the air quality of Bay Area communities, and can be implemented in a way that protects the most vulnerable and historically disadvantaged communities. Mounting evidence demonstrates the harmful effects of appliances that burn fossil fuels, and tighter regulations of these appliances will meaningfully lower rates of asthma, bronchitis and other respiratory ailments that lead to premature deaths. As a father of young children, who are especially at risk from this pollution, the need to reduce this pollution is immensely personal.

Thank you for your consideration.

Dylan Ackerman

Jennifer Elwell

From: Edwin Aiken [REDACTED]
Sent: Friday, February 3, 2023 8:03 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Edwin Aiken

[REDACTED]

[REDACTED]

Sunnyvale, California 94087

Jennifer Elwell

From: eileen lepera [REDACTED]
Sent: Monday, February 6, 2023 4:50 PM
To: Jennifer Elwell
Subject: Ban on gas stoves

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We are all for it. Anything we can do to help us breathe. You guys have got to get rid of gas leaf blowers for good and stop dragging your feet on that issue.

Thank you.

Sent from my iPhone

Jennifer Elwell

From: Elena Engel [REDACTED]
Sent: Thursday, February 2, 2023 10:43 AM
To: Jennifer Elwell
Subject: Proposed amendments to Rule 9-4 and 9-6 and Draft EIR

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

My name is Elena Engel, and I am a volunteer with a number of organizations that are trying to save us from our own folly. I volunteer primarily with 350SF, 350BA, and with the SF-Climate Emergency Coalition.

Yes, Yes and Yes. We all know the reasons we must reduce or eliminate NOx. We need to protect human health and oh, by the way, also the planet's health.

I urge you to approve these amendments. This is an excellent step for BAAQMD to take and in keeping with your agency's name (Air Quality Management).

Elena Engel

Jennifer Elwell

From: Elizabeth Gioumousis [REDACTED]
Sent: Friday, February 3, 2023 1:39 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Elizabeth Gioumousis

[REDACTED]

[REDACTED]

Sunnyvale, California 94086

Jennifer Elwell

From: Elizabeth Lee [REDACTED]
Sent: Saturday, February 4, 2023 11:38 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Elizabeth Lee

[REDACTED]

[REDACTED]

Palo Alto, California 94301

Jennifer Elwell

From: Ellen L [REDACTED]
Sent: Thursday, February 2, 2023 8:49 AM
To: Jennifer Elwell
Subject: Voicing support for rule 9-4 and 9-6!!

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Ellen Leng and I am an Emergency Physician living in Contra Costa county. I am very interested in improving population health as well as decreasing the effects of climate change.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and WHEN done right, policymakers can ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Ellen Leng, MD FACEP CWS

Jennifer Elwell

From: Emma HITZKE [REDACTED]
Sent: Friday, February 3, 2023 1:36 PM
To: Jennifer Elwell
Subject: Support for BAAQMD proposed rules change

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I'm writing in full support of the proposed changes to rules 9-4 and 9-6 requiring only zero NOx water heaters, furnaces and large commercial water heaters to be sold and installed by 2027, 2029, 2031 respectively, as well as the introduction of an ultra-low NOx standard to Rule 9-4 for furnaces starting in 2024. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

The risk raised in the EIR regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional and state electrification targets and reach zero net GHG emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed through the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment. The devastating floods from the last few weeks in California were a stark reminder of how climate chaos is already here and we need to use all the solutions to stop our greenhouse gas emissions.

I urge the BAAQMD Board to certify the EIR and adopt these proposed rule changes as quickly as possible.

Thank you!

Best Regards,

Emma Hitzke

[REDACTED]
San Francisco, CA 94116

Jennifer Elwell

From: Emy [REDACTED]
Sent: Sunday, January 29, 2023 1:06 PM
To: Jennifer Elwell
Subject: NO on Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

BAAQMD cites health risks to justify its proposal to ban gas heating appliances based on two non-scientific metadata research papers that say gas appliances cause childhood asthma, among other health threats.

Wall Street Journal columnist Kimberly Strassel has revealed that no scientist was involved in either study (January 27 edition). One was authored by non-scientist employees of the anti-gas, climate warrior Rocky Mountain Institute. The other was written by two attorneys at NYU's Institute for Policy Integrity - lawyers not scientists. A recent editor letter suggested the metadata for the studies was cherry picked to achieve a desired result. The conclusion dictated the data, not the other way around. This is the essence of disinformation.

If this is true, the proposed regulation should be withdrawn immediately. The board members who support it should resign.

Emy Baldwin

[REDACTED]
Palo Alto, CA 94303
[REDACTED]

February 6, 2023

Jennifer Ewell
Senior Air Quality Engineer
Bay Area Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

Re: Proposed Amendment to Regulation 9, Rule 4, and Rule 6

Dear Jennifer Ewell,

As a citizen of Mountain View who resides within the Bay Area Quality Management District, I appreciate past achievements of the BAAQMD for leading the Bay Area towards improved air quality. I encourage the BAAQMD to carefully consider rules which present a best path forward offering both cost-effective management of airborne emissions while maintaining quality of life. I have read the documents available from BAAQMD with regard to the proposed amendments to Regulation 9, Rule 4 and Rule 6 and would like to voice my concerns for the proposed changes.

Heat and hot water are used essentially every day in a household. The infrastructure of the building is designed to accommodate the technology intended to provide these necessities at the time of construction. Adoption of the proposed changes to Rules 4 and 6 will directly impact 2/3 of the households in the bay area and by nature of the 'Absolute 0' NOx requirement, essentially mandate the replacement of natural gas furnaces and water heaters with electric heat-pump alternatives. Most homes will lack sufficient electrical infrastructure to offset the energy input lost as a direct result of the effective 'banning' of natural gas as a source of energy input to a household.

BAAQMD Staff have provided a cost benefit analysis with supporting tables and underlying assumptions which provide a sufficient accounting of expected impacts to households on a first order basis for such line items such as the cost difference of NOx free water heaters, HVAC equipment, and panel upgrade costs. However, other significant diseconomies and quality of life impacts are not accounted for, which will impact many of the households forced to make the mandated conversions.

Adoption of the proposed changes to Rule 6 will result 50% less available hot water to a household after the conversion from an ultra low NOx gas water heater to the mandated zero-NOx electric heat pump water heater of the same form factor. The key metric for comparison between the technologies for a household quality of life comparison is the FHR (First Hour Rating) of the water heater. The physical exterior volume of the water heater is also a key metric of comparison since the new water heater installation will be constrained by the existing water heater footprint. Therefore, FHR comparison should be done between water heaters of similar footprint and exterior volume. BAAQM Staff Report: 20221220_01_Staff Report_RG09040906.pdf, Table 4-2 identifies the Rheem Pro Terra (Plug-In) series of Electric Heatpump Water Heater as exemplary of the latest technology households will have available

to replace their Ultra low NOx gas water heater when it reaches end of life. A 50 gallon ultra low NOx Rheem gas water heater, PROPG50-38U RH67 PD-1, has a FHR of 86 gal. The electric heat pump from the Pro Terra series which fits the same volume footprint (within 1%) is the PROPH40 TO RH120-M which has a FHR of 45 gal (essentially a 50% less hot water). The department of energy provides a useful calculator for determining proper sizing a new water heater based on FHR: <https://www.energy.gov/energysaver/sizing-new-water-heater> . However, in this case, a household of 4 might find this tool more useful for planning a showing/laundry/dishwashing schedule to contend with half the available hot water after the switch to an electric heat pump water heater. I contend that 50% reduction in available hot water in the first hour to a household is a diseconomy or reduction of quality of life that is quantifiable and not mentioned in the staff reports.

The switch from an ultra low NOx gas water heater to a zero-NOx electric heat pump water heater can also introduce unwanted noise into the living area of the house. Traditional gas water heaters are so quiet, it is difficult to know when they are operating even when standing next to them. However, an electric heat pump water heater utilizes a compressor. The Rheem Pro Terra series electric heat pump specifies it's compressor noise at 55dBA as a 'feature' (better than most). Water heaters are commonly located within the confines of the residence. To put 55dBA in context we can refer to BAAQM Report: 20221220_SR_AppG0940906.pdf, Table 3.4-1 which would best characterize 55dBA as a noise level ranging from a large business office to heavy traffic at 300 feet in a commercial area. I contend that a heat pump water heater within a living space will subject household members to elevated noise and that this diseconomy or reduction to quality of life has not been mentioned in the staff reports.

Residences with a gas water heater located within the house, such as furnace closet, will require potentially costly contract work to install the necessary heat pump ventilation ducting to the exterior of the residence. Unlike a gas water heater, an electric heat pump water heater extracts heat from the surrounding air and in doing so produces chilled air output. This requires a minimum reservoir of 700cuft. of air from which the electric heat pump must exchange heat. This is about the size of a small bedroom and therefore the typical heater-closets in which most water heaters and furnaces are found, offer insufficient air volume. For this reason, additional cost must be allocated for a contractor to install venting to allow the electric heat pump water heater adequate exchange with the outside air. No allowance for this added installation work has been accounted for in the cost of compliance tables provided in any of the BAAQM reports.

Adoption of the proposed changes to Rule 4 could result in a household being without heat for an extended period of time. The proposed changes to Rule 4 essentially would mandate the replacement of a gas furnace, once it requires replacement presumably due to failure, with an electric heat pump. To state the obvious, households usually discover their gas furnace is broken and needs replacement in winter when it is cold. Presently, replacement using drop-in (meets the same or similar form factor as the broken furnace) low NOx gas furnaces is straight forward. They are usually available, permitted, and installed within a few days by a single contractor. The retrofit of an electric heat-pump in place of a gas furnace is considerably more complex and likely requires coordination of several contractors. A concrete pad must be poured and set outside the residence (single family residence for example) for

situating the heat pump, then, installation of the heat pump, installation of the heat exchanger, installation of a dedicated electrical branch line back to the breaker box and very likely a PG&E service upgrade at the service panel to accommodate the increased electrical load. BAAQM has made a first order estimate for the cost of electrical service upgrade (~\$4256) in BAAQM report: 20221220_SR_AppC_RG09040906.pdf page 19, 'Compliance Costs Used In Impact Analysis'. However, no acknowledgment has been made in the BAAQM for the longer permitting process. Presumably, city permits for the construction work on the residence would be only marginally longer commensurate with the added complexity of the required work. But, when an electrical service upgrade is called for, that permitting is done by PG&E. Pacific Gas and Electric Co. and San Diego Gas and Electric Co. sponsored the Service Upgrades for Electrification Retrofits Study Final Report (May 27, 2022) written by NV5 Inc. and Redwood Energy. For convenience a link to the report is provided:

<https://pda.energydataweb.com/api/view/2635/Service%20Upgrades%20for%20Electrification%20Retrofits%20Study%20FINAL.pdf> Figure 7 'Overall Service Upgrade Process of PG&E' on

page 29 is the salient diagram. The report states that the process may be completed in 10 days or may take as long as 8 months. One might not believe that the approval process for service upgrade may take that long, but considering that installation of solar panels often triggers the same process and anecdotally 2 months is a very common experience for permit approval. Loss of heat in a residence for an extended period of time is at best a reduction in quality of life and at worst life threatening. BAAQMD alludes to this problem indirectly in Report: 20221220_01_Staff Report_RG09040906.pdf page 11 suggesting "These smaller solutions also allow for temporary use while a larger system is being permitted or installed, or, if desired by the building owner, while electric service is being upgraded...". To clear, these 'smaller solutions' are 1 ton 120V Heat Pump Mini Split Systems which cost approximate \$1K each, would need a contractor to install and would be sprinkled through the household as required like space heaters. Upon completion of permitting these 'temporary use' would no longer be needed. No plan is proposed for their proper disposal, refrigerant recovery or potential for reuse. There is no cost accounting for implementation of these 'temporary' solutions. There is no accounting for this quality of life / risk to life in any of the BAAQMD reports.

The switch from gas furnaces to zero-NOx electric heat pumps will increase ambient noise in the community. Gas furnaces typically produce no discernable noise outside the residence. For example, one never can tell if a neighbor's furnace is running by standing outside their house and listening carefully. However, the compressor portion of an electric heat pump is installed outside a residence, usually in close proximity (a few feet) of the residence wall and commonly operate at 70-75dBA weighted sound power level. To put this in context we may once again refer to BAAQMD Report: 20221220_SR_AppG09040906.pdf, Table 3.4-1 which would best characterize 75dBA as a noise level ranging from a 'gas lawn mower at 100 feet to a diesel truck at 50 feet at 50 miles per hour'. Given that 4 feet setbacks are common, your neighbor's electric heat pump installation may only be 6 feet from your windows. The ANSI/AHRI standard defines the measurement distance as 6 feet so what is specified is what you will get at 6 feet. At a distance of 60 feet the sound level should decrease to a more reasonable 50-55dBA. However, at 60 feet it is also likely that upon full adoption of heat pumps in a community, there will be multiple electric heat pump sound emission sources withing radius which will add to the totality of perceived noise. The increase in community

ambient noise could be estimated for a full heat pump adoption scenario as a function of mean distance between residences. But the installation of a neighbor's heat pump outside an individual's bedroom window will likely matter the most by far. BAAQMD report: 20221220_SR_AppG_RG09040906.pdf page ES-5 Impact 3.4-1: Potential to Generate Long-Term Operation Noise acknowledges 'the Project would result in substantial long-term operational noise impact, and this impact would be potentially significant.' To understand the potential impact of this statement and what it could mean to a resident of the bay area, it helps to contextualize it as potentially a gas lawn mower or diesel truck operating outside your window all winter long. The BAAQMD does not enforce noise nor does it account for this significant diseconomy in the report: 'The BAAQMD does not have .. authority to require [sound] mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures.' The adoption of electric heat pump will increase ambient noise in the community. Higher density, lower income, neighborhoods would likely experience greater impact. Individual circumstances may be more significant, unavoidable, and impact quality of life.

Electric heat pumps contain refrigerants which continuously leak over the life of the heat pump's life and are a known, powerful, global warming gas. When accounted for, refrigerant loss will significantly decrease the actual realized gains from the conversion of a low NOx gas furnace to an electric heat pump. Electric heat pumps on the market today operate using a refrigerant, R-410A (various trademarked names such as EcoFluor or Puron – carefully chosen to belie their true environmental impact). R-410A has a GWP (global warming potential) 2087 times that of CO2 per IPCC's forth Assessment Report as given in California Air Resources Board: <https://ww2.arb.ca.gov/resources/documents/high-gwp-refrigerants>. R-410A GWP is an order of magnitude worse than the NOx emissions targeted by the proposed Rule 6 change by BAAQMD. A first order estimate for the amount of heat pump refrigerant loss may be found in Table 3. Fugitive Emissions of Refrigerants in the paper 'Planning for Failure: End-of-Life Strategies for Residential and Commercial HVAC Systems' published by the National Renewable Energy Laboratory which can be down loaded from the Department of Energy Office of Scientific and Technical Information web page: <https://www.osti.gov/pages/biblio/1583092>. The research suggests 1% refrigerant loss at time of manufacture with a 1% loss per year is a reasonable expectation. Over a presumed 15 year lifespan 80% of the original refrigerant typically remains within the unit (20% has been released into the atmosphere and contributes global warming). The focus of this research is to emphasize the importance of refrigerant recovery at the end of life of the unit. Presently, this is not as well controlled or as successful as we might hope. Figure 1 of the report provides the Lifetime GHG (Green House Gas Emissions) in lb. CO2e/ton for residential units and itemizes the contribution due to loss of refrigerant due to leakage and 3 possible refrigerant recovery scenarios (1%, 20%, and 100%) at the equipment's end of life. Under the 3 scenarios, lifetime GHG emissions were calculated to be 2000, 3000, and 8000 lb. CO2e/ton. BAAQMD report: 20221220_01_Staff Report_RG09040906.pdf page 11 recommends 12,000 BTU/hr heat pump system as sufficient for meeting the heating/cooling needs of a 600 sqft. space. Using the middle refrigerant recover scenario of 20% and a median CA residence size of 1800 sqft. one can first order estimate the lifetime GHG emissions from implementation of the proposed Rule 6 as: (3000 lbs. CO2e/ton)*(1ton/600sqft.)*(1800sqft./household)*(1,641,623 gas heated households in

BAAQMD jurisdiction)*(1 metric ton/2205lbs.) = 6.7 million metric tons of CO2e global warming gas to be released over the operational life electric heat pumps or 0.45 million metric tons of CO2e/annum. There is no accounting for cost of EOL refrigerant recovery for the deployment of electric heat pumps in place of gas furnaces and the significant, detrimental, effects of fugitive refrigerant emissions which should be included in the cost benefit analysis.

The decision by BAAQMD not to consider Non-Zero Requirements is a missed opportunity to evaluate a multifaceted approach for realizing significant reduction in emissions while allowing households the flexibility to contend with the actual constraints of implementation when faced with living with a BAAQMD table entry simply listed as 'significant and unavoidable' or in some cases issues not accounted for such as those described above. Existing ultra-low NOx standards in place now are projected to offer increasingly measurable benefit through year 2035 as older non-compliant gas furnaces and water heaters are replaced with ultra-low NOx to meeting existing standards. In light of the significant cost of compliance from conversion from gas furnace and water heaters to electric heat pump solutions even a 100% increase in the cost of a gas furnace or water heater could still be considerably less expensive and less disruptive compared to what is an effectively mandated conversion to an electric heat pump. No evidence of engagement with manufactures has been presented to answer how much reduction in NOx emissions would be possible given increase in unit cost. This technology engagement could provide solutions which better meet household needs, decrease resistance of adoption, and reach a better cost benefit outcome. Therefore, I strongly recommend the BAAQMD engage and challenge manufacturers to propose NOx standards that would be obtainable given a targeted increases in unit sales price on the order of the projected cost of compliance. Manufactures might consider such a sizable premium over conventional ultra-low NOx equipment costs as unmarketable. However, given the actual cost of compliance and other actual constraints, a high-cost gas equipment option could still be attractive. The implementation of the changes of as proposed for Rule 4, and 6 will be very significant and have direct negative consequences experienced to the resident while the perceived benefit will be indirect and more ephemeral. I do not recommend adoption of the proposed changes to Rule 4, and 6 without considering and providing a path for reduced NOx though adoption of additional 'Non-Zero Requirements'.

Respectfully,



Eric Frick
Citizen of Mountain View, CA

Jennifer Elwell

From: Fiona Hyland [REDACTED]
Sent: Friday, February 3, 2023 4:57 PM
To: Jennifer Elwell
Subject: I support requiring furnaces and water heaters to be replaced with electric

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I also recommend subsidies or rebates to help everyone afford this.

[Sent from Yahoo Mail for iPhone](#)

Jennifer Elwell

From: Fred Bialy [REDACTED]
Sent: Monday, February 6, 2023 12:01 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

My name is Frederick Bialy and I worked for 30 years as an Emergency Physician. I urge you to support the proposed rules 9-4 and 9-6 setting a zero limit on nitrous oxide emissions from residential water heaters and furnaces.

In my work as an Emergency Physician I daily treated patients of all ages with respiratory and heart problems. There is an ever growing body of research showing the adverse effects that nitrous oxides, the result of burning fossil gas, have on peoples' health. Research is also revealing how big a negative factor nitrous oxide emissions from residential gas appliances have on air quality, especially indoors. The sooner we replace these gas appliances with electric heat pump based appliances, the sooner we will all enjoy better air quality and healthier lives.

As we phase out the use of fossil gas there will also be co-benefits for addressing the climate emergency that threatens us all with a planet that is harder for humans and other species to live on.

Please, adopt rules 9-4 and 9-6 at your upcoming meeting in March!

Sincerely,

Frederick Bialy, M.D.
Emergency Physician, retired

Jennifer Elwell

From: Jesus Nazereth [REDACTED]
Sent: Friday, February 3, 2023 2:22 PM
To: Jennifer Elwell
Subject: Leave my gas stove alone

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I love my gas stove and water heater. Don't ban any appliances. Americans have the right to choose which appliances they want to have in their home. Not little tin horn dictators who think they know what's best for everyone. Mind your own business and keep your hands off my appliances.

-Fred Ortiz

Jennifer Elwell

From: Gary Farber [REDACTED]
Sent: Monday, February 6, 2023 2:28 PM
To: Jennifer Elwell
Cc: CCC Supervisor John Gioia; CCC Supervisor Ken Carlson
Subject: 350 Contra Costa Action Supports Zero NOX Standard

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ms. Elwell,

350 Contra Costa Action fully supports the air district's proposed Zero NOX rules. Clean air matters for everyone's personal health. Reducing GHG emissions matters for the planet's health!

Thank you.

Gary Farber
350 Contra Costa Action

Jennifer Elwell

From: Gary Stevens [REDACTED]
Sent: Thursday, January 19, 2023 12:10 PM
To: Jennifer Elwell
Subject: Comment on proposed amendments to Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bay Area Air Quality Management District Staff and Board of Directors:

I am very concerned about the proposed rule changes to prohibit replacement of gas-fired heaters and appliances in homes in future. This will be prohibitively expensive for senior and middle class homeowners. Rules such as these are part of the reason the Bay Area is becoming untenable for middle class residents.

Replacing existing gas-fired equipment with electric heaters and appliances often requires infrastructure changes that are costly. Electric rates in the Bay Area, such as San Francisco where I live as a semi-retired senior, are 2-4x those elsewhere in the U.S.. If I have to replace my furnace or water heater with an electric heat pump, it would require >\$10,000 infrastructure changes, because the location and plumbing as-is don't work for the electric equipment.

Upon replacement, my electric bill will be untenable. This might be different if our rates were 7-15 cents per kwh, as in many regions. Instead, our rates at 31-40 cent per kwh, before expected rate increase that may bring 50 cent rates by the time the proposed regulation takes effect. My gas bill for the furnace and water heating averages \$50 per month. If these were electric, such as heat pump, it would be far, far higher, unaffordable. My new neighbors next door have a heat pump in a similar space and expense \$100-\$300/month on heating (after subtracting a baseline for other uses).

There are good motivations behind the proposal. However, its effect will be disproportionate on low and middle income households. I would simply not have the resources to remain in my home, if I had to make the mandated type of replacements. Ways to ameliorate this include:

- Grandfathering current gas systems from the replacement requirement for the current owner only (eventually, new owners would be required to make electric replacement)
- Exempting senior homeowners
- Establishing grants for low and middle income homeowners that pay a substantial portion of the required installation
- Changing the electrical rate for these lower emission equipment to a more reasonable rate, such as 7+ cents per kwh

#1 option above would provide security to low, middle and senior households. Over a period of time, all homes would still convert, as homes are sold to new owners.

Many folks complain about how expensive the Bay Area become, how middle class is being priced out. This is one of a series of unreasonable cost increases that are making San Francisco and the Bay Area a place for very high earners and the wealthy.

Thank you for your consideration,
Gary Stevens
San Francisco, CA

Jennifer Elwell

From: Gary Trott 2 [REDACTED]
Sent: Wednesday, February 1, 2023 9:51 PM
To: Jennifer Elwell
Cc: 'Gary Trott 2'
Subject: Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am acutely aware that burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution such as PM2.5 particles. NOx fumes are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

Phasing out natural gas appliances will reduce a very large source of pollution. The pollution affects the in-building air quality as well as the regional air quality. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality across the regional communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Regards
Dr. Gary Trott Ph.D

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 9:53 AM
To: Jennifer Elwell
Subject: Supporting Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell and BAAQMD,

I'm a long-term resident of Burlingame, writing to ask you to pass the proposed amendments to Rules 9-4 and 9-6. I cannot stress how wonderful it would be to me if these rules pass - it might be the best governing action that I'll see all year. I won't re-iterate the numbers of lives this will save, or the amount of misery in those suffering respiratory diseases, as you know this all better than I do. I'll just concur with you on the cruel way in which this 'silent epidemic' rarely reaches public consciousness because we don't see the impact directly - if 89 people were killed in a mass shooting, we'd definitely do something about it...

On a personal note, I have two teenage kids both of whom have ongoing asthma and other respiratory problems - basically, for almost the whole winter, they are coughing and taking inhalers and getting one cold or flu after another. It's not a huge problem, but it really does sap the energy and life out of them. I was shocked to hear that 20% of childhood asthma cases are caused by gas stoves in California, and am now religiously using a hood on my gas stove, but we also have an ancient furnace, and our hot water heater is in a closet, and I must figure out whether they are also causing problems.

Beyond all that, the planet-sized elephant in the room is climate change. Every hot water heater that is replaced in this area will have a lifetime emissions of over 30 tonnes of CO2 equivalent, so I reckon that every year in the bay area we are installing residential water heaters that are committing us to about 600,000 tonnes of emissions. We know that we are already destroying the planet, and that we simply need to stop, very very quickly. Given that affordable heat pumps are now available, there is no reason for us to keep installing gas. I realize that climate is less in your remit than smog, but I urge the voting members to think of all of humanity and their lifetime legacy.

On a second personal note, I am about to start a neighborhood outreach program where I live, to inform people about heat pumps and get them to replace their older appliances. So far I have found that most people don't know about these, but almost all are enthusiastic (especially given strong rebates and tax credits!) and are very much in support of air quality and climate goals. Despite the posturing of some politicians recently when it comes to gas stoves, I believe there will be strong support for these rule changes, and that by 2027 the supply chain and awareness will be fully adequate to make the transition.

Thanks for your awesome continuing work and all the lives and health that you are saving.

-Gerard Manning.

Jennifer Elwell

From: Ginnie Plato [REDACTED]
Sent: Friday, February 3, 2023 12:26 AM
To: Jennifer Elwell
Subject: NO on a ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Just registering opposition from this original San Mateo homeowner and her husband.

Go ahead and make information available for people to form their own decisions, but PLEASE DON'T put our home appliances under government control!

Sent from my iPhone

Jennifer Elwell

From: Giovannina Fazio [REDACTED]
Sent: Friday, February 3, 2023 9:06 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Giovannina Fazio

[REDACTED]

[REDACTED]

Belmont, California 94002

Jennifer Elwell

From: Gloria Linda Maldonado [REDACTED]
Sent: Friday, February 3, 2023 9:13 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Gloria Linda Maldonado

[REDACTED]

[REDACTED]

Redwood City, California 94062

Jennifer Elwell

From: Greg Spooner [REDACTED]
Sent: Monday, February 6, 2023 4:03 PM
To: Jennifer Elwell
Subject: Support rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Greg Spooner, I'm a long-time San Francisco resident, homeowner, scientist, business owner, and climate justice activist.

I'm writing to you today about Rules 9-4 and 9-6. I would like you to support these rules, and to work toward making indoor air quality healthy for all Bay Area residents. Burning fossil gas inside buildings produces nitrogen oxides (NOx) and other indoor air pollutants. As you well know, NOx are toxic and highly reactive gases that are generally bad for human health. These pollutants can be vented with good, well-used venting systems, but many people don't have these and don't even know when they're not working properly. It's way better for public health if people don't live with these pollutants in the first place!

This rule is partly about improving air quality in the communities most burdened by fossil fuel pollution, such as low-income communities of color in locales already suffering from industrial pollution from refineries, freeways and ports. Done right, Rules 9-4 and 9-6 could deliver real health and air quality benefits to these Bay Area residents. Please support Rule 9-4 and 9-6.

Sincerely,

Greg

--

Greg J Spooner, PhD
Principal, Gain Consulting Services

[REDACTED]
[REDACTED]
[REDACTED]

Jennifer Elwell

From: Hannah Quirk [REDACTED]
Sent: Saturday, February 4, 2023 12:08 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6 Amendments - Public Comment

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Hannah Quirk and I am an intern for the San Francisco Bay Chapter of the Sierra Club. I am writing with my support for the proposed amendments to Rule 9-4 and 9-6 on the agenda for March 15, 2023. For the past 5 months, I have worked on the Chapter's building electrification campaign and I have seen first-hand the importance of phasing out gas appliances for the health and safety of our communities and as a strategy to decrease greenhouse gas emissions and mitigate global climate change.

Burning gas in buildings produces nitrogen oxides (NOx) and indoor air pollution that endangers human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. Communities of color and low-income communities are disproportionately impacted by gas appliance pollution and unhealthy air quality. Transitioning homes to electric heat pumps and electric heat pump water heaters can address these inequities, promote environmental justice, and support the state in meeting federal air quality standards that protect health.

Gas appliances in buildings and homes produce 25% of total greenhouse gas emissions in California. According to BAAQMD, electrifying Bay Area appliances could reduce climate-warming emissions from appliances [73% by 2046](#) from a 2019 baseline. Moving to electric appliances like heat pumps – and powering these appliances with renewable energy – is the ticket to zeroing out climate emissions from heating homes entirely. As a member of Gen Z, I am incredibly worried about the world we will leave for future generations and frustrated by the lack of action by our leadership to protect the health of our planet. In recent years we have already started to see the devastating impacts of climate change - including deadly heat waves, wildfires, droughts, and storms. The time to act is now, and adopting amendments to Regulation 9, Rules 4 and 6 to phase out gas appliances in California is a key step for the state to reach its climate targets.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Hannah Quirk (she/her/hers)

[REDACTED]

Jennifer Elwell

From: Harriet Harvey-Horn [REDACTED]
Sent: Monday, February 6, 2023 10:36 AM
To: Jennifer Elwell
Subject: Say YES to stricter standards for home appliance emissions

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD board members,

I am a long-time resident of Los Gatos and a parent of two amazing young men for whom I want a safe, livable, healthy and thriving future. This will only happen if we rapidly reverse course on the outdated, unnecessary and dangerous practice of burning gas in our homes and other buildings. One step in the right direction is the adoption of strict standards for toxic NOx emissions from home appliances, and I urge you to do so at today's meeting.

I am a long-time asthma sufferer, who deeply regrets buying into the "cooking with gas" myth and replacing a gas furnace with another gas furnace a few years ago simply because I didn't know better, nor did the contractors who advised us on the replacements. Now, better informed about the health and safety impacts of indoor combustion of fossil fuels, the vastly superior alternatives that are available, and very concerned about the severity of climate disruption, I feel strongly that our communities need help to pull away from these harmful products. Better, yet, our communities need help moving toward the better, safer, more efficient, and increasingly more economical electric alternatives. So, why not??

According to UCLA research, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Harriet Harvey-Horn
Deeply concerned Bay Area resident, confident that we can (and must) transition to a fossil-free economy and more livable future...now
Los Gatos, CA
[REDACTED]

Jennifer Elwell

From: Henry Riggs [REDACTED]
Sent: Sunday, February 5, 2023 2:14 PM
To: Jennifer Elwell
Subject: Proposed gas appliance restrictions

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear District

I have been following the movement to outlaw residential gas appliances for several years. The mandated movement to all-electric is a mistake and at this time I firmly oppose it.

First, our electric grid capacity will be hard pressed to meet the new loads from new, large scale commercial, rail electrification and electric auto mandates as it is. When we need to have more (clean) generation, we are losing nuclear and hydro. That's the wrong direction. And we are still a long way from large scale night and winter energy storage.

Second, when we move to electric, we are open to sole-source limits and interruptions - the opposite of diversification, clearly a wrong direction for a key utility.

Third, the loss of more dependable gas service means buying power from out of state during shortages. Out of state power sources during times of extraordinary need will not be clean - or cheap. (We encourage their existence by opening up to the need.)

Fourth, we have already addressed the major sources of petroleum based pollutants by regulating commercial, government and transportation energy. The addition of residential restrictions is not the same level of import.

Fifth, all large scale endeavors benefit from working with the tide, not against it. If and when we provide ample electric supply, and as residential rooftop solar continues to be adopted, residents will increasingly chose electric to take advantage of their system - but with their own judgement about what to keep on natural gas. Rooftop will also increase diversification and will be quicker to benefit from improving battery tech.

If you lived in Texas in the winter of 2021 and had neither cooking nor heat, your dependency on the grid would come into perspective that ABAAG does not seem to share. If you lived in Pacifica in the winter, or San Jose in the summer, that too might remind you that PGE (and other suppliers) have outages exactly when you need them.

Please reconsider your proposed residential gas prohibition proposal, rescind it, and focus on more considerate efforts.

Henry Riggs
Menlo Park

Jennifer Elwell

From: Henry Riggs [REDACTED]
Sent: Monday, February 6, 2023 6:05 PM
To: Jennifer Elwell
Cc: Ray Mueller
Subject: Re: Proposed gas appliance restrictions

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

Ms Elwell

Let me add that it is hard to accept the need to “improve indoor air quality” versus our established and constantly improved home gas appliances. There is certainly no such overriding emergency as to take the rights from home owners to chose their appliances, including to chose gas or electric.

Thanis,

Henry Riggs

> On Feb 6, 2023, at 11:19 AM, Jennifer Elwell <jelwell@baaqmd.gov> wrote:

>

> Henry,

>

> Thank you for providing your public comment on this matter, it has been received and will be included in the record. Responses to all comments received will be compiled and posted on our website in advance of the board meeting at which this item will be considered.

>

> Jen Elwell

>

> Rule Developer

>

> -----Original Message-----

> From: Henry Riggs [REDACTED]

> Sent: Sunday, February 5, 2023 2:14 PM

> To: Jennifer Elwell <jelwell@baaqmd.gov>

> Subject: Proposed gas appliance restrictions

>

> [You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

>

> CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

>

>

> Dear District

>

> I have been following the movement to outlaw residential gas appliances for several years. The mandated movement to all-electric is a mistake and at this time I firmly oppose it.

>

> First, our electric grid capacity will be hard pressed to meet the new loads from new, large scale commercial, rail electrification and electric auto mandates as it is. When we need to have more (clean) generation, we are losing nuclear and hydro. That's the wrong direction. And we are still a long way from large scale night and winter energy storage.

>

> Second, when we move to electric, we are open to sole-source limits and interruptions - the opposite of diversification, clearly a wrong direction for a key utility.

>

> Third, the loss of more dependable gas service means buying power from out of state during shortages. Out of state power sources during times of extraordinary need will not be clean - or cheap. (We encourage their existence by opening up to the need.)

>

> Fourth, we have already addressed the major sources of petroleum based pollutants by regulating commercial, government and transportation energy. The addition of residential restrictions is not the same level of import.

>

> Fifth, all large scale endeavors benefit from working with the tide, not against it. If and when we provide ample electric supply, and as residential rooftop solar continues to be adopted, residents will increasingly chose electric to take advantage of their system - but with their own judgement about what to keep on natural gas. Rooftop will also increase diversification and will be quicker to benefit from improving battery tech.

>

> If you lived in Texas in the winter of 2021 and had neither cooking nor heat, your dependency on the grid would come into perspective that ABAAG does not seem to share. If you lived in Pacifica in the winter, or San Jose in the summer, that too might remind you that PGE (and other suppliers) have outages exactly when you need them.

>

> Please reconsider your proposed residential gas prohibition proposal, rescind it, and focus on more considerate efforts.

>

> Henry Riggs

> Menlo Park

>

>

Jennifer Elwell

From: Holly Lazzarini [REDACTED]
Sent: Friday, January 27, 2023 11:22 AM
To: Jennifer Elwell
Subject: Getting rid of gas

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ridiculously unrealistic!

Sent from my iPhone

Jennifer Elwell

From: Howard Crittenden [REDACTED]
Sent: Tuesday, February 7, 2023 11:44 AM
To: Jennifer Elwell
Subject: I Oppose the Ban on natural Gas

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I oppose banning natural gas.

Howard Crittenden
[REDACTED] Atherton, CA 94027

[REDACTED]

Jennifer Elwell

From: Howdy Goudey [REDACTED]
Sent: Monday, February 6, 2023 4:11 PM
To: Jennifer Elwell
Subject: Comments on the proposed amendments to Rule 9-4 and 9-6 and Draft EIR

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

Please support Rule 9-4 and 9-6 with proposed amendments to include the zero NOx standards.

I am a resident of the bay area in El Cerrito, CA. The time has come to end the harmful indoor (and outdoor) air pollution associated with gas burning appliances, and all the associated negative health impacts. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

The legacy of problematic policies and decisions in the past most often disproportionately impacts already burdened low income communities of color that have been placed in the most direct path of harm from fossil fuel pollution. When landlords are incentivized to purchase the least costly like-for-like gas appliance replacement for a rental units, the indoor air pollution impacts will continue to be disproportionately faced by the low-income renters that have little to no control over the decisions that are made about the energy sources used in the buildings in which they live.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

In addition to tackling a major source of air pollution, BAAQMD's appliance standard will deliver key climate co-benefits. Burning fossil fuels in homes for heating is responsible for roughly 11% of California's statewide climate emissions. The state cannot meet its climate targets without eliminating the unnecessary fossil gas combustion appliances in buildings that is also compromising our indoor and outdoor air quality and health.

Please support the zero NOx standards in the proposed amendments to Rule 9-4 and 9-6.

Sincerely,

Howdy Goudey
El Cerrito, CA

Jennifer Elwell

From: Igor Tregub [REDACTED]
Sent: Monday, February 6, 2023 10:40 AM
To: Jennifer Elwell
Subject: Please Support Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Completed

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Igor Tregub. Over the last eleven months, I have been working on the intersectional Issues of trying to save my homeland of Ukraine, our planet, democracy (including energy democracy), and distributed energy like solar and battery storage. These comments are being submitted as an individual and not on behalf of any organization.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

I am proud that my hometown of Berkeley, CA was the first to electrify its new construction and that well over 50 jurisdictions - including several that you represent - have followed suit. Yet much more remains to be done. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

As a renter of a unit existing multi-family construction that uses gas appliances, this rule will sadly not affect me, at least right away. But so many others will benefit from it, which is reason enough for me to enthusiastically support it. This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,
Igor Tregub

Jennifer Elwell

From: J Herbert [REDACTED]
Sent: Saturday, February 4, 2023 2:10 AM
To: Jennifer Elwell
Subject: Ban new NOx in construction - use PassiveHaus + HeatPumps - vote in favor of Rules 9-4 & 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

Please:

1. Ban new methane ("natural") gas installation in all construction, remodels, and retrofits;
2. Mandate LEED PLATINUM & PASSIVE-HOUSE insulation standards for new construction, remodels, or retrofits; and
3. Endorse Ground-Source heatpumps likewise as HVAC solutions (if needed).

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate

change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

J Herbert

[REDACTED]

[REDACTED]

Santa Clara, California 95050

Jennifer Elwell

From: Jake Cosenza [REDACTED]
Sent: Thursday, January 19, 2023 9:35 AM
To: Jennifer Elwell
Subject: Gas Heater Ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hey Jennifer -

While I'm generally supportive of a ban on gas appliances in new buildings (maybe that already exists?), I wanted to share how a ban on existing home's heaters/furnaces would affect me and others living in old homes:

I live in the Mission District and my building only has 50 amps of electrical service for two units. As a result, all our appliances are gas. We care deeply about the environment and recently purchased a Chevy Bolt EV, but we are limited to charging it through a 110v outlet because upgrading the electrical to our home would cost upwards of \$15,000. Far beyond what we can afford at this time. If our stove/furnace goes out and this ban is in effect, we are essentially being asked to spend \$15,000 to upgrade the electrical, plus the cost of the appliance. Not to mention, the Mission District has some of the oldest overhead power lines in the city, so when the power goes out we would have no backup.

If this policy is implemented, there would need to be some serious thought given to the tens of thousands of people in my situation, many of them low-income. Let's help folks upgrade their electrical service and a lower cost, so we can make strides towards protecting our air and climate. But we cannot burden folks with this kind of expense and expect this to be a popular policy.

Thank you for reading! Feel free to reach out if you would like to discuss further.

Jake Cosenza

Jennifer Elwell

From: Jamie Beckett [REDACTED]
Sent: Saturday, February 4, 2023 1:18 PM
To: Jennifer Elwell
Subject: Please don't ban gas heaters and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell, and BAAQMD board and staff,

I am writing to voice my strong protest to your proposal to ban new natural gas heaters and water heaters. I am 65 years old and, after 34 years in the Bay Area, am finally the owner of a single-family home. It was a struggle to afford this house and, like most homeowners, I worry about the ongoing cost of maintaining it.

Now you have added to my fears and threaten to undermine my financial security. It will already be a burden to replace my water heater and furnace when the time comes. But how am I to pay for the cost of rewiring my entire house, upgrading the electric panel and all of the other expenses related to your well-intentioned but destructive scheme?

I am an ordinary, middle-class woman who worked my entire life to afford this house. I know how lucky I am. Or at least I felt lucky until the BAAQMD and state lawmakers decided to build their political reputations on the backs of people like me and my neighbors.

Yes, yes, I know you will offer aid for electric conversion to some. But what about the hardship faced by those who are simply middle-class? How are we – and the millions of others like us who lack vast stock portfolios – supposed to come up with the tens of thousands of dollars to make these conversions?

I am also aware of the rebates and loans offered by some municipalities and utilities. To get a rebate, however, you have to be able to afford to make an electric conversion in the first place. If you get a loan, you eventually have to pay it back. It is not free money. This is just one more way our regulators and lawmakers are rewarding the rich and punishing the rest of us.

It's already far too costly to live in the Bay Area. According to The Chronicle, real estate is 113 percent higher than the national average. Utility costs are 73 percent higher than the rest of the nation. The cost of goods like food and transportation is 20 percent higher.

Now you want to increase the costs even more. Will you require PG&E to lower electricity prices when you force us into an all-electric future? Will contractors lower their prices for these conversions? And what about the permits required by cities and counties? Will those be free?

I am not some conservative who is against change. I am a lifelong Democrat. I learned the value of conservation more than 50 years ago from my mother who practiced the art of reduce, reuse, recycle long before it became common practice, and I continue to practice it today.

All I am asking is for you to look into your hearts and consider the people who will bear the burden of your grand plans. There are dozens of ways to improve our region's environment that won't drive people out of their homes. How about banning wood fires? How about doing a better job of managing our forests and preventing forest fires? And gee – what about improving our laughably inefficient public transportation system?

Instead of looking at large-scale solutions that are hard to accomplish, all of you at the BAAQMD are taking the easy way out. It's easy for you to make rules for those without power and money. It's hard to come up with long-term solutions that will make a real difference. Please, I beg you to try. Don't drive me out of my house, and don't drive me out of the state I love.

Yours sincerely,

Jamie Beckett
Redwood City, CA
[REDACTED]

Jennifer Elwell

From: Tien Stoeckenius 3 [REDACTED]
Sent: Tuesday, January 31, 2023 5:24 PM
To: Jennifer Elwell
Subject: Comment on proposed changes to Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

With respect to the proposed changes to Rules 9-4 and 9-6, I would like to make a few general comments:

1. As a mechanism for reducing emissions of Nix, the proposed changes seem like much effort and disruption for at best a small gain, at least in the near term. As noted in the staff report, residential and commercial space and water heating account for less than 8% or estimated NOx emissions, and that estimate involves considerable uncertainty. In addition, space and water heaters are usually replaced at decade long intervals, so (as also noted in the staff report) the major effect of the changes is a decade or more in the future.
2. The proposed rule changes seem to be more of an indirect way to control greenhouse gases rather than a specific pollutant. In particular, the requirement for zero NOx emissions suggests such motivation, as there is little reason to restrict a non-dominant source of NOx emissions to zero. A restriction to, for example, 4 ng/joule (a 90% reduction from the current level) would achieve essentially the same result and allow a greater range to technical solutions. Reducing greenhouse gases is a worthy goal, but doing so in this manner invites legal challenge.
3. I have concerns about the practicality of heat pump solutions for water heating. The difficulty is the rate at which water can be heated when using an air-source heat pump. Currently available units work slowly, and there is little prospect of increasing that rate without either sacrificing efficiency (e.g.: via resistance heat elements) or using an alternate heat source (impractical in most situations). The typical solution is to store a large amount of heated water, which requires expensive tanks and also adversely affects efficiency.
4. A better way to achieve the desired result, at least in principle, is via economic means. The reason that natural gas is widely used for heating is that, on an energy equivalent basis, it is much cheaper than electricity. A therm of natural gas is equivalent to about 29.3 kWh. At current residential electricity rates that yields a cost per therm on the order of \$10.00, about four times the existing rate. Particularly for water heating a heat pump efficiency ratio above 3 is not easily achieved, and for both water and space heating the cost of heat pump equipment is significantly larger than for natural gas fueled units.

Adding a tax on natural gas, and using the proceeds to subsidize electricity, would provide an incentive both to use electric solutions for new installations and speed up replacement of existing equipment. Because essentially all residential gas customers are also electricity customers, properly balancing the tax/subsidy should leave most customer's bills nearly unchanged (a rebate scheme may be necessary for residential customers who are net electricity generators).

The amount of the tax would initially not need to be large. \$.20/therm for the first two years, with scheduled increases to \$2.00/therm over 8 to 10 years might be sufficient. A discount could also be provided for natural gas fueled units that have zero NOx emissions.

I do not know how, or even if, such a scheme can be implemented under the current legal and political framework, but it seems worth exploring.

Thank you,

(Mr.)Jan Stoeckenius

[REDACTED]

Jennifer Elwell

From: janet garcia [REDACTED]
Sent: Friday, February 3, 2023 12:45 PM
To: Jennifer Elwell
Subject: Gas appliance Ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am VERY OPPOSED to the proposal to ban Gas appliances noted.
I have lived on the Peninsula for nearly 70 years.
Please listen to the people!

Jennifer Elwell

From: Janet Odell [REDACTED]
Sent: Friday, February 3, 2023 10:05 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Janet Odell

[REDACTED]

[REDACTED]

San Jose , California 95127

Jennifer Elwell

From: Jason Biggs [REDACTED]
Sent: Monday, February 6, 2023 2:20 PM
To: Jennifer Elwell
Subject: Opposition to Amendments to Rule 9-4 and 9-6 and Suggested Alternatives

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell:

I am writing in respectful opposition to the rules the BAAQMD proposes to amend that would have the effect of banning gas water heaters starting January 1, 2027 and gas furnaces starting January 1, 2029. While the public health benefits the BAAQMD is seeking to achieve are worthy goals, I nevertheless write in opposition to the amendments for the following reasons:

1. Upgrade Costs. Those with gas furnaces and gas water heaters may need to perform costly electrical upgrades to their homes, in addition to buying the new appliances when they wear out. I've seen estimates that these electrical upgrade costs could exceed \$4,000. This is a real risk given how dated the Bay Area housing stock is. This will really hurt low-income owners and the elderly who live on fixed incomes and may not be able to afford the high cost of upgrading their electrical systems. What then? Do they go without heat? Hot water?

2. Higher Operating Costs. Multiple sources indicate that electrical water heaters have higher operating costs and gas water heaters. While the upfront price of an electric water heater or an electric furnace may be lower at installation, over time the higher operating costs of the electrical heaters will cost consumers more. I again go back to the elderly person in retirement, on a fixed income, who will pay more each month in energy costs than if they were allowed to simply replace their gas water heater with a new gas water heater. <https://www.hvac.com/furnaces/electric-vs-gas-heating/> <https://www.forbes.com/home-improvement/plumbing/electric-vs-gas-water-heater/>

3. Power Outages. California experiences power outages during the winter months due to storms, and in the summer due to peak demand or wildfire risk reduction. Regardless of why, when the power goes out, you cannot heat your home in winter or heat your water (year round) without electricity. I believe some gas water heaters can operate without electricity, so those people will continue to have hot water even during a power outage.

4. Risks to the Grid. The BAAQMD decision has to be looked at in context of the other changes taking place in California. Gas cars will now be banned for sale starting in 2035, less than 10 years after the gas heater bans would go into effect. While it will take some time for the gas heaters and furnaces to wear out because of obsolescence, pretty soon they will all be electric. Is our grid capable of handling all of this increased power load? Where is all of the electricity going to come from? Given how long it takes for power projects to be built in California, are these new power sources and plants, including the land, already identified and the permitting process underway? What is going to happen when millions of Californians come home from work, plug in their electric car, turn on their electric furnace, take a hot shower at the end of the day and cook dinner on an electric stove (assuming gas stoves are not banned soon), all at the same time, after the sun has gone down and solar power drops? Simply put, is California actually going to be

ready for this move to all-electric?? Is this a hope, or can BAAQMD definitively say the power will be there? This is hugely important to the BAAQMD decision.

5. Waste of Gas Infrastructure. Over time, the BAAQMD decision would render obsolete an existing gas infrastructure system that would probably cost tens of billions of dollars to install today, not to mention the huge carbon footprint of installing such a system. Why let such a valuable resource go to waste? We have a perfectly functional gas distribution system (requiring regular maintenance just like the electrical grid) that can provide an alternative energy source to homeowners. It seems like a terrible thing to let that existing resource go to waste.

Proposed Alternatives

Rather than come down with a hammer and simply ban gas furnaces and gas water heaters, some proposed solutions for BAAQMD to consider would be the following:

- Provide financial incentives to consumers to retire their gas furnace or gas water heater with an electric model. Make those incentives known to consumers.
- Launch a hard hitting PR campaign that focuses on the health impacts associated with use of gas appliances and urges consumers to use electric instead.
- Postpone this decision for a number of years until new power sources have been built and are 100% capable of providing the power required to run all electric heaters, taking into account the banning of gas automobile sales starting in 2035 and the resultant increased demand on the grid due to the increased number of electric vehicles.
- If BAAQMD is committed to making this change, please consider pushing out the deadline for replacement for 5 or 10 additional years (to the late 2030's), to allow time for California's energy infrastructure (including energy storage) to be built out in a manner that can meet the increased demand all of these changes to "all electric" will require.

Conclusion

In summary, I believe BAAQMD has good intentions with its proposed rule and is seeking to limit bad health outcomes due to gas emissions. I believe those health concerns however are ultimately outweighed by the overall cost increases associated with moving to electric, which will harm low income owners and the elderly, as well as the current uncertainty of where (and when) all of this new electricity is going to come from, in addition to the other points noted above. I would rather the conversation trend toward one or more of the alternatives set forth above. Thank you for your consideration.

Respectfully submitted,
Jason Biggs

Jennifer Elwell

From: Jason Friedrichs [REDACTED]
Sent: Thursday, January 19, 2023 6:40 AM
To: Jennifer Elwell
Subject: Strong opposition to proposed appliance ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer,

I am a lifelong Democrat and Bay Area resident. This proposed ban on natural gas water heaters and furnaces will have terrible unintended consequences.

It will drive up the cost of construction for all residences unnecessarily which will disproportionately impact those with the fewest resources. Second, it will put more more pressure on our electric grid which is already unstable and create safety concerns when the power goes out because homes cannot be heated properly and people will die.

While there may be some small number of problems with existing furnaces, they are largely a safe and inexpensive technology that is a true benefit to all residents in the Bay Area. Don't take away that option. Let people choose electric if they want — not by mandate.

Jason Friedrichs
[REDACTED]
San Francisco

Jennifer Elwell

From: Jay Feldis [REDACTED]
Sent: Monday, February 6, 2023 3:44 PM
To: Jennifer Elwell
Subject: I oppose a ban of has appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

This ban is unnecessary to make any meaningful improvements in air quality. It will add costs an risks to homeowners, while degrading our quality of life.

Our community has much more important problems to address such as homelessness and crime.

John Feldis

[REDACTED]

Menlo Park

Jennifer Elwell

From: Jeff Burke [REDACTED]
Sent: Wednesday, January 18, 2023 11:13 PM
To: Jennifer Elwell
Subject: Comment regarding Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am a Bay Area taxpayer and homeowner, and I completely reject this lunacy. It might have conveniently slipped your mind that last summer, Newsom even told us not to plug in our EVs or turn on the washer in the face of blackouts.

With no gas appliances, that means we will be sitting in the dark, with cold water, and cold food.

This is insane! If this goes through, it is the last straw for us, and we will take our six-figure tech jobs and leave this lunatic asylum for good! And some of our neighbors will too! Then you can see which of your low income earners are going to support your lifestyle, your insane electricity bills, and the billions of needed grid updates! Good luck!

Jeff

Jennifer Elwell

From: Jeff Calcagno [REDACTED]
Sent: Monday, February 6, 2023 4:00 PM
To: Jennifer Elwell
Cc: Jeff Calcagno; Natalie Calcagno
Subject: considerations for, and opposition to, proposal

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors:

We write in opposition to the proposed rules regarding replacement of gas-fueled furnaces with electric appliances.

We have lived for over a decade in Unincorporated San Mateo County near Skyline Blvd. We rely on propane for our heat and hot water. Because our daughter has a chronic medical condition such that she does not tolerate temperature changes, we do everything we can to make sure our home stays at a tolerable temperature.

We live in a forested area where PGE-supplied energy is very unreliable, making us heavily dependent on our propane-powered backup generator. Despite significant tree trimming and removal by PGE in the last two years, our home continues to be subject to many power outages. These outages are becoming both more frequent, and longer. In the last few months, our home has been without PGE-supplied power for many, many days and nights across multiple outages. (Our home does not get sun for several months of the year, making reliance on solar power untenable.) Two years ago, with outages becoming commonplace, we retained a contractor to install a propane-powered back-up generator. This was quite expensive (>\$18,000), but we had no choice. The generator installed can power our basic appliances—including septic pump grinder, lights, etc.—but could not also power an electrical furnace and electrical hot water heater. We would not be able to keep our daughter, and the rest of our family, safe and warm.

Furthermore, we are concerned that if AmeriGas were asked to supply propane to us and to our neighbors solely to fuel back-up generators and not for higher-usage items, AmeriGas (and other local providers) might refuse. Some providers already balk at providing propane for back-up generators, which do not require fuel on a consistent basis.

Until PGE can demonstrate over a period of several years that it can supply electricity to our home without interruption, a mandate to transition to all-electric appliances is not reasonable and would likely force us to relocate elsewhere.

Thank you for considering our point of view on this critical matter.

Sincerely,

Jeff Calcagno and Natalie Ayars

San Mateo County homeowners

Jennifer Elwell

From: Jeff Lindquist [REDACTED]
Sent: Friday, February 3, 2023 8:12 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

As a native Californian, I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jeff Lindquist

[REDACTED]

[REDACTED]

Redwood City, California 94062

Jennifer Elwell

From: Jeffrey Perrone [REDACTED]
Sent: Saturday, February 4, 2023 7:39 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I'm a father and Bay Area resident who cares about the health of my children, and perhaps someday their children. This is an opportunity to preserve the health of MANY children and adults.

It is increasingly well recognized by scientists studying the issue that indoor combustion of methane leads to adverse health effects. Also, the methane released by leaking gas appliances in the home (not to mention outside the home) has negative effects on health, and also increases global warming, a much larger looming crisis.

It's important to take the steps we can, especially those that will prevent further investment in harmful methane-based technology in the home.

Please support Rule 9-4 and 9-6!

Thank you.

Jeffrey Perrone

Jennifer Elwell

From: Jeffrey Spencer [REDACTED]
Sent: Friday, February 3, 2023 6:52 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out fossil gas (sometimes called "natural gas") appliances in the Bay Area.

Burning fossil gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. The zero-NOx rules proposed in Rule 9-4 and 9-6 will deliver multiple health, environmental, and climate benefits, especially for communities of color and low-income communities who, studies show, are most impacted by gas appliance pollution (a legacy of racism and classism in our culture).

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standards will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jeffrey Spencer

[REDACTED]

[REDACTED]

Fremont, California 94536

Jennifer Elwell

From: Jennifer Graber [REDACTED]
Sent: Friday, February 3, 2023 7:20 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. As a pediatrician who sees children with asthma and premature newborns frequently, I feel sure that this change would go far to improve the health of our next generations.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jennifer Graber

[REDACTED]

[REDACTED]

Los Gatos, California 95033

Jennifer Elwell

From: Jennifer Heggie [REDACTED]
Sent: Sunday, February 5, 2023 6:53 PM
To: Jennifer Elwell
Subject: Comment on Proposed Regulation 9 Amendments to DEIR

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I am writing in support of the Air District proposed amendments to Regulation 9, rules 9-4 and 9-6, and request that the BAAQMD Board support EIR certification with these proposed changes. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over time.

The EIR identifies a risk of potentially insufficient grid capacity to support a transition to electric water heaters and furnaces. This risk is manageable. In addition to generating power from alternate sources such as building-based solar and available and developing bidirectional EV charging from vehicle to home, grid, or load, the risk can also be mitigated through the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, circuit sharing technology and other measures. The rule changes are needed if we are to meet our local, regional and state electrification targets and reach zero net GHG emissions by 2040.

The risk of increased noise associated with some electric alternatives is already being addressed through modifications to installation, recent improved products, and work on future products that will generate less noise than their older counterparts. And the transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment.

Please certify the EIR with these proposed rule changes as quickly as possible.

Thank you,
Jennifer Heggie
San Francisco resident

Jennifer Elwell

From: Jennifer Huber [REDACTED]
Sent: Friday, January 20, 2023 5:27 PM
To: Jennifer Elwell
Subject: Rule 9-4 and 9-6

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I completely support the drive to combat climate change by eliminating/reducing greenhouse gases. So, I support BAAQMD banning the sale and use of gas appliances, including gas furnaces and water heaters, for new construction. But there needs to be an exception or more time for older houses.

Older houses like mine don't even have ground wires (except for a few outlets where I manually ran a ground wire) and they have internal panels with screw-in fuses, so it isn't just a simple panel upgrade. I'd have to gut my house (and live somewhere else while contractors worked). If I could even find a contract. I don't think there are enough electrical contractors to convert that many older homes in such a short time (by 2027 or 2029), particularly given the existing demand due to natural disasters and the increased need for new housing.

Basically, this rule would force me out of my home. And it would lower the sale price of my home in the process.

On March 15, please amend the rules to add an exception for older homes.

Sincerely,
Jennifer Huber
El Sobrante, CA homeowner

Jennifer Elwell

From: Jennifer Mazzon [REDACTED]
Sent: Sunday, February 5, 2023 5:27 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-4 Date: February 5, 2023 at 4:44:25 PM PST

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

I urge you to please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

As a mother of three teenage children, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Thank you,

Jen Mazzon
Menlo Park Resident

Jennifer Elwell

From: Jennifer Thilman [REDACTED]
Sent: Friday, February 3, 2023 8:29 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jennifer Thilman

[REDACTED]

[REDACTED]

Fremont, California 94536

Jennifer Elwell

From: Jennifer Thompson [REDACTED]
Sent: Friday, February 3, 2023 8:30 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jennifer Thompson

[REDACTED]

[REDACTED]

Palo Alto, California 94301

Jennifer Elwell

From: Jennifer Valentine [REDACTED]
Sent: Friday, February 3, 2023 3:43 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jennifer Valentine

[REDACTED]

[REDACTED]

Massapequa Park, New York 11762

Jennifer Elwell

From: Jenny Green [REDACTED]
Sent: Thursday, February 2, 2023 6:21 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I'm a San Jose resident and a member of Mothers Out Front Silicon Valley, and am writing to ask you to please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area, and also to fight climate change.

As you know, burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx causes respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

In my home, we recently replaced our gas water heater with an electric heat pump water heater, and we replaced our gas stovetop with an electric stovetop. We're very happy with both, and we are planning to replace our HVAC system with a heat pump as soon as we can afford it. We're doing this for the sake of our children -- to provide cleaner air for them to breathe, and to contribute toward preserving a livable climate for them and their descendants.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,
Jenny Green
San Jose, California

Jennifer Elwell

From: [REDACTED]
Sent: Saturday, February 4, 2023 9:47 AM
To: Jennifer Elwell
Subject: Comments on Proposed Amendments for Rules 9-4 and 9-4 for BAAQMD Board of Directors

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell:

I am submitting the following comments on the Proposed Amendments for Rules 9-4 and 9-4 that will be the subject of a Air District Board of Directors hearing on March 15, 2023.

Dear Board of Directors of the Bay Area Air Quality Management District:

I am writing in opposition to the Proposed Amendments to Regulation 9 Rule 4 (Nitrogen Oxides from Fan Type Central Furnaces) and Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters) that will be the subject of a public hearing on March 15, 2023,

The analysis presented by the staff is flawed. The costs of the proposal to the Bay Area community and Bay Area homeowners are greater than projected by staff and the benefits are smaller.

Upgrades to house electrical panels cost on the order of \$2000 - \$4000 and can take 9 months to be approved and completed. That is a long time for a homeowner to be without adequate heating. New heat pump systems can cost \$10,000 versus \$5000 for a replacement gas furnace (that has a longer lifetime). Further, some of the proposal involves new technology of unproven reliability, which means that homeowners could be burdened with replacement costs much sooner than with proven gas furnace technology.

As such, the staff proposal represents a tax on older, senior homeowners.

Additionally, it is unclear if there is sufficient electrical grid capacity to support the increase in electrical demand from the staff's proposals.

It is one thing to try to apply the staff's proposals to new construction. It is something entirely different to force the proposal onto existing homes that are already designed and engineered for gas furnaces and water heaters. As such, the proposed amendments are an intrusion into the affairs of ordinary homeowners and are not what the Air District was formed to address. This sort of intrusion violates the spirit of the Fourth Amendment of the US Constitution.

I urge the Board to reject the Proposed Amendments.

Finally, the timelines in the staff proposal are too short for any proposed change of this magnitude. If the Board decides to approve the staff proposal (which I hope is rejected), the earliest timeline should be 10 years at a minimum, with a 15 year timeline being preferred.

Sincerely,
Jeremy Wright


Los Altos, CA

Jennifer Elwell

From: Jim Beatty [REDACTED]
Sent: Monday, February 6, 2023 10:22 AM
To: Jennifer Elwell
Subject: Ban of Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greetings.

“Nearly half of all five-county Bay Area residents are low income or very low income”, per bayareaequityatlas.org. To force all residents in these counties to change to costly electric water heaters, furnaces and stoves would be a huge burden on them and even with the middle class residents - even with “incentives” in place (which are never quite adequate). Also, the trumped-up reasons for this measure is based on poorly evaluated science. I strongly urge you to abandoned this folly and allow the citizens to decide for themselves, or put it to a vote at a general election.

J. Beatty

J

Jennifer Elwell

From: Sbc [REDACTED]
Sent: Wednesday, January 18, 2023 12:18 PM
To: Jennifer Elwell
Subject: Water Heaters

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

You people need to find something else to do. This is another example of overreach by an out-of-control bureaucracy acting self-righteously under the guise of “environmental purity”.

Jim Clark

Sent from my iPad

Jennifer Elwell

From: Jim Robbins [REDACTED]
Sent: Wednesday, January 18, 2023 8:30 AM
To: Jennifer Elwell
Subject: Comment on "Rules 9-4 and 9-6 Building Appliances"

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I very much support the move to heat pump HVAC systems, however I have also lived in several old buildings in SF where a change would be Extremely impractical.

Many buildings have the heater placed centrally in the building. Routing from the interior unit to the exterior compressor would be impossible without tearing open walls or ceilings.

Even finding a place to locate the exterior compressor unit would be very difficult at some properties. They can't be visible to the street, and placement on a roof or shared back alley may also not be practical.

There need to be exceptions when an upgrade to heat pumps isn't practical. Better to incentive the use of heat pumps so that they are a financially better choice whenever possible.

If you want to see this new rule fail, all it would take is a horror story in the media about a little old lady freezing in the cold because she can't afford a new heater.

Jim

Jennifer Elwell

From: Jo Ann Mandinach [REDACTED]
Sent: Monday, February 6, 2023 11:20 AM
To: Jennifer Elwell
Subject: Stop the forced conversion to all-electric

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

In Palo Alto, we routinely suffer power outages from birds, balloons, tree branches, etc. -- at least 10 a month.

Why should we sit here in the cold and dark, unable to drive our e-cars away from dangers just so some unrealistic, impractical bureaucrats want to meet some absurd target??

If you want to ensure we meet demands, STOP forcing the Bay Area to add 1,000,000 more people for ABAG's absurdly high housing targets that ignore the tanking economy, the hundreds of thousands of tech workers laid off and the more serious economic crash due to investments in AI and automation.

WE CAN'T AFFORD TO CONVERT, not with \$1,000 A MONTH utility bills!

Jo Ann Mandinach

[REDACTED]
Palo Alto, CA 94301

Jennifer Elwell

From: Joanna Smiley [REDACTED]
Sent: Friday, February 3, 2023 9:44 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Joanna Smiley

[REDACTED]

[REDACTED]

Newark, California 94560

Jennifer Elwell

From: John Accinelli [REDACTED]
Sent: Wednesday, January 18, 2023 11:50 PM
To: Jennifer Elwell
Subject: Banning Natural Gas - Are you nuts?

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I just had a furnace sales guy tell me I should be excited to be an early adopter of the heat pump furnace - the new rage in the Bay Area - and it would only costs \$26,000. Furthermore, the average product life expectancy - implied by the lack of replacement parts over time - is only 20 years. So the furnace of the future would costs homeowners over \$1000 a year to own, and require 100% low-cost of electricity to operate - to strain on the grid here.

While air pollution is much improved in the Bay Area over the late 1960s, the biggest challenge is the continued adoration of tobacco, cannabis and vaping products. Does second hand smoke still play a role in asthma sufferers or is this old news? So with the known dangers posed by tobacco and that attractive mental paranoia of excessive pot usage, local governments still see fit to maintain legal access to these regardless of their costs on society.

I DO NOT SUPPORT this ban of natural gas in residential appliances. The issue seems oddly out of sync with all that is going wrong at present in the Bay Area.

Now we just need to find out who's Enronning natural gas prices in California and put a stop to it.

John Accinelli
Oakland Observer

Sent from my iPhone

Jennifer Elwell

From: John Accinelli [REDACTED]
Sent: Wednesday, January 25, 2023 9:50 AM
To: Jennifer Elwell
Subject: Re: Banning Natural Gas - Amended Statement

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

Just finished reading WSJ article that analyzed metadata research concerning natural gas cooking and increases in childhood asthma. It does not take a position on the benzene released in the home, which science said was harmless, nor does it promulgate the banning of a product based solely on a green political position, such as benzene released into the atmosphere by furnaces and water heaters use.

I would like to amend my statement. I am against the total banning of natural gas product in residential housing, but believe that some oversight of rental property might be required to insure proper fan hood ventilation, in order to reduce the risks associated with asthma in children. Residential housing sales can include a similar mandate to test fan hoods and meet a minimum ventilation requirement whenever a house sale commences. I do not support the banning of gas heaters or furnaces at this time, as they are a cost effective and place no load on our electrical grid.

There seems to be a link between gas stove use and childhood asthma, and I regret the use of "are you nuts" in the subject line of a previous email. The big unknown is what other air quality issues may exacerbate childhood asthma in the home, such as second-hand smoke from tobacco, vaping or other preferred recreational products with a dubious history or living next to a freeway or a pollen heavy region?

Thoughtfully,
John Accinelli
Oakland resident and observer

Sent from my iPhone

> On Jan 18, 2023, at 11:50 PM, John Accinelli [REDACTED] wrote:

>

> I just had a furnace sales guy tell me I should be excited to be an early adopter of the heat pump furnace - the new rage in the Bay Area - and it would only cost \$26,000. Furthermore, the average product life expectancy - implied by the lack of replacement parts over time - is only 20 years. So the furnace of the future would cost homeowners over \$1000 a year to own, and require 100% low-cost of electricity to operate - to strain on the grid here.

>

> While air pollution is much improved in the Bay Area over the late 1960s, the biggest challenge is the continued adoration of tobacco, cannabis and vaping products. Does second hand smoke still play a role in asthma sufferers or is this old news? So with the known dangers posed by tobacco and that attractive mental paranoia of excessive pot usage, local governments still see fit to maintain legal access to these regardless of their costs on society.

>

> I DO NOT SUPPORT this ban of natural gas in residential appliances. The issue seems oddly out of sync with all that is going wrong at present in the Bay Area.

>

> Now we just need to find out who's Enronning natural gas prices in California and put a stop to it.

>

> John Accinelli

> Oakland Observer

>

>

>

>

>

>

> Sent from my iPhone

Jennifer Elwell

From: John Anderson [REDACTED]
Sent: Sunday, February 5, 2023 11:24 PM
To: Jennifer Elwell
Subject: Support Rules 9-4 and 9-6 amendments to reduce NOx

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am a resident and homeowner in San Francisco. I'm urging you to include strong support for Rules 9-4 and 9-6 to support electric appliances, and for help the transition away from gas appliances. My wife and I have been trying to switch from a gas water heated and home heating to electric for several years now, and the obstacles we have encountered are legion. Not least of these is contractors' lack of familiarity with current heating technology. It is very clear to me that, until they are forced to do so, They will discourage clients from switching away from gas. BAAQMD's zero-NOx standard will drive heat pump adoption, and prevent Bay Area families from being saddled with toxic, wasteful, and obsolete equipment.

Thank you for your time,
John Anderson
[REDACTED]
San Francisco, CA 94115

Jennifer Elwell

From: John BECKER [REDACTED]
Sent: Saturday, February 4, 2023 3:18 PM
To: Jennifer Elwell
Subject: Support for Air quality emission limits

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We strongly support actions to promote air quality. As a region and as a nation, we need to support efforts to manage global warming and preserve the quality of our air. That may mean some inconvenience and expense. However, ignoring the problem will be even more disastrous than we have witnessed already.

John Becker
Jan Becker
[REDACTED]
Belmont, CA 94002

Sent from [Mail](#) for Windows

Jennifer Elwell

From: John McKenna [REDACTED]
Sent: Monday, February 6, 2023 1:26 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice and Future Generations

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am the father of a beautiful eight-year-old girl that has her whole life in front of her. However, if we don't urgently address the climate emergency that is upon us, her future will be unnecessarily burdened by the terrible effects of global warming - warming that is primarily the direct effect of burning fossil fuels. Sadly, the fossil fuel industry has known about these negative effects for decades. Instead of stopping for the betterment of society, they chose profits and deception through the practice of denial, doubt, and delay. This must stop now. We must do all that we can to leave our one and only home, planet Earth, on a path to being better than what we borrowed from our children.

Burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

NOx, PM2.5, and ozone concentrations vary block-by-block, with a recent study in the Bay Area finding that communities of color were exposed to [55% more NO2](#) than mostly white neighborhoods. [99% of disadvantaged communities](#) in California live in an ozone nonattainment area. Transitioning homes to electric heat pumps can tackle a key source of NOx pollution, improving air quality, and supporting the state in meeting federal air quality standards that protect health.

As California warms with climate change, access to cooling is a public health necessity. BAAQMD's appliance standard will help address this gap in climate resilience. Heat pumps are highly efficient electric appliances that pull double duty — cooling and heating homes while using a fraction of the energy of other appliances. They are the ticket to adding cooling to millions of California homes without overloading the electricity grid. In addition to tackling a major source of air pollution, BAAQMD's appliance standard will deliver key climate co-benefits. Burning fossil fuels in homes for heating is responsible for [roughly 11%](#) of California's statewide climate emissions. The state cannot meet its climate targets without eliminating this pollution. This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities

of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thank you for considering this note and thank you for **doing everything that you possibly can to preserve a livable future for our children**, and improve our own lives and the lives of those in underserved communities in the process.

Sincerely,

John McKenna
Menlo Park, CA


Jennifer Elwell

From: John Neal [REDACTED]
Sent: Saturday, February 4, 2023 7:47 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

John Neal
[REDACTED]

[REDACTED]

Oakland, California 94609

Jennifer Elwell

From: John ODA [REDACTED]
Sent: Friday, February 3, 2023 9:53 PM
To: Jennifer Elwell
Subject: Gas stoves

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

[Introduce yourself] Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

[Add personal message] According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. [Additional talking points below] This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.
Sincerely, John Oda

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 12:28 PM
To: Jennifer Elwell
Subject: The Ban of New Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To the Bay Area Air Quality Management District:

The environmental impact report states that the increase in electrical energy would require solar panels on 19,500 acres of rural land in the Bay Area.

The justification for your rules is based on two non-scientific reports. Employees of the anti-gas climate warrior Rocky Mountain Institute wrote one, and two attorneys at NYU's Institute for Policy Integrity wrote the other one: written by – lawyers, i.e., not written by scientists.

The meta data for the studies was cherry picked to achieve a desired result. The conclusion dictated the data, not the other way around. This is the essence of biased and misleading propaganda used to promote or publicize a particular political cause or point of view.

Immediately withdraw your proposed regulation. The board members who support it should resign or be dismissed.

John Alexander Sheakley
[REDACTED]
San Mateo, CA 94404-1512
[REDACTED]

Jennifer Elwell

From: Jordan Briskin [REDACTED]
Sent: Friday, February 3, 2023 3:03 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed emissions-free standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Jordan Briskin

[REDACTED]

[REDACTED]

Palo Alto, California 94306

Jennifer Elwell

From: Joseph Lam [REDACTED]
Sent: Friday, February 3, 2023 7:04 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Joseph Lam

[REDACTED]

[REDACTED]

Menlo Park , California 94027

Jennifer Elwell

From: jmachado9283 [REDACTED]
Sent: Friday, February 3, 2023 7:34 PM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Just vote 'No'.

This proposal is cost-prohibitive to the majority of residential and commercial property owners in the Bay Area. There are neighborhoods that can't even accommodate 200-amp electrical services TODAY. And if your neighborhood does, it will take months to get permits. And upwards of \$8,000 just for the PG&E service drop! Not even considering the cost of an electrician for in-house wiring. And the cost of the appliances themselves.

So if my gas water heater dies in 2027-- what will I do under this proposal? Stay in a hotel for six months while I wait for the permits for the new PG&E 200-amp service drop? Really?

Let's transition in a way that doesn't create a cost-prohibitive financial burden on Bay Area residential and commercial property owners. A smart plan will take decades to implement, not a mere handful of years.

For those concerned about the alleged health implications of gas appliances, let them spend thousands to retrofit their homes. Leave everyone else alone. Let us decide what is best for us in our own lives. Don't throw the baby out with the bath water.

Joseph S. Machado
San Jose

Sent with [Proton Mail](#) secure email.

Jennifer Elwell

From: Josh Dickinson [REDACTED]
Sent: Monday, February 6, 2023 1:47 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice!

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer and BAAQMD Boardmembers,

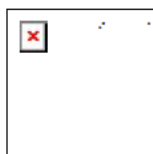
My name is Josh Dickinson, small business owner, real estate broker and father of three beautiful children in Kensington! Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. As an asthma sufferer myself, I've noticed first-hand the impacts on my own health from indoor cooking with natural gas.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thank you for your consideration!

Sincerely,
Josh



Josh Dickinson
President & Broker, Zip Code East Bay
[REDACTED]
A Certified B Corporation + Green Business

Jennifer Elwell

From: Judith Bushey [REDACTED]
Sent: Saturday, February 4, 2023 6:23 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Judith Bushey

[REDACTED]

[REDACTED]

San Jose, California 95135

Jennifer Elwell

From: Judy Weatherly [REDACTED]
Sent: Monday, February 6, 2023 1:32 PM
To: Jennifer Elwell
Subject: New Heaters & Water Heater Regs

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I am writing to loudly protest the new regs BAAQMD is proposing. I am 73 y.o. on Social Security and my wife lost her business at the beginning of the pandemic. These new rules will likely leave us homeless. We own our home and in no way will be able to afford re-wiring our home, replacing our heating & air conditioning unit, and our water heater. You are about to create an absolute nightmare for low income, disabled, and senior residents in the Bay Area.

What in the world are we supposed to do without hot water and heat!!!!????!! It is absolutely astounding how inept our government can be - well-intentioned I'm sure, but with no regards for those of us paying your salary. How dare you be so heartless in the name of what - saving the planet and killing us!?!

These new regulations must be stopped!!!! Start over and think more clearly and wisely about what you are about to do!!!!

With hope for a future,
Judy Weatherly
[REDACTED]

Jennifer Elwell

From: Howlett Julia [REDACTED]
Sent: Friday, February 3, 2023 7:37 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. With family members suffering from asthma, I know first hand how the region's air pollution affects our citizens. Please vote for cleaner air and a better way of life.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Howlett Julia

[REDACTED]

[REDACTED]

San Jose, California 95112-4931

Jennifer Elwell

From: [REDACTED]
Sent: Friday, February 3, 2023 4:00 PM
To: Jennifer Elwell
Subject: Opposition to proposal to ban gas water heaters and furnaces.

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I strongly oppose the ban that would apply to new construction and appliances that homeowners must replace, starting in 2027 for most water heaters and 2029 for furnaces. There are two very important reasons that the proposed ban should not be adopted:

- Converting to only electric heaters and furnaces will put an enormous increase on the demand for electricity and will inevitably result in power restrictions and outages. California electricity generation does now meet demands reliably, with the risk of rolling blackouts in heat waves. There will be insufficient electricity to power the increase in electric cars subsequent to the state of California banning the sale of new gasoline cars in 2035. The increase in demand if electric water heaters and furnaces are mandated will exacerbate the problem, and result in tremendous shortfalls of electric power availability.
- The cost of replacing gas water heaters and furnaces will be significant, would effect a large number of California residents, and be a significant economic burden on families.

Utility gas is the most popular residential heating fuel type in California. Some 64 percent of occupied housing units in the state relied on utility gas for heating in 2020. Electricity was the second most used residential heating fuel type, at 27.1 percent. By comparison, 0.72 percent of housing units used solar energy for heating. [California: house heating fuel share by type | Statista](#)

The inability to provide reliable electricity with increased demand, and the cost to the residents of California of replacing gas heaters are reasons to vote no on the proposal.

Julia B. Wall
Atherton, CA

Jennifer Elwell

From: [REDACTED]
Sent: Friday, February 3, 2023 11:24 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

[REDACTED]
[REDACTED]
Los Gatos, California 95030

Jennifer Elwell

From: Julie Kloper [REDACTED]
Sent: Friday, February 3, 2023 10:05 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

I found out in 2018 that the emissions from my gas stove were triggering asthma attacks. When I started having asthma attacks around 2006 these were not allergens that doctors considered as possible triggers. Since I have issues with indoor air and not outdoor allergens and my asthma started as an adult around the time I started cooking with gas, my husband and I, decided to take the recommendation of my allergist and replace our gas stove with an electric stove. I no longer have asthma attacks and do not need inhalers. Since the inhalers made me feel a bit run down all the time it has been life changing.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Julie Kloper

[REDACTED]

[REDACTED]

Rohnert Park, California CA

Jennifer Elwell

From: Justin Evans [REDACTED]
Sent: Sunday, February 5, 2023 9:35 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-4

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

I urge you to please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

As a father of two, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Justin Evans
Menlo Park Resident

Jennifer Elwell

From: Kaela R Plank [REDACTED]
Sent: Monday, February 6, 2023 2:03 PM
To: Jennifer Elwell
Subject: I Support Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Kaela Plank. I grew up in Pacifica, CA and currently call Berkeley, CA my home. Burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

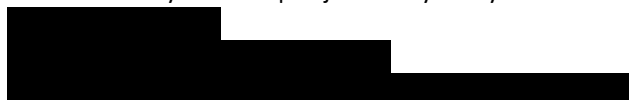
As someone who loves the outdoors, I have come to cherish good air quality both indoors and outdoors. I grew up in a home where the windows were always open and it was a rude awakening during the 2020 fire season when air quality was so bad that I couldn't open my windows when I was cooking on my gas range and my home was sweltering because I don't have air conditioning and there was an ongoing heatwave. I rely on being able to open my windows to cool my home and as a renter I have no control over the appliances in my home. That experience drove home for me how essential access to good air quality is.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. Additionally, communities of color and low-income communities are most impacted by gas appliance pollution and unhealthy air quality. Moving to electric heat pumps can help. People of color in the U.S. are exposed to nearly [twice as much](#) residential gas appliance pollution as White communities. While NOx, PM2.5, and ozone concentrations vary block-by-block, with a recent study in the Bay Area finding that communities of color were exposed to [55% more NO2](#) than mostly white neighborhoods and [99% of disadvantaged communities](#) in California live in an ozone nonattainment area. Transitioning homes to electric heat pumps can tackle a key source of NOx pollution, improving air quality, and supporting the state in meeting federal air quality standards that protect health. These policies will also play an essential role in environmental justice and health equity efforts. We need to start thinking more about the communities most impacted by our negligence as a society to ensure everyone lives in a safe and health promoting community.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. Your team has the power to make a positive impact in under resourced communities.

Sincerely,
Kaela

Kaela Plank MS, MPH
pronouns: she, her, hers
Nutrition Policy Institute | Project Policy Analyst III- Evaluation Specialist



NPI: [website](#) | [Twitter](#)



Tufts University Friedman School of Nutrition Science and Policy '18 | Master of Science-Biochemical and Molecular Nutrition
Tufts University School of Medicine '18 | Masters of Public Health
University of California- Davis '13 | B.S. Anthropology

Jennifer Elwell

From: Katherine Falk [REDACTED]
Sent: Thursday, February 2, 2023 8:36 PM
To: Jennifer Elwell
Subject: Please support Rules 9-4 and 9-6!

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I strongly support transitioning away from gas appliances for a variety of reasons. Reducing exposure to NOx is one of them. I hope the Air District votes in favor of these rules.

Sincerely,
Katherine Falk
[REDACTED]
Oakland CA 94611

Jennifer Elwell

From: kh nohormel.com [REDACTED]
Sent: Monday, February 6, 2023 3:40 PM
To: Jennifer Elwell
Subject: Comments on ban of new gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

You should not be making policy based on biased studies written by non-scientists. Did the RMI meta study include all findings and all studies or did they include only the studies that supported their existing belief that gas appliances should be banned? And a study written by lawyers? Seriously? I have a better idea—why not ban wildfires? All smog improvement from the last 20-30 years of regulations have been wiped out by each year's wildfire season, here, in the Bay Area, from smoke blowing here from other areas. Natural gas usage is a blip in comparison.

Do you have any studies about the effect of using a natural gas stove with proper hood ventilation? It is already in the building codes to have a properly sized hood whenever a gas range is installed. Perhaps you should require hood manufacturers to have an auto-on feature instead. I am sure that burning food on any type of cooking appliance also emits gases and particulates that are harmful, so venting would mitigate even more risk.

And what is the difference to air quality between a natural gas furnace versus a natural gas power plant creating the electricity to send to the home at night in the winter, including the extra electricity the power plant needs to make because of loss on the electrical lines? No one is getting solar power at night, and not that much during the day in the winter, so yes, most of the power used to heat homes electrically at night will be from natural gas. And yes, most winter heating is done at night when it is coldest.

We currently have brown-outs in the summer whenever the weather gets really hot, because the grid is not providing enough electricity to run our air conditioners (and not everyone even has an air conditioner). Why do we not have brown-outs in the winter when it gets very cold? Oh, because we are not all relying on electricity for our heat. But we will soon have winter brown-outs, if we all have to heat with electricity only.

I do not see how you can possibly believe that the grid will support all living units being all-electric, unless you are allowing for a slow transition based on whose appliances die first. That seems very unfair, forcing a much larger expenditure unpredictably on people based on when an appliance malfunctions. And how long will it take to get the new appliance working, how long will people be without hot water or heat, while waiting for PG&E to sign off on the new electrical wires running from pole to house because the house has only a 60 amp or 100 amp service, common for many older homes.

You and PG&E keep making natural gas more expensive, so why not allow economics to influence people to trade in their natural gas appliances? Over time, most people will give up their gas appliances. Why not simply allow them to make the choice, and upgrade when they are ready?

Get off your high horse and quit forcing this down people's throats. A little patience goes a long way.

Katherine Hughes
Los Altos, CA

Jennifer Elwell

From: Katherine Robinson [REDACTED]
Sent: Sunday, February 5, 2023 7:42 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

I urge you to please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially in the lungs of children.

As a mother of two young children, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Thank you,
Katherine Robinson
Menlo Park Resident

--

Katherine Robinson
[REDACTED]

Jennifer Elwell

From: Kathy Kerridge [REDACTED]
Sent: Monday, February 6, 2023 3:10 PM
To: Jennifer Elwell
Subject: Rules 9-4, 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please pass this on to the board members
Dear BAAQMD Board members,

There is air pollution from many sources all around us. I, my husband and my daughter and her family all live in Benicia near a refinery. Both myself, my husband and my grandchildren all suffer from asthma. I realize that there are many sources of pollution, and the board must act on as many as they legally can. Fortunately reducing pollution from gas appliances can not only protect our health, but if the replacement appliances are electric will have multiple benefits.

We installed a heat/cool pump a couple of years ago, and an electric water heater even before that. We have solar and have been very pleased with the savings from this combination. We have also been happy with the heat/cool pumps ability to keep our home both warm and cool. We never thought we would need an air conditioner, but increasingly we do. Getting rid of our gas furnace and gas water heater has been a win/win for us. Our PG&E bill this month is substantially lower than what other people are paying.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death, estimated by UCLA to be about 350 deaths per year. Even though this regulation will not affect stoves it has a beneficial impact on air pollution.

My only complaint about the proposed regulations is that they will take too long to be implemented.

Heat/cool pumps and electric water heaters may be the only option available to meet these regulations at this time. Switching to electric appliances would also be a huge benefit in reducing one of the most harmful GHGs – methane. The quickest way to have a meaningful impact on climate change is to reduce methane. I know that is not the intent of this rule, but it could be a very beneficial side effect. Having heat/cool pumps in communities is also a way to address one of the biggest dangers of climate change-heat waves. Heat waves are deadly and impact the elderly and poor the most.

I hope that the Air District is doing everything that it can to get state and federal money to help low income people pay for the change. There are ways to install these without having to redo an electrical panel. Once a heat/cool pump is installed it is cheaper to operate. If it is combined with a solar system it gets even cheaper. Over the long run this will save people money, save contractors building residential and commercial business money (if they don't have to put in gas line), and help save a habitable planet for future generations.

Sincerely,

Kathy Kerridge

Jennifer Elwell

From: Katie Rueff [REDACTED]
Sent: Saturday, February 4, 2023 1:34 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Katie Rueff
[REDACTED]

[REDACTED]

Palo Alto, California 94303

Jennifer Elwell

From: Kelly.Porter [REDACTED]
Sent: Monday, February 6, 2023 2:41 PM
To: Jennifer Elwell
Subject: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces and appliances, with electric furnaces and appliances. I am against implementation of the proposed rules.

My home is located in a heavily forested area in Redwood City, somewhat near Skyline Blvd. Historically, every year, my neighborhood has experienced a material number of power outages lasting 12 hours to several days, due to trees falling during inclement weather, roadway accidents which take down power poles, and more recently during PG&E shutdowns due to elevated fire risk. Eleven such outages have occurred in the past 36 days alone.

During these outages, I am able to keep the house in a habitable state by running propane-fueled appliances. Forcing me, along with millions of others, to replace these propane-fueled appliances with electric versions, is prohibitively expensive. This is especially true for low-income and elderly residents, for whom the burden of such a replacement mandate will be severe.

The Palo Alto Daily Post says that the goal of the proposed rules “is to reduce ... nitrogen oxides ... (which can) irritate airways and worsen respiratory diseases.” Moreover, “an electric heat pump system would cost about \$8,027 to buy and install compared with \$5,096 for a gas furnace — a difference of \$2,931. Buying and installing an electric water heater would cost about \$852 more than a gas water heater. If the home is older and needs an electrical panel upgrade to support the new appliances, that could add about \$4,256 to the cost.”

I am against this ban. Please don't make health choices on my behalf, and please don't spend thousands of dollars of my (and my fellow citizens') hard-earned money. However, if the district chooses to move forward with this appliance ban, I urge the commission to consider those of us who are less than fully served by 100% or even 99% PG&E power uptime during the year.

I would suggest a simple rule amendment would be that if, over the previous 2-5 years, a home has experienced an average of at least 24 hours of outage annually then it may receive an appliance installation

waiver permitting gas/propane appliances. Surely less than 1-2% of PG&E customers are in a similar position with so much electricity downtime, so such a rule would have a negligible impact on the district's goals.

Thank you for your consideration,

Kelly

Kelly Porter

[REDACTED]

Redwood City, California 94062

San Mateo County homeowner

Jennifer Elwell

From: Kevin Hearle Ph.D. [REDACTED]
Sent: Saturday, February 4, 2023 2:04 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Kevin Hearle Ph.D.

[REDACTED]

[REDACTED]

San Mateo , California 94402

Jennifer Elwell

From: Kevin Ma [REDACTED]
Sent: Monday, February 6, 2023 11:25 AM
To: Jennifer Elwell
Subject: Comments: Support for Amendments to Rule 9-4 and Rule 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Staff and Board of Directors,

As a resident of Santa Clara County, I write in support of the proposed amendments to Rules 9-4 and 9-6, on restricting NOx emissions from furnaces and water heaters.

Research, as staff has presented, shows the health impacts from existing gas-based technologies. While newer buildings under stricter building codes are moving to all-electric technologies, those residing in older buildings would still be exposed to the dangers of gas appliances, impacting disinvested communities the most. Therefore, the air district must send a clear signal that changes must be made by a set timeframe to reduce health costs and negative effects on lives.

There are other benefits to the proposed regulations, including introducing more cooling technologies to residents as warming spells frequent the area more, as well as addressing greenhouse gas emissions, whose current climate effects are strengthening wildfires and associated smoke.

With this step, we would be pioneers on a path of which the state (via CARB) and the nation (via CPSC) are looking towards. And it would be great if BAAQMD can organize efforts with local jurisdictions and CCAs to ensure rollout of electric technologies can go smoothly.

Sincerely,
Kevin Ma
Mountain View

Jennifer Elwell

From: Kim Messmer [REDACTED]
Sent: Friday, February 3, 2023 11:17 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Kim Messmer
[REDACTED]

[REDACTED]

Santa Clara, California 95051

Jennifer Elwell

From: Kristie Eglsaer [REDACTED]
Sent: Friday, February 3, 2023 11:35 AM
To: Jennifer Elwell
Subject: Comments on the proposed amendments to Rule 9-4 and 9-6 and Draft EIR

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Sewell and BAAQMD Board Members,

I support the Air District setting zero-NOx emissions standards for home furnaces and water heaters and in support of Rules 9-4 and 9-6.

I am very much in favor of the switch from gas to electric. Last summer we had a gas leak at the duplex where we rent. Fortunately we just happened to open the door where the meters are and smelled it, and the company came out right away.

In the apartment complex where my mother recently lived, she had multiple gas leaks in the last year and was awoken by her carbon monoxide detector going off in the middle of the night. She ended up moving.

Neither of us are able to make the choice to switch from gas to electric on our own since we rent.

Challenges

I understand these types of policy decisions are complex. For the idea to actually be implemented, I encourage the district to anticipate and get ahead of challenges to implementation.

Support Workforce Development

There is a skilled labor shortage. It would be great for the district to explore ways to support workforce development like supporting job training programs starting in high school and community colleges or providing child care support for those in training or on the job. Also, cities could allow trainees to get hands-on on-the-job training during Public Works and other city projects.

Find Funding

The IRA and Bipartisan Infrastructure bills include funds to update the aging grid and support electrification. Communicating what rebate programs exist that homeowners and building owners can tap into would also be very helpful.

Aging Electrical Grid, Reduce Demand and Retrofit

Palo Alto is facing the challenge of an aging electrical grid to meet their climate goals:

<https://www.paloaltoonline.com/print/story/2022/03/11/can-citys-aged-electric-grid-handle-climate-change-goals>

In addition to investments for updating the grid, Palo Alto is considering switching to advanced metering infrastructure, or smart meters, to help reduce peak demand. In addition to these type of things, the district can explore encouraging things like retrofitting older buildings so they use less energy in general.

I look forward to the switch to electric for the health and safety of humans and the planet!

Thank you for considering my comments!

Sincerely,

Kristie Eglsaer
San Mateo, CA

Jennifer Elwell

From: Lacey Hicks [REDACTED]
Sent: Friday, February 3, 2023 7:17 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Lacey Hicks

[REDACTED]

[REDACTED]

Fremont , Texas 94638

Jennifer Elwell

From: Lada Adamic [REDACTED]
Sent: Thursday, February 2, 2023 10:10 AM
To: Jennifer Elwell
Subject: comment on Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Air District Board,

I write to urge you to not ban the sale of new gas appliances.

The environmental benefits are small, given that emissions from these appliances are a small percentage of total, as per the attachments provided.

The studies of health effects are not mature nor large scale enough for now. Waiting a few years for more conclusive studies to come in, rather than making such a drastic change based on little data and simulations, would avoid mistakes that could erode public trust. In the meantime we can invest resources in other approaches, e.g. bolstering active transportation and education on indoor air quality, that have a more solid basis.

Thank you for your attention.

Sincerely,

Lada Adamic
Mountain View, CA

Jennifer Elwell

From: Larry Thompson [REDACTED]
Sent: Monday, January 30, 2023 7:17 PM
To: Jennifer Elwell
Subject: Gas Furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please do not ban gas furnaces, it will not help improve air quality.
Thank you!
Concerned Citizen

Jennifer Elwell

From: Lawrence Deng [REDACTED]
Sent: Friday, February 3, 2023 9:14 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Lawrence Deng



NONE

San Jose, California 95120

Jennifer Elwell

From: Leana Rosetti [REDACTED]
Sent: Monday, February 6, 2023 4:10 PM
To: Jennifer Elwell
Subject: Rule 9-4 and 9-6 comments

Follow Up Flag: Flag for follow up
Flag Status: Flagged

[REDACTED] appears similar to someone who previously sent you email, but may not be that person. [Learn why this could be a risk](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am an environmental biologist in Oakland. I have been advocating for the electrification of our buildings for several years now, as it is the most impactful thing I think we can do locally to combat climate change. It is also an immediate health issue, as research has shown alarming statistics about the pollution and impact of gas appliances in our homes. Burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Leana Zang-Rosetti

Jennifer Elwell

From: [REDACTED]
Sent: Friday, January 20, 2023 11:51 AM
To: Jennifer Elwell
Subject: Regulation 9 Rule 6 Gas hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD

First, let me say I believe the Climate Crisis is real and needs to be addressed. That said your proposed rule to stop sales of gas domestic water heaters is a terrible idea. When your water heater goes out, it is an emergency, and you call a plumber. Plumbers are used to this and the respond quickly. Under the proposed rule, if your heater is gas, now you will also need an electrician to run a new dedicated heavy-duty circuit. Electricians don't typically have "emergency service", so it may be days before they come. Because this new circuit will require a dedicated circuit breaker, a building permit will probably be required. If you live in an older home, more extensive (and expensive) modifications may be required to the electrical service to handle the increased load. People who live in smaller older homes (who can least afford it) will be the most effected. **A much better way to handle this conversion to electric would be to work with local governments to require it on sale of the home when it's not an emergency and funds are available.**

Leif Ortegren
Petaluma CA

[REDACTED]

Jennifer Elwell

From: Lewis paris [REDACTED]
Sent: Monday, February 6, 2023 12:32 PM
To: Jennifer Elwell
Subject: Gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED] Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear CARB I am a senior living in rural San Mateo Co. We loose electric service so much now if it was not for our ability to have these appliances we could not heat our homes have hot water and the ability to cook food, the cost would kill us to replace and pay electric bills on our fixed income.Please stop this insanity,the electric grid seems to be failing us now ,we can't reasonably rely on it, we need these other sources of energy. Thanks Lewis Paris

Sent from my iPhone

Jennifer Elwell

From: Linda Chin [REDACTED]
Sent: Sunday, February 5, 2023 8:54 PM
To: Jennifer Elwell
Subject: Gas water heater and furnace

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Board,

We urge you to limit mandatory electric appliances to new construction and remodels only. We have lived in Los Altos for 32 years and have undergone 3 remodel consisting of bathrooms and kitchen. We recently added solar at which time the electrician told us if we were to add any more electric appliances, we need to request from pge an upgrade of the power line and increased electrical power to the house. This would require trenching the front yard and a cost of around \$20,000. He also said the application process is now running over a year. Do you realize there are many homes in our area that are older or have not been upgraded? Can you imagine the backlog of electrical upgrades this would cause, as well as the expense to those on limited incomes? Your decision has a huge impact and unintended consequences. Please be judicious in your decision.

Thank you,
Linda Chin
Los Altos

Jennifer Elwell

From: Linda Tolosano [REDACTED]
Sent: Wednesday, January 18, 2023 9:58 AM
To: Jennifer Elwell
Cc: [REDACTED]
Subject: Ban on Gas in Bay Area Homes

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I was alarmed to read an article in the San Francisco Chronicle about the ban of natural gas in homes.

We are retired seniors who own a home that was built in 1956. In order to comply with the proposed regulations, we would have to upgrade our electrical system, replace the furnace and water heater. How do you expect seniors on a fixed income to comply? Are you going to subsidize changes you are demanding? Because it would be very expensive for us to bring our house into compliance.

I'm all in favor of the regulations for new construction, but you are asking too much of people who live in older homes.

Please consider what you are asking people to do before you approve these new regulations.

Thank you,
Linda Tolosano
[REDACTED]

Jennifer Elwell

From: Linh Dan Do [REDACTED]
Sent: Friday, February 3, 2023 7:36 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I am a mother of 2 young children, and a resident of Menlo Park, and I have been increasingly alarmed by the effects on health and environment that result from gas appliances - effects that we see right here in California.

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Linh Dan Do

[REDACTED]

[REDACTED]

Menlo Park, California 94025

Jennifer Elwell

From: Linnea WICKSTROM [REDACTED]
Sent: Monday, January 23, 2023 7:24 PM
To: Jennifer Elwell
Cc: Linnea WICKSTROM
Subject: Comment: Bay Area Air Quality Management Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

TO: Jennifer Elwell
Bay Area Air Quality Management District

RE: Air District staff is proposing amendments to [Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces](#) and [Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters](#). These rules govern point of sale emission standards for small, typically residential and commercial, water and space heating systems. Emissions of nitrogen oxides impact local and regional air quality and contribute to the formation of ozone and secondary particulate matter.

Yes, all new construction should be fully electric. And with solar at least for market-rate housing , all public buildings, and all businesses.

But, given that your concern is for indoor air quality:

- Why not simply require that all new gas furnaces and water heaters in existing houses be adequately vented to the outside? That could happen a lot sooner, with a lot less expense and furor.
- Why not require all-electric heat and hot water for the largest users: apartments and businesses?

If you proceed to ban sales of gas furnaces and water heaters in existing houses after 2029 and 2027 respectively, how will you:

- Accommodate seniors who do not want to or are unable to spend \$10-\$30-\$50K * cash or in increased utility bills (latter if local utility carries the purchase and installation costs and adds re-payment to utility bills)
- Accommodate disabled people in same situation as seniors, above?
- Regulate permitting and inspection in cities famous for complex and lengthy processes?
- Regulate permitting and inspection in cities in which many contractors refuse to work due to city requirements?
- Regulate easements in cities in which side/back easements will not allow some installations?
- Provide for grid enhancement when strains are already showing just due to EV charging?
- Support homeowners who may be required to tear out converted garages that currently accommodate gas furnaces and water heaters?
- Support homeowners who would have to provide/add a conditioned room (of at least 800 cubic feet and 80 square foot footprint) for a heat-pump water heater (increasing the load for the heat-pump replacement for the gas furnace)?

Linnea Wickstrom

Palo Alto, CA

cc. Assembly Member Marc Berman, State Senator Josh Becker

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street
San Francisco, CA 94105

Jennifer Elwell

From: Lisa Cohen [REDACTED]
Sent: Friday, January 20, 2023 4:27 PM
To: [REDACTED]; Jennifer Elwell
Subject: NO FORCED INSTALLATION OF ELECTRIC WATER HEATERS AND FURNACES

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Miss Elwell,

It is absolutely unacceptable for an unelected agency or any entity to impose a ban on natural gas powered water heaters and heating systems and to force their replacement with electric heaters and furnaces.

It will pose a hardship for low income individuals and people that are on a fixed income.

Is causing economic hardship inconsequential to you as long as you can virtue signal?

Natural gas is one of the cleanest forms of energy available to mankind.

Pray tell, where is all this electricity going to come from? Coal fired power plants?

My husband and I hesitantly voted for Ray Mueller assuming he might represent us. Clearly not if he supports this.

Do SMC Supervisor Noelia Corzo, Santa Clara County Supervisor Otto Lee, Belmont Vice mayor Davina Hurt, and

Mountain View Councilwoman Margaret Abe-Koga put virtue signaling ahead of the best interests of their constituents?

I hope that the people and groups I have bcc'd reach out to you with their sentiments so that you all reconsider implementing this tyrannical decree that will injure so many.

I will encourage as many people as I know to speak out against more California tyranny that falsely cloaks itself in environmental fallacy.

Best regards,
Lisa Cohen
Menlo Park

Jennifer Elwell

From: Lisa Taner [REDACTED]
Sent: Monday, January 30, 2023 12:22 PM
To: Jennifer Elwell
Subject: NO to Gas Appliance Ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

Our city made movements in the direction to have residents ban gas appliances. For a region which prides itself on 'equity' such a ban fails to consider the costly conversion for elderly, people on fixed incomes, or those who are living paycheck to paycheck. The information gleaned from one our of City Sustainably Commissioners last summer (see below) may be a bit outdated if you now have more than ample rebates - but my feeling is that there will still be large costs for homeowners/landlords to bear.

GOT GAS APPLIANCES? YOUR POCKETBOOK COSTS COULD BE AT LEAST \$17,500

But, it is the homeowner who will pay the costs to remove the gas appliance and replace it with an electric appliance. There are costs to upgrade and/or add electric circuit panels, finding space to install such panels, increasing electric service with PG&E (dealing with overhead/underground wiring replacements), and rewiring a home for circuit placement. This could be at least \$17,500 for a 1400 square foot home.

Rebates from the state can be unreliable. The pool of state money set aside as rebates for homeowners who convert a gas furnace to an electric heating system expired in May 2022. It expired a few months after it was made available. Its replenishment date is unknown.

After installation there is the cost of 100% electric bill versus the costs of a utility bill that is both electric and gas.

*The costs of converting an existing home from gas to electric appliances could make economic sense for those homes with **large** gas bills. This could help ensure rebates are available for those who would most benefit from the gas to electric conversion and reduce green house gas emissions.*

Further, taxpayers have had enough forced on them - even in the name of being green. Why is the removal of choice even considered? Go to the big guys with deep pockets - large factories and commercial buildings. Our local refineries can't seem to get their environmental acts together, and I know a person who used to inspect businesses to be sure they were not creating environmental hazards. This friend quit because there was so much 'looking the other way' going on, the job was impossible. Residents have done so much - we drive cars that made a huge difference (low emission or electric), we observe Spare the Air days, we use electric leaf blowers and on and on...Resident homeowners are not the bad guys, but we feel like we are and the punishment is this forced change.

The absolutely pathetic 'findings' that the electrical grid will work out in conjunction with this change is laughable. Just last year there were concerns that the grid couldn't handle charging all the electric cars, and now we are talking about so much more. Countless articles underscore the size of the challenge, including problems created by solar storage, the inability for transformers to bear loads, the shortage of new transformers and the enormous costs associated for the 'preparation' to fill increased demand - like this Governing article last May, analyzing Silicon Valley and its cities (<https://www.governing.com/next/californias-grid-isnt-ready-for-fully-electrified-homes>):

Even rooftop solar and battery storage units can create problems because when they produce more electricity than used, they overload transformers.

"There are places even today where we can't even take one more heat pump without having to rebuild the portion of the system. Or we can't even have one EV charger go on," said Tomm Marshall, assistant director of utilities, at a recent meeting of the city's Utilities Advisory Committee. "If we go out and begin heavily promoting electrification ... we're going to be just chasing our tail trying to keep up," he said.

Modernizing the entire grid, quickly, is cheaper in the long run, but there's a big upfront cost: **about \$160 million, by one preliminary estimate**. If financed over 30 years at an interest rate of 3.2 percent, it would cost about \$11 million a year. It means replacing virtually all of the 800 transformers that serve single-family homes, using experienced linemen and "bucket trucks." More transformers might be added. An estimated 20 percent of secondary distribution lines and 25 percent of feeder lines also would need upgrades. Some poles may need to be stronger. Newly introduced technologies would enable power to flow in different directions. And because the whole city will rely on electricity, new controls, fuses and detection systems are needed to make the grid more resilient and quicker to restore.

In addition to cost, this poses several major challenges. Due to supply chain problems, there aren't enough transformers. And competition is fierce for energy engineers and linemen, who have special skill sets and years of training. Even before the planned scaleup, 18 of 68 positions in the city's electrical operation and 5 of 15 linemen jobs are empty.

The Progressive tail is, as usual, wagging the dog. We can do much without removing CHOICE. It's no wonder people are leaving California in droves. Taxation, removal of choice with development and now our appliances? Enough is enough.

Sincerely,

Lisa Taner

Jennifer Elwell

From: Lisha Mainz, D.C. [REDACTED]
Sent: Monday, February 6, 2023 4:57 PM
To: Jennifer Elwell
Cc: Richard Jekat
Subject: Fwd: BGRA: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Subject: BGRA: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

ref: [Monday's the last day to submit comments on rules to replace gas furnaces and water heaters with electric appliances – Palo Alto Daily Post \(paldailypost.com\)](#)

To: jelwell@baaqmd.gov

Subject: BGRA: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

(I)

My home is located in the heavily forested area of San Mateo County relatively near Skyline Rd. As such, annually we have historically experienced a consequential number of power outages due to trees falling during inclement weather, roadway accidents which affect power poles, and more recently during PG&E shutdowns due to elevated fire risk. These outages frequently take more than 24-48 hours to resolve. For example, since the last day of this past December, I count eleven (11) days during which my home experienced an outage, virtually all exceeding 12 hours with the longest exceeding 84 hours (yes, 3+ days without electricity).

During these outages, I am able to keep the house in a habitable state by running a modest propane home generator which powers the fan on my 95% efficient propane furnace (which includes a secondary heat exchanger to accomplish that level of efficiency) and my propane gas water heater which only needs electricity for the control system and to power the pilotless ignition system.

If in the future I am forced to replace these appliances with electric versions (even efficient heat pump systems), these appliances will require high amperage 220V electricity which would require a whole home generator installation that reasonably could be expected to provide 20+ kW of service as opposed to my modest portable generator. This is not to mention that my home has a second furnace on the second story which is not remotely close 220V panel access so is going to require very significant wiring cost to upgrade along with necessitating an even larger home backup generator.

If the district chooses to move forward with this appliance ban, I urge the commission to consider those of us who are less than fully served by 100% or even 99% PG&E power uptime during the year. I would suggest a simple rule amendment would be that if, over the previous 2-5 years, a home has experienced an average of at least 24 hours of outage annually then it may receive an appliance installation waiver permitting gas/propane appliances. Surely less than 1-2% of PG&E customers are in a similar position with so much electricity downtime, so such a rule would have a negligible impact on the district's goals.

(II)

I do have a secondary observation which perhaps the commission has not considered: there are many of us who have gas/propane furnaces for heating who do not have home air conditioning installed. Those of us in this situation have heretofore simply tolerated the hot weather which has become more frequent due to global warming. But virtually every home furnace heat pump of which I am aware is designed to be run as an air conditioner (cooling system) during warm weather by simple reversal of the pump direction. A heat pump is just an air conditioner running the opposite direction. Surely an unintended consequence of this proposal significantly underestimates the amount of new peak Summer cooling demand which all of these newly installed A/C units will require. That is to say, by mandating electric heat pumps, the district will effectively be mandating that every home have an installed central air conditioner which is likely to be used at the very time that PG&E most wishes to lower peak electricity demand.

Thank you for your consideration,
Lisha Mainz & R. A. Jekat
San Mateo County homeowner

Jennifer Elwell

From: L. R. Jensen [REDACTED]
Sent: Wednesday, January 18, 2023 11:25 AM
To: Jennifer Elwell
Subject: Proposed Amendments of Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Jelwell:

This email is written with the intention that it be a public comment regarding the currently proposed amendments of Rules 9-4 and 9-6 regarding natural gas powered furnaces and water heaters.

I am writing from the perspective of a 63 year old life-long Bay Area resident that has owned two older homes during my lifetime.

The first home I owned, in San Jose, was built in the 1920's and was extensively remodeled in about 1980. When we went to install an electric powered hot tub in 1995, we were informed by our electrician that we would need to upgrade the electrical panel - it did not have the capacity to handle the extra load. The cost at the time to upgrade the electrical panel was over \$2000. The process took several weeks, with most of the delay involving obtaining permits, obtaining PG&E authorization, and getting the permit signed off.

The current home I own was built in 1947 and is located in Oakland. Two years ago, our gas power water heater failed. Fortunately, we were able to find a plumber that was able to replace it in less than 24 hours with a minimum of fuss and expense (less than \$1,000 total).

I am an environmentalist and laud the drive to reduce uses of carbon-based fuels. However, I can see a disaster for many brewing with your proposed rule amendments, based on my own experience.

Totally foreseeable scenario: Sale of gas water heaters banned. Homeowner's water heater fails. After a couple of days of no hot water, homeowner informed that an entirely new electrically powered water heating system will need to be installed instead. Electrician informs homeowner that the home's electrical system is already taxed by the office equipment supporting his home office and other appliances, and will need to be upgraded. Process of obtaining permits and PG&E authorization undertaken. Homeowner lives FOR MONTHS WITHOUT HOT WATER while electrical panel upgrades are pending. Instead of spending around \$1,000 to have a replacement hot water heater installed, homeowner spends well in excess of \$5,000 for an upgraded electrical panel and a new electric hot water heater.

The same scenario is foreseeable with respect to a failed natural gas furnace. Except it would cost A LOT MORE to convert to an all electric central heating system (at least \$4,000 just for the heat pump installation). Add to that the cost of a new electrical panel and possible additional electrical wiring and possibly additional ducting. The homeowner could

easily spend \$10,000 AND BE WITHOUT HEAT FOR MONTHS waiting for permit issuance and sign off, and PG&E authorization.

Now I am going to add the perspective of a residential landlord. Under applicable law, residential landlords are required, under the "warranty of habitability," to, among other things, provide heat and hot water to their tenants. They are subject to being sued for failing to do so and also can lose the ability to collect some or all of the rent if unable to do so. I can just imagine the scenario: A single mom that has rented out her home temporarily due to being transferred by her employer to an out of state location. The gas powered furnace fails. The homeowner/landlord can not provide heat so the tenant stops paying rent. It takes MONTHS AND OVER \$10,000 to replace the old furnace with a new electrical unit and upgrade the electrical panel and, on top of that, she has incurred \$10,000 in attorney's fees defending against a habitability lawsuit filed by her tenants, plus she has not collected \$15,000 in rent and has therefore been unable to make her mortgage and property tax payments and loses the house to foreclosure, costing her over \$200K in lost equity.

You people need to consider rules within the confines of what is realistic. These proposed rule amendments will wreak havoc on the lives of regular people (the wealthy will have no problem adjusting, they never do - - but they are only a small percentage of the population).

For the foregoing reasons, I OPPOSE the proposed rule amendments.

As an alternative, I would advocate that a rule be passed that prohibits installation of gas appliances in new residential construction.

As another alternative, I would advocate that homeowners be motivated by carrots rather than sticks. That is to say, instead of foisting the huge cost of the conversion to electric appliances on homeowners, a program be created that partially subsidizes conversion from gas to electric heat and water. There is a model program in the state's Earthquake Brace & Bolt program, which on average covers 15% of the cost for a homeowner to perform a standard earthquake retrofit on an older home. It is a popular program and regularly "sells out" of allocated funding. The same type of program could be rolled out for electric appliance conversion, and should include additional funds for electrical panel upgrades and related permits where an electrician certifies the need for same.

Thank you for your consideration,

Lawrence R. Jensen

[REDACTED]

[REDACTED]

Jennifer Elwell

From: Lynn & Neil RANSICK [REDACTED]
Sent: Friday, January 20, 2023 12:29 PM
To: Jennifer Elwell
Subject: Proposed ban on gas water heaters and furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

In a city like San Francisco most of the homes were built well before 1970. They are not equipped to run electric water heaters or furnaces without costly changes to their electric panels and the wiring to these appliances.

Also the cost of electricity is considerably more than natural gas. PG&E just raised their electric rates to prohibitive levels.

The electric grid can barely handle the current requirements without brownouts and blackouts.

It is horrifying to think that you are considering requiring existing homeowners to switch to electric when their appliances need to be replaced. Require new homes to be all-electric if you must make a change and leave existing homes alone.

I appreciate the spirit of idealism, but I don't think you are fully considering the negative and extremely costly impact upon the citizens you serve.

Lynn Norris

[REDACTED]
S.F. [REDACTED]

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 4:59 PM
To: Jennifer Elwell
Subject: I Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am a member of many climate organizations and am very concerned about the rising level of GHGs. Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

[Add personal message] According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

[Additional talking points below] This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Magi Amma

Jennifer Elwell

From: Malcolm Post [REDACTED]
Sent: Wednesday, January 18, 2023 4:51 PM
To: Jennifer Elwell
Subject: Re: do NOT ban gas unless...

You don't often get email from [REDACTED]. [Learn why this is important](#)

Thank you Jen. Just for my records, how is it possible that the Board will consider an item that is not actually implementable from a technological perspective. Setting aside the very real concern about how to produce enough "green" megawatts (what a profound waste if every incremental megawatt isn't "green," right?), we all know delivery is literally impossible. You don't deliver, say, 400 amps of service through 200 amps of infrastructure ... you all understand this, right? And for their part, PGE doesn't have the local infrastructure either.

How do you mandate something that is impossible? Perhaps we should ask our friends in Texas if they have any cold weather experience with this kind of thing?

On Wed, Jan 18, 2023 at 1:03 PM Jennifer Elwell <jelwell@baaqmd.gov> wrote:

Malcolm,

Thank you for providing your public comment on this matter, it has been received and will be included in the record. Responses to all comments received will be compiled and posted on our website in advance of the board meeting at which this item will be considered.

Jen Elwell

Rule Developer

From: Malcolm Post [REDACTED]
Sent: Wednesday, January 18, 2023 10:49 AM
To: Jennifer Elwell <jelwell@baaqmd.gov>
Subject: do NOT ban gas unless...

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer

Do not ban gas unless you are prepared to pay to upgrade the electrical infrastructure in my building. The current bill in today's dollars is approximately \$35-40K.

I'll be expecting a check from you if you proceed.

Oh, you should also have a crystal-clear plan for how CA will be able to produce enough RELIABLE electricity to make this happen. As you *should* know, the technology and infrastructure don't exist right now. Your pie in the sky (and, candidly, sanctimonious) edicts are tiresome.

"Can we have heat tonight guys?" "Mmm, not looking good... it's been cloudy and calm for days now. Let's just huddle around the living room lamp."

"Can we have hot water tonight? I'd like to bathe the children." "No, not tonight, Honey. Rolling blackouts because it's been too windy out."

Other than that, you all are doing terrific work.

Malcolm Post

San Francisco

From: Marilyn Barrett [REDACTED]
Sent: Monday, January 23, 2023 7:49 PM
To: Marcy Hiratzka [REDACTED]
Subject: BAAQMD ban on natural gas in homes

Hi Marcy Hiratzka,

I am writing to you in your position of Clerk of the Boards, Executive & Administrative Resources as I wish to make a comment on an issue to be addressed at the upcoming board meeting on March 15. I could not find a place on the BAAQMD website to leave my comment. If there is a place to leave comments please refer me to it.

I read an article in the SF Chronicle that the Bay Area Air Quality management district plans to ban natural gas in homes. My issue with this proposal is that the supply of electricity to our homes is not guaranteed. At least once per year we lose the supply of electricity to our homes either due to winter storms or pre-emptive concerns over fire danger. Th electricity might be off for a few hours or many days. The loss of natural gas to our homes will make them unlivable during those times. Having hot water allowed me to survive 5 days without electricity – with the addition of a propane camping stove to cook and heat from a wood burning stove. Those who can afford to do so, have installed gas generators in order to cope with the loss of electricity. Others have installed solar panels but are still beholden to the main electrical grid. I would ask you to consider the uncertainty of the electrical supply before making your ruling. Perhaps taking to time to work with PG&E so that the supply of electricity is more reliable. I also wonder why the agency is not working with business to reduce the use of gas. Seems that would make a bigger change. Is the agency targeting homes because homeowners are an easier target?

Thank you for addressing my concern.

Marilyn Barrett
[REDACTED]
Mill Valley, CA 94941
[REDACTED]

Jennifer Elwell

From: Marilyn Smith [REDACTED]
Sent: Friday, February 3, 2023 10:35 AM
To: Jennifer Elwell
Subject: Please Support phasing out natural gas

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

We recently paid to have more electrical boxes put in our house to support moving to all electric. We had an induction stove, an electric dryer, an electric hot water heater, a heat pump furnace (all installed in 2022) and I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Marilynn Smith

[REDACTED]

[REDACTED]

San Jose, California 95127

Jennifer Elwell

From: Mark Grossman [REDACTED]
Sent: Friday, February 3, 2023 8:04 AM
To: Jennifer Elwell
Subject: Rule 9-4 and 9-6 for citizens' health

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I urge you to support the proposed zero-emissions standard to phase out gas appliances.

We now know that burning natural gas produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Mark Grossman
[REDACTED]

[REDACTED]

Palo Alto, California 94301

Jennifer Elwell

From: Mark Hoffberg [REDACTED]
Sent: Saturday, February 4, 2023 8:49 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.


Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Mark Hoffberg
[REDACTED]



PALO ALTO, California 94303

Jennifer Elwell

From: mark reifkind [REDACTED]
Sent: Monday, February 6, 2023 4:20 PM
To: Jennifer Elwell
Subject: Ban of Natural gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern

This is to let you know as a 50 year resident of the Bay Area and a San Jose homeowner for 23 how adamantly I oppose this ban on natural gas appliances. It's patently absurd. The actual costs, right now, of replacing these appliances is far more than is described in the Mercury News today and it will only get worse.

We cannot adequately supply our electric needs right now, how will it be possible to do so if ALL the gas appliances are replaced in 6 years? Not to mention where will all the installers come from and how long will the permitting process take? And then the state is planning to replace the gas and diesel cars with electric too?

No one with any sense believes your estimate of 2.2 % increase of use on the grid

If this goes through I most certainly will move and take my tax dollars with me

Again I cannot tell you strongly enough how much I oppose this idea

Respectfully

Mark Reifkind

Mark Reifkind
Master Instructor
GiryaStrength.com

Jennifer Elwell

From: psientist0 [REDACTED]
Sent: Monday, February 6, 2023 3:50 PM
To: Jennifer Elwell
Subject: Ban on gas appliance replacement

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The ban on gas appliances is not supported by sound science. Computer generated forecasts of earth warming have failed and not met their targets.

California does not have the infrastructure to produce enough electricity to run new electric appliances for all California residents. This ban is a disaster in the making.

-Marsha Adams-

*Keep an open mind. The highest form of ignorance is when you reject that which you know nothing about, **or call it a conspiracy.***

BUT, Never underestimate the creative power of ignorance.

Jennifer Elwell

From: Mary Dateo [REDACTED]
Sent: Thursday, February 2, 2023 11:04 AM
To: Jennifer Elwell
Subject: I Support Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers, I'm a resident of Mountain View. We've been able to electrify our home, for which I'm thankful. I strongly support rules 9-4 and 9-6 to address the unhealthy NOx situation inside of homes. I'm troubled to hear that low-income communities and communities of color are most affected by this indoor pollution / health risk; electrified appliances made available in an equitable manner will help address this. Further, the cooling provided by heat pumps will allow more people to shelter in place inside their homes during hot fire seasons, when outdoor air quality can be so bad. Please set strong safeguards, to eliminate gas appliances in homes. Regards, Mary Dateo

Jennifer Elwell

From: Mary Gilles [REDACTED]
Sent: Monday, February 6, 2023 5:00 PM
To: Jennifer Elwell
Subject: Do Not Ban Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

This is absurd and will not move the needle on the issues we have with climate change.

MARY GILLES, Realtor
Golden Gate Sotheby's International Realty Menlo Park Office
[REDACTED]

Jennifer Elwell

From: Mary Lou Meeks [REDACTED]
Sent: Saturday, February 4, 2023 9:25 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Mary Lou Meeks
[REDACTED]

[REDACTED]

Palo Alto, California 94303

Jennifer Elwell

From: [REDACTED]
Sent: Monday, January 23, 2023 9:59 AM
To: Jennifer Elwell
Subject: Ban on gas water heaters and furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

In a city like San Francisco most of the homes were built well before 1970. They are not equipped to run electric water heaters or furnaces without costly changes to their electric panels and the wiring to these appliances.

Also the cost of electricity is considerably more than natural gas. PG&E just raised their electric rates to prohibitive levels.

The electric grid can barely handle the current requirements without brownouts and blackouts.

Do not ban.
Marilu Donnici

Sent from my iPad
Mary Louise Donnici
Sr. Loan Officer
Pacific Bay Lending, Inc.

[REDACTED]



Jennifer Elwell

From: Mary Porter [REDACTED]
Sent: Monday, February 6, 2023 2:49 PM
To: Jennifer Elwell
Subject: Ban on Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am strongly opposed to your proposal to ban gas home furnaces and water heaters. This should be left up to individual cities and not the Bay Area Air Quality Management District.

You are putting seniors and others on fixed incomes in a position not of their choosing when they may have to replace a broken appliance and have to pay more for an electric than a gas appliance. I don't think enough research has been done on the health issues associated with gas. We know some of the data supporting this change has not been sufficiently vetted.

Please do not enact this ban. Fine to give subsidies to help people finance the switch over when they choose to, but don't impose it on us.

If you do enact the ban then you must give complete compensation for the change over. Many houses were plumbed for gas in the early 2000's because developers thought gas appliances was the way to go. Now we have a trend in the opposite direction. But houses can't just switch over. I have read of instances where PG&E could not service these homes that switched their appliances to electric from gas. You are creating a real hornet's nest for the future by enacting any sort of ban. There is more to it than just switching out an appliance from gas to electric.

Do NOT pass this BAN of gas furnaces and water heaters.

Thank you,
Mary Porter

Jennifer Elwell

From: mary schumacher [REDACTED]
Sent: Friday, February 3, 2023 9:39 PM
To: Jennifer Elwell
Cc: Me
Subject: Ban on Gas appliances concerns

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I am concerned about the changes in requirements for electric appliances to replace gas appliances. I am confused about the new rules. Do I have to change all my appliances to get whatever rebates there might be? Who caps off the gas? Will there be informed guidance for people to ask for help with these restrictions? I saw a company was available to help guide people, but you have to pay them for that service. Can any electrician do this work? Are permits required for all work? Will there be enough rebates and offsets available? What are the time periods for asking for these monies? How is the word going to get out to all the homeowners and citizens?

Thank you for asking for people's concerns. These are some of my concerns for how these changes affect me as a homeowner with gas appliances.

Sincerely,
Mary Schumacher
[REDACTED]

Sent from [Mail](#) for Windows

Jennifer Elwell

From: Mats Lundgren [REDACTED]
Sent: Monday, February 6, 2023 4:04 PM
To: Jennifer Elwell
Subject: WUI: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

The general idea here is good but my strong recommendation is to exempt properties that are in WUI and/or Unincorporated San Mateo County.

I live along Bear Gulch Road in such an area (WUI and Unincorporated). Due to the impact of climate change the winter storms are now more frequent and cause multiple days of power outages. I have attached one recent example where power was out for 77h.

Unfortunately this is the new normal and it will likely be another 20 years before PG&E has been able to get the power lines underground to deliver reliable electrical service during the winter storms (when heating is critical).

I believe an analysis will show that if dwellings in Unincorporated SMC and/or WUI (Wildlife Urban Interface) were exempted it will have a very small impact on BAAQMD overall goal.

The beautiful nature with the trees we are surrounded by makes a real contribution every day to healthier air in the Bay Area.

Thank you for your consideration,


Mats Lundgren
San Mateo County homeowner

Current Outage Status:

Power is restored

Current As Of: January 8 | 6:26 PM PST

[Report An Outage](#)

 **POWER WAS RESTORED ON JANU**
7:56 PM PST - 8:11 PM PST

Our preliminary determination is that
was caused by an equipment issue.

Start time

January 4 | 3:20 PM PST

Estimated restoration

January 8 | 9:00 PM PST

Jennifer Elwell

From: Maureen Galindo [REDACTED]
Sent: Monday, February 6, 2023 2:35 PM
To: Jennifer Elwell
Subject: Gas Replacement

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

The mandatory ban on natural gas appliances troubles me. Once again, the government is stepping in to take away our choice of energy use. I believe it would be far better to allow us to choose between gas and electric use in our homes. With incentives, some citizens might decide to switch to electric, but it should be a choice.

For many families gas appliances are preferred because of their efficiency, convenience and cost. Our energy costs continue to climb and the use of only electric appliances will just exasperate the problem. Already inflation has affected our grocery budget, fueling prices, etc. Higher energy bills will not help the lower income families.

I find that the efficiency of gas is also more reliable. The storms we experienced in December and January left many of us with power outages for hours at a time. Relying on an electric oven or stove, one is unable to cook. In addition, a family is unable to use electric heaters and are left in the cold because the state has discouraged wood burning fireplaces as well.

Please reconsider the ban on natural gas appliances; allow the citizens to choose the energy source they prefer.

Sincerely,
Maureen Galindo

From: Maureen Kennedy [REDACTED]
Sent: Monday, February 6, 2023 2:04 PM
To: Marcy Hiratzka [REDACTED]
Subject: No ban on new gas appliances

The proposed ban on new gas appliances will unnecessarily increase the cost of living in this area which is already too high. A resident should be able to replace a gas appliance with another without having to retrofit the building to accommodate electric replacements. The high cost of housing is one of our area's highest concerns and this will only increase it. Please do not approve the rules that will require the conversion of gas furnaces, water heaters and stoves to electric.

Thank you,
Maureen Kennedy
[REDACTED]
Palo Alto, CA 94301

Jennifer Elwell

From: meg minto [REDACTED]
Sent: Monday, February 6, 2023 4:46 PM
To: Jennifer Elwell
Subject: gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Monday 6 Feb '23

Very strongly opposed to the plan to phase out gas appliances.

I'm an asthmatic, but I've never had any problem from gas appliances.

You are probably aware of the excellent WSJ January 27th edition article. I can't say it any better than that.

Given my age I might be out of here before any of these dates hit, if they do hit, but what would be the situation for old people who are struggling financially and then have to make this expensive change? Would they be exempted?

Already I am living in a house with no gas. We have a good electric hot water heater that somebody rigged up. We have a washer dryer that is too complicated in its effects on other appliances for us to be able to use. We don't use microwave ovens (once when I did, a fuse blew). We don't use any space heaters. We are just very cold.

Again, very strongly opposed,

Meg Minto
Palo Alto

Jennifer Elwell

From: Megan Micco [REDACTED]
Sent: Monday, February 6, 2023 1:41 PM
To: Jennifer Elwell
Subject: Please set setting a zero-NOx emissions standards for home furnaces and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

My name is Megan Micco and I am a third generation Berkeley Native. As the 2023 climate action committee chair for the Bridge Association of Realtors, I am very concerned about reducing emissions. Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death. I have asthma and my mother died of a rare primary central nervous system cancer last year and exposure to indoor toxins, as we are now learning, are correlated with both those conditions.

Despite installing a new high end gas range in my home less than five years ago, I will be moving to induction this year. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. **Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.**

Sincerely,

Megan Micco | Broker Associate



Representing real estate on unceded Lisjan homelands in Huichin



BERKELEY | OAK | SF | NY | LA | DC | BOS | MIA | THE HAMPTONS | ASPEN

Attention: I have not and will not verify any information contained in documents prepared by other people/third parties.

Jennifer Elwell

From: mb [REDACTED]
Sent: Monday, February 6, 2023 1:37 PM
To: Jennifer Elwell
Subject: Proposed ban on Gas appliances.

Follow Up Flag: Flag for follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I disapprove of banning gas appliances with electric ones. I believe that gas appliances work fine and during the two electric outages this year, we were able to have dinner by completing our preparation on our gas stove. I do not believe there is significant indoor air pollution from home furnaces, water heaters, etc. any more than any other appliances we may be using. In addition, I do not think it is feasible or desirable to force people en mass to use electricity, particularly when we don't have a clear plan on making enough electricity available for all the electric cars that people will be running and charging all over the state. Too, forcing older individuals who have been in their homes for tens of year to replace appliances with more costly equipment is not only unreasonable, it is unfair. If you are building a new home, that is one thing but another when you are aging in place. Please be realistic and sensible about forcing these changes.
Melanie Bieder

Jennifer Elwell

From: Melanie Cross [REDACTED]
Sent: Friday, February 3, 2023 7:04 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Melanie Cross

[REDACTED]

[REDACTED]

Palo Alto, California 94306

Jennifer Elwell

From: Meldan Heaslip [REDACTED]
Sent: Monday, February 6, 2023 2:58 PM
To: Jennifer Elwell
Subject: No NOx - Yes Please - Support Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Meldan Heaslip and I live and work in Kensington, CA. I own a consulting company that employs 30 people working in the engineering sector. I earned my BS degree at UC Berkeley in climate and energy.

I am writing to thank you for your incredible work, to congratulate you on the many successful projects the BAAQMD has fought for and executed, and to urge you to support rule 9-4 and 9-6.

These are exciting times as we see technical solutions to many of our environmental issues not only in development but in production at scale. In the case of efforts to replace the need to burn gas in buildings, we have appliances such as heat pumps for heating and cooling and induction stoves for cooking available now at prices close to their gas-burning equivalents.

We know that burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

What is exciting to me about this rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thank you again for your hard work, my congratulations to you for all the great successes you have accomplished, and please support this rule.

Best wishes,
Meldan

Jennifer Elwell

From: John Doe [REDACTED]
Sent: Saturday, February 4, 2023 8:12 PM
To: Jennifer Elwell
Subject: Draft gas furnace and water heater requirements

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Greetings Ms. Elwell—I read parts of the Executive summary for the draft BAAQMD recommendations for residential gas furnaces and water heaters and wish to make a few comments as an older resident in the Bay Area with both a gas water heater and furnace. I can understand tightening the NO2 requirements and am supportive of that, with perhaps a slightly longer window for implementation. I believe that the move and assumption that the zero requirements would make people switch to electric is too drastic for such a short window of time to the end of the 2020s. This would involve an outlay of money which older residents may not have (we are having a special line put in for a new garage door opened and know that's a stretch for us right now as there is also the cost of the garage door—over \$4,000). Putting in a circuit for electric in addition to needing to buy new water heater or furnace would be very expensive, too. Grants, etc. might be offered to certain people, but there is the requirement of having to fill out paperwork and deal with bureaucracy, which can be really frustrating.

I am very supportive of pro-protecting our environment and do not use electric can openers or have a clothes dryer aside from our clothes line outside and in the garage. Seems that there are many ways to improve our air quality and combat climate change. I know these methods may be termed “old-fashioned” but they do work.

So again, the point is a request for a longer extension of time (to mid/late 2030s perhaps instead of end of 2020s 2030)) to switch to electric or even solar with battery water heaters or furnaces (since that's what the draft report says is the “real” end product of its recommendations); thank you for reading. Take care.

Cheers!
Melodie Lew
[REDACTED]

Sent from [Mail](#) for Windows

Jennifer Elwell

From: Michael Closson [REDACTED]
Sent: Sunday, February 5, 2023 10:45 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Michael Closson
[REDACTED]

[REDACTED]

Menlo Park, California 94025

Jennifer Elwell

From: michael demoss [REDACTED]
Sent: Friday, January 20, 2023 8:39 PM
To: Lisa Cohen
Cc: [REDACTED]; Jennifer Elwell
Subject: Re: NO FORCED INSTALLATION OF ELECTRIC WATER HEATERS AND FURNACES

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Superintendent Mueller,
I put YOUR election sign in front of my house on Santa Cruz.
My wife & I voted for you, because we believed you to be reasonable.
Mandatory elimination of gas in homes and businesses is NOT reasonable.
Renewable energy is NOT YET Reliable or Affordable.
The electric grid cannot handle the increased electric use if gas is banned. Remember Newsom told us to "hold off" on charging our electric cars!
Newsom has had to rely on ships anchored in the bay to supplement electricity.
The warning signs are EVERYWHERE!
I want you to promote and vote for VOLUNTARY electric conversion.

That is the REASONABLE decision.
I know that you agree.
Thanks you,
Mike & Maureen DeMoss
Important: Call me if you disagree, at [REDACTED]

Sent from my iPhone

> On Jan 20, 2023, at 4:26 PM, Lisa Cohen <israeleisha@gmail.com> wrote:
>
>
> Dear Miss Elwell,
> It is absolutely unacceptable for an unelected agency or any entity to impose a ban on natural gas powered water heaters and heating systems and to force their replacement with electric heaters and furnaces.
> It will pose a hardship for low income individuals and people that are on a fixed income.
> Is causing economic hardship inconsequential to you as long as you can virtue signal?
> Natural gas is one of the cleanest forms of energy available to mankind.
> Pray tell, where is all this electricity going to come from? Coal fired power plants?
> My husband and I hesitantly voted for Ray Mueller assuming he might represent us. Clearly not if he supports this.

> Do SMC Supervisor Noelia Corzo, Santa Clara County Supervisor Otto Lee, Belmont Vice mayor Davina Hurt, and Mountain View Councilwoman Margaret Abe-Koga put virtue signaling ahead of the best interests of their constituents?

> I hope that the people and groups I have bcc'd reach out to you with their sentiments so that you all reconsider implementing this tyrannical decree that will injure so many.

> I will encourage as many people as I know to speak out against more California tyranny that falsely cloaks itself in environmental fallacy.

>

> Best regards,

> Lisa Cohen

> Menlo Park

Jennifer Elwell

From: michael demoss [REDACTED]
Sent: Monday, February 6, 2023 4:23 PM
To: Jennifer Elwell
Subject: Update to gas ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

California is becoming well know as an “out of control” and “overreaching” extreme state.

The decision to ban gas:

- 1) Is not based on ALL available scientific analysis.
- 2) Will cause people and businesses to leave California.
- 3) Will result in the same catastrophe that Texas experienced when Wind and Solar energy failed during cold weather.

Please table this ban until electricity is reliable and affordable.

We all want to protect the environment. Banning gas will only make California life more expensive and unpredictable.

Conversion to electricity must be a “VOLUNTARY” decision . . . BECAUSE it is NOT based on Science; it is an ideologically based decision, based on a one-sided analysis of the impact on the environment.

Banning gas is a WRONG DECISION for this time.

My advice: Do more research and listen to different experts.

Remember: Every expert has an equal and opposite expert.

Thank you,

Michael DeMoss, Attorney
Menlo Park

Sent from my iPhone

Independent Assessment of BAAQMD Rule 9-4 and 9-6 Costs to California Homeowners with Inadequate Electric Panels

Michael R Kapolnek

Master of Science in Mechanical Engineering, University of Illinois at Urbana-Champaign

Senior Staff Engineer, Retired, Lockheed Martin Corporation

January 7, 2022

Summary

The Bay Area Air Quality Management District (BAAQMD) has proposed amendments to Rules 9-4 and 9-6 that will require that failed gas-fueled space and water heaters be replaced with units that emit no Nitrogen Oxides starting in 2027. Given current technology, only electric appliances can meet that standard. Those rule amendments will force up to 1.8 million Bay Area homeowners to undertake expensive, time-consuming upgrades of their main electric service panels in order to restore heat or hot water to their homes after their gas-fueled units fail. They will need temporary housing during the months-long upgrade process. The total homeowner cost of that temporary housing is very high, up to about \$20 billion. The BAAQMD staff report recommending these amendments failed to disclose this impact. The report also overstates the potential of 120V appliances to avoid panel upgrades. Even without accounting for temporary housing expenses, metrics contained in the staff report clearly indicate that the proposed amendments are not cost effective if a panel upgrade is needed. The amendments must be modified to exempt homes with inadequate electric service panels. Other programs should be implemented to update those homes.

Introduction

The Bay Area Air Quality Management District (BAAQMD) has proposed amendments to Rules 9-4 and 9-6 will require that failed gas-fueled space and water heaters be replaced with units that emit no Nitrogen Oxides starting in 2027 (Ref 1). Given current technology, only electric appliances can meet that standard. Those rule amendments will force up to 1.8 million Bay Area homeowners to undertake expensive, time-consuming upgrades of their electric panels in order to restore heat or hot water to their home after their gas-fueled units fail. They will need temporary housing during the months-long upgrade process.

The cost of that housing was not included in the December 2022 staff report recommending approval of proposed amendments. This assessment was undertaken to evaluate the scope of that unaccounted cost and identify other errors and inaccuracies in the report.

Background

In September 2022, the California Air Resources Board (CARB) approved the 2022 State Strategy for the State Implementation Plan (SIP) (Ref 2) which included a ban on natural gas-fueled space and water heaters starting in 2035. BAAQMD has proposed amendments to existing building appliance rules that will have the same effect, though start much earlier (Ref 1). No exception is made for homes without an electric service panel that can support the required electric appliances. Those homes must upgrade their

service panels and install zero emission replacement units in order to restore hot water or space heating.

Electric panel upgrade is a time-consuming process. One study referenced by CARB's 2022 Scoping Plan (Ref 3) indicates that it can take weeks or months (Ref 4). A key finding of another study referenced in the 2022 Scoping plan indicates that the upgrade process often exceeds six to nine months (Ref 5). Residents of those homes cannot be expected to live without heat or hot water for months. Temporary housing will be required. This very significant impact was not identified in the December 2022 BAAQMD Staff report on the proposed rule amendments.

Review of BAAQMD 2022 Staff Report on Proposed 9-4 and 9-6 Rule Amendments

The 2022 Staff Report ignored or minimized effects of the proposed building appliance rule amendments on homes without sufficient electric capacity to install the required zero-emission appliances. Appendix C of the December 2022 staff report on the proposed amendments (Socioeconomic Impacts) indicates that 1,776,310 Bay Area homes might require an electric panel upgrade in order to comply with the proposed amendments (Ref 1). There is no exception for homes requiring panel retrofits to support electric appliances in order to replace failed gas-fueled space and water heaters. These errors and omissions, which are critical to an informed decision on the amendments, are discussed below.

A. 120V Appliances

The December 2022 Staff Report argues that space and water heating for these homes can be accomplished using 'low-voltage' (120V) space and water heaters already on the market (Ref 1). The staff report incorrectly implies that 240V appliances likely require electric panel upgrades whereas 120V appliances do not. This is incorrect. Electric current requirement and branch circuit slot availability force panel upgrades. Operating voltage does not. 240V supply is available to many customers whose panel capacity is below 200A, the recognized panel capacity required for an all-electric home (Ref 6).

When a homeowner is forced to convert to electric space or water heating, the first consideration will be whether their electric panel has empty slots where a circuit breaker can be added to supply another load. If the main electric panel is already full, the next option is to reconfigure the panel by the addition of an electric subpanel which will allow for additional branch circuits. If a subpanel cannot be installed, a mini-split heat pump space heater cannot be used since all mini-split heat pumps require dedicated branch circuits (Ref 7). Most heat pump hot water heater manufacturers require a dedicated circuit for their units, although Rheem Corporation markets several low recovery rate units that can be powered by an existing circuit shared with other appliances (Ref 8).

In cases where a dedicated circuit can be added, the electric current capacity of the main panel must be checked. The City of Sunnyvale provides a worksheet to calculate required main panel capacity given the existing and projected loads on the panel (Ref 9). Presumably, other Bay Area cities have similar requirements. A branch circuit cannot be added to the main panel if the total current required by the existing and new circuits exceeds the total allowable load.

A benefit of 120V space and water heaters is that they consume less energy during operation, so they consume less of a limited main electric panel capacity than a typical 240V unit. Unfortunately, they also provide much less heating (half or less), so they are inappropriate for many homes.

Another benefit is the theoretical ability to plug the appliance into an existing, shared circuit. This is true only for heat pump water heaters. The National Electric Code requires dedicated circuits for heat pump space heaters (Ref 14).

A.1 Electric Space Heating Appliances

For a home that already uses a gas-fueled central heater, the best zero-emission replacement is a whole house heat pump system since its functionality and installation will be very close to the existing system. A reasonably sized home will need a 3 or 4-ton unit. These require 240V electric input and draw 30 to 45 amps (Ref 15 and 16). It is very unlikely that a low-capacity electric panel can support that energy draw.

The 2022 Staff Report argues that homeowners can replace a gas-fueled furnace with multiple 120V mini-split heat pumps, then use only one at a time based on which rooms are occupied. This is very unrealistic. BAAQMD staff cannot expect residents to restrict occupancy to the small area conditioned by a low-capacity heat pump. Beyond that, it takes time to heat an area that has been without heat for an extended time. Therefore, at least two systems would need to be active at once: the currently occupied area and the next area of expected use. The energy demand of simultaneously powered mini-split heat pumps combined with other home electric demands can cause a low-capacity main electric panel to exceed its capability.

Also, since all mini-split heat pumps require a dedicated electric circuit for each system, the existing main electric panel or sub-panel must be able to accommodate as many new circuits as the number of mini-splits required to heat the entire home, further eroding the likelihood that the existing main panel can accommodate conversion from a gas-fueled furnace to electric heating.

For a home that already uses a gas-fueled central heater, multiple mini-split space heaters are a kluge: an expensive, unsatisfactory stop-gap solution to a flawed appliance emission requirement plan.

A.2 Electric Water Heaters

Staff notes that 120V heat pump tanked water heaters are currently available. They fail to mention that the performance of these appliances is much less than a typical gas-fueled water heater. While the tank volume and operating temperature of the heat pump and gas-fueled water heaters are equivalent, the recovery rate of the 120V heat pump units is much less than the gas-fueled units. Recovery rate is a measure of the time required for the water heater to replace the hot water drawn from it (Ref 17). This can be an issue after several showers, or after using a clothes or dish washer. The shared-circuit heat pump water heater referenced in the staff report has a recovery rate that is only 32% of a typical gas-fueled unit (Ref 8 and 11). The dedicated circuit model recovery rate is much better, about 76% of the typical gas-fueled model (Ref 10 and 11). These performance differences could be an issue for large households, especially considering the shared circuit unit. Broad scope user experience data is needed to evaluate applicability of these appliances to the full range of Bay Area households.

Beyond performance limitations, these low-capacity water heaters cannot directly replace on-demand water heaters. Until recently, on-demand water heaters were touted as an environmentally friendly alternative to tanked water heaters, so their installation became more widespread. Replacing an on-demand water heater with a tanked water heater requires locating a suitable installation location for the water tank and re-plumbing the home. The 2022 Staff Report did not address this issue or the cost to replumb a home with an existing on-demand water heater system.

B. Temporary Housing Costs

Appendix C (Socioeconomic Impacts) of the December 2022 staff report (Ref 1) on the proposed amendments indicates that up to 1,776,310 Bay Area homes will require an electric panel upgrade in order to comply with the proposed rule amendments. There is no exception for homes requiring panel upgrades to support electric appliances in order to replace failed gas-fueled space and water heaters. Therefore, those homes must upgrade their electric panels prior to replacing burned out units. References 4 and 5 indicate lead times of weeks to months, often exceeding six to nine months. Residents in those homes will need to relocate to temporary housing during that long process.

The population-scaled average rent for a three-bedroom Bay Area home in 2021 was \$3651 per month (Ref 12). This value assumes temporary housing on par with the home that must be vacated during the panel upgrade. Note that the average rent called out in the staff report is for all rental units, including apartments.

Assuming an average panel upgrade lead time of three months, a temporary housing cost of \$10,953 per upgrade must be assumed when performing cost/benefit analyses. This is more than double the assumed \$4256 cost (Ref 1) of the panel upgrade itself. The area wide temporary housing cost would be $\$10,953 * 1,776,310 = \19.45 billion. Adding the cost to replace the panel, the total cost becomes $(\$10,953 + \$4256) * 1,776,310 = \$27$ billion.

C. Panel Upgrade Rate

Appendix C of the 2022 Staff Report (Ref 1) assumes equipment lifetimes of 13 years for water heaters and 18 years for space heaters. Based on the discussion above, some homes will be able to avoid a panel upgrade when installing a zero-emission water heater. Energy requirements for appropriately sized zero emission space heaters greatly diminish the chances that a panel upgrade can be avoided when replacing a gas-fueled furnace. Therefore, Bay Area utilities and the electric contractor base will need to upgrade all low-capacity electric panels within an 18-year period. 8000 upgrades will be required every month to upgrade the nearly 1.8 million homes that might require it. This is a very high rate. PG&E cannot handle the current demand for upgrades, which is the primary cause of months-long lead times imposed on customers whose upgrades are currently in process. Area utilities will need significant staff increases to handle the demand. The 2022 Staff Report does not address this issue at all, including its effect on electric rates.

The current Bay Area electrical contractor base is also likely insufficient to handle the required panel upgrade rate. An electrician will need at least one day to complete a panel upgrade. Therefore, a single electrician can accomplish about 20 upgrades each month. 400 Bay Area electricians will be fully occupied on panel upgrades for 18 years. The 2022 Staff Report does not address whether or how the contractor base can be expanded to fill this need.

If utility staffing and the electrical contractor base are not improved before implementing the proposed rule amendments, lead times for panel upgrades worsen. This will add to the already unacceptable temporary housing costs discussed above.

Cost-Effectiveness of the Proposed Amendments

Table 6-1 of the 2022 Staff Report (Ref 1) summarizes the cost effectiveness of the proposed amendments. For homes that require a panel upgrade, the space heating amendment cost effectiveness is almost \$200,000 per ton of emission reduction. The water heating amendment cost effectiveness is almost \$600,000 per ton of saved emissions. Neither value accounts for temporary housing costs during the long panel upgrade process. Accounting for that roughly triples the cost metrics to \$600,000 and \$1.8 million per ton, respectively. Compare these values to those documented in CARB's 2022 Scoping Plan Update for their proposed scenario (Ref 3 – see Table C-26). No CARB cost effectiveness metric exceeds \$1000 per ton of emission reduction. These indicate that forcing electric panel upgrades in order to install zero emission space and water heaters fails any reasonable cost-effectiveness test. That should have triggered staff to consider cost-effective emission reduction measures.

Also note that Table 5-1 of the 2022 Staff Report indicates that combined commercial and residential on-site Nitrogen Oxide emissions represent 7.5% of the total 2018 Bay Area Nitrogen Oxide emissions. The staff report does not attempt to separate commercial and residential emissions. The California Energy Commission's California Building Decarbonization Assessment (Ref 13) indicates that residences are responsible for 63% of building Nitrogen Oxide Emissions. Using that value, 4.7% of total Bay Area NOx emissions are from residences. The staff report indicates that up to 65% of Bay Area homes may need a panel upgrade. Therefore, those homes represent 3% of total Bay Area Nitrogen Oxide emissions. The proposed amendments will not completely eliminate those emissions since some portion of the electricity used to heat those homes will be provided by gas-fueled power plants. While any emission reduction is attractive, reducing less than 3% of Bay Area NOx emissions is insufficient justification for the \$27 billion cost imposed on Bay Area homeowners.

The 2022 Staff Report attempts to justify the proposed amendments by stating these emissions are a significant fraction of those from stationary sources and BAAQMD only has authority to address stationary sources. This is very poor public policy. A public agency should not impose extremely costly measures just because that is the only tool they have. BAAQMD should instead work with CARB and other state agencies to identify and implement cost-effective measures before resorting to expensive rules that address the last few percent of emissions.

Alternative Approaches

The State of California has adopted a strategy to minimize greenhouse gas emissions by substituting renewably-sourced electricity for fossil fuel combustion. Electrifying home heating is a key element of that strategy. Unfortunately, CARB and, now, BAAQMD are using that strategy to justify deeply flawed appliance emission standard rules. The proposed standards are appropriate only for those homes whose electric service panel can support the zero emission appliances required by them. Because no exception is made for homes without adequate electric service, residents of those homes will be forced to find temporary housing, at great expense, during the months-long panel upgrade process.

The large cost and hardship associated with temporary housing can be eliminated by relying on preemptive upgrades for homes with inadequate electric panels, instead of forcing upgrades as part of an emergency replacement. Alternatives are available and discussed below. Both assume that homes with inadequate electric service panels will be exempt from the natural gas space and water heater ban

until their panel is upgraded. The best method for accomplishing this is to use building codes to require zero emission appliances only for those homes that can support them without a panel upgrade.

A. Natural Upgrades and Incentive Programs

Homeowners typically upgrade their electric service panel when renovating or remodeling their homes. Installation of electric vehicle chargers also trigger upgrades and will become more common as new car sales transition to 100% electric. This will result in many preemptive upgrades. Incentive programs combined with education of climate benefits will further accelerate panel upgrades. Eventually, natural gas infrastructure retirement will force the remaining homes to upgrade their panels. This approach may not achieve the emission savings timeline assumed for the total gas heater ban, but the residual should be acceptable given that this subset of homes is responsible for less than 3% of area Nitrogen Oxide emissions.

B. Legislate Panel Upgrades

Local government bodies could legislate electric panel upgrades. Instead of a single deadline for all homes, the mandate should be rolled out on a county or city-level schedule to avoid overloading utilities or the contractor base as a deadline approaches. The total time span needs to account for the available contractor base and utility capability. An 18-year span would result in about 8000 area-wide upgrades per month, likely beyond the capability of contractor and utility staffing. Programs to increase the contractor base would probably be required regardless of the total time span. Legislation requiring utilities to staff up to meet demand would be needed.

This approach also offers an opportunity to streamline the upgrade process and minimize costs. The majority of affected homes are likely part of housing tracts built between the 1950's and 1970's where standard designs and design practices were used. Panel upgrade designs for those homes would be very similar. Batched permitting at the city level and batched utility approvals would minimize cost and schedule for those process steps. A single contractor could be hired to perform all upgrades within the tract. The utility would make all necessary infrastructure improvements in the tract as a single project instead of piecemeal depending on the order of their wait list. This 'assembly line' approach offers significant cost and schedule savings opportunities.

Upon Rental Unit Vacancy

In addition to the legislated upgrade process discussed above, or as a stand-alone, local governments could legislate panel upgrades for rental homes before a new tenant is allowed to move in. This legislation would be a strong incentive for landlords to preemptively upgrade their property before a tenant moves out since, otherwise, the property would be vacant for months while the upgrade process drags on.

Conclusions

The cost to homeowners that must upgrade their main electric service panel to accommodate zero-emission replacement space and water heaters is very high. Seventy percent of the expense is attributable to temporary housing required during the long panel upgrade process. The total

homeowner cost of that temporary housing is also very high, about \$20 billion. The BAAQMD staff report recommending these amendments failed to disclose this significant impact. The report also overstates the potential of 120V appliances to avoid panel upgrades. Even without accounting for temporary housing expenses, metrics contained in the staff report clearly indicate that the proposed amendments are not cost effective if a panel upgrade is needed. The amendments must to be modified to exempt homes with inadequate electric service panels. Other programs should be implemented to update those homes.

References

1. STAFF REPORT, PROPOSED AMENDMENTS TO BUILDING APPLIANCE RULES – REGULATION 9, RULE 4: NITROGEN OXIDES FROM FAN TYPE RESIDENTIAL CENTRAL FURNACES AND RULE 6: NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FUELED BOILERS AND WATER HEATERS. Elwell, Jennifer. Bay Area Air Quality Management District. December 2022. Available at: [Building Appliances \(baaqmd.gov\)](https://baaqmd.gov/BuildingAppliances)
2. 2022 State Strategy for the State Implementation Plan. 22 September 2022. California Air Resources Board. Available at [2022 State SIP Strategy \(ca.gov\)](https://ca.gov/2022/09/22/state-strategy-for-the-state-implementation-plan)
3. 2022 Scoping Plan for Achieving Carbon Neutrality. 16 November 2022. California Air Resources Board. Available at [2022 Scoping Plan Documents | California Air Resources Board](https://ca.gov/2022/11/16/scoping-plan-for-achieving-carbon-neutrality)
4. City of Berkeley. 2021. Existing Buildings Electrification Study. Available at: https://drive.google.com/file/d/10OY_USkF2MeoBkLXuzQEewpW8rAm-WTk/view
5. PG&E. 2022. Service Upgrades for Electrification Retrofits Study Final Report. CALMAC STUDY ID: PG&E0467.01. Available at: <https://pda.energydataweb.com/#!/documents/2635/view>
6. City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis Draft. 13 September 2018. TRC Energy Services. Available at [2019-palo-alto-reach-code-cost-effectiveness-20180914.pdf \(cityofpaloalto.org\)](https://www.cityofpaloalto.org/2019-palo-alto-reach-code-cost-effectiveness-20180914.pdf)
7. Mini Split Power Requirements (With Wire Size and Breaker Size). 18 November 2022. Rene Langer. PickHVAC Cooling and Heating Guide. Available at [Mini Split Power Requirements \(With Wire Size and Breaker Size\) - PICKHVAC](https://www.pickhvac.com/Mini-Split-Power-Requirements-With-Wire-Size-and-Breaker-Size)
8. Performance Platinum Plug-in Heat Pump Water Heater with Hydroboost (120V Shared Circuit) Specification Sheet. Rheem Corporation. Available at [D5F267A7-2E6D-4315-A9D4-BDD3A2815708.pdf](https://www.rheem.com/d5f267a7-2e6d-4315-a9d4-bdd3a2815708.pdf)
9. Residential Electrical Load Estimating. March 2021. City of Sunnyvale. Available at [New Electrical Panel Calc Study Issue.pdf](https://www.sunnyvale.gov/New-Electrical-Panel-Calc-Study-Issue.pdf)
10. ProTerra Heat Pump Water Heater (120V Dedicated Circuit) Specifications Sheet. Rheem Corporation. Available at [RH-PIHP-DC Plug-in-Heat-Pump-Dedicated-Circuit_0610.pdf \(rmc-cdn.s3.amazonaws.com\)](https://www.rmc-cdn.s3.amazonaws.com/RH-PIHP-DC_Plug-in-Heat-Pump-Dedicated-Circuit_0610.pdf)
11. Professional Prestige® Powered Damper Ultra Low NOx gas water heaters Specification Sheet. Rheem Corporation. Available at [D468186C-DABA-4E84-BE55-1C3D024055CB.pdf](https://www.rheem.com/d468186c-daba-4e84-be55-1c3d024055cb.pdf)
12. California Fair Market Rent for 2021 Accurate Rental Price Data. Rentdata.org. Available at: <https://www.rentdata.org/states/california/2021>
13. Building Decarbonization Assessment. 2021. Kenney, M., N. Janusch, I. Neumann, and M. Jaske. California California Energy Commission. Publication Number: CEC-400-2021-006-CMF. Available

at: <https://www.energy.ca.gov/publications/2021/california-building-decarbonization-assessment>

14. Dedicated Electrical Circuits. 25 May 2022. Timothy Theile. Available at: [Dedicated Electrical Circuits for Appliances \(thespruce.com\)](#)
15. Mr Cool 3 Ton 15 SEER 8.5 HSPF Complete Split Air Conditioning Heat Pump System Specifications. Home Depot. Available at [MRCOOL 3 Ton 15 SEER 8.5 HSPF Complete Split Air Conditioning Heat Pump System MXH1536AH36E - The Home Depot](#)
16. Mr Cool MX 4 Ton 14 SEER 8.2 HSPF Complete Split Air Conditioning Heat Pump System. Home Depot. Available at [MRCOOL MX 4 Ton 14 SEER 8.2 HSPF Complete Split Air Conditioning Heat Pump System MXH1548AH48C - The Home Depot](#)
17. What is a Good Hot Water Heater Recovery Rate? 13 November 2019. John C Flood. Available at [What is a Good Hot Water Heater Recovery Rate? \(johncflood.com\)](#)

Jennifer Elwell

From: michael kapolnek [REDACTED]
Sent: Monday, February 6, 2023 1:04 PM
To: Jennifer Elwell
Subject: Another public comment for March 15 BAAQMD Board Meeting to consider Building Appliance Rule Amendments

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ms Elwell,

Below is a second public comment from me to include in the docket for the March 15 Board Meeting.

Thank You,
Mike Kapolnek

The State of California has implemented laws and regulations that govern utility disconnections. They are intended to protect the safety and health of low-income customers facing financial or other hardships. Besides advance notice, these customers must be offered the opportunity to arrange payment plans before they lose the ability to heat their home. Rules governing customers with serious medical conditions are stricter.

The proposed zero-emission space heater rule amendments violate the intent of these laws and regulations. Many Bay Area homes lack the electric service capacity necessary to support zero emission space heaters. Retrofitting those homes requires weeks to months lead time, often exceeding six-to-nine months. Residents likely have no notice of a furnace failure. The proposed amendments forbid timely (one or two day) emergency furnace replacements. This is essentially a zero-notice, months-long gas service cutoff with no recourse for quick resolution.

If affected residents cannot find affordable temporary housing, they may be tempted to heat their homes using unsafe means. An October, 2022 Consumer Reports article states that an alarming number of Americans use a gas range to heat their home. Besides the safety hazards of the practice, it exposes residents to unhealthy indoor air.

Space heaters are another option for residents facing long delays in furnace replacement. The National Fire Protection Association reports that home heating equipment is a leading cause of home fire deaths. Space heaters were responsible for almost 90% of those deaths.

To summarize, forbidding timely emergency furnace replacement violates the intent of existing California laws and regulations and creates situations where desperate residents may use unsafe means to heat their home, possibly leading to loss of life.

The rule amendment assessment I previously submitted as a public comment discussed the exceedingly poor cost effectiveness of forcing electric panel upgrades before replacing a failed furnace. The discussion above reinforces the imperative to exempt homes that require a panel upgrade from the proposed space heater rule amendment.

Jennifer Elwell

From: Michael Kutilek [REDACTED]
Sent: Sunday, February 5, 2023 10:16 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Michael Kutilek

[REDACTED]

[REDACTED]

San Jose, California 95112-2368

Jennifer Elwell

From: Michael Wittig [REDACTED]
Sent: Friday, February 3, 2023 7:16 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Michael Wittig

[REDACTED]

[REDACTED]

SAN JOSE, California 95124

Jennifer Elwell

From: Mical Atz Brenzel [REDACTED]
Sent: Thursday, January 19, 2023 5:18 PM
To: Jennifer Elwell
Subject: Comment on Proposed Gas Appliance Ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ms. Elwell, I would like to comment on the proposed ban on the sale of new gas water heaters and furnaces being considered by the Bay Area Air Quality District.

I am appalled that such a ban would be considered without properly considering the harms that this would entail for tens of thousands of Bay Area residents, including me.

My home has both a gas furnace and a gas water heater. My home was built in 1950. Its electrical system can barely support the electrical appliances we currently have, and an electrician informed me just last month that in order to support anything like a gas water heater or an electric car charging station, I would have to substantially rewire my home, consolidating the three electrical panels currently in place into an upgraded one. He stated categorically that no licensed electrician would install any of these devices without such an upgrade being done. Such an upgrade, he stated further, would cost in the realm of \$35,000 or more.

If you prohibit the sale of new gas furnaces and water heaters, and I am unable to replace mine when they wear out, how do you propose I heat my home and have hot water? Will the Bay Area Air Quality District pay for the upgrade of my electrical system?

This proposal blithely places an unbelievable financial burden on anyone living in an older home in the Bay Area, and there are many, many of us. We do not have unlimited resources, unlike the federal government which seems to instigate these "global warming" mitigations.

Depriving residents of heat and hot water will not save the planet, but they will force middle class residents to have to sell their homes to wealthier individuals who will be able to rebuild them to meet these arbitrary new standards. Is that the goal of the Bay Area Air Quality District?

I will not even describe the problems that will ensue for the owners of multi-family properties, in which larger scale gas water heaters are a standard. Be prepared for outright property abandonment or radically higher rents.

Before imposing such a draconian ban on valuable, cost-efficient and NON-POLLUTING appliances, please consider carefully all of the ramifications.

Thank you very much,

Mical Atz Brenzel
Menlo Park

Jennifer Elwell

From: Michelle Hudson [REDACTED]
Sent: Wednesday, February 1, 2023 9:37 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am writing to you as a mother of two children who have asthma. They both grew up in a household with a gas stove (and other gas appliances) because I never knew any better. Until recently, that is.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thank you,
Michelle Hudson
Resident of City of San Mateo

Jennifer Elwell

From: Michelle MacKenzie [REDACTED]
Sent: Friday, February 3, 2023 9:20 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Michelle MacKenzie

[REDACTED]

[REDACTED]

Menlo Park, California 94025

Jennifer Elwell

From: mike smith <[REDACTED]>
Sent: Tuesday, January 24, 2023 3:17 PM
To: Jennifer Elwell
Subject: comment on proposed natural gas rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Sirs,

I am writing to express my opposition to the proposed ban on natural gas devices later in the decade. The plan, as described in the Daily Post, is too strict because it doesn't allow exemptions for emergency repairs. It's one thing to ask those building new homes or remodeling an existing one to comply. But what is going to happen to existing homeowners if their appliance stops working? Many older homes are not wired for the 240V that is needed for the electric appliances, and in many cases their service panel is also inadequate for the additional load. Do you really think it's fair to tell someone who has their hot water heater break they can't have hot water again until they have an electrician replace the breaker box and add 240V wiring?

Mike Thompson
Palo Alto, CA

Jennifer Elwell

From: Mira Chokshi [REDACTED]
Sent: Monday, February 6, 2023 11:06 AM
To: Jennifer Elwell
Subject: In Support of Regulation 9, Rule 4 and 6 to reduce NOx from residential furnaces and water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Mira Chokshi, and I live with my family in San Francisco. I am an environmental engineer by training and a current climate policy fellow. **I am writing to support your amendments to Regulation 9, Rule 4 and 6, to reduce emissions of nitrogen oxides (NOx) from residential furnaces and water heaters.**

Burning gas in buildings produces NOx and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

I have two young kids with highly sensitive respiratory conditions. On days with poor air quality, my 4-year old struggles to breathe and enjoy outdoor activities. The indoor air quality is also impacted by NOx generated from water heaters and furnaces, which will continue to affect my kids respiratory health indoors too. Furthermore, the NOx gases continue to warm the climate and exacerbate the climate crisis.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. **Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.**

Sincerely,

Mira Chokshi
San Francisco resident

Jennifer Elwell

From: Mitch Lerman [REDACTED]
Sent: Wednesday, January 25, 2023 5:24 PM
To: Jennifer Elwell
Subject: Banning gas water heaters and furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Ms. Elwell,

I'm in favor of reducing green house gases but...it would be a major upgrade to my house built in 1960 to go all electric. I'm not sure that going all electric is that much more environmentally friendly because much of our electricity is generated by burning natural gas. It isn't efficient to generate electricity from gas, transmit the electricity, and then turn it into heat. I get the promise of generating electricity from renewal sources but we're not there yet.

No one wants to go through a major electrical upgrade when a water heater or furnace fails. The time and cost is just not reasonable. I get that there might be some technology to reduce the cost but the circuit breakers in my house are located in a place that may not meet current building codes, so I would be looking at moving the electrical panel, upgrading to higher capacity/newer technology while my heat is off or no hot water.

I get the need to switch to renewal energy but there needs to be realistic view of how our electricity is generated and how to get houses converted.

Mitch Lerman

Jennifer Elwell

From: Nancy Burke [REDACTED]
Sent: Thursday, January 26, 2023 11:46 AM
To: Jennifer Elwell
Subject: Gas water heaters/furnaces

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To Whom It May Concern.

Recently, it came to my attention that California is looking at ending replacement of gas water heaters and furnaces in older homes. As a household living on a limited income; this would be untenable for us. The cost of switching to electrical appliances would be costly and likely prohibitive for our household and many others in Contra Costa County. Please reconsider the timeline of 2027/2029 and make exceptions for those who simply cannot afford the changes in electrical upgrades and appliances. Thank you.
Nancy Burke

Jennifer Elwell

From: Nancy Green [REDACTED]
Sent: Wednesday, January 25, 2023 4:36 PM
To: Jennifer Elwell
Subject: Proposed ban of Natural Gas is a very bad idea

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Banning natural gas powered home and water heating appliances is a cumbersome, expensive proposal, that will overburden our already stretched electrical grid. A serious, detailed analysis of the results of such a policy is in order.

Yet, I have not seen any detailed analysis from BAAQMD of the total actual installation or operating cost of this policy, nor a detailed analysis of how much electricity will be required, where the extra electricity will come from at the time that is needed, or what effect this will have on our already excessive electricity rates. Add to that an analysis of how many billions of dollars will be needed to upgrade the grid to support it.

According to the newspaper, this policy will increase state-wide electricity demand by 2.5%, which will be offset by new solar projects. That is not an analysis. A real analysis would show how many additional kWh would be required, on what days and at what time of day. Then please explain where those kWh will come from at those specific times. It will NOT come from solar power during the winter months. So, where will it come from?

People heat their homes in November, December and January and require more energy to heat them at night. Solar panels generate little to no electricity during those months, and absolutely none at night or when it is raining or overcast. I have a very large solar system and I can guarantee you that this is the case.

You say the cost will be about \$3,800k more for the heat pumps, while ignoring that many people would need to upgrade their electrical panels to support the heat pump. Others will have to install ducts to carry the heat.

Personally, it could easily cost me \$30k to \$80k! I don't have forced air heating. I heat my home with very efficiently with two natural gas fireplaces. I heat my water with an exceptionally efficient, small-sized tankless water heater. Under your plan, I would have to install duct work on my roof. I would have to upgrade my electrical wiring and probably install extensive new wiring. I would have to find a place large enough to put a heat pump water heater. I would have to add new piping to connect the hot water to my existing plumbing. Your idea is simply NOT affordable and NOT practicable.

As for the health issues you site, I have severe asthma and COPD. I have never experienced an exacerbation while spending time near a gas stove or near my tankless water heater when it is running. For me personally you would not be solving any problem.

DO NOT IMPLEMENT THIS POLICY.

Sincerely,
Nancy Green

[REDACTED]
Palo Alto, CA 94303-3113
[REDACTED]

Some references below, for your information:

<https://www.nytimes.com/2021/10/28/business/energy-environment/electric-grid-overload-solar-ev.html>

<https://www.fresnobee.com/news/local/article267995517.html>

<https://www.nytimes.com/2022/03/13/business/energy-environment/california-off-grid.html>

<https://www.nbcbayarea.com/news/local/california-power-grid-electric-vehicles/2993652/>

Jennifer Elwell

From: Nancy Haber [REDACTED]
Sent: Tuesday, January 31, 2023 11:16 AM
To: Jennifer Elwell
Subject: Support Adoption of Proposed Amendments to Rule 9-4 and Rule 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I'm writing in full support of the proposed changes to rules 9-4 and 9-6 requiring only zero NOx water heaters, furnaces and large commercial water heaters to be sold and installed by 2027, 2029, 2031 respectively, as well as the introduction of an ultra-low NOx standard to Rule 9-4 for furnaces starting in 2024. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

The risk raised in the EIR regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional and state electrification targets and reach zero net GHG emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed through the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment.

I urge the BAAQMD Board to certify the EIR and adopt these proposed rule changes as quickly as possible.

Thank you,

Nancy Haber

[REDACTED]
San Francisco, CA 94112
Member of 350 SF and SF Climate Emergency Coalition

Jennifer Elwell

From: Nancy Schneider [REDACTED]
Sent: Friday, February 3, 2023 5:35 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Nancy Schneider

[REDACTED]

[REDACTED]

San Mateo, California 94402

Jennifer Elwell

From: Nancy Westreich [REDACTED]
Sent: Monday, January 23, 2023 5:11 PM
To: Jennifer Elwell
Subject: Gas stoves/heaters/fireplaces

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms Elwell,

We are writing to ask the Board to consider the impact of a mandatory change to electric appliances from gas.

We have 2 points which we think should be considered:

1. We recently replaced a 20 year old furnace after it failed. We looked into getting an electric heat pump, but were told by several heating contractors that a heat pump would not warm our home if the outside temperature was 40 degrees or lower. The only way to fix that would be to install electric heating strips which would require an expensive major upgrade to our electrical system or to add a new gas furnace which would activate when the temperature dropped below 40. This winter, the temperature in our area has been below 40 degrees every evening and morning since November. All of the heating contractors strongly recommended the furnace approach since a heat pump alone would not be enough
2. Constant blackouts. In the last 12 months, PG & E has cut off electricity in our immediate area 7 times last summer due to their wildfire prevention system being triggered (there weren't any actual fires) and 3 times for about 12 hours each during the recent storms this winter. If we didn't have a gas fireplace, a gas water heater and a gas stove, we would have no heat during those freezing evenings and mornings, no hot water for showers and no way to make coffee or otherwise cook. These regular blackouts are no fun, but would be so much worse without any heat, hot water or ability to cook.

We know there are technical fixes such as expensive upgrades or Tesla outdoor batteries to deal with blackouts, but they are very expensive. The equipment that is out there today is not adequate to handle the power needs of our home at an affordable price. We ask that you take these concerns into consideration in enacting future regulations. Thank you.

Best,

Nancy and Glenn Westreich
[REDACTED]
San Anselmo, CA. 94960

Jennifer Elwell

From: Nate [REDACTED]
Sent: Saturday, January 28, 2023 4:14 PM
To: Jennifer Elwell
Subject: Mandate

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi my Nate and recently read a article about BAAQMD proposing to mandate heat pumps for home and water heating...about saving money.... What independent company did the analysis...We the people want a real analysis of the actual costs and infrastructure effects before adopting this proposal.. BAD idea ...sounds like a money grab.....for the rich.....

[Sent from the all new AOL app for Android](#)

Jennifer Elwell

From: Wmbned [REDACTED]
Sent: Sunday, February 5, 2023 11:51 PM
To: Jennifer Elwell
Subject: proposed natural gas rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you for the opportunity to submit comment regarding the proposed natural gas appliances ban:

As existing-home owners in Los Altos we would like to submit our feedback regarding the BAAQMD NG ban plan. We believe existing homes with gas appliance installations should be allowed to continue their use as long as replacement parts, servicing, and/or equivalent and efficient NG appliances are commercially available. There are three major issues concerning the proposed rush toward all-electric utilities and appliances via proposed new "reach code" regulation in the Bay Area and CA in general that need to be considered:

1. The economic burden for the average-income present homeowner to be forced to make the proposed transitions in the current environment has been described well by San Carlos City Councilwoman Sara McDowell recently regarding their Council's decision not to force electrification (as recently published in the Daily Post by Emily Mibach). The additional cost and complexity of converting existing homes to all-electric as well as both the short- and long-term reality of PG&E's continuing problems and viability (and the CA electric grid fragility in general) do not support the accelerated push toward a single-source clean energy solution. In addition, many existing homeowners would need to absorb significant remodeling costs to add interior and exterior electrical capacity for major all-electric heating and water heaters. Currently these all-electric units tend to be physically larger than NG equivalents for the same output/efficiency and require larger utility spaces and enclosure closets to accommodate.
2. The trend toward relying on a single home appliance energy source (namely PG&E electricity and grid), and California's continuing dependence on imported electricity from neighboring states to meet demand, means that the frequent or extended electricity outages we can expect will leave more homeowners with no back-up alternative for heating needs for safety, security, and health during electrical supply outages. In addition, the practical conversion of all homes to self-solar with required battery bank storage and capacity is a long way off.
3. Costs - Utility bills in CA are already the highest in the Nation (and in general higher than even the EU and ROW). This trend will not easily be reversed and will most likely accelerate unless there is a serious coordinated effort by energy and infrastructure providers and regulators to provide realistic and practical energy resources in future years..

Respectfully, Ned Kuypers, [REDACTED]

Jennifer Elwell

From: Niall Ferguson [REDACTED]
Sent: Monday, February 6, 2023 2:27 PM
To: Jennifer Elwell
Subject: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors,

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

My home is located in the heavily forested area of San Mateo County relatively near Skyline Rd. As such, annually we have historically experienced a consequential number of power outages due to trees falling during inclement weather, roadway accidents which affect power poles, and more recently during PG&E shutdowns due to elevated fire risk. These outages frequently take more than 24-48 hours to resolve. For example, since the last day of this past December, I count eleven (11) days during which my home experienced an outage, virtually all exceeding 12 hours with the longest exceeding 84 hours (yes, 3+ days without electricity).

During these outages, I am able to keep the house in a habitable state by running a modest propane home generator which powers the fan on my 95% efficient propane furnace (which includes a secondary heat exchanger to accomplish that level of efficiency) and my propane gas water heater which only needs electricity for the control system and to power the pilotless ignition system.

If in the future I am forced to replace these appliances with electric versions (even efficient heat pump systems), these appliances will require high amperage 220V electricity which would require a whole home generator installation that reasonably could be expected to provide 20+ kW of service as opposed to my modest portable generator. This is not to mention that my home has a second furnace on the second story which is not remotely close 220V panel access so is going to require very significant wiring cost to upgrade along with necessitating an even larger home backup generator.

If the district chooses to move forward with this appliance ban, I urge the commission to consider those of us who are less than fully served by 100% or even 99% PG&E power uptime during the year. I would suggest a simple rule amendment would be that if, over the previous 2-5 years, a home has experienced an average of at least 24 hours of outage annually then it may receive an appliance installation waiver permitting gas/propane appliances. Surely less than 1-2% of PG&E customers are in a similar position with so much electricity downtime, so such a rule would have a negligible impact on the district's goals.

Yours sincerely,

Niall Ferguson

San Mateo County homeowner

Jennifer Elwell

From: Pam Brigg McKown [REDACTED]
Sent: Sunday, February 5, 2023 12:02 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Pam Brigg McKown
[REDACTED]

[REDACTED]

El Cerrito, California 94530

Jennifer Elwell

From: Pascal Bruyere [REDACTED]
Sent: Friday, February 3, 2023 7:53 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

I am a renter and can not push my own choices, me and people in my situation need help to push things through this change. Old furnaces and appliances might be repaired, but new ones should all be electrical.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Pascal Bruyere

[REDACTED]

[REDACTED]

Sunnyvale, California 94087

Jennifer Elwell

From: Pat Lang [REDACTED]
Sent: Friday, February 3, 2023 7:38 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Pat Lang

[REDACTED]

[REDACTED]

Los Altos Hills, California 94022

Jennifer Elwell

From: Pat Marriot [REDACTED]
Sent: Monday, February 6, 2023 4:22 PM
To: Jennifer Elwell
Subject: I oppose the natural gas ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I believe climate change is real. I drive an electric car. I have solar panels and storage batteries. The gas ban doesn't take into account the huge conversion costs, including re-wiring one's home and adding solar panels. California already has power outages because we don't have enough electricity on the grid for current homes, let alone the thousands more Sacramento decrees we must build.

I agree with this letter to the editor.

2-6-23 PALO ALTO DAILY POST

Natural gas ban

Dear Editor: The Bay Area Air Quality Management District cited health risks to justify its proposal to ban gas heating appliances based on two non-scientific metadata research papers that say gas appliances cause childhood asthma, among other health threats.

Wall Street Journal columnist Kimberly Strassel has revealed (Jan. 27 edition) that no scientist was involved in either study. One was authored by non-scientist employees of the anti-gas, climate warrior Rocky Mountain Institute. The other was written by two attorneys at NYU's Institute for Policy Integrity — lawyers not scientists. A re-
[See LETTERS, page 8]

cent letter to the Daily Post suggested the metadata for the studies was cherry picked to achieve a desired result. The conclusion dictated the data, not the other way around. This is the essence of disinformation.

The proposed regulation should be withdrawn immediately. The board members who support it should resign.

Nancy Green
Palo Alto

Sincerely,

(Ms.) Pat Marriott Los Altos

Jennifer Elwell

From: PM Daeley [REDACTED]
Sent: Thursday, January 19, 2023 11:59 AM
To: Jennifer Elwell
Subject: Natural Gas Furnace/Water Heater Ban

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning Ms. Elwell,

In regard to a proposed ban on natural gas furnaces and water heaters, while I agree that we must find a way to reduce outdoor pollution, there is one major obstacle that must be overcome before we can implement the proposed natural gas bans.

I am not willing to go back to the rolling blackouts and brown outs of the early aughts. Our current and planned electric grid cannot even support the existing demands on its capacity, most especially in the warm months. How does the proposed ban address that issue? I have not seen any reports on reducing natural gas usage that have even mentioned this issue. It is one and the same with the wholesale adoption of EVs. We do not have the infrastructure to support a significant increase in demand for electrical power.

Any proposed regulation or legislation for banning natural gas usage must be required to also outline and fund the necessarily dramatic increase in capacity of our electrical grid. Perhaps we could have rolling implementation of natural gas bans as regional electricity production increases in each area.

To implement bans on natural gas without providing for increased demand for electricity is foolish and short-sighted. Perhaps individuals supporting these bans should make it through this next summer without air conditioning and go without dinner, there being no power for electric stoves. That will give them an experience of what it would be like without more electrical production capabilities in concert with natural gas bans.

Or perhaps, after the bans are in place, we will all re-experience rolling blackouts and realize what it is like to have no power, literally and figuratively.

Sincerely,
Patricia M. Daeley

Jennifer Elwell

From: Patrick [REDACTED]
Sent: Saturday, February 4, 2023 12:03 PM
To: Jennifer Elwell
Subject: BAAQMD's Proposed Building Appliance Standards

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Re: Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building

Appliance Rules 9-4 and 9-6

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

I am a concerned resident and homeowner in Fairfax, CA. I help lead climate organizations 350Marin.org and FossilFreeCA.org.

The science is clear: Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area

Sincerely,

J. Patrick Costello, Certified Financial Planner™

Fairfax, CA

Marin County

Jennifer Elwell

From: Paul Frantz [REDACTED]
Sent: Tuesday, January 31, 2023 3:45 PM
To: Jennifer Elwell
Subject: Comments on rule 9-4 and 9-6 updates

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am an asthma sufferer who can feel the difference in my lungs on bad air days. So, I am very much in favor of improving Bay area air quality.

That being said, I do not believe sufficient attention has been given to the costs homeowners will incur. In particular, your proposal does not address the fact that some homeowners' compliance costs will be far higher than the average cost. In my own case, I would expect the cost to run a 240V circuit to the water heater in the \$2500-\$3500 level, based on past electrical projects in my house.

The worst case is much higher: the two residences in my building share a 200Amp service panel. We have already added electric car charger wiring for both residences. If we add electric hot water and HVAC loads for both residences on top, we will probably need a service panel upgrade. And if that requires upgrading the underground service wire, that means trenching and repaving the driveway, plus concrete cutting and patching, and drywall work. It's probably at least a \$10,000 job.

Your rule change needs to include financing: help for low-income homeowners, and help, or an opt-out, for homeowners who can demonstrate that compliance would be unusually costly.

One final point: your analysis assumes everyone will choose a heat pump water heater. Because my water heater is next to the bedroom, the noise generated by heat pumps may force me to choose resistance heating, in which case, my energy costs will increase, not decrease.

Heat pumps for new construction seem like a good idea, but I expect you will see major opposition once the public understands how much your rule change on replacement water heaters and HVAC units will cost them.

Regards,
Paul Frantz, San Francisco

Jennifer Elwell

From: Paula Rochelle [REDACTED]
Sent: Friday, February 3, 2023 8:09 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Paula Rochelle

[REDACTED]

[REDACTED]

Saratoga, California 95070

Jennifer Elwell

From: pearl karrer [REDACTED]
Sent: Monday, February 6, 2023 2:55 PM
To: Jennifer Elwell
Cc: [REDACTED]
Subject: comments on ban of new gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bay Area Air Quality Managers:

Please consider these comments regarding the upcoming proposal to ban new gas appliances in our homes.

Our Bay Area is subject to earthquakes. We've been here since the 1960's and have seen the effects of them. In the 1989 Loma Prieta, 6.9, we lost power, but our gas stove, hot water heater, and heating to our home kept us and several neighbors warm.

Gas appliances also protect us from the rolling blackouts during heat waves, due to our poor electric grid.

Health issues have been put forth as reasons for the ban. Those studies did not involve trained scientists. I am 86 and have always lived with gas appliances. Moreover, as a good cook, a gas stove is far superior to an electric one.

We are being bombarded by government mandates. Home owners should be able to decide what appliance works best for them and fits their budgets.

Sincerely,
Pearl Karrer
Ed Karrer

Jennifer Elwell

From: Pedram Navid [REDACTED]
Sent: Wednesday, January 18, 2023 9:43 AM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6 Building Appliances Comment

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi,

I'd like to provide the following comment:

I live in a house in Farifax in Marin County that uses both a natural gas water heater and a natural gas furnace located in the crawlspace. Last year I upgraded the panel to accomodate an electric vehcile at considerable expense so I would be able to sell our gas-powered car. The cost for the panel, and the high-gauge copper, plus labor was around \$8,000 and required several months notice from PGE to shut of the power and get approvals.

To replace both our gas furnace and gas water heater would require yet another upgrade as our panel is at capacity. The cost of running high-gauge copper wire to the crawl space and water closet will likely cost thousands of dollars, on top of the cost of replacing the units. I understand the environmental concerns, but to force all homes to upgrade to electric will incur significant cost that will not easily be absorbed by most homes.

This will force people to either continue to operate less efficient gas units for a longer time, or to move out of their house. I urge the committee to consider the long-term ramifications to people and ensure there's a plan to address it.

Thank you
Pedram Navid

Jennifer Elwell

From: Peter Belden [REDACTED]
Sent: Monday, February 6, 2023 9:53 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for clean air and climate

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

I am writing as a resident of San Francisco. I urge you to support rule 9-4 and 9-6 to reduce NOx emissions from building appliances. As you know, burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,
Peter Belden
[REDACTED]
San Francisco, CA 94107

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 1:46 PM
To: Jennifer Elwell
Subject: Keep gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern,

Please do not require the replacement of gas appliances for the electrical appliances. This will be costly to many seniors who have lived in their homes for many years- and who vote.

Thank you for your kind attention.

Peter Garrison.

[Sent from the all new AOL app for iOS](#)

Jennifer Elwell

From: Peter Jon Shuler [REDACTED]
Sent: Saturday, February 4, 2023 12:25 PM
To: Jennifer Elwell
Subject: Opposed to Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell, and BAAQMD board and staff,

The January 18 article in the San Francisco Chronicle by Dustin Gardiner says the agency has seen very little pushback from the Bay Area in regard to the banning of natural gas water heaters and furnaces. Well, I am here to voice my strong opposition.

Look, I care about the environment and climate change. I've been a registered Democrat since I was 18. And so it pains me to find myself making common cause with right-wing lunatics. But this is what you get when you have elected officials and agencies falling all over themselves to prove themselves "the most progressive of them all" at the expense of their constituents.

Your proposed ban on gas furnaces and water heaters is just the latest example of governmental and regulatory agencies so eager to burnish their reputations and legacies with aggressive rules that they forget or ignore the real-life consequences on the little people that suffer the results of their decisions. As far as I can tell, the District's pushing ahead with this is as much about bragging rights than any real difference it will make.

The Draft EIR pays lip service to the disastrous results of this rulemaking, but then offers no solutions. Like most EIRs, this one tries to sound very logical and scientific, but the entire thing is based on wishful thinking and pixie dust.

Especially for those of us living at the mercy of PG&E, the electric grid is already a hot mess. It is already incapable of handling the current demand for electricity. We are subject to blackouts, or threats of blackouts, every time we turn around. We just experienced massive blackouts due to severe weather systems downing trees and disabling large portions of the grid.

In the summer, we have rolling blackouts and grid failures in our all-too-frequent hot spells. Even in seasonal summer conditions, we are warned and CHARGED EXTRA for running air conditioning at the times of day we need it most. During the fire season, we are subject to fire safety blackouts every time there's a forecast of hot and windy conditions. This Saturday's Chronicle article (February 4 by Claire Hoa - "All-electric future suffers whenever power goes out") makes some of the same points that also concern me.

Can any of you, with a straight face, assure me that all this will be better in four or five years when you plan to dump an even bigger load on the grid? If you claim that the grid will be able to support your absurd timeline, given PG&Es track record, you really are delusional -- or liars. And you know what will happen then? Prepare to see an even bigger proliferation of dirty, gasoline or propane generators.

Even your beloved "clean" electricity is dirty. For the most part, we're just sending our pollution somewhere else. Even so-called clean energy, as the DEIR admits, is ruining pristine wilderness with ugly wind farms and ugly solar farms. And as we increasingly depend on storage, we are stuck with the toxic practices associated with the mining, manufacturing and disposal of battery materials.

Every time you make new rules, you create new problems.

In addition, you would do well to take seriously the concerns of people like Mike Kapolnek, quoted in the January 18 article, about the cost of upgrading electrical panels and rewiring and retooling homes to make your plan feasible. I live in a modest Redwood City neighborhood with lots of little homes built long before the 1970s. The vast majority have gas furnaces and water heaters. And who lives in these homes? Senior citizens, ethnic minorities, people living paycheck to paycheck. Replacing a major appliance such as a furnace or water heater is already a huge hit for someone just struggling to hang on. Add thousands of dollars more and PG&E red tape to that and you are effectively pushing people over the edge and out of their homes. Some people have a little more means than others. It will likely cause financial pain and frustrating inconvenience all around. Most of us don't have thousands of dollars in extra cash to throw at your ego-trip rulemaking. Maybe we can just barely scrape by. But many will not be able to scrape by at all.

One final note about the January 18 Chronicle article. I know the Air Quality District and SPUR are separate entities. But I suspect the attitudes expressed by SPUR's Laura Feinstein are not far from what at least some of you are thinking. From her position of privilege, she dismissed concerns about the unintended consequences of these changes as "knee-jerk."

I was shocked to hear such a smug, arrogant comment from a local thought leader on these issues. It sounded a little too much like, "Let them eat cake!" She goes on to extol "relatively inexpensive" circuit sensors and smart current sensors and other technology. Relatively inexpensive to whom? She seems to forget that all this hi-tech junk and its installation costs real money to real people. Mostly to people who can least afford it.

The "solutions" proffered by all of the electrification advocates and experts are expensive, piecemeal and will take years if not decades to complete. Meanwhile, your deadline looms over the Bay Area like a sledgehammer.

Please reconsider this ill-conceived and ill-considered regulatory overreach. The DEIR states that the grid will be able to handle the burden of this new load by 2050. This is cold comfort. 1) Many of us will be dead by then, 2) What are the rest of us supposed to do in the meantime? The fact that you haven't considered that shows the contempt you have for the people you regulate.

Sincerely,

Peter Jon Shuler
Redwood City

Jennifer Elwell

From: Philip Haves [REDACTED]
Sent: Monday, February 6, 2023 4:05 PM
To: Jennifer Elwell
Subject: Proposed amendments to Rule 9-4 and 9-6 and Draft EIR

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I am Philip Haves and I live in Berkeley. I recently retired as a building scientist.

As you may know, burning gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. This one reason why I have just replaced my gas cook-top with an induction cook-top that has no such harmful effects. I am also about to replace the gas boiler in my home heating and hot water system with a solar-driven heat pump that will not produce local air pollution and will substantially reduce carbon dioxide emissions.

These rules are not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thank you for considering my request,

Philip Haves

Philip Ragozzino

[REDACTED]
San Francisco, CA 94124
[REDACTED]

January 30, 2023

Regarding: Regulation 9, rules 4 and 6, sections 301.5 and 303.5
Proposal to end the sale and installation of natural gas fired water heaters and furnaces.

To whom it may concern,

My wife and I are homeowners in San Francisco. We bought our new home in 1992 through a program for low-income residents sponsored by the San Francisco Mayor's Office of Housing. The house was built with both a natural gas fired furnace and water heater and still has similar appliances. I expect to have to replace them in the future.

We are opposed to proposed Rules 9-4 and 9-6.

We appreciate what you are trying to do by enacting these restrictions. I have read, with the limited understanding of a layman, the study on which your proposal is based and your conclusion - that the pollutants emitted by such heaters and furnaces causes asthma - is dubious.

Look, I am now a senior citizen and I have had asthma for almost my entire life - more than 50 years. I have been able to control it by adapting my activity level to minimize my exposure to asthma attack triggers like the severe but short-term air pollution which we had in San Francisco a few years ago from out of control wildfires, and also by avoiding other triggers like flowering plants, cigarette smoke, furry animals, dust, mold and high levels of personal stress.

As an asthmatic child, I lived in a house with a father who smoked, cats, flowering plants, some dust, and a lot of stress. The house also contained a natural gas fired water heater and oil burner.



However, since I moved out of that house, over 40 years ago, I have lived in eight other homes, all of which had both natural gas fired water heaters and furnaces, but which did not have smokers, furry animals, or flowering plants, which have been kept relatively clean of dust and mold, and I have dealt with stress with in a healthy way: through regular meditation. The result has been that during that time the number of asthma attacks I have had can be counted on one hand. None of those attacks we're caused by indoor or outdoor air pollution from natural gas fired heaters or furnaces. They were caused by the triggers listed above.

The conclusion that pollutants emitted from gas fired water heater and furnaces are a significant asthma trigger is wrong.

Houses like the one I live in now, and have lived in since 1992, will almost certainly require significant electrical upgrades to accommodate the new electric powered heaters. The construction dust that an electrical contractor would stir into the air when opening drywall to run new wiring is far more likely to trigger an asthma attack than the pollution the water heater or furnace will emit.

Furthermore, stress within any family having to foot the extraordinary expense of replacing a water heater or furnace in an emergency is also more likely to cause a child, exposed to that stress, to have an asthma attack than the emissions from a water heater or furnace.

I could cite many other reasons I oppose this proposed regulation, like my wife's concern that we, now retired seniors living in a low income neighborhood, would have a difficult time paying the additional cost to replace a broken water heater or furnace with an electric one rather than a similar natural gas powered one, but I will limit my reasons to this: A lifetime of experience as an asthmatic, and my understanding of the triggers of asthma, tell me that passing this proposed regulation would be a colossal mistake.

Please do NOT pass regulation 9, rules four and six.

Regards,

Phil Ragozzino

Jennifer Elwell

From: Piper McNulty [REDACTED]
Sent: Friday, February 3, 2023 10:37 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Piper McNulty

[REDACTED]

[REDACTED]

Cupertino, California 95014

Jennifer Elwell

From: Rajan Narang [REDACTED]
Sent: Friday, February 3, 2023 1:31 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I'm writing in strong support of the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. As you know, this proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Rajan Narang
[REDACTED]

[REDACTED]

Redwood City, California 94061

Jennifer Elwell

From: Randy Breunling [REDACTED]
Sent: Sunday, February 5, 2023 8:21 PM
To: Jennifer Elwell
Cc: Randy Breunling
Subject: Proposed BAAQMD Amendments to Rules 9-4 and 9-6 - some comments/questions

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Ms. Elwell...

I'm a homeowner in west San Jose and wanted to send along some comments and questions regarding the proposal(s) being voted on March 15 regarding the future of gas water heaters and furnaces. I believe these are referred to as amendments to Rules 9-4 and 9-6.

My initial awareness of and understanding of the Bay Area Air Quality Management District (BAAQMD) proposal(s) to be voted on March 15 is from what was reported in local media. I have since read some of the materials posted by the district.

Some background: The home I own is 60+ years old. It has the following gas appliances: water heater, furnace, dryer, cooktop. The gas hookups for the water heater, furnace, and dryer have always been there. We added the gas cooktop 30 years ago. A replacement gas water heater is 4 years old. A couple years ago we did some home renovation work, and added an A/C unit, replaced an old gas furnace with a new gas furnace, had the house insulated, and put in a larger electrical panel (200A, replacing a 100A panel, the larger panel needed due to the A/C unit). We're in the midst of a kitchen renovation, waiting over a year for appliances, and are replacing the gas cooktop with an induction cooktop, and the larger electrical panel allows us to do that. As part of our kitchen work, we will ask our contractor to cost out the effort needed to wire our house for an electric water heater and furnace. We are not going to wire up the house for an EV charger. It is already wired for an electric clothes dryer. I am not against using an electric water heater and furnace. From research I've done it appears to be about a wash (gas vs electric) from a cost perspective (purchase and operational use). We do not have solar installed. Our electricity bill up to now has not justified the cost of putting in solar.

Below are my comments and questions about the proposal(s).

- Just to verify...the proposed rules will ban the sale (and installation) of gas water heaters (2027) and furnaces (2029) into homes in the District with existing gas appliances. This will, prior to the effective dates of these Rules, force homeowners to retrofit their homes to allow the installation of electric water heaters and furnaces / heat pumps. Is that correct?

- We are fortunate in that we already have a larger electrical panel in place, and will need to see what the other costs will be regarding any other infrastructure retrofit work (a possible electrical sub-panel (which our contractor has already mentioned), wiring, and whatever else is needed). The electrical panel work we had done was \$4500, plus permits, plus approval/coordination from/with PG&E. All of this would be homeowner cost to retrofit a house like ours that was built 60+ years ago with a smaller electrical panel and the assumption that there would be gas appliances. I'm assuming the local PG&E grids in each neighborhood were built with that same assumption.

Given these costs, what happens with people that can't afford all this additional work (panel work, wiring, etc.)?

And is everyone going to have to have this work in place by 2027 for water heaters and 2029 for furnaces? Because if my gas water heater fails on Jan 01 2027, I must have the retrofit work already done in order to just replace the failed gas water heater.

- Regarding the electrical panel work. Is a 200A panel going to be large enough to actually support all these additional appliances (and one or more EV chargers in the future)? Or will I need a 400A panel, if even allowed in my area? Or will people need to move to the newer type of dynamic/smart electrical panels? I read in one of the local media articles, a remark made by one of the district's members that people will just have to install one of these types of smart panels. Are these considered viable for the average homeowner at this point and will they be available? What will the BAAQMD's effort be in ensuring these smart electrical panels (or larger panels in general) are viable and available?

- Regarding the increased (near-term) demand for electric water heaters and furnaces (or heat pumps), and electrical panels. Does the BAAQMD have a responsibility to ensure (somehow) that these appliances are available? As mentioned earlier, I am in the middle of a kitchen renovation...and we are waiting up to a year for some appliances. It's been 3 months since our appliance order was placed...and we are told we won't have appliance delivery information until at least June. The appliances are not expected to show up in June. We are told that we can't expect appliance delivery estimates until June.

Given our current experience with the delay for kitchen appliances, will there be similar long-lead times for electric water heaters and furnaces?

What is the availability going to be of in-demand electric appliances (water heaters and furnaces) and electrical panels?

Will the BAAQMD have a role in ensuring electrical panels, appliances, and people to install are available?

- Related to the above. Is the BAAQMD going to provide direct funding support to homeowners? If not, where is any such funding coming from? And is it believed that any rebates or incentives being offered will cover the entire cost of such retrofit work?

- What about the ability of PG&E to deliver all this additional electricity due to the increased demand from these electric appliances? An electric furnace will be the largest consumer of the electricity an average home uses. An electric water heater is the second largest energy consumer. When we had our larger electrical panel installed a couple years ago, the PG&E field person said our local grid is already (over)loaded from the additional demands from installed A/C units, some car chargers, and an overall increased use of electricity). And that goes back to my stated assumption that the local PG&E grids were built for neighborhoods in which gas appliances were going to be used.

Is the BAAQMD working with PG&E on any issues related to this?

Will PG&E be required to update any local grids to support all this additional demand?

- Is the BAAQMD going to provide a detailed plan for what has to be done to get 'there' by 2027 and 2029, respectively?

What metrics are going to be used to determine if the district is ready for these retrofit mandates/rules to actually go into effect?

As part of any plan, is the BAAQMD going to provide guidance, assistance, and (as asked earlier) funding to support homeowners in all of this?

What is the plan to ensure that nobody's home or dwelling goes without hot water or heat when a water heater needs to be replaced (2027) or a furnace needs to be replaced (2029)?

Is the BAAQMD going to actively manage and be responsible for the success or failure of this mandated retrofit effort across the district?

Or is the BAAQMD just putting out the mandate/rules (if passed) with no responsibility after that?

- Where is all this additional electricity going to come from? Or is there an implicit expectation/requirement with all this that homeowners will have to or need to install rooftop solar and battery backup?

- Why no mention of insulation requirements for homes? Many older homes in the Bay Area have little insulation thus causing additional use of energy (electrical or gas). Not cheap to do, but necessary if we're interested in energy efficiency/conservation.

- Does the BAAQMD have the authority to put these rules/mandates in place and enforce them?

- Doesn't CA already have a proposal in place or in works to ban (some) gas appliance sales by 2030. If so, why the local BAAQMD expedited mandates/rules?

Since this proposal will have huge impacts on local homeowners and dwelling owners I don't believe they can be passed until all of the above questions and issues have been addressed. I'd have to think that the above questions represent a fairly standard set of questions that homeowners like myself would have about all this. Will the BAAQMD publish an FAQ (or something similar) with the most-asked questions with responses?

Thank you for reading through my comments/questions.

Regards...

--Randy Breunling

West San Jose

Jennifer Elwell

From: Raphael [REDACTED]
Sent: Thursday, February 2, 2023 5:55 PM
To: Jennifer Elwell
Subject: Comment to BAAQMD proposed rules change

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I'm writing in full support of the proposed changes to rules 9-4 and 9-6 requiring only zero NOx water heaters, furnaces and large commercial water heaters to be sold and installed by 2027, 2029, 2031 respectively, as well as the introduction of an ultra-low NOx standard to Rule 9-4 for furnaces starting in 2024. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

The risk raised in the EIR regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional and state electrification targets and reach zero net GHG emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed through the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment. The devastating floods from the last few weeks in California were a stark reminder of how climate chaos is already here. We need to use all the solutions in our tool box to stop our GHG emissions.

I urge the BAAQMD Board to certify the EIR and adopt these proposed rule changes as quickly as possible.

Thank you!

Best Regards,
Raphael Hitzke
[REDACTED]
San Francisco, CA 94116

Jennifer Elwell

From: Rebecca Eliscu [REDACTED]
Sent: Friday, February 3, 2023 9:02 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

Additionally, Statewide, homes and buildings in California generate four times more NOx pollution than California's gas power plants and nearly two-thirds as much NOx as California's 16 million passenger cars

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate

change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Rebecca Eliscu

[REDACTED]

[REDACTED]

Menlo Park, California 94025

Jennifer Elwell

From: Rebecca Young [REDACTED]
Sent: Thursday, February 2, 2023 9:14 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. I am a parent and a long-time resident of Mountain View, CA. This proposed standard will make indoor air quality safer for all of us, especially children who are at high risk for negative health effects from burning methane gas in homes.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Rebecca Young

[REDACTED]

[REDACTED]

Mountain View, California 94043

Jennifer Elwell

From: Regan Avery [REDACTED]
Sent: Monday, February 6, 2023 4:31 PM
To: Jennifer Elwell
Cc: 'Regan Avery'
Subject: Opposition to new rules on gas appliances, massive infrastructure limitations

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bay Area Air Quality Management District,

I am Co-President of an apartment management company that has owned, renovated, and operated apartment communities in the Silicon Valley since 1960.

I am very concerned about the proposed rules being considered for apartment communities as they will require extremely burdensome infrastructure upgrades on top of purchasing new appliances that would out of reach of most existing apartment units in the Bay Area.

None of our 2400 apartment homes could handle the electrical load of switching from gas to electric, and the expense to upgrade electrical panels along with related rewiring in the walls and repairs would cost millions. Furthermore, our properties do not have capacity from the street to add this electrical demand in the units so which therefore doubles the cost of the project (for PG&E to survey and drop more lines to our properties). We just underwent this project at one property to handle upgrading all electrical panels washer/dryer installs, and it took PG&E over a year to add one line and a huge capital expense. This same work would have to be done again, at a larger scale, given our new panel calculations rely on existing gas ranges and water heaters in every apartment at the community.

Furthermore, I am concerned your math on offsetting the impact of the rules on increasing the demand on the grid with increased solar projects does not include the impact of our properties needing to add EV chargers to communities just prior to your dates given the state EV mandate. I can guarantee both the huge expense burden of your rules on apartment communities for required infrastructure and appliance changes, combined with a backlogged PG&E that will only get worse going forward from today, will drive up the cost of apartment housing costs in the Bay Area and put operators out of business.

I should add that if part of the rationale for these rules is the health impacts of gas on residents, we have seen studies where the main determinant of higher gas levels in homes was ventilation not being used. Resident education on the use of fans in the kitchen would make a huge impact on resident health and not require your proposed draconian rules.

Sincerely,
Regan Avery, Co-President
ACCO MANAGEMENT
Avery Construction
[REDACTED]
Mountain View, CA 94041

[REDACTED]

Jennifer Elwell

From: Renee Alloy [REDACTED]
Sent: Friday, January 27, 2023 11:37 PM
To: Jennifer Elwell
Subject: Banning gas

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I recently replaced my gas water heater with electric. Not only was this a very expensive endeavor but Palo Alto has made the permit process impossible. We did it in October and are still waiting for it to pass inspection so we can apply for the rebate. In the meantime it takes twice as long for the water to heat up- wasting our precious water resources. I am hoping it will all resolve soon. An expensive water pump was just installed to try to alleviate the long warm up time, it's better but not as good as it was.

I know we need to do something about global warming but going full electric isn't the answer. I worry enough about the blackouts we regularly experience because I use oxygen and need to refill the tanks daily. Because of these frequent power outages we are looking at back up generators- it goes on and on. I also use air purifiers and bipap to help with my lung condition.

Now some people don't even have a house that can be converted to electric without a huge expense and we are old, our pockets have been depleted.

I don't think banning is the correct next step. If we move towards this there needs to be variants, smaller steps and leeway as well as other choices aside from only electric.

Renee Alloy
[REDACTED]
Palo Alto

Sent from my iPhone

Sent from my iPhone



The new degree of comfort.™

February 6, 2023

Ms. Jennifer Elwell Lam
Bay Area Air Quality Management District
375 Beale Street
Suite 600
San Francisco, CA 94105

RE: Bay Area Air Quality Management District Proposed Amendments to Regulation 9, Rules 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and 6: Nitrogen Oxides Emissions from Natural Gas-fired Boilers and Water Heaters

Dear Ms. Elwell,

Rheem Manufacturing Company (Rheem) appreciates the opportunity to submit the following comments regarding the Staff Report detailing the Proposed Amendments to Building Appliance Rules – Regulation 9, Rules 4 and 6.

Rheem is an industry leader in total heating, cooling, refrigeration and water heating solutions and one of the few global brands with product offerings covering residential and commercial heating, cooling, conventional and hybrid storage water heaters, tankless water heaters, solar water heating systems, pool and spa heaters, commercial boilers, residential hydronic and geothermal systems, commercial refrigeration products, indoor air quality accessories, and replacement parts for all categories. Rheem is headquartered in Atlanta, Georgia, and has U.S. based manufacturing facilities in California as well as in Alabama, Arkansas, Connecticut, and North Carolina.

Rheem remains committed to bringing sustainable water heating and HVAC solutions to the market to achieve decarbonization goals and to provide cost-effective heating and cooling solutions for new construction and replacement applications serving a broad cross-section of residents, homeowners, and businesses. An essential component in meeting emissions reduction targets is *market readiness*, which includes technology availability, service and installation capabilities, and consumer awareness. While Rheem supports Bay Area Air Quality Management District's (BAAQMD) broader objectives to reduce NOx emissions in the region, we remain concerned about the market readiness to achieve the stated targets and the lack of harmonization with California's 2022 State Strategy for the State Implementation Plan (SIP)¹.

Market readiness concern: Premature zero-NOx implementation could result in net increase in GHG emissions associated with increased electricity production.

¹ California Air Resources Board: *2022 State Strategy for the State Implementation Plan*, Adopted September 22, 2022.



INTEGRATED HOME COMFORT

Rheem supports BAAQMD intent not to mandate specific technology solutions to achieve zero-NOx emissions, however, it is very likely the solutions will be predominately electric based technologies including but not limited to electric heat pump systems. Without having fully developed heat pump solutions for large loads and a clear regulatory pathway to allow dual-fuel or natural gas equipment for emergency back-up, it is very likely electrical resistance load will substantially be increased. As such, Rheem is concerned that a full implementation of the proposed rule amendments, without appropriate exemptions, could generate a net increase in GHG emissions associated with increased electricity production. Using the National Renewable Energy Laboratory's (NREL) Cambium database² which projects GHG emissions factor and was last updated in 2022, California's 2022 electrical grid will produce an increase in GHG emissions if gas-fired products switch to electric resistance. If gas-fired products switch to heat pump there will be a reduction in GHG emissions. Rheem recommends an evaluation of the electrical grid be included in the interim reports and if the expected use of electric resistance products is expected increase GHG emissions, then a delay of the zero-NOx requirements should be implemented.

Market readiness concern: Manufacturing technology assessment should occur *prior* to finalizing targets and dates.

Rheem supports the requirements for interim report and assessment to be completed prior to any zero-emission compliance date. However, we believe the report should be completed *prior* to finalizing the proposed rule, and with a minimum of three years prior to a compliance date, to provide appropriate planning and a proper development horizon. Typical product development cycles are five years—significantly longer than the two years outlined in the Staff Report.

Market readiness concern: Equipment scope should be narrowed to ensure available solutions.

The scope of the Regulation 9, Rules 4 and 6, is far reaching including residential, commercial, and industrial equipment with up to 2 million Btu/h for boilers and water heating, and up to 175,000 Btu/h for space heating furnaces, impacting multiple product types used for various single family, multi-family, and commercial business applications. Rheem recognizes that a very small subset of products included already have zero-NOx replacement solutions and that with sufficient development time and incentives this offering will grow. However, there is also a significant portion of the products and applications covered by the regulation that cannot easily or cost-effectively be transitioned within the proposed timeframe. In particular, large water heating equipment and space heating installations, especially those used for commercial applications, may not be ready to meet the proposed effective date and could result in significant cost impacts to consumers and businesses where replacements or retrofit products are not available.

² NREL's Cambium database of emissions factors: <https://www.nrel.gov/analysis/cambium.html>

Market readiness concern: Installation challenges need to be addressed, especially for replacements.

Staff should consider and recognize that there are multiple applications and installation challenges that need to be overcome and addressed prior to the compliance date. Key installation challenges already noted include:

- Emergency replacement of failed HVAC and water heating equipment, funding, product availability, ease of installation and contractor timing for service
- Electric wiring and panel upgrades and insufficient power supply with older homes
- Larger installation footprints, provisions for air flow for heat pumps and renovation costs
- Need for high temperature water supply for commercial processes, restaurants, laundry, hospitals, and healthcare facilities.
- Compliance path for large commercial and rooftop HVAC units which have not traditionally been subject to NOx restrictions and have limited replacement options

Market readiness concern: Compliant solutions should include “near-zero” emissions pathways for maximum effectiveness.

Staff should continue to consider and allow for “near” zero emissions solutions, which could include some types of natural gas, to achieve significant NOx reductions, while at the same time preserving energy resilience and emergency back-up for the larger equipment. Where applications cannot easily be decarbonized, certain ‘off-ramps’ may need to be included. Rheem recommends that an exemption be added to both Rule 4 and 6 allowing natural gas-fired products meeting the current NOx emissions requirements to be installed if there is a primary furnace, boiler, or water heater that meets the new NOx emissions requirements already installed or being installed with the natural gas-fired product.

Rheem commends Staff for their inclusion of hybrid (dual fuel furnace) heat pumps that comply on an average basis, recognizing the readiness and effectiveness of this technology to reduce emissions. However, Rheem requests clarification on whether natural gas-fired products that meet the current NOx requirements will continue to be sold if installed into hybrid systems.

Rheem recommends that a definition and calculation procedure for average NOx emissions be included. Rheem also requests that hybrid (dual fuel) heat pumps for water heating equipment be included. This would apply to installations where a small percentage of the total heating load is provided by a gas fired water heater/boiler for the purposes of emergency back-up and peak loads. Electric heat pumps with storage tanks used to replace gas fired equipment usually require much larger installation footprints and will typically comprise of multiple units. Utilizing gas equipment for some portion of the total load would provide for a simplified installation and lower cost.

Regulatory harmonization concern: Coordination of rules and timing is essential for the adoption and transition to the new technologies.

Through the state SIP, the California Air Resources Board (CARB) has definitively conveyed its intention to develop zero-emission building appliance rules with a 2030 implementation date. While this rulemaking has yet to commence, CARB has committed to finalizing requirements by 2025. Given the number of air districts in California with authority to issue individual rules for appliances, the potential for regulatory complexity within the state is high. This is difficult for distributors and installers to navigate, especially at the borders of jurisdictions. Rheem appreciates BAAQMD's intention to achieve local air quality goals, and to position the proposed rule amendments as complementary to the plan laid out in the SIP, but we suggest that staff defer additional appliance rulemaking to the state-level agencies, in order to bring about maximum harmonization and avoid unnecessary and duplicative regulatory burden. Rheem encourages coordination with CARB, at a minimum, on the scope of product categories rule effective dates.

Rheem supports a harmonized California State and BAAQMD compliance plan with the following specific recommendations:

- More narrowly tailor definitions, including exceptions for a specific subset of commercial and residential equipment types, sizes and applications with known replacement solutions and costs.
- Better define compliance parameters for hybrid dual fuel furnaces, recognizing that heat pumps with alternate fuel back-up heat will typically operate under the ideal settings as programmed by installers, with consistent bypass unlikely. While Staff has expressed intent to include dual-fuel systems that comply with the standards in the certification process, it remains unclear if that extends to the zero emission levels and where gas-fired equipment is used exclusively for emergency back-up. Including definitions in both rules for dual-fuel equipment and specific provisions for compliance would provide much needed clarity and certainly. Also, including requirements for controls to ensure use of gas is optimized would help address compliance concerns. Specifically for rule 6 section 9-6-110, we recommend adding an exception for equipment covered in 9-6-301.5 and 9-6-303.5 used for dual-fuel and emergency back-up. Outline incentives and funding for adoption and installation of new equipment for replacement applications, especially for affordable housing, and including electric panel upgrades and emergency replacements. For example, the Staff needs to consider proactive replacement programs to offset the adverse impacts and loss of services associate with emergency replacements requiring technology upgrades mandated by these proposed rules.
- Provide exceptions for commercial and industrial applications, including those requiring high temperature water. More specifically, for rule 6 in section 9-6-110, we recommend adding exception for equipment covered in 9-6-303 that is used exclusively to provide service hot water at temperatures of 180 °F greater and is also to be equipped with controls to limit use to such applications. This exception is essential for providing hot water for sanitation applications for commercial kitchens and laundries where heat pump technologies or electric resistance equipment cannot be installed or provide the needed hot water service.



Rheem greatly appreciates that Staff intends to maintain a compliance regime based on date of equipment manufacture, making planning and inventory management straightforward. We suggest this intention be clearly stated in the final rule, as the language regarding compliance could be subject to differing interpretations.

We thank the BAAQMD staff for their continued hard work on the regulation and staff report and for emphasizing the key role heat pumps will play in achieving the state's building decarbonization goals. We look forward to future collaboration and would be happy to discuss our comments.

If there are questions, please do not hesitate to contact me directly.

Sincerely,

A handwritten signature in black ink that reads "Karen B. Meyers".

Karen Meyers
Vice President, Government Affairs
Rheem Manufacturing Company

cc: BAAQMD Board of Directors c/o Marcy Hiratzka, Clerk of the Boards, Executive &
Administrative Resources
Joe Boros
Allison Skidd



Jennifer Elwell

From: Richard Gallo [REDACTED]
Sent: Friday, February 3, 2023 7:43 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Richard Gallo

[REDACTED]

[REDACTED]

Santa Cruz, California 95062

Jennifer Elwell

From: Richard Hallsted [REDACTED]
Sent: Monday, February 6, 2023 1:45 PM
To: Jennifer Elwell
Subject: conversion to electric from gas appliances comment

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whomever:

We saw an article in a local paper today saying that this was the last day to comment on possible rule changes for conversion to electric furnaces and heaters, which we support. But.....

We tried to replace our aging gas furnace with a Mitsubishi electric heat pump last year. One main reason stopped us from doing this project. The setback rules for equipment on side yards here in Palo Alto - for some reason our area has an 8 ft. setback rule whereas many other parts of the city have six foot setbacks which would have worked for our project. Setback rules from the 1950's would get in the way of many people who might consider doing conversions now and in the future unless the rules are made a bit more flexible or just changed so these very low decibel units can be installed in sensible locations on properties.

One other comment - the last part of the article talks about a consultant estimating the costs of a conversion. We have a medium sized 1950's house and the cost to convert was closer to \$35-45K (multiple bids through the city sponsored process back in early 2021) rather than the \$8K mentioned in the article. We already have an upgraded 200 amp service, solar, updated electrical throughout the house. Also the cost to convert to heat pump water heater was closer to \$7.5K given the electrical work needed given the location of the water heater. Again, retrofitting these things into these older houses which did not give any thought to today's needs costs a lot of money, more than many people would have to spend. And a lot more than the consultant estimated.

Thank you for listening,

Richard Hallsted
Palo Alto, California

Jennifer Elwell

From: Richard Probst [REDACTED]
Sent: Monday, January 23, 2023 9:17 PM
To: Jennifer Elwell
Subject: comment on Building Appliances rules

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

I am writing in support of the proposed amendments to rules 9-4 and 9-6.

I am certain that the BAAQMD will receive many complaints about this proposal, but this is the right thing to do. We need to reduce the pollution from natural gas.

Best,
—Richard

Richard Probst
[REDACTED]
Los Altos CA 94024

Jennifer Elwell

From: Richard Staehnke [REDACTED]
Sent: Monday, February 6, 2023 3:43 PM
To: Jennifer Elwell
Subject: Ban of new gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Stop this nonsense. Your cost estimates are far from accurate upgrading an electrical panel in my neighborhood runs \$10 -12 thousand dollars alone. It takes 3 months for the necessary permits, inspections, and final hook up. When your hot water heater or stove or dryer goes out you can't wait 3 MONTHS TO REPLACE. Then you have to assume that tens if not hundreds of thousands can't afford that. Don't tell me that government help will take care of this that's ridiculous. Do I go to the Government store and pick up a check for this or wait forever wearing wet clothes that don't fit because of the weight loss from no food while freezing my you know what off !!!
STOP LEGISLATING BY FIAT AND LET THE PEOPLE VOTE

RICHARD STAEHNKE
Sent from my iPhone

Jennifer Elwell

From: Rick Vujovich [REDACTED]
Sent: Tuesday, February 7, 2023 12:36 PM
To: Jennifer Elwell
Subject: Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Do not ban gas appliance - just because you think it is what you wish. The public does not want the gas appliances banned. And you work for the people, not your own agenda.
In addition, there is zero documentation or reports presented by you - that indicate what you are proposing will reduce what the air district is proposing.
It costs more for the conversion - and is that what your department willing to pay to all the people of California?
Bad idea and no fact to support the change.

Rick Vujovich

Jennifer Elwell

From: Rick Yost [REDACTED]
Sent: Monday, February 6, 2023 2:46 PM
To: Jennifer Elwell
Subject: Bay Area Air Quality District ban on gas/propane furnaces & hot water heaters

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

(I) My home is located in the heavily forested area of San Mateo County relatively near Skyline Rd. As such, annually we have historically experienced a consequential number of power outages due to trees falling during inclement weather, roadway accidents which affect power poles, and more recently during PG&E shutdowns due to elevated fire risk. These outages frequently take more than 24-48 hours to resolve. For example, since the last day of this past December, I count eleven (11) days during which my home experienced an outage, virtually all exceeding 12 hours with the longest exceeding 84 hours (yes, 3+ days without electricity).

During these outages, I am able to keep the house in a habitable state by running a modest propane home generator which powers the fan on my 95% efficient propane furnace (which includes a secondary heat exchanger to accomplish that level of efficiency) and my propane gas water heater which only needs electricity for the control system and to power the pilotless ignition system.

If in the future I am forced to replace these appliances with electric versions (even efficient heat pump systems), these appliances will require high amperage 220V electricity which would require a whole home generator installation that reasonably could be expected to provide 20+ kW of service as opposed to my modest portable generator. This is not to mention that my home has a second furnace on the second story which is not remotely close to 220V panel access so is going to require a very significant wiring cost to upgrade along with necessitating an even larger home backup generator.

If the district chooses to move forward with this appliance ban, I urge the commission to consider those of us who are less than fully served by 100% or even 99% PG&E power uptime during the year. I would suggest a simple rule amendment would be that if, over the previous 2-5 years, a home has experienced an average of at least 24 hours of outage annually then it may receive an appliance installation waiver permitting gas/propane appliances. Surely less than 1-2% of PG&E customers are in a similar position with so much electricity downtime, so such a rule would have a negligible impact on the district's goals.

(II) I do have a secondary observation which perhaps the commission has not considered: there are many of us who have gas/propane furnaces for heating who do not have home air conditioning installed. Those of us in this situation have heretofore simply tolerated the hot weather which has become more frequent due to global warming. But virtually every home furnace heat pump of which I am aware is designed to be run as an air conditioner (cooling system) during warm weather by simple reversal of the pump direction. A heat pump is just an air conditioner running the opposite direction. Surely an unintended consequence of this proposal significantly underestimates the amount of new peak Summer cooling demand which all of these newly installed A/C units will require. That is to say, by mandating electric heat pumps, the district will effectively be mandating that every home have an installed central air conditioner which is likely to be used at the very time that PG&E most wishes to lower peak electricity demand.

(III) Has an analysis of the impact on our stressed electrical grid been done? Are we setting ourselves up for failure?

Thank you for your consideration,
Rick Yost
San Mateo County homeowner

--

Rick L. Yost

[REDACTED]

RLTW!

Jennifer Elwell

From: Rita Fanfelle <[REDACTED]>
Sent: Monday, January 23, 2023 5:21 PM
To: Jennifer Elwell
Subject: Comment on proposed gas restrictions

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from kindgranny@hotmail.com. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Never have I been so angry to read the ridiculous proposal that the Bay Area Air Quality Management District is proposing.

I have lived in the Bay Area for over 50 years, used gas appliances, raised sons with allergies and as every concerned individual of the environment is always trying to find ways not to pollute the air we all breathe. To think that the proposal to try and eliminate all gas appliances and substitute electric alternatives is completely irrational. The hardship on all will be monumental. The studies conducted do not warrant such drastic measures. People are reeling from the recent events ie. Inflation, Covid, storms, etc. Adding your proposal will only upset the majority of residents

Rita Fanfelle

Jennifer Elwell

From: Rob SS [REDACTED]
Sent: Tuesday, February 7, 2023 4:52 PM
To: Jennifer Elwell
Subject: GAS is Efficient!

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Any current 'Ban' on efficient gas appliances is misguided and yet another Burden to Californians - and perpetuating the exodus!

This attempt to "Save" everyone from everything can Never be resolved. People Need to Take Responsibility for Themselves in our Free Country.

What you -Should- be looking into is Energy Efficiency!!

I see residential street lights and parking lot lights lights ON at ALL Hours of Daylight - when they serve No purpose whatsoever.

Turning Down Thermostats in the baking Hot Federal buildings would help as well.

Look to Yourselves before continuing to Burden The People!

NO on any Ban!!

Jennifer Elwell

From: Robert Horstmeyer [REDACTED]
Sent: Monday, February 6, 2023 4:22 PM
To: Jennifer Elwell
Cc: [REDACTED]
Subject: Natural Gas Rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi:

I am writing regarding your new rules to go to all electric for residential furnaces and water heaters. No more natural gas.

I understand that you are claiming that the requirement won't strain the electrical grid. How can that be?

We have EV penetration taking off and they add demand to the grid. And now you will add the new electric demand for heating spaces and water.

I would love to see the calculations on that and to know that someone at BAAQMD is guaranteeing me on that. Anyone at

BAAQMD have skin in the game for that call? If you are wrong – and PGE has been consistently wrong about the transition to solar and about system resilience (note that years ago, PGE claimed the Western grid would fail when we got just 10% non-dispatchable power on the grid)—I guess you just shrug your shoulders while tens of thousands of households go cold.

Another consideration. Electricity goes out. And it goes out for some extended time periods. This usually happens when it is cold and windy. So what is my fall-back when the electric grid goes down. Do we go into chaos mode like Texas did a few years ago during a cold snap?

By having some gas for heating we have resiliency. If I have some gas, I can keep warm. No electricity and no gas –we get cold.

Maybe cold is not that big a deal in the Bay Area. We are not Montana or Maine. But I can guarantee you that when we go 100% electric we will see people get cold at some winter in the future.

As NO_x can be mitigated by burning over a cooled metal screen; why not require an alternative burner technology and allow gas to

used? Sure, a low NOx burner will cost more in capital cost but the electric equipment is also more costly.

I suggest you allow gas burning but require a new low NOx standard for residences. And please don't tell me "zero" NOx will be the new standard. You will be increasing NOx production at all the thermal plants that will be increasing electric output for the all electrical homes. Allowing some level of gas heating will provide at least some redundancy in the home energy system.

Getting to zero fossil fuel use is a great idea but we need a well thought out, flexible transition plan. Arbitrarily declaring everything must be electric, especially with PGE as our utility and EPRI as our analysts is a surefire recipe for disaster. The saving grace is the Bay Area climate. We can all wear long underwear, jackets and ski beanies and survive for a few days without electricity.

Best,

Bob

Robert J. Horstmeyer

[REDACTED]

[REDACTED]

The information in this email may contain privileged and/or confidential information and is intended for the named recipients only. If you are not the addressee indicated in this message, please do not copy or deliver this message to anyone. In such case, destroy this message and notify us immediately by replying to this email or by calling us directly, in the U.S. at [REDACTED] and in the U.K. at [REDACTED].

Jennifer Elwell

From: Robert Jardine [REDACTED]
Sent: Friday, February 3, 2023 7:29 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Robert Jardine

[REDACTED]

[REDACTED]

Cupertino, California 95014

Jennifer Elwell

From: Robert Kahn [REDACTED]
Sent: Saturday, February 4, 2023 4:36 PM
To: Jennifer Elwell
Subject: Please support Rule 9-4

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell and BAAQMD Board Members,

I'm a resident of San Carlos and an active volunteer who advocates for climate change solutions, clean air, and clean/abundant water.

In the longer term, I hope we can fully decarbonize our economy and transition to clean, renewable sources of energy. The reality is that this will take time.

One immediate concern is that burning natural gas in buildings produces nitrogen oxides (NOx) and harmful indoor air pollution. As you know, NOx are toxic, highly reactive gases that endanger people by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color benefit as soon and without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Rob Kahn

Jennifer Elwell

From: Robert Mayo [REDACTED]
Sent: Tuesday, February 7, 2023 8:52 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

Please act as aggressively as possible on the NOx regulations, including the banning of installation of gas water heaters as early as is feasible. People needing emergency replacements can be authorized to get a loaner gas water heater for 120 days while needed electrical work is completed. Up to \$10,000 should be made available for work that is necessary, and an exemption can be made for situations where \$10,000 is not sufficient.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Robert Mayo

[REDACTED]

[REDACTED]

Mountain View, California 94041

Jennifer Elwell

From: robert raven [REDACTED]
Sent: Saturday, February 4, 2023 11:17 PM
To: Jennifer Elwell
Subject: electrify

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please electrify the Bay Area and quickly phase out gas furnaces and heaters!
My rental apartment has gas appliances and I'd rather have electric ones!
Thanks,
Robert Raven
American Canyon

From: ROBERT SHERWOOD [REDACTED]
Sent: Thursday, January 19, 2023 1:23 PM
To: Marcy Hiratzka [REDACTED]
Cc: Mike Larbre [REDACTED]; [REDACTED]; Robbie Sherwood [REDACTED]; Bren [REDACTED]; Victor Hunter [REDACTED]; Christina Conyers [REDACTED]; Christine Hunter [REDACTED]; Rhonda VonGober [REDACTED]; [REDACTED]; Lorrie Larbre [REDACTED]; Greg Baker [REDACTED]; Bob Howard [REDACTED]
Subject: Natural Gas Conversion Discussions

ATTN: MARCIE, Clerk
Bay Area Air Quality Management District

It is important that The Air Quality Management District understand the specific objections to the concept of discontinuing use of Natural Gas in residential and commercial properties:

- Natural Gas is the cleanest of fuels used today. It is plentiful, accessible and relatively inexpensive to transport;
- Roughly 90% of rural properties built over the past 40 years have been built to specifically use Natural Gas for home use including cooking, heating, laundry and hot water. To convert these services to electricity would be dangerous due to the woefully inadequate electric grids that exist in our State. Given the quality and condition of existing electrical grids, their inadequacies in addition to the also inadequate maintenance by our public utility companies including Pacific Gas & Electric in the North Bay area, many thousands of families were left with no electrical service and without the presence of Natural Gas to fuel the heating may have saved hundreds of lives.
- The costs to both upgrade the grids and to convert homes, offices, schools, etc. to adapt to electrical service would be prohibitive at any time and given all the financial constraints our State faces; anytime in the near future would be an unbearable weight on the residents of California as a whole. In addition to the aforementioned; as the owner of five apartment complexes predominantly built in the 70s and 80s, my electrical panels and wiring would NOT have the capacity to support the conversion from gas to electric leading to increase fire danger via tenant using portable electric heaters or base board heaters.

Keep in mind most electricity in the US is produced by the burning of coal, oil and natural gas! Natural gas being the cleanest by far!
A proposal of going "ALL ELECTRIC" is merely a shell game and will not end well. I for one will join with others in the disbanding of the Bay Area Air Quality Management District as an ineffective, authoritarian, over reaching organization that is ultimately working against the people who it is supposedly serving.

Sincerely,

Robert Sherwood
Sherwood Properties

[REDACTED]

Sonoma CA [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Jennifer Elwell

From: Robert Whitehair [REDACTED]
Sent: Friday, February 3, 2023 9:29 AM
To: Jennifer Elwell
Subject: Air Quality Standards for gas appliance

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please send to the appropriate place

Dear BAAQMD Boardmembers,

My name is Robert Whitehair, with San Mateo Climate Action Team and Elders Action Network. I am currently awaiting open heart surgery. I grew up in a home with a gas stove, a gas wall furnace, a portable gas furnace, and a gas water heater. I have asthma, COPD, and bronchitis, which make the heart condition much worse.

I am living proof that use of gas in buildings adversely affects human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

It must be emphasized that based on research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

Proposed rule 9-4 and 9-6 are not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,
Robert Whitehair

Jennifer Elwell

From: Robert Zhou [REDACTED]
Sent: Wednesday, February 1, 2023 10:16 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

My name is Robert Zhou, and I am a recent college graduate living in San Mateo. I want to keep myself, my community, and future generations healthy and resilient in the long term, and that means setting regulations (such as the Bay Area Air District standards) designed to transition our society away from pollution.

Burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Robert

Jennifer Elwell

From: ROCKY FORT [REDACTED]
Sent: Thursday, January 19, 2023 6:44 PM
To: Jennifer Elwell
Subject: Rules 9-4, 9-6, Gas furnace and water heater ban.

Follow Up Flag: Flag for follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Ms. Elwell, I live in San Lorenzo, Alameda County, in a house that was built in 1944. I own my home. Ironically, we are having our water heater replaced next week due to its age (14 years). I read an article in the SF Chronicle about BAAQMD possibly banning gas fired furnaces and water heaters when needing to be replaced. It is costing us \$2,000.00 to replace our gas water heater with a super low NOX equivalent. If we had to replace it with an electric unit, the cost would skyrocket! Plus. we are retired, and on fixed incomes. And our old house has a 100-amp electrical panel. Not enough for all electric appliances. Also, there is no 220v wiring to our water heater. More expense! Needless to say, I am against this proposed undemocratic way to force us to do something we cannot afford. And why is the board planning to change the rules by 2027? Only 4 years to implement is too quick for my tastes. Why not, if you are really going to approve this, put it out 10 years? And put in some exemptions for people in our situation. The board should also think about the additional load on an already shaky power grid. If you add electric water heaters, electric furnaces, and electric vehicles to our current grid, it will surely cause even more black outs than we have now. And if there is a blackout, how are we supposed to get hot water? If the board does approve this short sighted, and cruel, banning of one of our most essential appliances, I will buy another gas water heater (it will be cheaper now than later with the proposed rule changes) and store it in the garage for the next time we have to replace it. Please, please, do not put this burdensome regulation on us and other people that are in our situation. Sincerely, Rocky and Greta Fort, [REDACTED], San Lorenzo, CA [REDACTED] P.S. If there is somewhere on the BAAQMD website to comment, please email me the info and I will gladly repeat what I have already sated to you.

Jennifer Elwell

From: RD Melen [REDACTED]
Sent: Monday, February 6, 2023 6:20 PM
To: Jennifer Elwell
Subject: Proposed Amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Central Furnaces and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters ease do not do this

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am adamantly opposed to these amendments.

--

Roger Melen
cell [REDACTED]

Jennifer Elwell

From: Roland Dow [REDACTED]
Sent: Monday, February 6, 2023 4:07 PM
To: Jennifer Elwell
Subject: Do Not Ban Our Natural Gas

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

6 February 2023

To: Bay Area Air Quality Management District:

As a long term resident of Santa Clara County and a 4th generation Californian I am very much against the proposed ban on natural gas appliances. Just a few short years ago natural gas was touted as "The Clean Energy Fuel". What's changed. It's powering many electrical generation plants throughout California and the USA. Banning natural gas appliances is unnecessary and not forward thinking at this time. Put this decision on hold at this time at the very least!

A common sense citizen living in Los Altos.

Roland Dow
94024

Jennifer Elwell

From: Ronald Vinsant [REDACTED]
Sent: Tuesday, February 7, 2023 9:52 AM
To: Jennifer Elwell
Cc: Bettina Vinsant; Dan Wright
Subject: Ban on gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I am writing on behalf of a small (8 units) Condominium Association, Shelter Glen Homeowners, which would be greatly affected by banning gas appliances as replacements of existing appliances.

Here is our understanding of the requirements although our understanding may not be correct. It is difficult to get clear answers .

In order for our complex to change from gas to electrical for our stoves, water heaters and wall heaters, we would need to upgrade our electrical service(s) in each unit and for the complex.

We currently have 50 ampere services in each unit.

A heat pump (trying to be as efficient as possible) for 1000 sq ft would require 50A (based on [Air Conditioning Contractors of America](#) Manual J). Nothing left for the electrical requirements for the rest of the house.

It is our understanding that if we upgrade the service(s) in each unit we will have to comply with "SEC. 8.51. - Section 230.79 amended—Rating of service disconnecting means" of the Mountain View Electrical code. Depending on how this section of code is interpreted the service panel in each unit would have to be raised to at least 125 amperes (230.79 D) and perhaps 200 amperes (230.79 C). This would required the rewiring (as the 50A wire size is too small) of not only each unit but the feeders from the main service to each unit. Rewiring would necessitate the removal of concrete as our feeders are all underground.

In any event this would required our HOA to increase the size of the main service to the complex from it's current 400 amperes to either 1000 amperes of 1600 amperes depending on which section of 230.79 we have meet. The wire size from the utility transformer is unfortunately too small to handle the increased load. This again would require removal of concrete as the feeders from the utility are also underground. We have not yet inquired of PG&E if their transformers are capable of supporting this increased load.

In addition, we have elderly in our complex that are concerned that if electrical power fails there is no back up source of energy. With natural gas we have the ability to heat, have hot water, and cook even if the power fails.

We have endeavored to find an electrical contractor to give us a bid on the upgrade. No luck so far.

Ron

Jennifer Elwell

From: Sally Giese [REDACTED]
Sent: Monday, February 6, 2023 3:57 PM
To: Jennifer Elwell
Subject: gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am against replacement of gas appliances with electric. I am part of a little pocket of 29 users, who lose their power regularly; 9 times last year, and 3 times so far this year. I've lived here 34 years and its been going on 34 years. Because we are only 29 users we are not high on the priority list for a repairman. The newspaper article I read only listed furnaces and water heaters as affected appliances, However ranges are also often mentioned. When we lose power, we can still shower and cook on the burners. They get the power on eventually, but never fix the real problem of what is causing 29 customers to lose power repeatedly.

PG&E says the grid won't be impacted, yet, I've been part of rolling blackouts and in summer when ACs are running, they have told users not to charge their electric cars. There is no guarantee PG&E can keep the lights on. Until PG&E can prove themselves to be a more reliable utility company, please do not impose this ban.

Sally Giese
[REDACTED]

Jennifer Elwell

From: Sam Reed [REDACTED]
Sent: Friday, February 3, 2023 10:17 AM
To: Jennifer Elwell; [REDACTED]
Subject: proposed amendments to boiler and furnace rules

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell and Supervisor Hopkins,

I strongly support the proposed amendments to Rules 9-4 and 9-6. Our children's health and that of the biosphere--which are ultimately the same thing--should be our priority. Reducing nitrous oxide emissions in our homes is a big step in the right direction.

Thank you,

Sam Reed

[REDACTED]
Sebastopol 95472

Jennifer Elwell

From: Sandra Pachaud [REDACTED]
Sent: Monday, February 6, 2023 8:35 AM
To: Jennifer Elwell
Subject: Electric conversion

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I don't a need to switch to all electric appliances at this time. The Wall Street Journal columnist Kimberly Strassel states that switching from gas to electric was based on non-scientific metadata. It states childhood asthma could decline by switching to electric appliances. Honestly, leaf blowers probably contribute more to asthma than a gas appliance. Being retired, I can't afford it and don't feel that our government should be regulating this.
S Pachaud

Sent from my iPad

Jennifer Elwell

From: Slpt [REDACTED]
Sent: Saturday, February 4, 2023 2:48 PM
To: Jennifer Elwell
Subject: Please Support Rules 9.4 and 9.6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board members,

Please support Rules 9-4 and 9-6 and ensure breathable air for our communities. By doing so you will fulfill your missions "to create a healthy breathing environment for every Bay Area resident while protecting and improving public health, air quality, and the global climate." You have the power to prevent deaths and dangerous health conditions in children and adult around the bay. Your actions will also reduce global GHG emissions. As I am sure you know, the ongoing climate disaster is only going to get worse, so we have to do everything possible to mitigate the damage for the sake of the planet, our health, and to prevent the societal breakdowns (i.e., droughts that bring about migration by desperate people) that we already see.

Thank you.

Sincerely,
Sara Theiss

--

Jennifer Elwell

From: Sarah Gao [REDACTED]
Sent: Friday, February 3, 2023 10:31 AM
To: Jennifer Elwell
Subject: Public Comment for Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

My name is Sarah Gao and I'm a resident of San Francisco writing to express my strong support for the proposed phase out of fossil gas appliances.

San Francisco has been a leader in addressing the impacts of fossil gas usage, including passing important ordinances that ensure the electrification of new buildings that will not only decrease our emissions but also protect public health by reducing particulate exposure from fossil gas usage. However, as we've seen from recent storms, droughts, and wildfires, the many effects from the ongoing climate crisis are already here and are worsening. We need to do everything in our power to expediently phase out our emissions.

As a biologist and a young person, I am, along with many of my peers, extremely terrified of what the future has in store given the trajectory that we're on. I understand that as a renter, I will not be personally responsible for the costs associated with switching out appliances, a concern that many others have expressed in the public comments here. However, I will say that given the rocketing rent prices in the city, it's hard to imagine that landlords who rent to tenants will have insufficient funds for these upgrades within the next 4-7 years. It would be, at the least, relieving to know that my exorbitant rent is being used to make an actual impact towards mitigating the crisis that defines my future.

I can, however, understand that there are some homeowners who would not be able to afford these upgrades and the utmost should be done to provide affordable, accessible pathways for them to convert their appliances, such as instant rebates at the point of purchase. The same should be done for those in need to upgrade their outdated building's electrical systems to accommodate such changes. Additionally, more education around how these will ultimately save them money over time, given the increasing price of fossil gas.

Nonetheless, the urgency of the climate crisis demands action that we are already sorely lagging behind on. For too long, the status quo has kept us in stagnation because of naysayers unwilling to change or finding it too cumbersome. Electrifying our appliances and phasing out fossil gas will put us on the right path towards righting these wrongs and give us a fighting chance for a livable future.

Thank you!

Sincerely,
Sarah Gao

Jennifer Elwell

From: Scott Barlow [REDACTED]
Sent: Friday, February 3, 2023 7:14 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Scott Barlow

[REDACTED]

[REDACTED]

Sunnyvale, California 94087

Jennifer Elwell

From: Scott Grinthal [REDACTED]
Sent: Sunday, February 5, 2023 4:53 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Scott Grinthal
[REDACTED]

[REDACTED]

San Mateo, California 94402

Jennifer Elwell

From: Sergio Marti [REDACTED]
Sent: Monday, February 6, 2023 3:59 PM
To: Jennifer Elwell
Subject: Comments on Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello, I am writing to oppose the proposed rule changes that would ban natural gas appliances.

My concerns are:

1. As the EIR mentions, implementing the proposed rule changes will exceed planned electricity generation by a substantial amount. Without planning for increasing climate-friendly energy generation, we will likely see what happened over this past summer -- electricity shortages at peak times when demand is high but generation from solar has fallen off. In this case, California imported electricity from neighboring states or fired up natural gas generators. Since the BAAQMD cannot mandate the construction of green energy generating plants to handle the additional electric load, implementing the rule changes runs the risk of creating additional greenhouse gasses.
2. Heat pumps and electric water heaters will place additional electrical load on every home in the Bay Area. Given that all new vehicles sold in California by 2035 will be electric, an enormous number of houses will have to upgrade their electrical panels to comply with code. The amount of effort required to do this cannot be understated. I have several friends who have gone through an electrical panel upgrade as part of a renovation. They can testify to the fact that it takes months just to get on PG&E's schedule and thousands of dollars in parts and labor. These issues might be outside of the scope of the EIR, but any realistic consideration of these rule changes must consider the practical impact.

In summary, I believe the proposed rule change will cause many more problems than it will solve and so I oppose the change. Increasing the load on our already taxed electrical grid before we upgrade its capacity using renewable energy sources is putting the cart before the horse and will jump us out of the frying pan and into the fire.

Thank you,
-Sergio

Jennifer Elwell

From: stan fitzgerald [REDACTED]
Sent: Friday, February 3, 2023 7:58 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

stan fitzgerald

[REDACTED]

[REDACTED]

walnut creek, California 94595

Jennifer Elwell

From: Stephanie Bloom [REDACTED]
Sent: Sunday, February 5, 2023 8:29 PM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To BAAQMD Board of Directors,

Please support Rules 9-4 and 9-6 to ensure we have clean air in the Bay Area. NOx is a serious pollutant that causes significant health damage, especially to the lungs of children.

As a mother, a physician, and a public health professional, I care deeply about this issue. The time for strong leadership with respect to public health is now.

Thank you,
Stephanie Bloom, MD, MPH, FAAP

Jennifer Elwell

From: Stephanie Reader [REDACTED]
Sent: Friday, February 3, 2023 8:25 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area. We have minimized use of our gas range and switched to a heat-pump water heater to reduce the NO_x generated in our home, but we recognize that significant public health benefits will require broad regulation of the polluting effects of burning methane gas. Therefore, we urge BAAQMD to phase out gas appliances here in the Bay Area. The time has come, and far better technology is now available.

Burning methane gas in buildings produces toxic nitrogen oxides (NO_x) and harmful indoor air pollution. This proposed zero-NO_x rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM_{2.5} pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate

change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Stephanie Reader

[REDACTED]

[REDACTED]

Los Altos, California 94024

Jennifer Elwell

From: [REDACTED]
Sent: Thursday, February 2, 2023 5:23 PM
To: Jennifer Elwell
Subject: Rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell:

The Bay Area Air Quality Management District (Air District) is currently developing zero-NOx emissions standards for home furnaces and water heaters that would have major benefits for Bay Area health. This is part of a plan for an equitable, affordable transition to tackling appliance pollution and standing up for community health. Zero-NOx standards will ensure a transition from polluting appliances to clean, healthy alternatives. Transitioning to pollution-free, electric appliances is key to reducing air pollution and protecting public health.

Nitrogen oxides (NOx) are toxic, highly reactive gasses that endanger human health by causing or exacerbating respiratory conditions such as asthma, wheezing, decreased lung functioning, increased likelihood of hospital visits, heart disease, and even early death. NOx are produced by burning gas, propane, and wood. **In the Bay Area, gas appliances in homes produce more toxic NOx pollution than all of the region's passenger cars. This is incredibly dangerous for both our indoor and outdoor air quality. I urge you to pass the proposed Regulation 9 rules 4 and 6.**

Thank you.

Sincerely,

Dr. Stephen Rosenblum

Palo Alto

Jennifer Elwell

From: steve gazzera [REDACTED]
Sent: Monday, February 6, 2023 3:18 PM
To: Jennifer Elwell
Subject: We want our gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please leave our gas appliances alone. We like them.

We don't need all electric appliances. Thank you

Steve gazzera
Mt view. CA

[Sent from Yahoo Mail for iPhone](#)

Jennifer Elwell

From: Steve Simons [REDACTED]
Sent: Monday, February 6, 2023 2:06 PM
To: Jennifer Elwell
Subject: Ban on Natural Gas

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

Could you please refer me to any written material on the game plan that includes the reasons to replace natural gas with electricity and current means of generation of electricity that's practical, non-polluting and abundant enough to make a difference? Below is a link that include views of the opposition. I'd like to know if there's something that I can read that addresses these views.

<https://www.cato.org/regulation/spring-2022/why-kill-natural-gas>

Thanks,

Steve Simons
Los Altos

Jennifer Elwell

From: Steve Smith [REDACTED]
Sent: Thursday, January 19, 2023 6:46 AM
To: Jennifer Elwell
Subject: Rules 9-4 & 9-6 panel upgrade costs appear to be incomplete

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer,

I am impressed that the economic analysis includes electrical panel upgrades. Based on the cost presented, it appears that that number EXCLUDES the following costs, which could almost double those costs. Kindly note that this list is incomplete.

- A) electrician costs of installation of new electrical lines from the new panel to the water heater/furnace. Granted, I am assuming that your panel upgrade costs cover JUST THE PANEL AND PGE'S CONNECTION THERETO
- B) patch and repair costs to the wall that contains the new electrical panel. You should assume the new panel is physically larger than the old one or that a new sub panel is needed
- C) patch and repair costs of interior walls that contain the new electric lines (not sure what percentage of houses have an interior furnace or water heater where surface mount conduit would be inappropriate).
- D) homes with no attics would require crawl space electric runs, increasing installation costs.
- E) homes with no attics and built on a slab would require conduit for their electric runs, greatly increasing those labor and materials costs.

Thank you for your consideration of these items. If you are going to do a cost benefits analysis, it ought to cover TOTAL costs (and benefits)

Regards

Stephen Smith

Sent from my iPhone

Jennifer Elwell

From: Steven Schlansker [REDACTED]
Sent: Wednesday, January 18, 2023 8:21 AM
To: Jennifer Elwell
Subject: Comment on home NG NO2 emissions

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

BAAQMD Board,
We each have the right to breathable air and a habitable planet.
Natural Gas is cleaner than coal, but still a polluting fossil fuel.

I urge you to please continue the process of phasing out natural gas appliances in homes.
After gas stoves, the next obvious targets are water heaters and air furnaces.

From air pollution to explosions destroying entire city blocks, it is time for us to end our use of natural gas and retire the distribution system.

There will be some challenges: some homeowners will need financial assistance to upgrade, and we need to double down on training qualified electricians to upgrade electrical distribution. These are large, but surmountable, problems.

Let's phase out all new natural gas construction. The sooner the better.

Thank you for your consideration,
Steven Schlansker
Berkeley Hills

Jennifer Elwell

From: Steven Schramm [REDACTED]
Sent: Monday, February 6, 2023 10:19 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I'm sure you get a lot of form letters, so this isn't one of those. I genuinely want to make the air better for everyone, and rules 9-4 and 9-6 will help get us there. I have swapped out my gas water heater for a heat pump water heater, and I will soon replace my gas furnace (and air conditioner) with a heat pump as well. But I can do this, as I have the means and time. Not everyone does. By supporting these rules, we can more quickly reduce pollution, improve the health of everyone, and also address one of the causes of Climate Change. So please support these rules. Thanks.

Steven Schramm

[REDACTED]

[REDACTED]

Mountain View, California 94041-2577

Jennifer Elwell

From: Steven [REDACTED]
Sent: Monday, February 6, 2023 3:21 PM
To: Jennifer Elwell
Subject: Going Electric

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To Whom It May Concern,

By forcing home owners to switch from natural gas, which was touted as clean energy just a few years ago, to all electric appliances sounds like a governmental overreach of authority. Currently, PG&E is incapable of supplying us with electricity for a calendar year. With the addition of electric cars and idiotic and expensive regulations are you willing to shut the Bay Area down in the summer when there is a fire danger or in the winter during storms? Has anyone given that consideration?

I support a healthy environment but this new rule discussion is completely NUTS.

Steven Wilk

Jennifer Elwell

From: sue [REDACTED]
Sent: Monday, February 6, 2023 12:06 PM
To: Jennifer Elwell
Subject: support for Rule 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear

BAAQMD Boardmembers, I am a long term resident of the city of San Mateo who believes that action is needed to fight climate change NOW. I am writing in support of Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. Limiting NOx emissions has many benefits- reducing indoor air pollution, improving air quality as well as fighting climate change. Thanks, Sue Blockstein [REDACTED] San Mateo, CA 94402

Jennifer Elwell

From: susan chamberlain chamberlain [REDACTED]
Sent: Friday, February 3, 2023 9:30 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

susan chamberlain chamberlain

[REDACTED]

[REDACTED]

palo alto, California 94301

Jennifer Elwell

From: Susan Ferrone [REDACTED]
Sent: Monday, February 6, 2023 12:01 PM
To: Jennifer Elwell
Subject: Proposed Gas Restrictions

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We are writing to oppose the proposed gas restrictions for gas-fueled furnaces and water heaters. We do not to be forced to buy electric water heaters and furnaces when our gas-fueled furnace and water heater need to be replaced.

The additional cost is extremely prohibitive and punitive. The Post stated that at current prices, an electric heat pump would cost about \$8,027 to buy and install versus \$5,096 for a gas furnace, 57.5% more and a difference of \$2,931.

Incentivize those who want to install electric water heaters and furnaces with rebates. Do not penalize consumers and force them to buy expensive electric appliances.

In addition, electricity is unreliable. We have endured many power outages, some lasting five days.

Sincerely,
Ken and Susan Ferrone

Jennifer Elwell

From: Susan Green [REDACTED]
Sent: Friday, January 27, 2023 3:32 PM
To: Jennifer Elwell
Subject: Regarding proposed changes to rules 9-4 and 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from green [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell,

I'm writing in full support of the proposed changes to rules 9-4 and 9-6 requiring only zero NOx water heaters, furnaces and large commercial water heaters to be sold and installed by 2027, 2029, 2031 respectively. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

The risk raised in the EIR regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of heat pumps, incentives to increase residential battery storage and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional and state electrification targets and reach zero net GHG emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed thru the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment.

I urge the BAAQMD board to adopt these proposed rules changes as quickly as possible.

Thank you,
Susan Green
(member of 350SF and SF Climate Emergency Coalition)
[REDACTED]
San Francisco, CA 94114

Jennifer Elwell

From: Susan Trivisonno [REDACTED]
Sent: Friday, February 3, 2023 8:58 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Susan Trivisonno

[REDACTED]

[REDACTED]

San Jose, California 95135

Jennifer Elwell

From: Sue Saunders [REDACTED]
Sent: Saturday, February 4, 2023 12:41 PM
To: krice@marincounty.org; Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 for Public Health and Climate Emergency

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Comments on December 2022 Staff Report and Draft Environmental Impact Report for the Proposed Amendments to Building Appliance Rules 9-4 and 9-6

Dear Chair Bauters, Board of Directors, and Executive Officer Landers,

My name is Susannah Saunders and I am a twenty six year resident of San Anselmo, San Anselmo Climate Action Commissioner, member of the Marin/Sonoma Building Electrification squad, and the Marin Conservation League Climate Action Group.

I'm asking you to please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area. Public health, especially for disadvantaged communities already burdened by excessive exposure to gas vehicle toxic emissions, depends on the approval of this amendment. Avoiding the worst impacts from climate change cannot happen without the approval of this amendment.

My beloved daughter Julia Saunders suffered from life threatening asthma attacks as a child. She had to use albuterol inhalers and frequent nebulizer treatments that contributed to her hyperactivity and made it difficult for her to learn. She spent her fifth birthday in the emergency room and it was terrifying to watch her struggle to breathe. This amendment will mean less exposure to NOx emissions from building appliances that contributed to her life threatening asthma attacks.

I applaud your recognition of NOx emissions' threat to public health and its contribution to climate change. The extreme weather events killing people are directly linked to climate change. Reducing methane emissions must happen quickly if we are to have any chance of preserving our quality of life gravely threatened by climate change. Please support Rule 9-4 and 9-6 for the health of both the public and our planet.

Sincerely,
Susannah Saunders
[REDACTED]
San Anselmo, CA
94960
[REDACTED]

Jennifer Elwell

From: Sven Thesen [REDACTED]
Sent: Friday, February 3, 2023 3:28 PM
To: Jennifer Elwell
Subject: Invitation: Tour my All Electric Home; Support 4 Air District's proposed zero-NOx appliance standards

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Gentle BAAQMD Boardmembers & BAAQMD Staff,

You all either together or individually along with friends and relatives, are cordially invited to tour my all electric home, ProjectGreenHome.org in Palo Alto.

As a chemical engineer, dad, and man of faith, I am writing in support of the Air District's proposed zero-NOx appliance standards.

When we first designed ProjectGreenHome.org in 2008-9 we knew that we wanted to avoid any natural gas use due to the known greenhouse gas emissions so the home was built with a heat pump for potable water & radiant floor, a condensing clothes dryer and induction stove.

However, given the nascent market for these products in 2008-9 we also plumbed the house with gas as a backup; just in case the above appliances failed to appropriately work. The house was finished in 2011; in 2014, we had the city utility cap the gas line and remove the meter. We were tired of paying the standby fees for something that we never used.

Now, twelve years later, the heat pump, the condensing clothes dryer and induction stove are all still working fine - and providing us with comfort, convenience (the stove is so easy to clean and wicked fast to heat) and savings compared to the equivalent gas fueled appliances.

And there are way more makes and models on the market than there were in 2008/9.

Regarding emissions, we now also know that these types of gas-fueled appliances not only have a significant greenhouse gas emissions but also significant criteria pollutant emissions hence the need for these regulations.

Please email me to set up a tour of ProjectGreenHome.org and afterwards we can talk about how Spare the Air Days correlate to emergency room visits.

In advance, thank you for supporting these zero-NOx appliance standards

Cordially,
Sven, Co-Founder, ProjectGreenHome.

--
Sven Thesen, [REDACTED]
EV Consultant & Founder, ProjectGreenHome.org and BeniSolSolar.com; Wonder Junkie

How California Is Keeping Electric Vehicles Out Of Reach For Apartment-Dwellers

Good morning,

District's proposed changes to rules 9-4 and 9-6 requiring only zero NOx water heaters, furnaces, and large commercial water heaters be sold and installed by 2027, 2029, 2031 respectively, as well as the introduction of an ultra-low NOx standard to Rule 9-4 for furnaces starting in 2024. We urgently need these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

The risk raised in the EIR regarding potentially insufficient grid capacity to support a transition to electric water heaters and furnaces can be mitigated thru the adoption of increasingly efficient electric appliances, incentives to increase residential battery storage, and other policy measures that will be necessary, regardless of these rules changes, if we are to meet our municipal, regional and state electrification targets and reach zero net GHG emissions by 2040 if not earlier.

The risk of increased noise associated with some electric alternatives is already being addressed through the introduction of new technologies and products that generate far less noise than their older counterparts; this transition can be accelerated via carefully crafted regulations and incentives designed to favor noise reduction in electric appliances.

These two concerns should not be allowed to outweigh the considerably greater risks to public health and the planet from natural gas-powered equipment.

I urge the BAAQMD Board to certify the EIR and adopt these proposed rule changes as quickly as possible.

Thank you,

Tamara San Rafael

Sent from my iPhone

Email Disclaimer: <https://www.marincounty.org/main/disclaimers>

Jennifer Elwell

From: Tamara Gabel [REDACTED]
Sent: Tuesday, January 24, 2023 1:52 PM
To: Jennifer Elwell
Subject: Comments: Amending Regulation 9, Rules 4 and 6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] - [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Jewell and BAAQMD,

I live about a 15 minute drive from Stanford. Our house is heated by a propane furnace and we use propane to cook, dry our cloths, and for the water heater. We regularly are without electricity about 30 days per year because PG&E can't/won't perform its primary function - - keep electricity flowing to its customers. We have done one stretch of having no electricity for two weeks, and one week at a time is almost an annual event – a couple of times per year.

Until PG&E can do its job, no regulations or rules should be considered, let alone passed that will keep me from working, heating my home, being able to cook my food, dry my clothes, and heat water. Notice I'm not saying never, I'm just saying you can't in good conscience amend rules and regulations that apply to everyone including those who are so victimized by PG&E, pretending that PG&E is doing it's job, because it's not. Until it does the District should not try to regulate all of us that live on propane out of our homes and places of work.

PG&E needs to reliably preform its primary function to ALL of its customers, then you can have this discussion with those of us who rely on propane. Until then, do what you will with those who do not suffer at the hands of PG&E but you have got to exempt PG&E's victims who use propane.

Most recently, and for example, during the most recent New Year's Eve storm we were without electricity for three days. No electricity means no lights, no computers, no TVs, no refrigeration, etc., but it also means the internet is down, there is no wifi, cell towers are down, hard line telephones don't work, and we can't heat our homes (electric starters and because we aren't allowed to burn wood even if it is the sole source of heat). The only way we had to shed any warmth was to turn all on all of the burners on the propane stove just to take the edge off of the cold.

Finally, just to answer someone's questions, (1) PG&E's solution to this problem is to send us fliers telling up to prepare for power outages by buying and using generators, and (2) moving is not a realistic option. Since solar is not a viable option the generators would need to be diesel or multi-fuel. How is this better than using propane?

Tamara Gabel

Jennifer Elwell

From: Terah James [REDACTED]
Sent: Monday, February 6, 2023 3:28 PM
To: Jennifer Elwell; Terah James
Subject: Fw: Please keep natural gas

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

This is to weigh in on the recent effort to require gas appliances be eliminated and replaced with electric. Please keep natural gas. Thank you.

TJ James

Jennifer Elwell

From: Terry Grasso [REDACTED]
Sent: Wednesday, January 18, 2023 12:40 PM
To: Jennifer Elwell
Subject: gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer,

I am a 73 yr old retiree living in a house built in 1948 in Walnut Creek, Ca.

I currently have a gas furnace and water heater, along with a gas stove.

My current electrical panel would not support conversion to 100% electrical without considerable expense to my small pension and Social Security.

Are there any plans to grandfather in older houses like mine? If not, I might have to consider selling the home I have lived in for 40 years, just to comply with current government regulations.

Some type of gradual plan similar to what the state is doing with regard to electric vehicles should be studied.

My wife and I are big proponents of BAAQMD with regard to your wood burning regulations, we even went so far as to remove our fireplace, and encourage our neighbors to do the same, because of its propensity to pollute the outside air.

Regards,

Terry Grasso
[REDACTED]

Jennifer Elwell

From: Terry Houlihan [REDACTED]
Sent: Sunday, February 5, 2023 2:09 PM
To: Jennifer Elwell
Cc: [REDACTED]
Subject: Proposed Bay Area Air Quality Management District Rule Amendments prohibiting gas fired water heaters and furnaces: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

February 5, 2023

Dear Ms Jennifer Elwell:

This responds to the notice of proposed amendments to Rules 9-4 and 9-6 inviting public comments on the proposals.

I OPPOSE adoption by the BAAQMD of the proposed amendments to Rules 9-4 and 9-6 that would prohibit the sale and installation of gas fired water heaters and boilers. For at least the following reasons that the Board should not adopt the proposed amendments:

First, the underlying assumption of the proposed amendments, that existing gas fired appliances can be replaced with electric heat pumps, is **false** as to my condominium unit and equally false as to many San Francisco and Oakland properties.

My wife and I own a unit on Telegraph Hill that is part of a 20 unit complex. Our unit, like others, has 3 stories of rooms served by two different furnaces, one on the top level and one on the first level. There is no usable exterior ground space for an air source heat pump for my unit.

Many San Francisco buildings, like lofts in converted warehouses and multi-story buildings converted to individual condos, similarly lack available ground space. Pasting exterior cooling boxes on the walls of each such unit is not a practical proposal.

Interior only air source units appear to be primarily for cooling, not heating, and do not heat water. Their ability to handle the same heating function as gas fired appliances is assumed, not discussed in your materials.

Second, appropriate rules governing gas fired appliances are, at a minimum, statewide issues, if not multi-state. These issues are not regional and should not be acted on by a regional board.

The papers supporting the proposed amendments demonstrate this. They make a case for the **benefits to the region** from improved air quality, but make no attempt to quantify the **costs elsewhere in the state** of the added electricity generation and transmission construction required to

meet the additional electric power demand created by the proposed amendments. As a result of this, your own Draft Environmental Impact report concludes:

"If we follow CEQA to the letter, and view the alternatives only in terms of those that address the Project's significant impacts, then we must grant that the **No Project Alternative is the environmentally superior alternative** because it avoids significant potential Project impacts associated with noise and also avoids the Project's potential considerable contribution to significant impacts related to electrical infrastructure expansion (including renewable energy expansion)." Draft EIR at ES-7(emphasis added).

In other words, the draft EIR recommends **against** adoption of the proposed amendments.

Third, the equity assessment of the proposed amendments is deficient.

The equity assessment attempts to show the distribution of projected benefits among Asian/Pacific Islander, Hispanic/Latino, African-American/Black and White groups. But it makes no attempt show how the higher new equipment and increased electric power costs would impact such groups.

Fourth, assumptions in the support documents about future electric generation, transmission and distribution are false.

It is unlikely that, as assumed in the study, that additional electric utility generation required by the amendments would be met entirely by utility-scale solar. A more likely scenario is that the demand would be met by mix of generation, including existing gas-fired units that would be called on more often.

Fifth, the assumption that PG&E can handle the added distribution strain within the proposed time frame is simply wrong, particularly in rural areas such as West Marin and Sonoma where frequent outages occur.

By copying my comments to the staff of your San Francisco Board members Shamann Walton and Myrna Melgar, I request their staff to raise these issues with those members.

Respectfully,

Terry J Houlihan

[REDACTED]
[REDACTED]

San Francisco, CA 94133

Jennifer Elwell

From: Jennifer Elwell
Sent: Wednesday, February 1, 2023 8:30 PM
To: Terry Nagel
Subject: RE: Support for Rules 9-4 and 9-6 to ensure clean air

Terry,

Thank you for providing your public comment on this matter, it has been received and will be included in the record. Responses to all comments received will be compiled and posted on our website in advance of the board meeting at which this item will be considered.

Jen Elwell

Rule Developer

From: Terry Nagel [REDACTED]
Sent: Wednesday, February 1, 2023 5:41 PM
To: Jennifer Elwell <jelwell@baaqmd.gov>
Subject: Support for Rules 9-4 and 9-6 to ensure clean air

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

I am a former Mayor of Burlingame with great concern about the harmful indoor air pollution caused by natural gas. Studies have shown they have several health impacts and we all know that gas ruptures can cause deadly explosions.

I urge you to support Rules 9-4 and 9-6 to help ensure that all Bay Area residents, regardless of race or income, can breathe what should be a human right: clean air.

Thanks very much for your consideration.

Sincerely,

Terry Nagel
Former Mayor, Burlingame
Chair, Sustainable San Mateo County
[REDACTED]

Jennifer Elwell

From: thalia lubin [REDACTED]
Sent: Friday, February 3, 2023 2:03 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

thalia lubin

[REDACTED]

[REDACTED]

woodside, California 94062

Jennifer Elwell

From: Thom Reinstein [REDACTED]
Sent: Wednesday, February 1, 2023 12:50 PM
To: Jennifer Elwell
Subject: Gas stove remarks

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern:

Expecting working poor families to bear the inequitably high burden of a Natural Gas appliance ban is patently unfair and a great economic disadvantage to communities of color.

Compared to coal, Natural Gas emits about half as much carbon dioxide to produce the same amount of energy.

Please oppose this TERRIBLE idea.

Thom Reinstein
Contra Costa County

--

Sent from Gmail Mobile

Jennifer Elwell

From: Thomas Carlino [REDACTED]
Sent: Friday, February 3, 2023 9:53 PM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Thomas Carlino

[REDACTED]

[REDACTED]

San Jose, California 95117

Jennifer Elwell

From: Tom p [REDACTED]
Sent: Saturday, February 4, 2023 1:05 PM
To: Jennifer Elwell
Subject: Against ban on gas fired appliances

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

As the subject says. I'm Against the ban on gas fired appliances.

Thank you
Thomas Pfaeffle
[REDACTED]
San Mateo CA

Sent from my iPhone

Jennifer Elwell

From: Thomas Tilden [REDACTED]
Sent: Wednesday, January 18, 2023 7:19 PM
To: Jennifer Elwell
Subject: Gas in homes

Follow Up Flag: Flag for follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I live in Belmont. Several years ago my neighborhood lost power for almost three days in a winter storm. I had no heat because without electricity the furnace did not operate. I think I had hot water also. The house was cold but I did not want to burn wood in the fireplace. I was ready to start burning wood the third night but the power came back on.

After that I purchased a small gas insert for one fireplace that operates on battery only - no fan. It is comforting that I have backup heat if I lose power again for an extended period. We are told to be prepared.

I do not agree with the movement to eliminate gas from homes including homes that already have gas water heaters and furnaces. Soon every home and apartment will need a backup generator and a supply of gasoline which will sit untested and unused until the next long power outage.

Slow down. Start with new construction if you want but don't require existing homes to change until we see if this is working. California already reaches its limit on electrical production on some days.

Tom Tilden
[REDACTED]

Jennifer Elwell

From: TJ Giuli [REDACTED]
Sent: Friday, February 3, 2023 2:30 PM
To: Jennifer Elwell
Subject: Comments on Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello, I am writing to oppose the proposed rule changes that would ban natural gas appliances.

My concerns are:

1. As the EIR mentions, implementing the proposed rule changes will exceed planned electricity generation by a substantial amount. Without planning for increasing climate-friendly energy generation, we will likely see what happened over this past summer -- electricity shortages at peak times when demand is high but generation from solar has fallen off. In this case, California imported electricity from neighboring states or fired up natural gas generators. Since the BAAQMD cannot mandate the construction of green energy generating plants to handle the additional electric load, implementing the rule changes runs the risk of creating additional greenhouse gasses.

2. Heat pumps and electric water heaters will place additional electrical load on every home in the Bay Area. Given that all new vehicles sold in California by 2035 will be electric, an enormous number of houses will have to upgrade their electrical panels to comply with code. The amount of effort required to do this cannot be understated. Having gone through an electrical panel upgrade as part of a renovation, I can testify to the fact that it takes months just to get on PG&E's schedule and thousands of dollars in parts and labor. These issues might be outside of the scope of the EIR, but any realistic consideration of these rule changes must consider the practical impact.

In summary, I believe the proposed rule change will cause many more problems than it will solve and so I oppose the change. Thank you,
--TJ Giuli

Jennifer Elwell

From: Todd [REDACTED]
Sent: Friday, February 3, 2023 5:04 PM
To: Jennifer Elwell
Subject: Support Rule 9-4 and Rule 9-6 to reduce Nitrogen Oxides from Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jennifer,

My name is Todd Snyder and I strongly support Rules 9-4 and 9-6 to reduce emissions of Nitrogen Oxides from residential and commercial furnaces and water heaters in buildings in the Bay Area. I'm concerned about the harmful air pollution emitted by furnaces and water heaters. Please implement these rules as soon as possible to Protect Our Public Health!

Thank you,
Todd Snyder
San Francisco, CA 94115

Jennifer Elwell

From: Tom Kabat [REDACTED]
Sent: Thursday, February 2, 2023 2:15 PM
To: Jennifer Elwell
Subject: Support for Rule 9-4 and Rule 9-6

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I'm chair of the Menlo Park Environmental Quality Commission writing as a resident just representing my own views and decades of experience.

As an environmental engineer I understand the burning gas in buildings produce nitrogen oxides (NOx) and harmful indoor air pollution as well as harmful pollution in the neighborhoods to which we vent our exhaust. NOx are toxic, highly reactive gases that endanger human health by causing respiratory conditions such as asthma, decreased lung function, and vulnerability to other diseases and early death.

At my house we converted to zero NOx devices and it was easy. We put in a mini-split heat pump that also gives us needed summer smoke season cooling and a heat pump water heater that also as a byproduct dehumidifies our basement, we put in an induction stove and kicked gas to the curb. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

We are happy to be all electric, modern and healthy and we're more comfortable than when we had gas.

Implementing the rule as soon as possible will give Bay Area residents more opportunities to harvest the valuable Federal IRA incentives for installing the zero NOx alternatives.

These Federal incentives for furnace alternatives include up to \$8,000 upfront plus an additional 30% tax credits on up to the next \$6,667 of any added expense.

These Federal incentives for water heater alternatives include up to \$1,750 upfront plus 30% tax credits on up to the next \$6,667 of any added expense.

To harvest these federal incentives available 2024 through 2032, the District may want to consider implementing the rule a couple of years earlier than was proposed before the passage of the Federal IRA to further leverage the federal dollars.

This rule is not about just limiting NOx emissions from building appliances but improving air quality in the communities most burdened by fossil fuel pollution. Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Sincerely,

Tom Kabat
Environmental Engineer

Jennifer Elwell

From: Tony Gaughan [REDACTED]
Sent: Monday, February 6, 2023 4:12 PM
To: Jennifer Elwell
Cc: Summer Fu
Subject: Bay Area Air Quality Management District'

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD directors:

I am writing to comment on the proposed rules regarding replacement of gas fueled furnaces with electric appliances.

My wife and I moved to our home 18 months ago which is in a forested area of the county of San Mateo on Bear Gulch Road.

We do have a backup generator which is fueled by propane and quite simply has been a life saver. Since the beginning of this year with the recent storms we have had several outages - one which lasted 6 days. Without our generator as backup we would have had no electricity. We also use propane for our boiler and gas stove.

For me there are a few options to consider.

1. PG&E should, as priority move all power lines underground. It is more than likely our outages are mostly created by the above lines being cut by falling trees, etc. the commercials PG&E run suggest it is a priority to go sub-terrain.
2. Provide homes with significant incentives to use battery backup solutions - feed from the grid and other sources (eg solar).

We simply cannot rely on PG&E without significantly improved uptimes.

Thank you for considering this input,
Tony Gaughan

Jennifer Elwell

From: trish mulvey [REDACTED]
Sent: Friday, February 3, 2023 8:21 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

trish mulvey

[REDACTED]

[REDACTED]

palo alto, California 94303

Jennifer Elwell

From: Tristia Bauman [REDACTED]
Sent: Saturday, February 4, 2023 9:47 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Tristia Bauman
[REDACTED]

[REDACTED]

Gilroy , California 95020

Jennifer Elwell

From: Vansi Vallabhaneni [REDACTED]
Sent: Wednesday, January 18, 2023 1:44 PM
To: Jennifer Elwell
Subject: Public Comment in Support of Gas Ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello,

I'd like to give my support for the boards plan to ban gas appliances in new development. This fall you could see the haze caused by fossil fuel and wood burning in the Bay and it was so sad to see. It made seeing the beauty of the bay so much harder.

In addition, we all know about the negative health effects for residents and children of buildings with gas appliances thanks to the study from Australia.

Also I imagine residents can enjoy cheaper utility bills especially with how expensive gas has been of late.

Best
Vansi

Jennifer Elwell

From: victor buathier [REDACTED]
Sent: Monday, February 6, 2023 1:23 PM
To: Jennifer Elwell
Subject: Replacing Natural Gas-Fueled Furnaces-H2O Heaters and Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Baaqmd,

This is going to be long, so please bare with me,

Let's start with the elephant in the room, which is PGE. Everyone pushing the replacement of natural gas for our appliances, furnace, fireplace, and water heaters may have a good idea about protecting the environment, but, You all are putting the carriage ahead of the horse here.

Let's fix, repair and upgrade the electrification with PGE and the rest of the electrical companies before you all shove down these ridiculous rules that you think are going to make our lives a better place to live without putting yourselves in the homeowner's shoes and see exactly how this move is going to affect their livelihood and mine.

For the past years, journal columnists and lawyers have published articles on how dangerous gas particles are without scientific proof and (my theory) that people pushing for this are individuals, groups, or companies who will profit from forcing the change. And the biggest winner will be PGE which has continuously had an average increase of around 32 percent since 2010. In the last few years, they have had an average raise of 7.5 percent for electricity and roughly 11 percent for gas.

These raises will go nowhere for a while, and they constantly ask PUCO for raises. And in turn, our government allows this incompetent company to continue to operate without any consequences or drawbacks. Oh yes, don't mention that the government, state, and various individuals have sued PGE over the past few years and had to pay. True, but in return, they raise their rates on everyone to get back what they paid out, so how is this punishing them, you ask? It's not!

Look at how many hot summer days PGE has had to use Rolling Blackouts in the past six years, and it's not going to get any better weather-wise. This is before you all will force every homeowner into changing all gas equipment, appliances, and electrical panel if needed, which will add to the usage of electricity, which PGE can't handle now or shortly.

You and your colleagues think, believe, or are hopeful that what you want will be achievable, and I also believe this is possible, but let's regroup and take the correct approach first. First, the horse, then the buggy

The reality is that we need to fix PGE; let's get the right people together and work on that first and find ways to make life a little easier for our communities and not put stress on them when they can't afford to pay their bills now let alone paying for equipment that won't fit their budget and PGE bills will continue to rise without merit. In your own words, rates will go up by 2.2 percent or more (that's being very generous of you), and you want to install solar panels which will be ready (maybe by government standards) by the year 2050! (If I was a betting man, I think I would take that bet and believe that this project will be at least ten years late) Why not wait to force the changeover until the electrification is installed and see how that will work first? Doesn't it seem strange that you all want to put the carriage in front of the horse first? Again.

By the way, the consultant estimates that you all have been advertising need to be corrected. Only some heat pumps or gas heaters will cost the same, especially in the Bayarea with such a low volume of excellent and trustworthy HVAC companies (have you not seen the price gouging). Gas appliances are a better product in the long run because electric

furnaces will run more frequently. In turn, they will use more kilowatts, putting you in a higher TOU, higher tier program, and costing more which you were hoping to eliminate.

Please take your time and do what's right first before regretting your decision which you won't be able to fix.

Against electrification right now, but I will wait for 2050 and see how your solar panels are working by then,

Best,

Victor

Jennifer Elwell

From: Victoria Armigo [REDACTED]
Sent: Friday, February 3, 2023 8:45 AM
To: Jennifer Elwell
Subject: Please Support Rule 9-4 and 9-6 for Environmental Justice

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Senior Air Quality Engineer Jennifer Elwell,

Dear BAAQMD Board Members,

I strongly support the proposed zero-emissions standard by Bay Area Air Quality Management District (BAAQMD) to phase out gas appliances in the Bay Area.

Burning methane gas in buildings produces toxic nitrogen oxides (NOx) and harmful indoor air pollution. This proposed zero-NOx rule will deliver multiple health, environmental and climate benefits, especially for communities of color and low-income communities who are most impacted by gas appliance pollution.

According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution.

By promoting the use of electric heat pumps, BAAQMD's appliance standard will also address the gap in access to cooling, a public health necessity as temperatures rise with climate change, while reducing California's climate-warming emissions from appliances by 73% by 2046.

Please support Rule 9-4 and 9-6 to ensure we have clean air in the Bay Area.

Victoria Armigo

[REDACTED]

[REDACTED]

Sunnyvale, California 94086

Jennifer Elwell

From: Wendy Chou [REDACTED]
Sent: Thursday, February 2, 2023 8:35 PM
To: Jennifer Elwell
Subject: Gas appliances and safety concerns in my rental home

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Boardmembers,

I'm a resident of San Mateo County who is also a renter of a single-family home that has mostly gas appliances (water heater, furnace, and stove). I am not happy about this situation, as I realize that burning gas in buildings is very dangerous. It not only produces nitrogen oxides (NOx), but also carbon monoxide and fine particulates. I have little control over the types of appliances in my home because of my renter status (although we did stop using our gas stove because we bought a single-burner induction hob). That's why I am asking you, BAAQMD Boardmembers, to vote to support cleaner air by phasing out gas appliances. You can help by supporting Rule 9-4 and 9-6.

I would like to make sure that renters like me are given a chance at a healthier life. According to research from UCLA, replacing all residential gas appliances in California with clean electric alternatives would prevent 354 premature deaths, 596 acute cases of bronchitis, and 304 cases of chronic bronchitis annually through outdoor air quality improvements in PM2.5 pollution. Right now the Bay Area is failing to meet federal limits for safe levels of ozone pollution, which puts residents' health at risk. Furthermore, gas in the home causes plenty of other problems from leaking methane, flames, and the possibility of a gas-related explosion in the event of an earthquake or severe storm.

But it's not just about me in my home. This rule will contribute to improving air quality in the communities most burdened by fossil fuel pollution. These pollution reductions will deliver much-needed health and air quality benefits to Bay Area residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse cost impacts. Did you know that People of color in the U.S. are exposed to nearly twice as much residential gas appliance pollution as white communities? And that communities of color have been found to be exposed to 55% more NO2 than mostly white neighborhoods? Transitioning homes to electric heat pumps can tackle a key source of NOx pollution, improving air quality, and supporting the state in meeting federal air quality standards that protect health.

With climate change and air quality on the line, please support Rule 9-4 and 9-6. Thank you for your service.

Sincerely,

Wendy Chou
San Mateo

Jennifer Elwell

From: Bill Garrett [REDACTED]
Sent: Monday, February 6, 2023 9:37 AM
To: Jennifer Elwell
Subject: Proposed Ban On Gas Appliances Based On Suspect, Biased Research

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The proposed ban of natural gas heating appliances by the Bay Area Air Quality Management District (BAAQMD) for supposed health reasons is based on suspect, unreliable and non-scientific research.

BAAQMD's "health risk" justification for its proposed ban is based on at least two non-scientific metadata research papers, one authored by non-scientist employees of a biased environmental advocacy group and the other by two lawyers (again, non-scientists) for NYU's Institute for Policy Integrity. Contributing editor Kimberly Strassel of the Wall Street Journal reported that neither study involved an actual scientist (January 27th).

BAAQMD should stop pushing wrong-headed decisions on the citizens it serves and should be more careful in choosing the data on which to base its decisions.

William R. Garrett, Esq.
Hanna & Van Atta

[REDACTED]
Menlo Park, CA 94025

Telephone: [REDACTED]

Mobile: [REDACTED]

Facsimile: [REDACTED]

Email: [REDACTED]

Website: [REDACTED]

This email message may contain confidential, privileged information intended solely for the addressee. Please do not read, copy, or disseminate it unless you are the addressee. If you have received this email message in error, please call us (collect) at [REDACTED] and ask to speak with the message sender. Also, we would appreciate your forwarding the message back to us and deleting it from your system. Thank you.

Jennifer Elwell

From: William Williams [REDACTED]
Sent: Sunday, February 5, 2023 3:13 PM
To: Jennifer Elwell
Subject: Gas Appliance Ban

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

In San Mateo County, extensive commercial developments are approved or planned to be built.

The City of Burlingame is granting waivers to all-electric codes for new construction for some of these developments. The justification given is that proposals were submitted and approved before developers anticipated the increased costs for all electric facilities. This will lead to a long term expansion of natural gas usage.

Meanwhile, your agency is virtue posturing while changing appliance requirements for homeowners. I am 68 and partially disabled. I cannot afford to purchase more expensive appliances, retrofit my home, and pay higher energy bills as a result. One of my neighbors went totally electric, including electric car charging. He spent about \$100,000 for the retrofit and told me his PG&E bills are astronomical.

Why are large energy consumer's costs considered allowing gas infrastructure expansion while small users on fixed incomes will be forced to subsidize the green energy industry?

x Bill Williams
San Mateo

Sent from [Outlook](#)

Jennifer Elwell

From: Zoe Jonick [REDACTED]
Sent: Monday, February 6, 2023 11:12 AM
To: Jennifer Elwell
Subject: Support Rule 9-4 and 9-6 to Protect Our Communities

Follow Up Flag: Follow up
Flag Status: Completed

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear BAAQMD Board Members,

My name is Zoe Jonick, I'm a lifelong Oakland resident and a young person sincerely concerned about the climate crisis. I work with a lot of other youth, from middle school through college, and we want to express our support for any regulations that would hasten the transition from fossil fuels to clean energy. In this case, in support of Rule 9-4 and 9-6.

It is crucial that we electrify home appliances as soon as possible - all the recent studies confirm that our use of gas and oil in the home is extremely detrimental to our health. According to BAAQMD itself, these rules could help prevent 15,000 asthma symptom incidents and avoid up to 85 premature deaths each year - those are lives and livelihoods that deserve protection. These rules also would take us in a positive step towards Environmental Justice in the Bay Area - studies show that communities of color and low income communities are exposed to nearly twice as much residential gas pollution as white communities.

BAAQMD has a responsibility to take the strongest action possible to safeguard the health and safety of Bay Area communities - and we're relying on you to do so! This is something tangible, that can have real and immediate impacts to our local air quality - and quality of life.

Thank you for your time, and please support Rule 9-4 and 9-6 to ensure our current and future health.

Sincerely,

--

Zoe Jonick (she/her)
People vs. Fossil Fuels Organizer
[350 Bay Area](#) & [350 Bay Area Action](#)

[REDACTED] | [REDACTED]
Take Climate Action! [Join our monthly meetings](#) [Make a donation](#)

Final Environmental Impact Report
for the

Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

State Clearinghouse No. 2022050430

Prepared for:



BAY AREA AIR QUALITY
MANAGEMENT DISTRICT



Final Environmental Impact Report for the

Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

State Clearinghouse No. 2022050430

Prepared for:



Bay Area Air Quality Management District

375 Beale Street, Suite 600
San Francisco, California 94105

Contact:

Jennifer Elwell

415.749.4900

Prepared by:



Ascent Environmental

455 Capitol Mall, Suite 300
Sacramento, CA 95814

Contact:

Mike Parker, AICP

916.444.7301

March 2023

TABLE OF CONTENTS

Section	Page
LIST OF ABBREVIATIONS	ii
1 INTRODUCTION	1-1
1.1 Purpose and Intended Uses of this Final EIR	1-1
1.2 Project Location.....	1-1
1.3 Project Objectives	1-1
1.4 Summary Description of the Project.....	1-2
1.5 Major Conclusions of the Environmental Analysis.....	1-3
1.6 CEQA Public Review Process	1-4
1.7 Organization of the Final EIR.....	1-5
2 RESPONSES TO COMMENTS.....	2-1
2.1 List of Commenters on the Draft EIR	2-1
2.2 Master Responses.....	2-1
3 LIST OF PREPARERS.....	3-1
Appendices	
A Draft EIR Comments	
Tables	
Table 2-1 List of Commenters	2-1
Table 2-2 List of Master Responses	2-2

LIST OF ABBREVIATIONS

BAAQMD	Bay Area Air Quality Management District
CAAQS	California Ambient Air Quality Standards
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
E3	Environmental and Energy Economics
EIR	environmental impact report
GHG	greenhouse gas
MMRP	mitigation monitoring and reporting program
NAAQS	National Ambient Air Quality Standards
NOx	nitrogen oxide
NOA	notice of availability
NOP	notice of preparation
ng/joule	NOx per joule of useful heat
PG&E	Pacific Gas and Electric Company
PRC	Public Resources Code
SJVAPCD	San Joaquin Valley Air Pollution Control District
SCAQMD	South Coast Air Quality Management District

1 INTRODUCTION

This final environmental impact report (Final EIR) has been prepared by the Bay Area Air Quality Management District (BAAQMD) as lead agency, in accordance with the requirements of the California Environmental Quality Act (CEQA) and the State CEQA Guidelines (California Code of Regulations [CCR] Section 15132). This Final EIR contains responses to comments received on the draft environmental impact report (Draft EIR) for the Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters Project (proposed amendments to Rules 9-4 and 9-6 or Project). The Final EIR consists of the Draft EIR and this document (response to comments document), which includes comments on the Draft EIR and responses to those comments.

1.1 PURPOSE AND INTENDED USES OF THIS FINAL EIR

CEQA requires a lead agency that has prepared a Draft EIR to consult with and obtain comments from responsible and trustee agencies that have jurisdiction by law with respect to the Project, and to provide the public with an opportunity to comment on the Draft EIR. The Final EIR is the mechanism for responding to these comments. This Final EIR has been prepared to respond to comments received on the Draft EIR, which are reproduced in this document. The Final EIR will be used to support the BAAQMD's decision regarding whether to approve the Project.

Final EIRs are also be used by CEQA responsible and trustee agencies to ensure that they have met their requirements under CEQA before deciding whether to approve or permit project elements over which they have jurisdiction. Final EIRs may also be used by other state, regional, and local agencies that may have an interest in resources that could be affected by the project or that have jurisdiction over portions of the project. There are no responsible or trustee agencies for this Project. Further, no permits or approvals from other agencies are anticipated to be required.

1.2 PROJECT LOCATION

The proposed amendments to Rules 9-4 and 9-6 would apply to building appliances within the BAAQMD's jurisdiction, which encompasses 5,600 square miles. The area of BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast.

1.3 PROJECT OBJECTIVES

The overall purpose of the proposed amendments is to reduce nitrogen oxide (NO_x) emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Specifically, the objectives of the proposed amendments to Rules 9-4 and 9-6 are to:

- ▶ for Rule 9-4, introduce an "ultra-low" NO_x standard for space-heating appliances with a compliance date in 2024;
- ▶ for Rule 9-4, establish a zero-NO_x standard in 2029;
- ▶ for Rule 9-6, establish a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size;
- ▶ expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances;
- ▶ update and clarify the certification and calculation methods contained in the rules;

- ▶ ensure equitable implementation of the rules; and
- ▶ improve the clarity and enforceability of the rules.

1.4 SUMMARY DESCRIPTION OF THE PROJECT

The BAAQMD is proposing amendments to Rules 9-4 and 9-6. Rule 9-4 applies to the natural gas-fired space-heating furnaces commonly found in single-family homes, and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. Space- and water-heating appliances generate a large portion of NO_x emissions from sources in the Bay Area. NO_x is formed during natural gas combustion when ambient nitrogen and oxygen combine at high temperatures. If adopted, the proposed rule amendments would substantially reduce NO_x emissions from these appliances.

PROPOSED AMENDMENTS TO RULE 9-4

The proposed amendments for Rule 9-4 include introducing an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024 and setting a zero-NO_x standard in 2029. Like the current rule, amended Rule 9-4 would apply only to new devices and only to natural gas-fired devices. The proposed new lower and zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces.

PROPOSED AMENDMENTS TO RULE 9-6

The proposed amendments for Rule 9-6 include setting a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size. Like the current rule, amended Rule 9-6 would apply only to new devices and only to natural gas-fired devices. The proposed new zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing water heaters.

EMISSION CONTROL METHODS

Emission control methods to meet the proposed 14 nanograms of NO_x per joule of useful heat (ng/joule) standard for Rule 9-4 are well established and currently required by South Coast Air Quality Management District (SCAQMD) Rule 1111 and San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 4905. Potential complications identified in other jurisdictions, such as high-altitude and cold weather scenarios, are not applicable in the Bay Area. The BAAQMD anticipates that dual-fuel systems able to demonstrate compliance with this new proposed standard would be eligible for certification.

Current space and water heating appliances that meet the zero-NO_x standard and are available on the market consist mainly of electric heat pump systems. The BAAQMD does not intend to mandate specific technology solutions, but currently available electric solutions were used as the bases to form estimates and projections. Natural gas technologies, with combustion occurring in the absence of nitrogen, along with a variety of other technologies, could also meet the proposed standards. The assumed use of electric appliances for CEQA analysis purposes allows for a conservative estimate for impacts to utility systems and NO_x reductions and potential adverse environmental impacts because a switch to electric appliances would slightly reduce NO_x emissions reductions (some increase in NO_x emissions from power generation); have impacts on utilities and services systems from the additional electricity needed to power these appliances; and have potential noise impacts, as discussed herein. Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, NO_x emission reductions would be greater than those shown here as the resultant emissions would be zero (i.e., fewer potential emissions associated with electricity generation), there would be lesser impacts due to electricity need, and there would be no other foreseeable potential adverse impacts on any environmental impact areas. Thus, for CEQA analysis purposes, the BAAQMD assumes that currently in-use natural gas-fired appliances would be replaced with electric appliances. The proposed amendments include a zero-NO_x standard four to eight years in the future to encourage technology development, as well as availability and accessibility throughout the Bay Area.

OTHER POTENTIAL PHYSICAL EFFECTS

As described above, the proposed amendments to Rules 9-4 and 9-6 would affect natural gas-fired space- and water-heating appliances, including furnaces and water heaters used in single-family homes; multifamily residences; and commercial spaces, such as retail and office buildings. These appliances would be installed at existing and new residential and commercial buildings. The proposed rule amendments would not result in any land use changes and would not require construction (other than installation of the replacement units at existing buildings). These proposed amendments would also not result in foreseeable changes to equipment manufacturing processes that could require construction of new or expanded equipment manufacturing facilities or notable changes to equipment distribution patterns that could increase vehicle miles traveled. The BAAQMD conducted additional research on electrical grid capacity to serve the Project. The results of this research are included in the Draft EIR, Appendix C. Although the Project does not include development of other facilities that would directly increase demand for electricity, the Project would result in long-term replacement of appliances with zero-NO_x appliances that are assumed to be electric. This assumption is made for purposes of conducting a conservative CEQA analysis and is based on currently available technology. This change to electric appliances would contribute to increased electricity demand resulting from other programs, especially State-led decarbonization programs that involve much more reliance on renewable energy. The potential for the Project to contribute to substantial adverse physical effects associated with any electrical supply increases or necessary grid capacity upgrades is analyzed in the Draft EIR in Section 3.3, "Utilities and Service Systems (Energy Resources)." Should natural gas-fired appliances that meet the zero-NO_x standard be developed and used in practice, these potential grid impacts would decrease.

PROJECT TIMELINE

The proposed rule amendments would be in effect beginning in 2024. They would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces and water heaters. The equipment changeout is projected to be completed in 2046.

ENVIRONMENTAL PERMITS

No environmental permits would be required for Project implementation.

1.5 MAJOR CONCLUSIONS OF THE ENVIRONMENTAL ANALYSIS

The Draft EIR identified the following impacts related to the Project:

Air Quality

- Impact 3.1-1: Long-Term Operational-Related Emissions of ROG, NO_x, PM₁₀, and PM_{2.5} (less than significant [beneficial])

Greenhouse Gas Emissions and Climate Change

- Impact 3.2-1: Potential to Generate GHG Emissions (less than significant [beneficial])

Utilities and Service Systems (Energy Resources)

- Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact (significant and unavoidable)

Noise

- Impact 3.4-1: Potential to Generate Long-Term Operational Noise (significant and unavoidable)

Aesthetics

- Impact 3.5-1: Substantial Adverse Effects on a Scenic Vista (less than significant)

- ▶ Impact 3.5-2: Substantially Damage Scenic Resources, Including, but not Limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway (less than significant)
- ▶ Impact 3.5-3: Substantially Degrade the Existing Visual Character or Quality of Public Views Sites in Rural Areas, or Conflict with Applicable Zoning or Other Regulations Governing Scenic Quality in Urban Areas (less than significant)
- ▶ Impact 3.5-4: Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area (no impact)

PRC Section 21081.6(a)(1) requires lead agencies to “adopt a reporting and mitigation monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment.” A mitigation monitoring and reporting program (MMRP) has not been prepared for the Project because no mitigation measures are available to reduce the Project’s significant and unavoidable impacts.

1.6 CEQA PUBLIC REVIEW PROCESS

1.6.1 Notice of Preparation and Initial Study

In accordance with Public Resources Code (PRC) Section 21092 and CCR Section 15082, the BAAQMD issued a notice of preparation (NOP) and Initial Study on May 19, 2022, to inform agencies and the general public that an EIR was being prepared and to invite comments on the scope and content of the document (Draft EIR, Appendix A). The NOP and Initial Study were submitted to the State Clearinghouse for distribution to reviewing agencies; posted on the BAAQMD’s website (<https://www.baaqmd.gov/>); posted with the applicable County Clerks; and made available at the BAAQMD’s office. In addition, the NOP was distributed directly to public agencies. The NOP was circulated for a 34-day review period, with comments accepted through June 21, 2022.

In accordance with State CEQA Guidelines Section 15082(c), a noticed scoping meeting for the EIR was held virtually on June 9, 2022, from 6:00 p.m. to 8:00 p.m.

1.6.2 Draft EIR

In accordance with the State CEQA Guidelines Section 15087 and 15105, the Draft EIR was circulated for public review and comment for a period of 48 days, from December 20, 2022, to February 6, 2023. The Draft EIR was submitted to the State Clearinghouse for distribution to reviewing agencies; posted on the BAAQMD’s website (<https://www.baaqmd.gov/>); and made available at the BAAQMD’s office. In addition, the notice of availability (NOA) of the Draft EIR was posted with the applicable County Clerks and distributed directly to public agencies.

1.6.3 Final EIR

As a result of these notification efforts, written comments were received from State and local agencies, organizations, and individuals on the content of the Draft EIR. Chapter 2, “Responses to Comments,” identifies these commenting parties, a summary of their respective comments, and responses to these comments. None of the comments received, or the responses provided, constitute “significant new information” by CEQA standards (State CEQA Guidelines Section 15088.5).

As required by State CEQA Guidelines Section 15088(b), the BAAQMD has provided an electronic copy to each public agency that submitted written comments on the Draft EIR with written responses to that public agency’s comments at least 10 days prior to certifying the Final EIR.

1.7 ORGANIZATION OF THE FINAL EIR

This Final EIR is organized as follows:

Chapter 1, "Introduction," describes the purpose of the Final EIR, summarizes the Project and the major conclusions of the Draft EIR, provides an overview of the CEQA public review process, and describes the content of the Final EIR.

Chapter 2, "Responses to Comments," contains a list of all parties who submitted comments on the Draft EIR during the public review period and responses to the comments. Master responses were prepared to respond comprehensively to multiple comments that raised similar issues.

Chapter 3, "List of Preparers," identifies the lead agency contacts as well as the preparers of this Final EIR.

Appendix A contains copies of the comment letters received on the Draft EIR during the public review period.

This page intentionally left blank.

2 RESPONSES TO COMMENTS

Comment letters received during the public review period for the Draft EIR are provided in Appendix A. In conformance with Section 15088(a) of the State CEQA Guidelines, written responses are provided in this chapter to address comments on environmental issues received from reviewers of the Draft EIR.

The notice of availability (NOA) of the Draft EIR provided an opportunity for agencies and the public to provide comments on both the proposed rule amendments as well as the Draft EIR. Therefore, comments were received on the proposed rule amendments that did not address environmental issues. Copies of those comments and responses to those comments are included the Staff Report, which is available on the BAAQMD's website (<https://www.baaqmd.gov/rules-and-compliance/rule-development/building-appliances>). All comment letters submitted during the Draft EIR public review period will be reviewed and considered by the BAAQMD Board of Directors before a decision on the Project is rendered.

2.1 LIST OF COMMENTERS ON THE DRAFT EIR

Table 2-1 presents the list of commenters, including the author of the comment letter, the organization or affiliation of the commenter, the date of the comment letter, and the comment category and subcategory.

Table 2-1 List of Commenters

Commenter	Organization/Affiliation	Date	Comment Category	Comment Subcategory
AHRI	Organization/Manufacturer	2/6/2023	EIR	Alternatives
Annette Ross	Public	2/6/2023	EIR	Noise
Annette Ross	Public	2/6/2023	EIR	General
Bradford White Corporation	Organization/Manufacturer	2/6/2023	EIR	Alternatives
Charles Getz	Public	1/23/2023	EIR	Benefits
Charles Getz	Public	1/23/2023	EIR	Grid Impacts
Charles Getz	Public	1/23/2023	EIR	General
Daniel Feldman	Public	2/3/2023	EIR	Grid Capacity
Donald Duggan	Public	1/18/2023	EIR	Travel
Eric Frick	Public	2/6/2023	EIR	Noise
Eric Frick	Public	2/6/2023	EIR	General
Eric Frick	Public	2/6/2023	EIR	Alternatives
Izmirian Roofing and Sheet Metal	Company	2/6/2023	EIR	Noise
John Sheakley	Public	2/6/2023	EIR	Grid Impacts
Palo Alto Green Gables Residents	Public	1/23/2023	EIR	Noise
Peter Jon Shuler	Public	2/4/2023	EIR	General
Terry Houlihan	Public	2/5/2023	EIR	General
TJ Giuli	Public	2/3/2023	EIR	Grid Emissions

2.2 MASTER RESPONSES

The comments received on the Draft EIR are provided in Appendix A and the responses to those comments are provided below. Several comments raised similar issues. Rather than responding individually, master responses have been developed to address the comments comprehensively. Master responses are organized by category and

subcategory, as shown in Table 2-2. For example, Master Response 1 (EIR: General), responds to similar comments from Annette Ross, Charles Getz, Eric Frick, Peter Jon Shuler, and Terry Houlihan.

Table 2-2 List of Master Responses

Master Response	Commenters
Master Response 1 (EIR: General)	Annette Ross, Charles Getz, Eric Frick, Peter Jon Shuler, Terry Houlihan
Master Response 2 (EIR: Travel)	Donald Duggan
Master Response 3 (EIR: Noise)	Annette Ross, Eric Frick, Izmirian Roofing and Sheet Metal, Palo Alto Green Gables Residents
Master Response 4 (EIR: Benefits)	Charles Getz
Master Response 5 (EIR: Grid Impacts)	Charles Getz, John Sheakley
Master Response 6 (EIR: Grid Capacity)	Daniel Feldman
Master Response 7 (EIR: Grid Emissions)	TJ Giuli
Master Response 8 (EIR: Alternatives)	AHRI, Bradford White Corporation, Eric Frick

2.2.1 Master Response 1 (EIR: General)

COMMENT

The comments express concern about the potential adverse environmental impacts including added electrical generation capacity, added solar farms, and grid infrastructure.

RESPONSE

Staff acknowledges the concerns identified by commenters, which are thoroughly analyzed in the Draft EIR and accompanying evaluation of electric infrastructure impacts performed by E3 (Environmental and Energy Economics). These impacts are described in the Draft EIR (see Impact 3.3-1), which states that energy production projects (predominately utility scale solar development) are needed to serve California's growing energy needs and their development may have potentially significant environmental impacts. Development of new electrical infrastructure is not within the BAAQMD's jurisdiction and the development of any particular utility resource project is speculative at this time. As described on page 3.3-10 of the Draft EIR, the potential impacts of developing these energy projects would generally be located outside the Bay Area, and potentially outside California. These energy projects would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the Draft EIR discloses the Project's contribution to these impacts and concludes that the impact remains potentially significant and unavoidable under the Low Policy Reference Scenario.

The BAAQMD staff notes that the Draft EIR also reviews the significant environmental benefits of the proposed rule amendments. If adopted by the BAAQMD's Board of Directors and implemented, the Project would produce significant improvements to regional air quality. The Draft EIR describes how the Project would also reduce greenhouse gas (GHG) emissions.

Where an EIR discovers and discloses potentially significant environmental impacts, such as in the Draft EIR, the decisionmaker must weigh those adverse impacts against any beneficial environmental effects and other positive and negative attributes of the Project before deciding whether to approve the Project. The Draft EIR identifies the potentially significant environmental impacts associated with the proposed rule amendments as well as the anticipated improvements to regional air quality and public health and co-beneficial greenhouse gas reductions that would result from the proposed rule amendments.

The BAAQMD Board of Directors will take the commenters' opinions on the Draft EIR into consideration when making decisions regarding the Project before a decision on the Project is rendered.

2.2.2 Master Response 2 (EIR: Travel)

COMMENT

The comment expresses concern about the increased travel that would be required to purchase replacement appliances outside of the Bay Area.

RESPONSE

The proposed rule amendments are described in Chapter 2, "Project Description," of the Draft EIR. If adopted, the proposed rule amendments would result in changes to the types of new furnaces and water heaters that would be allowed for sale and installation within the Bay Area (i.e., only those appliances that meet the new NO_x standards would be allowed to be sold and installed in the Bay Area). Therefore, it is not expected that appliances obtained out of the region would be installed within the Bay Area as it is not allowed under the requirements of the proposed rule amendments to install such appliances (unless they emit zero-NO_x). No evidence has been provided that would suggest the Project would result in increased travel outside of the Bay Area to purchase replacement appliances.

2.2.3 Master Response 3 (EIR: Noise)

COMMENT

The comments express concern about the potential noise that would be generated from appliances installed outside of buildings.

RESPONSE

Potential noise impacts resulting from the Project are addressed in the Draft EIR (see Impact 3.4-1). As described therein, the potential operational noise impacts associated with new heat pump units could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. The Draft EIR concludes that the Project's long-term operational noise impact would be significant and unavoidable because the BAAQMD does not have jurisdiction to monitor or enforce mitigation measures. See also Master Response 1 (EIR: General).

2.2.4 Master Response 4 (EIR: Benefits)

COMMENT

The comment expresses concern that environmental and economic impacts of the Project outweigh its benefits.

RESPONSE

The Draft EIR and Staff Report lay out the environmental impacts and benefits of the Project. The BAAQMD Board of Directors will take the commenter's opinions into consideration when making decisions regarding the Project and will document that decision in the CEQA Findings and Statement of Overriding Considerations. See also Master Response 1 (EIR: General).

2.2.5 Master Response 5 (EIR: Grid Impacts)

COMMENT

The comments express concern about potential impacts associated with build out of electric grid and production resources.

RESPONSE

Cumulative impacts related to energy demand and the resulting environmental effects are addressed on page 3.3-10 of the Draft EIR. As described therein, comparing the Project's long-term energy demand increase with existing energy supplies would not be realistic, especially in the context of the massive statewide projected energy demand increases associated with existing and planned decarbonization programs described in Section 3.3 of the Draft EIR. These programs will require drastic changes to the existing energy infrastructure in the Bay Area and across the state. The Draft EIR (see Impact 3.3-1) evaluates the Project's contribution to this projected statewide increase in energy demand. See also Master Response 1 (EIR: General).

2.2.6 Master Response 6 (EIR: Grid Capacity)

COMMENT

The comment expresses concern about whether the Pacific Gas and Electric Company (PG&E) has capacity to support the increase in energy use resulting from the proposed rule amendments.

RESPONSE

Staff appreciates the comment and agrees that adoption of the proposed amendments may result in an increased demand for electric grid capacity, as thoroughly studied in the Draft EIR (see Impact 3.3-1). Should zero-NO_x natural gas-fired technologies be developed, the electric grid may not be affected by the proposed amendments. However, based on currently available zero-NO_x technologies, largely electric heat pumps, the Draft EIR analyzed what impact the amendments could potentially have. The Draft EIR analysis of the Project's energy infrastructure impacts is based on the technical report Electric Infrastructure Impacts from Proposed Zero NO_x Standards prepared by E3, which is included as Appendix C of the Draft EIR. Potential electric grid impacts were evaluated relative to two reference scenarios: a Low Policy Reference, which assumes no major state policy changes in support of building electrification, and a High Policy Reference, which assumes major state policy support for building electrification by the 2030s. The E3 study concludes that the Project would, under the "worst case" Low Policy Reference Scenario evaluated by E3, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. The E3 study estimates the amount of utility-scale solar capacity that would need to be developed to meet this demand, and the Draft EIR describes the types of environmental impacts that would result from these energy projects, as well as the Project's potential contribution to this significant cumulative impact. See also Master Response 1 (EIR: General).

2.2.7 Master Response 7 (EIR: Grid Emissions)

COMMENT

The comment expresses concern about the potential GHG emissions that would be generated by energy projects to serve the increased energy demands resulting from the Project.

RESPONSE

The Draft EIR (see Impact 3.3-1) evaluates the Project's contribution to the projected statewide increase in energy demand. As described therein, the potential construction and operational impacts associated with these energy facilities could be potentially significant and may include air pollution and GHG emissions. However, the electric infrastructure impacts report prepared by E3, an industry expert in energy policy, does indicate that future development of energy resources will be largely GHG emission-free once operating. Mitigation measures are likely available to minimize any potential GHG emissions from construction of new energy resources, and any potential though unlikely GHG emissions from operation of new energy resources. However, the Draft EIR concludes that it is likely that some would remain significant and unavoidable because the BAAQMD does not have jurisdiction to approve the construction of new energy resources or monitor or enforce any mitigation measures for these projects. See also Master Response 1 (EIR: General).

2.2.8 Master Response 8 (EIR: Alternatives)

COMMENT

The comments note that a non-zero threshold should have been considered, with an emphasis on dual fuel appliances. Additional comments express support for Alternative 3 and note that Alternative 3 is identified as the environmentally superior alternative in the Draft EIR.

RESPONSE

CEQA requires that a lead agency evaluate alternatives to a proposed project that would avoid or substantially lessen the project's environmental impacts. First, the Draft EIR does evaluate a non-zero threshold in Section 4.3.1, "Non-Zero Requirements."

Next, Alternative 3, evaluated in the EIR, would establish a zero-NO_x standard with a compliance date of January 1, 2035, for all appliances covered by the proposed zero-NO_x requirements in Rules 9-4 and 9-6. That is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). All other aspects of the proposed amendments would remain the same under Alternative 3.

The comments are correct that the Draft EIR identifies Alternative 3 as the "environmentally superior" alternative. However, the Draft EIR (see pages 4-13 through 4-15) describes that while Alternative 3 would slightly reduce the Project's impact on utilities and service systems, Alternative 3 would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same reduction (2052 as compared with 2046) and would achieve fewer reductions overall. The Project would achieve higher levels of NO_x and GHG reduction than Alternative 3 and would address existing significant air quality impacts in the Air Basin. The later implementation of Alternative 3 results in an estimated 10,722 tons of overall additional NO_x emissions, and up to 32.28 MT CO₂e additional GHG emissions that would not be emitted in the implementation schedule of the proposed Project. Similarly, delayed implementation of the proposed rule amendments would result in delayed health benefits resulting from air quality improvements in the region and an overall increase in total NO_x emissions in the Bay Area versus the Project.

Notwithstanding, the Draft EIR concludes that Alternative 3 is considered the environmentally superior alternative because Alternative 3 would slightly reduce the Project's impact on utilities and service systems, which meets CEQA's intent for alternatives that would "avoid or substantially lessen any of the significant effects of the project" (see State CEQA Guidelines Section 15126.6[a]). However, the Draft EIR explains that if "environmentally superior alternative" were more simply defined as the alternative that is best for the environment overall, including beneficial effects, then the conclusion would likely be different. As described throughout the EIR, the Bay Area is currently designated as a non-attainment area under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) for particulate matter. In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under CAAQS and the National Ambient Air Quality Standards (NAAQS). This is an existing and significant air quality impact. The Project would address this significant air quality impact by reducing NO_x emissions in the Bay Area,

thereby resulting in a less-than-significant (beneficial) impact to regional air quality. This reduction would also occur with implementation of Alternative 3; however, Alternative 3, would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same reduction (2052 as compared with 2046) and would achieve fewer reductions overall. The Project would also likely result in a greater beneficial effect related to GHG and climate change because the reductions would occur sooner than later and be greater overall.

The EIR does not make recommendations regarding which alternative to select and the BAAQMD Board of Directors has the discretion to deny or approve the Project or any alternative identified in the EIR. However, the EIR identifies that the Project would result in substantial improvements to regional air quality and public health while also achieving co-beneficial greenhouse gas reductions. The comment is directed towards the project approval process and does not address the content, analysis, or conclusions in the Draft EIR. The BAAQMD Board of Directors will take the commenters' opinions on the Draft EIR into consideration when making decisions regarding the Project before a decision on the Project is rendered.

3 LIST OF PREPARERS

Bay Area Air Quality Management District (Lead Agency)

Jennifer Elwell	Senior Air Quality Engineer
Eric Lara	Senior Air Quality Specialist
David Joe	Rule Development Assistant Manager
Victor Douglas	Rule Development Manager
Randi Wallach	Assistant Counsel

Ascent Environmental, Inc. (CEQA Compliance)

Honey Walters	Principal/Contract Manager, Senior Air Quality/GHG Specialist
Mike Parker, AICP	Principal
Sarah Henningsen	Project Manager
Julia Wilson	Air Quality/GHG Specialist
Kari Zajac	Noise Specialist
Brian Perry	Graphic Specialist
Corey Alling	Graphic Specialist
Gayiety Lane	Publishing Specialist
Michele Mattei	Publishing Specialist

This page intentionally left blank.

Appendix A

Draft EIR Comments



we make life better®

2311 Wilson Boulevard Suite 400 Arlington VA 22201 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street
Suite 600
San Francisco, CA 94105

RE: AHRI Comments on Staff Report for the Proposed Amendments to Building Appliance Rules Regulation 9: Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnace, and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

Dear Ms. Elwell:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) welcomes the opportunity to comment on the Bay Area Air Quality District's (BAAQMD or District) Staff Report (Report) for the Proposed Amendments to Building Appliance Rules Regulation 9: Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnace (Furnaces), and Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers (Boilers) and Water Heaters (Water Heaters).

AHRI represents more than 330 manufacturers of air conditioning, heating, commercial refrigeration, and water heating equipment. It is an internationally recognized advocate and technical resource for manufacturers of heating, ventilation, air conditioning, and refrigeration (HVACR) and water heating equipment and certifies the performance of many of the products they manufacture. In North America, the annual economic activity resulting from the HVACR industry is approximately \$256 billion. In the United States alone, AHRI's members, along with distributors, contractors, and technicians, employ more than 1.3 million people.

AHRI and its members are committed to, and support, greenhouse gas (GHG) emission reductions, while promoting sustainable, safe, reliable, and affordable access to the essential air and water heating and cooling provided by the products they manufacture.

Product Cost

The BAAQMD Staff Report (Report) specifies that the upfront installed cost of a Heat Pump is \$8,027 and a Heat Pump Water Heater is \$2,824.¹ When reviewing the most recent data for

¹ Appendix C: Draft Socioeconomic Impact Report, of the BAAQMD Staff Report, at page 17.

installation costs of these products through the TECH Clean California webpage,² the numbers provided in the Report are significantly lower than the data provided by TECH for the Bay Area. When looking at all projects, TECH identifies an average project cost to replace bath space and water heating with heat pumps to be \$17,400 based on a total of 10,342 projects.³ In the Bay Area, the TECH data shows water heating a minimum project cost of \$3,355 and a maximum project cost of \$60,428 for water heating, with an average cost of \$8,577 per water heater replacement.⁴ Looking at the same data set for heat pumps, the TECH data shows a minimum project cost of \$3,500 and a maximum project cost of \$66,218 with an average cost of \$22,745.⁵ The data shows a significantly higher cost than that specified in the Report which will have a significantly greater impact on consumers.

In addition, the analysis shows only the annualized cost to consumers for these replacements, which would imply the ability to finance the project cost over the life of the product. While this may be true in some cases, low-to-moderate income (LMI) households with potentially lower credit scores may be unable to secure financing for these products at a favorable rate, or at all, which would, for these consumers, increase the upfront cost of these projects. If financing is not an option, many LMI families may not be able to afford to replace their current products and may instead choose to repair them. Such an outcome subverts the intent of rule as it will keep higher NOx products on the market in excess of their expected life.

Utility Savings

AHRI disagrees with the use of the E3 report⁶ as the basis for savings on a consumer's utility bill. The analysis in the E3 report looks at different service districts and climate zones, such as SoCal SMUD and Bay Area, which do not relate back to the claims made in the report, specifically the claimed \$150 annual energy cost savings for space heating and the \$45 annual energy cost savings for water heating. The E3 report shows that for common high efficiency HVAC equipment in Climate Zone 4, consumers can expect \$100 in annual bill savings.⁷ The same analysis for water heating shows that common high efficiency heat pump water heaters will have a net annual cost to consumers of more than \$75 in climate zone 4.⁸

In addition, PG&E did a cost study of switching from gas to electric water heating in their service territory⁹ and compiled the cost-effective cases in which switching would have result in net savings for consumers. In reviewing PG&E's analysis, it is important to note the effect that proper installation, water storage temperature, ambient temperature, and proper sizing of the

² <https://techcleanca.com/public-data/maps-and-graphs/>

³ *Id.*

⁴ *Id.*

⁵ *Id.*

⁶ Energy and Environmental Economics. "Residential Building Electrification in California". (April 2019)

⁷ *Id.* Figure 3-10 at page 59.

⁸ *Id.* Figure 3-12 at page 61.

equipment had on the cost/benefit of the installation. At standard installation conditions, PG&E found a net cost to consumers of \$28-\$87, depending on if the customer was a CARE or non-CARE customer and if the customer kept the same capacity water heater or increased its capacity. PG&E furthered its analysis by reviewing different efficiency heat pumps and lower tank set points. However, this scenario cannot be assumed as the base case for BAAQMD's analysis as it requires the use of high efficiency heat pumps and lower tank temperature set points. These specific requirements cannot be mandated in the proposed rule. The analysis needs to be performed with the base efficiency heat pump at standard water storage temperatures, such as those put forth in Tables 2-1 and 2-2 of the PG&E report.

Given the projections from both reports, costs to consumers will vary because of a transition to heat pump space and water heating. This variability makes it difficult to justify the use of annual energy costs or savings based on a technology switch. Therefore, BAAQMD should adopt a position that there will be no significant financial impact to consumers as a consequence of this rule.

Emergency Replacements

In most cases, space and water heating equipment is replaced upon failure of the appliance. If this occurs and the house needs a panel upgrade or other alterations to accommodate a zero-NOx solution, that house could without space- or water heating for several days if not weeks while the retrofits occur. If such an event were to happen during a cold snap, there could be significant concern for the health and safety of the occupant(s). The District needs to consider solutions to the emergency replacement issue, including proactive replacement programs, such that the impact of proposed Rules 9-1 and 9-6 does not compromise safe and reliable access to services.

The California Statewide Codes and Standards Reach Codes Team (Statewide Reach Code Team) performed a cost effectiveness study for upgrading existing buildings in 2019.¹⁰ In its report, the team recognized the challenges associated with emergency replacements of space and water heating when moving from gas to electric, and outlined specific exceptions for these issues:

Exception 1: Non-ducted space conditioning systems and systems without central air conditioning.

Exception 2: Ducted space conditioning systems where only the gas furnace is replaced.

Exception 3: The main service panel does not have the capacity or space to accommodate an additional 240V, 30 A circuit, and the cost to upgrade the main service panel and run required electrical service to the heat pump air handler is prohibitive as determined by the jurisdiction.

¹⁰ California Statewide Codes and Standards Reach Codes, "2019 Cost-Effectiveness Study: Existing Single Family Residential Building Upgrades" Prepared by: Frontier Energy, Inc. and Misti Bruceri & Associates, LLC. (2019)

For heat pump water heaters, the Statewide Reach Code Team identified the need for the following exceptions:

Exception 1: The proposed location of the new water heater is located within conditioned space.

Exception 2: The proposed location of the replacement water heater is not large enough to accommodate a HPWH equivalent in size and one-hour capacity rating to the existing water heater or the next nominal size available.

Exception 3: The main service panel does not have the capacity or space to accommodate an additional 240 V, 30 A circuit, or the cost to upgrade the main service panel and run required electrical service to the water heater is prohibitive as determined by the jurisdiction.

Exception 4: A solar water heating system is installed meeting the installation criteria specified in Reference Residential Appendix RA4.20 and with a minimum solar savings fraction of 60 percent.

These cases need to be considered and addressed as they were by the Statewide Reach Code Team.

Recommendation

The District should adopt Alternative 3

For reasons outlined above and further in these comments the District should adopt a form of Alternative 3 from its analysis that includes the larger, commercial equipment. The Report itself states that a 6-year delay of compliance -- until January 1, 2035 -- would be considered the environmentally superior option.¹¹ Such a shift would allow time for utility scale solar and battery storage to be committed to and implemented, as opposed to just speculated. In addition, more time will afford the heat pump market to move in equilibrium with customer needs, including financing programs for LMI consumers, and an increased global manufacturing capacity. Moreover, additional time will be needed to ensure that a sufficient number of contractors and technicians are trained, for the purpose of ensuring quality installation. In addition to this rule, robust outreach and incentives for energy audits and early adoption of zero-NOx space and water heating equipment can reduce the need for emergency replacements, provide continued NOx reductions as the market matures, and drive consumer trust for these products.

¹¹ Draft Environmental Impact Report, Page 4-14.

A. Comments specific to Regulation 9 Rule 4: Nitrogen Oxides from Fan-Type Residential Central Furnaces:

1. Scope of products in each phase:

As stated in our previous comments, the current requirements of this regulation are unclear, and clarification is required for proper understanding. Section 9-4-301 outlines the NOx standards for *Stationary Natural Gas-Fired Furnaces*; whereas, Sections 9-4-301.1 and 9-4-301.2 refer only to *Stationary Natural Gas-Fired Residential Natural Fan Type Central Furnaces*. In section 9-4-301.3, the scope is expanded to *Stationary Natural Gas-Fired Furnaces*, which excluding furnaces used in *Mobile Homes*. Neither *Stationary* nor *Mobile Home* is defined, which makes it difficult for manufacturers to understand which furnaces would need to follow this standard and which would be exempt.

Moreover, the inclusion of these products in section 9-4-301.3 presents additional questions as to requirements applicable to these types of furnaces prior to January 1, 2029. The products discussed in the staff report include wall heating and other direct-vented products. These products are not typically marketed as furnaces, and the expectation that these products fall under the furnace definition in section 9-4-203 will add confusion to the market. Proper definitions that align to the U.S. Department of Energy definitions should be used to ensure that the scope of the rule is clear.

Finally, there is no discussion of *weatherized* units in this section. *Weatherized* can be defined as “designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation.”¹²

2. Dual-Fuel Systems

AHRI requests that the District reconsider its exclusion of dual-fuel systems as a compliance pathway for the ultra-low NOx requirements in Section 9-4-301.3. Dual-fuel systems provide an ideal pathway to lower NOx emissions and a way to reach the average NOx emissions of less than 14ng/j required in the section. The Report specifies that it is not intending to specify technologies to meet these NOx goals; however, not allowing for a pathway to dual-fuel compliance is effectively specifying ultra-low NOx burners as the only path to comply with this section. Not only would a dual-fuel pathway limit NOx emissions but it also would help homeowners move to heat pumps sooner, at a reasonable cost, and provide increased resiliency to the grid by reducing winter peak loads.

BAAQMD should include a definition of dual-fuel systems in the proposed rule with control requirements to ensure the weighted average NOx emissions are below the requirements.

¹² SCAQMD Rule 1111-1 (b)(17).

Dual fuel systems also should be considered as an option in the environmental analysis, especially given the impact to low- and medium-income consumers.

B. Comments specific to Regulation 9 Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters:

1. Commercial Applications

The current proposed amendment to Regulation 9 Rule 6 specifies a zero-NOx requirement for water heaters greater than 75,000 BTU but less than 2,000,000 BTU by 2031. Currently the only solution on the market for zero-NOx water heating is heat pump water heaters (HPWHs). In commercial applications these products are nascent and typically designed to work at lower internal tank temperatures. Process applications in commercial settings such as hospitals, healthcare facilities, universities, commercial laundries, as well as large restaurants require water temperature up to and greater than 180°F for meeting sanitation requirements. Hence, HPWH-only systems are not currently commercially viable and may not prove to be cost-effective solutions for these commercial applications given the delivered cost of electricity in the Bay Area. The District needs to ensure that these applications can be met with current technology before putting this rule into place. The Report does not discuss the requirements of process applications and simply mentions that industrial product greater than 2,000,000 BTU would be addressed in a separate rulemaking for Regulation 9 Rule 7. While AHRI appreciates this distinction, there are products less than 2,000,000 BTU that are used in commercial sanitization applications. Waiting until 2 years prior to compliance to review and assess this market through the interim report is insufficient. If suitable analysis cannot be performed and a feasible solution identified for these applications, there needs to be an exception in place for these products to ensure that there safe, reliable, affordable access to critical hot water for public health. More specifically, an exception should be added for equipment covered in 9-6-303 that is used exclusively to provide service hot water at temperatures of 180° F and greater. In addition, similar to AHRI's request for space heating, BAAQMD should include a definition of dual-fuel systems in the proposed rule with control requirements to ensure the weighted average NOx emissions are below those requirements and include these products in their environmental analysis.

2. Residential Applications

As referenced in the Report, there are residential 120V HPWHs that have been announced and are undergoing field studies in California. However, these products are not yet widely available for consumers, and utilities are still compiling performance data on these units. While AHRI members remain confident that the 120V product class will have intended applications and be utilized in the marketplace, it is premature for the District to use this product class as an empirical justification for the Amendment. AHRI would remind the District that notwithstanding 120V HPWHs ability be "plugged in" to a standard 120V outlet, most utility closets, basements,

and garages do not currently have a 120V outlet located by the water heater. This means that even when these products are readily available, an electrician would be required to install a dedicated outlet for the water heater. Further HPWHs require condensate removal. If a drain does not exist near the water heater, a plumber would be required to install one. These are just a few of the technical barriers and costs that need to be considered for the wide-scale adoption of these products, which are not accounted for in the Report's analysis.

A rushed technology transition may lead to unintended consequences with respect to installation and performance of the products, which would only serve to damage public perception and slow the adoption in other jurisdictions. Given the current status of this market, the 2027 transition date is unreasonable. Furthermore,, having the compliance date for these products potentially moved forward to 2025 due to the interim report creates uncertainty for the entire supply chain. A reasonable timeframe must be established for these products to be developed and matured such that the supply chain can handle this regulation and contractors and technicians have time to be trained in proper installation and maintenance.

Additional Policy Observations:

A. Effective Dates and Review Period

AHRI reiterates concerns raised in our previously submitted comments¹³ that while AHRI is supportive of the evaluation process covered thoroughly in the interim report, 2-years is not sufficient for manufacturers and the supply chain to make the necessary adjustments in time to comply. Further, the 2-year window does not allow the BAAQMD Board sufficient time to properly review the report and make informed decisions. This process needs to have a concrete timeline for review and determination from the Board to provide manufacturers certainty and properly plan for implementation. Lack of a clear timeline for compliance or deviation from this rulemaking creates significant uncertainty for manufacturers, which need time to develop compliant products and initiate production. Less than two years between report publication and a compliance date is not enough time for industry to accommodate any equipment redesigns that may be necessary. For example, after publication of a U.S. Department of Energy final rule, two to five years¹⁴ is required before the compliance period for any new regulation, acknowledging the time needed to design compliant HVAC equipment and to retool necessary manufacturing equipment.

The effects of this moving target and shorter timeline were not evaluated in the Report and need to be fully considered prior to implementation of the amendments.

¹³ AHRI Comments on EIR for Proposed Amendments to Regulation 9 rules 4 and 6. Submitted on June 22, 2022

¹⁴ ASHRAE Products have 2 or 3 years in accordance with 42 U.S.C. 6313 § (a)(6)(D).
Residential Products have 5 years in accordance with 42 U.S.C. § 6295(l)(2).

Conclusion

Two fundamental pillars of industry are certainty and consistency. The above proposals address certainty for industry. Consistency can only be achieved by local air quality management districts working to align on NOx requirements so that there is one clear, consistent path forward for manufacturers in California. Incentives should be provided for early adoption, and programs should be put in place to help low-income households afford this transition. This approach will aid in an equitable transition and remove the main hurdle for emergency replacements, which is cost. This approach will also allow for optimal environmental benefits.

We appreciate the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me at kbergeron@ahrinet.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Kyle Bergeron", with a long horizontal flourish extending to the right.

Kyle Bergeron
Senior Regulatory Engineer

cc: Helen Walter-Terrinoni

Jennifer Elwell

From: Annette Ross [REDACTED]
Sent: Monday, February 6, 2023 2:33 PM
To: Jennifer Elwell
Subject: Changing from gas to electric

Follow Up Flag: Follow up
Flag Status: Flagged

[You don't often get email from [REDACTED]. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I have more questions than comments:

1. Why a ban instead of an incentive program that encourages property owners to make the change?
2. Why a more lenient schedule for commercial property owners and owners of multi-family properties?
3. Why not wait until you are certain about the potential other impacts such as noise from compressors and possible setback changes?
4. Is there a model set up that shows an installation with a compressor that property owners can see?
5. Has this plan been integrated with other ordinances and the numerous pieces of housing legislation so the property owners who make the change aren't hit with some sort of expensive surprise such as a violation of setback requirements or a noise violation?

And what if the property owner cannot achieve (or afford) the setback change should one be necessary? Is there a mechanism for exemptions?

6. How about taking overall carbon footprint into account before adding another onerous rule to the already too-thick law books?
7. The article references AN EIR. As in one? Is anyone looking at the big picture and the capacity of our electrical grid? The grid is challenged now but that is not stopping city and state leaders from pushing electric cars, trains, water heaters, furnaces, ranges, and significant housing growth. Claims that the grid can handle that level of increased demand lack credibility.
8. Is there a sunset clause that accounts for tech changes that, for example, improve gas furnaces and water heaters, making them roughly equivalent to electric appliances?
9. Is there a mechanism for exemption generally (not just w/regard to setbacks)?

I know the planet needs protecting, but it often seems that homeowners are the equivalent of low hanging fruit for the implementation of government mandates.

Regards,

Annette Ross
Palo Alto

Sent from my iPhone



February 6, 2023

Jennifer Elwell
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Re: Proposed Amendment to Regulation 9, Rule 6

Dear Ms. Elwell:

On behalf of Bradford White Corporation (BWC), we would like to thank you for the opportunity to comment on Bay Area Air Quality Management District's (BAAQMD) Proposed Amendment to Regulation 9, Rule 6, and supporting staff reports.

BWC is an American-owned, full-line manufacturer of residential, commercial, and industrial products for water heating, space heating, combination heating, and water storage. In the Bay Area, a significant number of individuals, families, and job providers rely on our products for their hot water and space heating needs.

Rule 9-6 Certification Procedure

In the proposed rule change, section 9-6-402.4, BAAQMD allows for manufacturers to certify compliance to the District through South Coast Air Quality Management District's (SCAQMD) certification process. With the entire state headed towards zero-emission water heating over the next decade, BWC believes alignment between air districts is critical for helping manufacturers plan transitioning to zero-emission product classes. While alignment between districts regarding certification requirements is logical, the transition dates proposed by BAAQMD and SCAQMD do not align. If BAAQMD proposes to transition to zero NOx on a different timeline than SCAQMD, it is not clear how manufacturers will be able to certify equipment. We respectfully request BAAQMD to clarify how the certification process will work if this occurs.

Additionally, BWC questions whether the District needs to require any emissions testing for products that are all electric. Section 9-6-301 Determination of Emissions, states that:

"Emissions of oxides of nitrogen from water heaters subject to Section 9-6-301, 303, 304, or 305 shall be tested in accordance with the following provisions:

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com



601.1 Each water heater model shall receive certification based on emission tests of a randomly selected unit of that water heater model. 601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance with EPA Reference Method 7, including 7A-7E.”

If manufacturers are required to test emissions on all electric products, rather than simply certify their fuel type is electric, this will place an additional cost and unnecessary burden on manufacturers to certify and sell products within the District.

Low Voltage Products

In the staff report, BAAQMD staff repeatedly references availability and affordability of residential water heating product. Staff further suggests that low voltage heat pump water heaters (HPWHs) will lower the cost barrier for homeowners, as they may avoid costly electrical upgrades. Low voltage products are currently only available through a couple of manufacturers, and furthermore, the products that were introduced to the market in 2022, have not been widely installed. The market for low voltage products is in its infancy, and it is premature to determine whether or not they are viable options for a wide range of applications. Until low voltage HPWHs become more widely adopted and determined to work well in a wide range of applications, we discourage the District from making policy decisions on a product type that is too new to the market.

Environmental Impact Report Alternative 3

Approximately 90% of residential water heater replacements are done on an emergency basis where the water heater has failed and cannot be necessarily easily or cost effectively replaced. It is essential that products are available locally, as customers need to be able to have these products installed in a timely manner to satisfy their needs. Local availability is not likely if manufacturers do not have the right product mix, and those products are not stocked by local distributors and retailers, forcing the consumer or business to go without hot water for an extended period of time.

Having the right products available for the right application is only one piece of the puzzle. Barriers, such as electrical infrastructure and space constraints can add to the complexity and replacement cost, may be overly burdensome to the customer. In particular, low- to medium-income homeowners and small business owners, who are simply trying to restore hot water service will be adversely affected. If BAAQMD chooses to adopt the proposed timelines, then BAAQMD must also ensure there is a robust program and funding in place to help property owners prepare for the transition well in advance of needing a new water heater.

While the state is off to a good start increasing adoption of residential HPWH technology, the commercial sector has not been addressed with the same level of attention. The commercial water heating sector has many different types of installations and water temperature needs and the industry needs ample time to understand these barriers in order to transition in this sector to zero NOx water heating. The recently adopted 2022 Title 24, California Energy Code does not address HPWHs in existing commercial and nonresidential buildings, largely because there are very few commercially available products on the market today.

A shift to require existing commercial and nonresidential buildings be retrofitted to use all electric water heating technology will require significant time, money, and collaboration between manufacturers and plumbing trade associations to train the workforce to ensure quality installations. This is an effort that will take several years to come to fruition, as new technology becomes commercially available, possibly extending beyond 2031. Like residential products, commercial HPWH technology will face similar

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com



challenges around product footprint, adequate air space and electrical capacity. In cases where challenges exist, requiring the water heater to be relocated, or in cases where an emergency replacement is not achievable, the District should have provisions in place to allow an Ultra-Low NOx alternative. While solutions to these challenges may emerge, the market for commercial HPWH equipment is even smaller than residential products and will take significant effort to develop practical solutions.

While it is reasonable to expect a building owner to plan around current laws and regulations surrounding NOx emission standards and commercially available compliant equipment, the cost to change from natural gas water heating to a heat pump water heater will be significant, especially when considering multiple HPWHs will be needed to replace a single gas-fired water heater. For low- and medium-income households and small business owners, it will particularly be difficult for them to plan the replacement of their equipment.

BWC believes that for the reasons outlined above, that Alternative 3, with a proposed implementation date of 2035, is the most appropriate path of three pathways proposed the District. The environmental impact report states that a 6-year delay of compliance until January 1, 2035, would be considered the environmentally superior option, as determined by CEQA guidelines. Furthermore, the shift will allow the state time to ramp up production of new clean energy sources to meet not only the needs of the Bay Area but the rest of the state as well. From a manufacturer's perspective, the additional time will allow the HPWH market to further develop with the help of incentives and allow more time to develop products to meet the multitude of field applications. As previously stated, proper training for contractors and technicians is critical to a successful transition. A longer transition period will help the workforce has the necessary skills, training, and recruitment of new members to support the transition

In closing, we would like to continue to invite BAAQMD staff to meet with BWC to discuss how we can assist in transitioning to zero-emission water heating equipment across all sectors. We understand the state and District's goals to reduce emissions and want to play a part in ensuring it is successful in doing so.

BWC thanks the Bay Area Air Quality Management District for the opportunity to provide feedback on the proposed Regulation 9, Rule 6. Please let me know if you have any questions or would like to schedule a meeting to discuss our comments further.

Respectfully Submitted,

Bradford White Corporation

Eric Truskoski
Senior Director of Government and Regulatory Affairs

Cc: R.B. Carnevale; R. Simons; B. Hill; L. Prader; C. VanderRoest; M. Corbett; B. Wolfer

Built to be the Best™

725 Talamore Drive • Ambler, PA 19002-1873 • 215-641-9400 • www.bradfordwhitecorporation.com



Jennifer Elwell

From: CharlieMargaret [REDACTED]
Sent: Monday, January 23, 2023 4:00 PM
To: Jennifer Elwell
Subject: Objection/opposition to Ban of natural gas appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

My name is Charles W. Getz in San Carlos CA, within the jurisdiction of the BAAQMD. My wife and I STRONGLY oppose this idiotic rule to ban gas furnaces/water heaters.

1. The assumption this will materially improve the environment is flawed and unsupported by any defensible science or studies. The negative impact far outweighs the "positive" impact. The US already leads in carbon reduction; this will add negligible amounts to that "improvement" while causing immeasurable economic harm
2. A comprehensive EIR under CEQA must include cumulative impacts on the Grid factoring in the equally idiotic proposal to ban gas powered vehicles plus the speculative unproven "solar energy" additions to the grid. Also the economic impacts on households of fixed income, low-income and people of color. Also the impact on future housing costs, commercial space and public facilities.
3. The taking under the 5th Amendment of property by forcing conversion to electric higher-priced and inferior products.
4. The impact on the environment of added electrical generation, added solar farms, disrupted businesses and many other elements.
5. The negative impact on property values, gas-related professions and businesses, interstate commerce, and people of color by these proposals.
6. This fundamental of a change MUST be voted upon by the people. Not by an unelected board albeit with "locally" elected officials. When they serve on BAAQMD, they are **not** elected by the people. They reflect their underlying political organization. This is indirect taxation/regulation without representation.
7. We are Seniors on a fixed income. This will adversely affect us and we cannot afford the proposed changes.
8. Natural Gas is an effective, affordable and environmentally friendly source of energy.

Please deny or withdraw this truly ridiculous idea!!

Charlie and Margaret Getz

Jennifer Elwell

From: Daniel Feldman [REDACTED]
Sent: Friday, February 3, 2023 11:26 AM
To: Jennifer Elwell
Subject: Public Comment on proposed amendment to Regulation 9 Rule 6

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell,

I would like to register a public comment regarding [the proposed amendment to Regulation 9 Rule 6 of the Bay Area Air Quality Management District](#).

As a practicing environmental scientist (B.S. in the subject from MIT and Ph.D. in the subject from Caltech, led the first paper measuring the greenhouse effect of methane, currently leading the production of the temperature and precipitation projections for the Fifth National Climate Assessment), I support the need for reducing indoor air pollution and greenhouse gas emissions.

However, I am concerned about the proposed Amendments for two primary reasons:

1. The Amendments appear to have been created without any indoor air monitoring whatsoever in homes in the San Francisco Bay Area to show what NOx and PM2.5 concentrations result from new water heaters and furnaces that comply with existing BAAQMD standards. The findings of the Staff Report on premature deaths, asthma, and economic analysis require both an observational basis and peer-review. Therefore, the claims listed in the Fact Sheet about premature deaths avoided and PM2.5 exposure would not and should not withstand scientific scrutiny.
2. No information is provided about whether Pacific Gas and Electric (PGE) has affirmed that they have the capacity to support the mandated upgrades to electrical water heaters and furnaces/heat pumps after the Amendments go into effect in a timely manner. Residential electrical panel upgrades require load analyses, PGE electrical infrastructure upgrades and PGE permitting. As a point of reference, PGE currently requires more than a year and a half to perform a transformer upgrade to service a neighborhood when residential solar generation is installed and the existing transformers are inadequate to support those upgrades. Permits and analysis for electrical panel upgrades take more than 3 months. Since BAAQMD estimates that 2/3 of all homes in the Bay Area will need to be upgraded, PGE would need a much larger number of personnel to support permitting and electrical panel upgrades than they now have, or the time required for new panels and permitting should be expected to be much longer than it currently is. No information has been provided in the proposed amendment as to PGE's plans to support these Amendments.

Thanks for your consideration of these comments and I would be happy to answer any questions you have.

Daniel

Jennifer Elwell

From: Donald Duggan [REDACTED]
Sent: Wednesday, January 18, 2023 11:19 AM
To: Jennifer Elwell
Subject: Amendments to Rules 9-4 and 9-6 banning the sale of new gas-fired furnaces and water heaters - Comment

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Elwell:

These are my comments on the proposed rule changes:

1. I read through the linked document and expected to find a benefit-cost analysis that shows a benefit/cost ratio greater than one. There was a lot of discussion of how much these rules would cost homeowners, especially for homes that were built pre 1945 (like the one I live in). And a lot of discussion about how the proposal will reduce bad stuff in the air, the benefit of which is estimated at somewhere between \$240M and \$890M per year (Figure 6-1, 2020 \$). The economic impacts are reported in terms of cost per ton of nitrogen oxide and particulates avoided (costs up to \$590,000 per ton!), but no attempt is made to compare costs and benefits in a rational manner. Without a peer-reviewed benefit-cost analysis, how can the Board expect the homeowners (who have to pay for this change) to support it? If there is a benefit-cost analysis that shows benefit exceeding costs in the documentation, please point me to it.
2. The cost analysis talks a lot about the benefit that new electric heat pumps will bring to existing air conditioning users, but I live in Oakland and I don't know anyone who has air conditioning.
3. The EIR does not seem to account for the increased travel to purchase replacement appliances after these rule changes are imposed. For example, I will have to drive to Sacramento to buy a replacement water heater if mine dies, similarly for a replacement furnace.
4. In summary, although it is evident that the proposed rule changes have good intentions, I would need to see a lot more evidence of their benefit before I could support the additional cost that would be imposed on me and my neighbors.

Thank you for consideration of my comments.

Donald Duggan
[REDACTED]

February 6, 2023

Jennifer Ewell
Senior Air Quality Engineer
Bay Area Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
jelwell@baaqmd.gov

Re: Proposed Amendment to Regulation 9, Rule 4, and Rule 6

Dear Jennifer Ewell,

As a citizen of Mountain View who resides within the Bay Area Quality Management District, I appreciate past achievements of the BAAQMD for leading the Bay Area towards improved air quality. I encourage the BAAQMD to carefully consider rules which present a best path forward offering both cost-effective management of airborne emissions while maintaining quality of life. I have read the documents available from BAAQMD with regard to the proposed amendments to Regulation 9, Rule 4 and Rule 6 and would like to voice my concerns for the proposed changes.

Heat and hot water are used essentially every day in a household. The infrastructure of the building is designed to accommodate the technology intended to provide these necessities at the time of construction. Adoption of the proposed changes to Rules 4 and 6 will directly impact 2/3 of the households in the bay area and by nature of the 'Absolute 0' NOx requirement, essentially mandate the replacement of natural gas furnaces and water heaters with electric heat-pump alternatives. Most homes will lack sufficient electrical infrastructure to offset the energy input lost as a direct result of the effective 'banning' of natural gas as a source of energy input to a household.

BAAQMD Staff have provided a cost benefit analysis with supporting tables and underlying assumptions which provide a sufficient accounting of expected impacts to households on a first order basis for such line items such as the cost difference of NOx free water heaters, HVAC equipment, and panel upgrade costs. However, other significant diseconomies and quality of life impacts are not accounted for, which will impact many of the households forced to make the mandated conversions.

Adoption of the proposed changes to Rule 6 will result 50% less available hot water to a household after the conversion from an ultra low NOx gas water heater to the mandated zero-NOx electric heat pump water heater of the same form factor. The key metric for comparison between the technologies for a household quality of life comparison is the FHR (First Hour Rating) of the water heater. The physical exterior volume of the water heater is also a key metric of comparison since the new water heater installation will be constrained by the existing water heater footprint. Therefore, FHR comparison should be done between water heaters of similar footprint and exterior volume. BAAQM Staff Report: 20221220_01_Staff Report_RG09040906.pdf, Table 4-2 identifies the Rheem Pro Terra (Plug-In) series of Electric Heatpump Water Heater as exemplary of the latest technology households will have available

to replace their Ultra low NOx gas water heater when it reaches end of life. A 50 gallon ultra low NOx Rheem gas water heater, PROPG50-38U RH67 PD-1, has a FHR of 86 gal. The electric heat pump from the Pro Terra series which fits the same volume footprint (within 1%) is the PROPH40 TO RH120-M which has a FHR of 45 gal (essentially a 50% less hot water). The department of energy provides a useful calculator for determining proper sizing a new water heater based on FHR: <https://www.energy.gov/energysaver/sizing-new-water-heater> . However, in this case, a household of 4 might find this tool more useful for planning a showing/laundry/dishwashing schedule to contend with half the available hot water after the switch to an electric heat pump water heater. I contend that 50% reduction in available hot water in the first hour to a household is a diseconomy or reduction of quality of life that is quantifiable and not mentioned in the staff reports.

The switch from an ultra low NOx gas water heater to a zero-NOx electric heat pump water heater can also introduce unwanted noise into the living area of the house. Traditional gas water heaters are so quiet, it is difficult to know when they are operating even when standing next to them. However, an electric heat pump water heater utilizes a compressor. The Rheem Pro Terra series electric heat pump specifies it's compressor noise at 55dBA as a 'feature' (better than most). Water heaters are commonly located within the confines of the residence. To put 55dBA in context we can refer to BAAQM Report: 20221220_SR_AppG0940906.pdf, Table 3.4-1 which would best characterize 55dBA as a noise level ranging from a large business office to heavy traffic at 300 feet in a commercial area. I contend that a heat pump water heater within a living space will subject household members to elevated noise and that this diseconomy or reduction to quality of life has not been mentioned in the staff reports.

Residences with a gas water heater located within the house, such as furnace closet, will require potentially costly contract work to install the necessary heat pump ventilation ducting to the exterior of the residence. Unlike a gas water heater, an electric heat pump water heater extracts heat from the surrounding air and in doing so produces chilled air output. This requires a minimum reservoir of 700cuft. of air from which the electric heat pump must exchange heat. This is about the size of a small bedroom and therefore the typical heater-closets in which most water heaters and furnaces are found, offer insufficient air volume. For this reason, additional cost must be allocated for a contractor to install venting to allow the electric heat pump water heater adequate exchange with the outside air. No allowance for this added installation work has been accounted for in the cost of compliance tables provided in any of the BAAQM reports.

Adoption of the proposed changes to Rule 4 could result in a household being without heat for an extended period of time. The proposed changes to Rule 4 essentially would mandate the replacement of a gas furnace, once it requires replacement presumably due to failure, with an electric heat pump. To state the obvious, households usually discover their gas furnace is broken and needs replacement in winter when it is cold. Presently, replacement using drop-in (meets the same or similar form factor as the broken furnace) low NOx gas furnaces is straight forward. They are usually available, permitted, and installed within a few days by a single contractor. The retrofit of an electric heat-pump in place of a gas furnace is considerably more complex and likely requires coordination of several contractors. A concrete pad must be poured and set outside the residence (single family residence for example) for

situating the heat pump, then, installation of the heat pump, installation of the heat exchanger, installation of a dedicated electrical branch line back to the breaker box and very likely a PG&E service upgrade at the service panel to accommodate the increased electrical load. BAAQM has made a first order estimate for the cost of electrical service upgrade (~\$4256) in BAAQM report: 20221220_SR_AppC_RG09040906.pdf page 19, 'Compliance Costs Used In Impact Analysis'. However, no acknowledgment has been made in the BAAQM for the longer permitting process. Presumably, city permits for the construction work on the residence would be only marginally longer commensurate with the added complexity of the required work. But, when an electrical service upgrade is called for, that permitting is done by PG&E. Pacific Gas and Electric Co. and San Diego Gas and Electric Co. sponsored the Service Upgrades for Electrification Retrofits Study Final Report (May 27, 2022) written by NV5 Inc. and Redwood Energy. For convenience a link to the report is provided:

<https://pda.energydataweb.com/api/view/2635/Service%20Upgrades%20for%20Electrification%20Retrofits%20Study%20FINAL.pdf> Figure 7 'Overall Service Upgrade Process of PG&E' on

page 29 is the salient diagram. The report states that the process may be completed in 10 days or may take as long as 8 months. One might not believe that the approval process for service upgrade may take that long, but considering that installation of solar panels often triggers the same process and anecdotally 2 months is a very common experience for permit approval. Loss of heat in a residence for an extended period of time is at best a reduction in quality of life and at worst life threatening. BAAQMD alludes to this problem indirectly in Report: 20221220_01_Staff Report_RG09040906.pdf page 11 suggesting "These smaller solutions also allow for temporary use while a larger system is being permitted or installed, or, if desired by the building owner, while electric service is being upgraded...". To clear, these 'smaller solutions' are 1 ton 120V Heat Pump Mini Split Systems which cost approximate \$1K each, would need a contractor to install and would be sprinkled through the household as required like space heaters. Upon completion of permitting these 'temporary use' would no longer be needed. No plan is proposed for their proper disposal, refrigerant recovery or potential for reuse. There is no cost accounting for implementation of these 'temporary' solutions. There is no accounting for this quality of life / risk to life in any of the BAAQMD reports.

The switch from gas furnaces to zero-NOx electric heat pumps will increase ambient noise in the community. Gas furnaces typically produce no discernable noise outside the residence. For example, one never can tell if a neighbor's furnace is running by standing outside their house and listening carefully. However, the compressor portion of an electric heat pump is installed outside a residence, usually in close proximity (a few feet) of the residence wall and commonly operate at 70-75dBA weighted sound power level. To put this in context we may once again refer to BAAQMD Report: 20221220_SR_AppG09040906.pdf, Table 3.4-1 which would best characterize 75dBA as a noise level ranging from a 'gas lawn mower at 100 feet to a diesel truck at 50 feet at 50 miles per hour'. Given that 4 feet setbacks are common, your neighbor's electric heat pump installation may only be 6 feet from your windows. The ANSI/AHRI standard defines the measurement distance as 6 feet so what is specified is what you will get at 6 feet. At a distance of 60 feet the sound level should decrease to a more reasonable 50-55dBA. However, at 60 feet it is also likely that upon full adoption of heat pumps in a community, there will be multiple electric heat pump sound emission sources withing radius which will add to the totality of perceived noise. The increase in community

ambient noise could be estimated for a full heat pump adoption scenario as a function of mean distance between residences. But the installation of a neighbor's heat pump outside an individual's bedroom window will likely matter the most by far. BAAQMD report: 20221220_SR_AppG_RG09040906.pdf page ES-5 Impact 3.4-1: Potential to Generate Long-Term Operation Noise acknowledges 'the Project would result in substantial long-term operational noise impact, and this impact would be potentially significant.' To understand the potential impact of this statement and what it could mean to a resident of the bay area, it helps to contextualize it as potentially a gas lawn mower or diesel truck operating outside your window all winter long. The BAAQMD does not enforce noise nor does it account for this significant diseconomy in the report: 'The BAAQMD does not have .. authority to require [sound] mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures.' The adoption of electric heat pump will increase ambient noise in the community. Higher density, lower income, neighborhoods would likely experience greater impact. Individual circumstances may be more significant, unavoidable, and impact quality of life.

Electric heat pumps contain refrigerants which continuously leak over the life of the heat pump's life and are a known, powerful, global warming gas. When accounted for, refrigerant loss will significantly decrease the actual realized gains from the conversion of a low NOx gas furnace to an electric heat pump. Electric heat pumps on the market today operate using a refrigerant, R-410A (various trademarked names such as EcoFluor or Puron – carefully chosen to belie their true environmental impact). R-410A has a GWP (global warming potential) 2087 times that of CO2 per IPCC's forth Assessment Report as given in California Air Resources Board: <https://ww2.arb.ca.gov/resources/documents/high-gwp-refrigerants>. R-410A GWP is an order of magnitude worse than the NOx emissions targeted by the proposed Rule 6 change by BAAQMD. A first order estimate for the amount of heat pump refrigerant loss may be found in Table 3. Fugitive Emissions of Refrigerants in the paper 'Planning for Failure: End-of-Life Strategies for Residential and Commercial HVAC Systems' published by the National Renewable Energy Laboratory which can be down loaded from the Department of Energy Office of Scientific and Technical Information web page: <https://www.osti.gov/pages/biblio/1583092>. The research suggests 1% refrigerant loss at time of manufacture with a 1% loss per year is a reasonable expectation. Over a presumed 15 year lifespan 80% of the original refrigerant typically remains within the unit (20% has been released into the atmosphere and contributes global warming). The focus of this research is to emphasize the importance of refrigerant recovery at the end of life of the unit. Presently, this is not as well controlled or as successful as we might hope. Figure 1 of the report provides the Lifetime GHG (Green House Gas Emissions) in lb. CO2e/ton for residential units and itemizes the contribution due to loss of refrigerant due to leakage and 3 possible refrigerant recovery scenarios (1%, 20%, and 100%) at the equipment's end of life. Under the 3 scenarios, lifetime GHG emissions were calculated to be 2000, 3000, and 8000 lb. CO2e/ton. BAAQMD report: 20221220_01_Staff Report_RG09040906.pdf page 11 recommends 12,000 BTU/hr heat pump system as sufficient for meeting the heating/cooling needs of a 600 sqft. space. Using the middle refrigerant recover scenario of 20% and a median CA residence size of 1800 sqft. one can first order estimate the lifetime GHG emissions from implementation of the proposed Rule 6 as: (3000 lbs. CO2e/ton)*(1ton/600sqft.)*(1800sqft./household)*(1,641,623 gas heated households in

BAAQMD jurisdiction)*(1 metric ton/2205lbs.) = 6.7 million metric tons of CO2e global warming gas to be released over the operational life electric heat pumps or 0.45 million metric tons of CO2e/annum. There is no accounting for cost of EOL refrigerant recovery for the deployment of electric heat pumps in place of gas furnaces and the significant, detrimental, effects of fugitive refrigerant emissions which should be included in the cost benefit analysis.

The decision by BAAQMD not to consider Non-Zero Requirements is a missed opportunity to evaluate a multifaceted approach for realizing significant reduction in emissions while allowing households the flexibility to contend with the actual constraints of implementation when faced with living with a BAAQMD table entry simply listed as 'significant and unavoidable' or in some cases issues not accounted for such as those described above. Existing ultra-low NOx standards in place now are projected to offer increasingly measurable benefit through year 2035 as older non-compliant gas furnaces and water heaters are replaced with ultra-low NOx to meeting existing standards. In light of the significant cost of compliance from conversion from gas furnace and water heaters to electric heat pump solutions even a 100% increase in the cost of a gas furnace or water heater could still be considerably less expensive and less disruptive compared to what is an effectively mandated conversion to an electric heat pump. No evidence of engagement with manufactures has been presented to answer how much reduction in NOx emissions would be possible given increase in unit cost. This technology engagement could provide solutions which better meet household needs, decrease resistance of adoption, and reach a better cost benefit outcome. Therefore, I strongly recommend the BAAQMD engage and challenge manufacturers to propose NOx standards that would be obtainable given a targeted increases in unit sales price on the order of the projected cost of compliance. Manufactures might consider such a sizable premium over conventional ultra-low NOx equipment costs as unmarketable. However, given the actual cost of compliance and other actual constraints, a high-cost gas equipment option could still be attractive. The implementation of the changes of as proposed for Rule 4, and 6 will be very significant and have direct negative consequences experienced to the resident while the perceived benefit will be indirect and more ephemeral. I do not recommend adoption of the proposed changes to Rule 4, and 6 without considering and providing a path for reduced NOx though adoption of additional 'Non-Zero Requirements'.

Respectfully,



Eric Frick
Citizen of Mountain View, CA

Jennifer Elwell

From: Luther Izmirian [REDACTED]
Sent: Monday, February 6, 2023 1:00 PM
To: Jennifer Elwell
Cc: Luther Izmirian
Subject: Gas Appliance Ban Rules.

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We are a 100 year old HVAC contractor in San Mateo. We install all types of equipment including water and air source heat pumps as well as Hybrid systems using gas furnace with heat pump.

Older housing stock that can not be insulated and sealed can not be heated with heat pumps as the heating demand is so much larger than the cooling loads. Cost of equipment noted in articles is not realistic and is a fraction of the cost for heat pumps. We find it amazing that people pushing the ban on gas appliances never check with us in the industry regarding the application for what is being proposed.

Problems are how can we locate outdoor equipment and meet set back requirements, noise limits, and capacity requirement, not to mention the huge additional cost as well as the added electrical service changes this will require. Homes with underground service have a huge cost increase if they can even change the service and if there is power available. This is a real problem in Foster City.

We have had homes tested and the air quality issue is not an issue as users utilize the ventilation systems that are required with gas stoves. All furnaces, water heaters, and dryers vent to outdoors. There is a lot of false information being proffered to make the argument against use of gas. The vast majority of equipment we install is either staging 96% efficient or 99% efficient. Customers request the higher efficiency available.

Please do not saddle homeowner and property owners with these large costs.

Luther Izmirian
Izmirian Roofing & Sheet Metal
[REDACTED]
San Mateo, Cal 94401

[REDACTED]

Jennifer Elwell

From: [REDACTED]
Sent: Monday, February 6, 2023 12:28 PM
To: Jennifer Elwell
Subject: The Ban of New Gas Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To the Bay Area Air Quality Management District:

The environmental impact report states that the increase in electrical energy would require solar panels on 19,500 acres of rural land in the Bay Area.

The justification for your rules is based on two non-scientific reports. Employees of the anti-gas climate warrior Rocky Mountain Institute wrote one, and two attorneys at NYU's Institute for Policy Integrity wrote the other one: written by – lawyers, i.e., not written by scientists.

The meta data for the studies was cherry picked to achieve a desired result. The conclusion dictated the data, not the other way around. This is the essence of biased and misleading propaganda used to promote or publicize a particular political cause or point of view.

Immediately withdraw your proposed regulation. The board members who support it should resign or be dismissed.

John Alexander Sheakley
[REDACTED]
San Mateo, CA 94404-1512
[REDACTED]

Jennifer Elwell

From: QQQ PAL [REDACTED]
Sent: Monday, January 23, 2023 3:03 PM
To: Jennifer Elwell
Subject: No to proposed natural gas rules

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Today's Palo Alto Daily Post has three articles related to the proposed natural gas facilities. The costs in new installation of proposed facilities with electrical systems are not only excessively expensive but also possibly affecting building outside spaces with the setback requirement. It may require the upgrading of electrical panel: also the equipment outside could generate high noises. Please vote NO to the proposed rules. Thank you.

Palo Alto Green Gables neighborhood residents

[Sent from Yahoo Mail on Android](#)

Jennifer Elwell

From: Peter Jon Shuler [REDACTED]
Sent: Saturday, February 4, 2023 12:25 PM
To: Jennifer Elwell
Subject: Opposed to Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED] [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Jennifer Elwell, and BAAQMD board and staff,

The January 18 article in the San Francisco Chronicle by Dustin Gardiner says the agency has seen very little pushback from the Bay Area in regard to the banning of natural gas water heaters and furnaces. Well, I am here to voice my strong opposition.

Look, I care about the environment and climate change. I've been a registered Democrat since I was 18. And so it pains me to find myself making common cause with right-wing lunatics. But this is what you get when you have elected officials and agencies falling all over themselves to prove themselves "the most progressive of them all" at the expense of their constituents.

Your proposed ban on gas furnaces and water heaters is just the latest example of governmental and regulatory agencies so eager to burnish their reputations and legacies with aggressive rules that they forget or ignore the real-life consequences on the little people that suffer the results of their decisions. As far as I can tell, the District's pushing ahead with this is as much about bragging rights than any real difference it will make.

The Draft EIR pays lip service to the disastrous results of this rulemaking, but then offers no solutions. Like most EIRs, this one tries to sound very logical and scientific, but the entire thing is based on wishful thinking and pixie dust.

Especially for those of us living at the mercy of PG&E, the electric grid is already a hot mess. It is already incapable of handling the current demand for electricity. We are subject to blackouts, or threats of blackouts, every time we turn around. We just experienced massive blackouts due to severe weather systems downing trees and disabling large portions of the grid.

In the summer, we have rolling blackouts and grid failures in our all-too-frequent hot spells. Even in seasonal summer conditions, we are warned and CHARGED EXTRA for running air conditioning at the times of day we need it most. During the fire season, we are subject to fire safety blackouts every time there's a forecast of hot and windy conditions. This Saturday's Chronicle article (February 4 by Claire Hoa - "All-electric future suffers whenever power goes out") makes some of the same points that also concern me.

Can any of you, with a straight face, assure me that all this will be better in four or five years when you plan to dump an even bigger load on the grid? If you claim that the grid will be able to support your absurd timeline, given PG&Es track record, you really are delusional -- or liars. And you know what will happen then? Prepare to see an even bigger proliferation of dirty, gasoline or propane generators.

Even your beloved "clean" electricity is dirty. For the most part, we're just sending our pollution somewhere else. Even so-called clean energy, as the DEIR admits, is ruining pristine wilderness with ugly wind farms and ugly solar farms. And as we increasingly depend on storage, we are stuck with the toxic practices associated with the mining, manufacturing and disposal of battery materials.

Every time you make new rules, you create new problems.

In addition, you would do well to take seriously the concerns of people like Mike Kapolnek, quoted in the January 18 article, about the cost of upgrading electrical panels and rewiring and retooling homes to make your plan feasible. I live in a modest Redwood City neighborhood with lots of little homes built long before the 1970s. The vast majority have gas furnaces and water heaters. And who lives in these homes? Senior citizens, ethnic minorities, people living paycheck to paycheck. Replacing a major appliance such as a furnace or water heater is already a huge hit for someone just struggling to hang on. Add thousands of dollars more and PG&E red tape to that and you are effectively pushing people over the edge and out of their homes. Some people have a little more means than others. It will likely cause financial pain and frustrating inconvenience all around. Most of us don't have thousands of dollars in extra cash to throw at your ego-trip rulemaking. Maybe we can just barely scrape by. But many will not be able to scrape by at all.

One final note about the January 18 Chronicle article. I know the Air Quality District and SPUR are separate entities. But I suspect the attitudes expressed by SPUR's Laura Feinstein are not far from what at least some of you are thinking. From her position of privilege, she dismissed concerns about the unintended consequences of these changes as "knee-jerk."

I was shocked to hear such a smug, arrogant comment from a local thought leader on these issues. It sounded a little too much like, "Let them eat cake!" She goes on to extol "relatively inexpensive" circuit sensors and smart current sensors and other technology. Relatively inexpensive to whom? She seems to forget that all this hi-tech junk and its installation costs real money to real people. Mostly to people who can least afford it.

The "solutions" proffered by all of the electrification advocates and experts are expensive, piecemeal and will take years if not decades to complete. Meanwhile, your deadline looms over the Bay Area like a sledgehammer.

Please reconsider this ill-conceived and ill-considered regulatory overreach. The DEIR states that the grid will be able to handle the burden of this new load by 2050. This is cold comfort. 1) Many of us will be dead by then, 2) What are the rest of us supposed to do in the meantime? The fact that you haven't considered that shows the contempt you have for the people you regulate.

Sincerely,

Peter Jon Shuler
Redwood City

[REDACTED]

Jennifer Elwell

From: Terry Houlihan [REDACTED]
Sent: Sunday, February 5, 2023 2:09 PM
To: Jennifer Elwell
Cc: [REDACTED]
Subject: Proposed Bay Area Air Quality Management District Rule Amendments prohibiting gas fired water heaters and furnaces: Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

February 5, 2023

Dear Ms Jennifer Elwell:

This responds to the notice of proposed amendments to Rules 9-4 and 9-6 inviting public comments on the proposals.

I OPPOSE adoption by the BAAQMD of the proposed amendments to Rules 9-4 and 9-6 that would prohibit the sale and installation of gas fired water heaters and boilers. For at least the following reasons that the Board should not adopt the proposed amendments:

First, the underlying assumption of the proposed amendments, that existing gas fired appliances can be replaced with electric heat pumps, is **false** as to my condominium unit and equally false as to many San Francisco and Oakland properties.

My wife and I own a unit on Telegraph Hill that is part of a 20 unit complex. Our unit, like others, has 3 stories of rooms served by two different furnaces, one on the top level and one on the first level. There is no usable exterior ground space for an air source heat pump for my unit.

Many San Francisco buildings, like lofts in converted warehouses and multi-story buildings converted to individual condos, similarly lack available ground space. Pasting exterior cooling boxes on the walls of each such unit is not a practical proposal.

Interior only air source units appear to be primarily for cooling, not heating, and do not heat water. Their ability to handle the same heating function as gas fired appliances is assumed, not discussed in your materials.

Second, appropriate rules governing gas fired appliances are, at a minimum, statewide issues, if not multi-state. These issues are not regional and should not be acted on by a regional board.

The papers supporting the proposed amendments demonstrate this. They make a case for the **benefits to the region** from improved air quality, but make no attempt to quantify the **costs elsewhere in the state** of the added electricity generation and transmission construction required to

meet the additional electric power demand created by the proposed amendments. As a result of this, your own Draft Environmental Impact report concludes:

"If we follow CEQA to the letter, and view the alternatives only in terms of those that address the Project's significant impacts, then we must grant that the **No Project Alternative is the environmentally superior alternative** because it avoids significant potential Project impacts associated with noise and also avoids the Project's potential considerable contribution to significant impacts related to electrical infrastructure expansion (including renewable energy expansion)." Draft EIR at ES-7(emphasis added).

In other words, the draft EIR recommends **against** adoption of the proposed amendments.

Third, the equity assessment of the proposed amendments is deficient.

The equity assessment attempts to show the distribution of projected benefits among Asian/Pacific Islander, Hispanic/Latino, African-American/Black and White groups. But it makes no attempt show how the higher new equipment and increased electric power costs would impact such groups.

Fourth, assumptions in the support documents about future electric generation, transmission and distribution are false.

It is unlikely that, as assumed in the study, that additional electric utility generation required by the amendments would be met entirely by utility-scale solar. A more likely scenario is that the demand would be met by mix of generation, including existing gas-fired units that would be called on more often.

Fifth, the assumption that PG&E can handle the added distribution strain within the proposed time frame is simply wrong, particularly in rural areas such as West Marin and Sonoma where frequent outages occur.

By copying my comments to the staff of your San Francisco Board members Shamann Walton and Myrna Melgar, I request their staff to raise these issues with those members.

Respectfully,

Terry J Houlihan

[REDACTED]
[REDACTED]

San Francisco, CA 94133

Jennifer Elwell

From: TJ Giuli [REDACTED]
Sent: Friday, February 3, 2023 2:30 PM
To: Jennifer Elwell
Subject: Comments on Rules 9-4 and 9-6 Building Appliances

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from [REDACTED]. [Learn why this is important](#)

CAUTION: This email originated from outside of the BAAQMD network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello, I am writing to oppose the proposed rule changes that would ban natural gas appliances.

My concerns are:

1. As the EIR mentions, implementing the proposed rule changes will exceed planned electricity generation by a substantial amount. Without planning for increasing climate-friendly energy generation, we will likely see what happened over this past summer -- electricity shortages at peak times when demand is high but generation from solar has fallen off. In this case, California imported electricity from neighboring states or fired up natural gas generators. Since the BAAQMD cannot mandate the construction of green energy generating plants to handle the additional electric load, implementing the rule changes runs the risk of creating additional greenhouse gasses.
2. Heat pumps and electric water heaters will place additional electrical load on every home in the Bay Area. Given that all new vehicles sold in California by 2035 will be electric, an enormous number of houses will have to upgrade their electrical panels to comply with code. The amount of effort required to do this cannot be understated. Having gone through an electrical panel upgrade as part of a renovation, I can testify to the fact that it takes months just to get on PG&E's schedule and thousands of dollars in parts and labor. These issues might be outside of the scope of the EIR, but any realistic consideration of these rule changes must consider the practical impact.

In summary, I believe the proposed rule change will cause many more problems than it will solve and so I oppose the change. Thank you,
--TJ Giuli

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

RESOLUTION No. 2023-

**A Resolution of the Board of Directors of the Bay Area Air Quality Management District
Amending Regulation 9, Rule 4 (Nitrogen Oxides from Fan-Type Residential Furnaces)
and Amending Regulation 9, Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired
Boilers and Water Heaters);
and
Certifying a California Environmental Quality Act Environmental Impact Report**

RECITALS

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has the authority and the responsibility to adopt, amend and repeal rules and regulations as necessary and appropriate to control air pollution from stationary sources in the San Francisco Bay Area as provided in Sections 40000, 40001, 40702 of the California Health & Safety Code;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined that a need exists to strengthen the District's rules and regulations that address nitrogen oxides ("NOx") emissions from natural gas-fired space and water heating appliances by adopting amendments to Regulation 9, Rule 4 (currently titled: Nitrogen Oxides from Fan-Type Residential Furnaces; proposed amended title: Nitrogen Oxides from Natural Gas-Fired Furnaces) ("Rule 9-4") as set forth in Attachment A hereto and Regulation 9, Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters) ("Rule 9-6") as set forth in Attachment B hereto (Attachments A and B are herein referred to collectively as "Proposed Amendments");

WHEREAS, the Proposed Amendments include both groundbreaking zero-NOx emissions standards for natural-gas fired space and water heating appliances with future compliance dates ranging from 2027-2031, and a near-term ultra-low NOx emissions standard for natural-gas fired water heaters;

WHEREAS, the Proposed Amendments do not ban natural gas use in buildings and do not address gas cooking appliances;

WHEREAS, while the Proposed Amendments require that new natural gas-fired space and water heating appliances sold and installed beginning in 2027-2031 emit zero-NOx, and staff understands that the development of zero-NOx natural gas fired appliances is technically possible, based on currently available zero-NOx technology, staff assumed for purposes of conservative analysis of the emissions reductions, socioeconomic impacts, and environmental effects of the Proposed Amendments that natural gas-fired appliances would be replaced with electric solutions upon burnout beginning in 2027-2031 if the proposed zero-NOx standards are adopted;

WHEREAS, exposure to NOx and their atmospheric reaction products can greatly impact health, resulting in irritation of airways in the human respiratory system, aggravation and development of respiratory diseases, particularly asthma, hospital admissions and visits to emergency rooms;

WHEREAS, NO_x reacts with other chemicals in the air to form both secondary fine particulate matter and ozone, and both of these pollutants are also harmful when inhaled, contribute to regional air pollution, and have been linked to a broad range of adverse health effects, including premature mortality, adverse respiratory health effects, cardiovascular diseases, impacts to cognitive function, and cancer;

WHEREAS, the Bay Area does not currently attain all state and national ambient air quality standards for particulate matter and ozone, and further reductions of particulate matter and ozone through the implementation of all feasible measures are needed for attainment and maintenance of the standards;

WHEREAS, the federal Environmental Protection Agency has proposed its intention to strengthen the national ambient air quality standard for fine particulate matter; Air District staff anticipates the need to submit a particulate matter attainment plan in response to this new standard once it is finalized; and the particulate matter reductions achieved through adoption of the Proposed Amendments would help the Air District to attain any new standard;

WHEREAS, the Air District's Advisory Council has determined that particulate matter is "the most important health risk driver in Bay Area air quality," and that reductions in particulate matter levels are needed to achieve further clean air and public health benefits;

WHEREAS, emissions from building appliances were highlighted in measures SS30 (reduce NO_x and carbon monoxide from residential and commercial furnaces) and BL2 (explore potential Air District rulemaking options to reduce all emissions from fossil fuel-based space and water heating systems for both residential and commercial use) in the Air District's 2017 Clean Air Plan;

WHEREAS, emissions from natural-gas fired space and water heating appliances generate a substantial portion of nitrogen oxides (NO_x) emissions in the Bay Area, approximately 4,267 tons of NO_x per year in 2018, which is estimated to surpass the NO_x emissions of passenger vehicles in the Bay Area;

WHEREAS, staff has estimated that implementation of the Proposed Amendments would achieve NO_x emissions reductions of approximately 3,236 tons per year;

WHEREAS, staff has estimated the reductions in NO_x (and resultant secondary particulate matter reductions) achieved by the Proposed Amendments would avoid an estimated 23 to 52 deaths per year and about 71 new cases of asthma per year, and that these health benefits are valued at an estimated 400 million U.S. dollars annually based on the federal Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program;

WHEREAS, if electric heat pump technologies are installed in place of existing natural gas-fired space and water heating appliances upon burnout after the compliance dates of the Proposed Rules go into effect, additional health benefits would be achieved through the reduction of primary particulate matter, avoiding 37 to 85 premature deaths per year and about 110 new cases of asthma each year, which benefits are valued at an estimated 890 million U.S. dollars annually based on the federal Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program;

WHEREAS, if electric heat pump technologies are installed in place of existing natural gas-fired space and water heating appliances upon burnout after the compliance dates of the Proposed Rules go into effect, the Proposed Rules would also achieve significant greenhouse gas emissions reductions benefits, estimated by staff at up to 4.81 million metric tons of carbon dioxide equivalent per year;

WHEREAS, the Board of Directors understands that these estimated greenhouse gas emissions reductions are not guaranteed by the Proposed Amendments, and that greenhouse gas emissions reductions would be lower if zero-NOx natural gas-fired space and water heating appliances are developed and adopted by consumers at scale;

WHEREAS, in 2021 Air District staff convened and met periodically with a Stakeholder Working Group, which included community and environmental advocates, equipment manufacturers, local city staff and representatives from the California Air Resources Board, the California Energy Commissions and others, to discuss concepts and specific issues relating to Rules 9-4 and 9-6 and drafting amendments;

WHEREAS, Air District staff held a public workshop on October 7, 2021 to present and discuss draft regulatory amendments for Rules 9-4 and 9-6, along with a workshop report;

WHEREAS, based on comments received and additional research, Air District staff revised the draft rule amendments and published revised draft rule amendments on or about May 18, 2022;

WHEREAS, the Air District held a scoping meeting in a virtual format on June 9, 2022 and accepted comments on the draft revised rule language through June 21, 2022;

WHEREAS, Air District staff presented briefings to various committees of the Board of Directors during this rule development process, including to the Stationary Source & Climate Impacts Committee on November 19, 2020, April 19, 2021, October 18, 2021, November 15, 2021, April 18, 2022, October 17, 2022, and February 15, 2023;

WHEREAS, in response to feedback from the public, interested stakeholders, and Air District staff, as well as the Board of Directors, Air District staff prepared revised Proposed Amendments and a detailed Staff Report, along with a request for public comment, which staff published on the District website on December 20, 2022 and for which comments were accepted until February 6, 2023;

WHEREAS, the Air District received more than five hundred comments on the Proposed Amendments, many of which are supportive of the Proposed Amendments and others which are opposed, and has carefully reviewed these comments;

WHEREAS, Air District staff have prepared summaries of the comments received and staff's responses in a Response to Comments document, which has been considered by the Board of Directors and is incorporated herein by reference;

WHEREAS, on or before December 20, 2022, Air District staff published in newspapers, and published and distributed on the Air District's website a notice of a public hearing on or after March 15, 2023, to consider adoption of the Proposed Amendments;

WHEREAS, Air District staff have prepared and presented to the public and to the Board of Directors a final Staff Report describing the purpose of and need for the Proposed Amendments, which has been considered by the Board of Directors and is incorporated herein by reference;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District held a public hearing on March 15, 2023, which was properly noticed in accordance with the provisions of Health & Safety Code Section 40725 and was conducted in accordance with the provisions of Health & Safety Code Section 40726, to consider the Proposed Amendments in accordance with all provisions of law;

WHEREAS, at the public hearing, the subject matter of the Proposed Amendments was discussed with interested persons in accordance with all provisions of law;

WHEREAS, in accordance with Health & Safety Code Section 40727, and based on substantial evidence presented at the hearing and described in the Staff Report and other documentation, the Board of Directors of the Bay Area Air Quality Management District has found and determined that the Proposed Amendments are necessary; that the District has the authority to adopt the Proposed Amendments; that the Proposed Amendments are clearly written and displayed; that the Proposed Amendments are consistent with other legal requirements; that the Proposed Amendments are not impermissibly duplicative of existing regulatory requirements; and that the Proposed Amendments will implement specific provisions of law as referenced and identified below;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined that a need exists to adopt the Proposed Amendments to address NOx, ozone and secondary particulate matter emissions in the Bay Area to improve and protect air quality and public health;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined that the Air District has the authority to adopt the Proposed Amendments pursuant to Sections 40000, 40001, 40702 of the Health & Safety Code, which authorize the Air District to adopt and implement regulations to control air pollution from stationary sources, and to execute the powers and duties imposed upon the Air District, among other things;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined, based on a review of the text of the Proposed Amendments set forth in Attachments A and B and the rulemaking materials prepared by Air District staff, that the Proposed Amendments are written and displayed so that their meaning can be easily understood by the persons directly affected by the Proposed Amendments, and by the public at large;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined that the Proposed Amendments are in harmony with and not in conflict with or contradictory to existing statutes, court decisions, and state and federal regulations;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has determined that the Proposed Amendments do not impose the same requirements as any existing state or federal regulations, except to the extent necessary and proper to execute the powers and

duties granted to and imposed upon the Air District as the agency with authority to control air pollution emissions from stationary sources in the San Francisco Bay Area;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District has identified and determined that the Proposed Amendments will implement, interpret and/or make specific the provisions of Sections 40000, 40001, 40702 and 40727 of the California Health & Safety Code;

WHEREAS, the Board of Directors of the Bay Area Air Quality Management District finds and intends that its determinations stated in the preceding paragraphs constitute the findings the Board is required to make before adopting the Proposed Amendments pursuant to Health & Safety Code Section 40727;

WHEREAS, in accordance with the requirements of Health & Safety Code Section 40728 and other requirements of law, the Air District has maintained a file of the documents and other materials that constitute the record of proceedings on which this rulemaking project is based (including the environmental analysis for the project prepared in accordance with the California Environmental Quality Act), which record documents and other materials are located at the Bay Area Air Quality Management District, 375 Beale Street, Suite 600, San Francisco, 94105, and the custodian for which is Marcy Hiratzka, Clerk of the Boards;

WHEREAS, in accordance with the requirements of Health & Safety Code Section 40728.5, to the extent that such requirements are applicable, and also as a matter of sound public policy notwithstanding whether or not such requirements are applicable, the Board of Directors of the Bay Area Air Quality Management District has actively considered the socioeconomic impacts of the Proposed Amendments, having reviewed and considered the analysis thereof in the Staff Report and the report prepared by Applied Development Economics, Inc., referenced and incorporated there and herein, and has made a good faith effort to minimize any adverse socioeconomic impacts of the Proposed Amendments through consideration of delayed compliance dates for the zero-NOx standards, which will allow time for technology options to increase and costs to decrease, and inclusion of required reporting from Staff to the Board of Directors on topics including zero-NOx technology options and cost prior to the compliance dates;

WHEREAS, the Proposed Amendments include the requirement that staff report back to the Board of Directors in "interim reports" no later than two years prior to each compliance date on the availability and accessibility of zero-NOx space and water heating appliances, including information on zero-NOx technology options currently (and projected to be) available; the projected costs of purchase and installation of such technology, including any ancillary costs, as applicable; any incentive programs available to reduce these costs; and infrastructure readiness associated with rule compliance;

WHEREAS, the Board of Directors understands that staff plans to convene an Implementation Working Group comprised of community-based organizations, environmental justice groups, advocacy and subject matter expert organizations, building technology experts, affordable and market rate housing developers and managers, local and state government staff, funding and financing agencies, equipment manufacturers and distributors, tenant representation organizations and labor organizations to assist staff in gathering information for the aforementioned interim

reports to the Board of Directors and assist staff in working towards implementation of the Proposed Amendments;

WHEREAS, the Air District is especially concerned with equitable implementation of the Proposed Amendments, and the Board understands that Air District staff will work towards equitable implementation of the Proposed Amendments, with assistance from the Implementation Working Group, and will report to the Board in the interim reports on the availability and accessibility of financial incentive programs to reduce compliance costs for the Bay Area's low income residents and disadvantaged communities;

WHEREAS, the Board has considered the estimated cost-effectiveness of the Proposed Amendments, which staff estimates ranges from \$54,100/ton of NO_x reduced to \$594,000/ton of NO_x reduced for the proposed zero-NO_x standards, based on currently available zero-NO_x technology;

WHEREAS, the Board of Directors finds and determines that the Proposed Amendments are collectively a "project" ("Proposed Project") pursuant to the California Environmental Quality Act ("CEQA") (Public Resources Code § 21000 et seq.);

WHEREAS, the Air District is the CEQA lead agency for this project pursuant to Section 21067 of CEQA and Sections 15050 and 15051 of the CEQA Guidelines ("Guidelines") (Title 14 of the California Code of Regulations);

WHEREAS, Air District staff has prepared an Environmental Impact Report ("EIR") for the Proposed Project pursuant to the requirements of CEQA, in connection with and based on information and analysis developed by the District's CEQA contractor, Ascent Environmental, Inc., of Sacramento, California;

WHEREAS, as part of the development of the EIR, District staff prepared and published (with the assistance of Environmental Audit, Inc.) an Initial Study and Notice of Preparation for the EIR, which was published and noticed in accordance with the requirements of CEQA (including CEQA Sections 21082.1, 21091, 21092 and Guidelines Sections 15080 et seq.) on May 19, 2022;

WHEREAS, Air District staff also convened a CEQA scoping meeting on June 9, 2022, to solicit input from interested members of the public on the Initial Study and on the scope and contents of the EIR and the potential environmental impacts to be evaluated in it;

WHEREAS, Air District staff then completed a Draft EIR, and published the Draft EIR and provided notice of such publication to the public and to interested parties and agencies, in accordance with the requirements of CEQA (including CEQA Sections 21082.1, 21091, 21092 and Guidelines Sections 15080 et seq.) on or before December 20, 2022;

WHEREAS, the Draft EIR finds that the Proposed Project will have the potential to create significant and unavoidable impacts on utility resources, as fully detailed in the report prepared by Energy and Environmental Economics, Inc. (E3), which is appended to the Draft EIR at Appendix C and incorporated by reference as if fully set forth herein, that cannot be mitigated to a level that is less than significant, as described in Chapter 3.3 of the Draft EIR;

WHEREAS, the Draft EIR also finds that the Proposed Project will have the potential to create a significant adverse environmental impact due to potential operational noise from certain zero-NOx appliances both inside and outside of residences and commercial buildings, that cannot be mitigated to a level that is less than significant, as described in Chapter 3.4 of the Draft EIR;

WHEREAS, the Draft EIR finds that the Proposed Project will not have the potential to create any other significant adverse environmental impacts;

WHEREAS, the Draft EIR discusses potential alternatives to the Proposed Project which would achieve the project objectives but avoid or substantially lessen its potentially significant effects related to noise and utility resources, including Alternative 3, the Draft EIR's "environmentally superior" alternative, that would delay compliance dates for the proposed standards to 2035 and as a result lessen potential impacts to utility resources, but that alternative would result in reduced air quality and public health benefits compared to the Proposed Project, and air quality and public health benefits are the purpose of the Proposed Project;

WHEREAS, substantial evidence in the record demonstrates that the potentially significant and unavoidable impacts related to noise and utility resources are acceptable as provided in Guidelines Section 15093 because the air quality and public health benefits from the Proposed Amendments outweigh the Proposed Amendments' potentially significant unavoidable impacts;

WHEREAS, the Draft EIR was circulated for public review during the period from December 20, 2022 to February 6, 2023;

WHEREAS, the Air District received comments on the Draft EIR;

WHEREAS, Air District staff prepared responses to all comments received on the Draft EIR and the Proposed Amendments and published a Final EIR;

WHEREAS, this matter has been duly noticed and heard in compliance with applicable requirements of the Health & Safety Code and the Public Resources Code;

WHEREAS, Air District staff provided copies of (i) the Proposed Amendments, and (ii) the Final EIR, which is comprised of the comments received on the Draft EIR and staff's responses thereto, to each of the members of the Board of Directors for their review and consideration in advance of the public meeting of the Board of Directors on March 15, 2023;

WHEREAS, Air District staff has recommended that the Board of Directors certify the Final EIR, which was prepared as the CEQA document for the Proposed Project, as being in compliance with all applicable requirements of CEQA, and adopt accompanying CEQA Findings and a Statement of Overriding Considerations;

WHEREAS, the Board of Directors concurs with recommendations of Air District staff regarding the Final EIR, CEQA Findings and Statement of Overriding Considerations for the Proposed Project;

WHEREAS, Air District staff recommends that the Board of Directors adopt the Proposed Amendments;

WHEREAS, the Board of Directors concurs with the recommendations of Air District staff regarding the Proposed Amendments.

RESOLUTION

NOW THEREFORE, based on the above recitals, which are true and correct and are incorporated herein by reference, and on all of the information provided in the rulemaking record for the Proposed Amendments, including but not limited to the public comments received and staff's responses thereto and all of the information presented at the public hearing, the Board of Directors of the Bay Area Air Quality Management District hereby resolves as follows:

BE IT RESOLVED, that the Board of Directors does hereby certify and adopt the Final EIR pursuant to CEQA for the Proposed Project.

BE IT FURTHER RESOLVED that the Board of Directors hereby makes the findings and certifications that are summarized below and detailed in full in Attachment C to this Resolution, which is incorporated by reference as if fully set forth herein:

1. The Final EIR for the Proposed Project has been prepared in accordance with all requirements of CEQA.
2. The Final EIR for the Proposed Project was duly presented to the Board of Directors for its consideration in accordance with CEQA and other applicable legal requirements.
3. The Board of Directors has reviewed and considered the information in the Final EIR and the evidence in the record described and summarized in the Final EIR, including but not limited to (i) the Final EIR's conclusion that the Proposed Project may have significant noise and utility resources impacts as described in the Final EIR, (ii) the lack of Air District authority to implement mitigation measures to mitigate the potentially significant noise and utility resources impacts outlined in the Final EIR, and (iii) the alternatives considered to avoid or substantially lessen the potentially significant noise and utility resources impacts that are evaluated in the Final EIR.
4. The Board of Directors finds that there are no feasible mitigation measures that have been identified that can be implemented by the Air District to mitigate the potentially significant noise and utility resources impacts.
5. The analysis of alternatives set forth in Chapter 4 the Draft EIR has provided the Board of Directors with a basis for considering ways in which the potentially significant noise and utility resources impacts could be avoided or substantially lessened while still achieving all or most of the project's objectives. The alternatives analysis in the EIR is sufficient to carry out the purposes of such analysis under CEQA.

6. The Board of Directors finds that there is a pressing need to reduce NOx emissions to protect public health and the environment, which the Proposed Project addresses. The Board of Directors finds that, while Alternative 3 lessens the Proposed Project's noise and utility resources impacts, Alternative 3 provides fewer air quality and public health benefits than the Proposed Project, and for that reason, Alternative 3 is rejected.
7. The Final EIR (including responses to comments) is complete, adequate and in full compliance with CEQA as a basis for considering and acting upon the Proposed Amendments.
8. The Final EIR reflects the independent judgment and analysis of the Bay Area Air Quality Management District.
9. The Board of Directors has exercised its own independent judgment in reviewing, considering and certifying the Final EIR and in making the findings and certifications set forth in this Resolution, which reflects the independent judgment and analysis of the Board of Directors.

BE IT FURTHER RESOLVED that the Board of Directors of the Bay Area Air Quality Management District does hereby adopt the proposed amendments to Rules 9-4 and 9-6 as set forth in Attachments A and B, respectively, with instructions to staff to correct any typographical or formatting errors before final publication.

BE IT FURTHER RESOLVED that in support of and as part of its adoption of the Proposed Amendments, the Board of Directors hereby makes the following additional findings and certifications:

1. For all of the reasons contained in the Staff Report, Section X, which are incorporated by reference as if fully set forth herein, the Proposed Amendments are necessary; the Air District has the authority to adopt the Proposed Amendments; the Proposed Amendments are clearly written and displayed; the Proposed Amendments are consistent with other legal requirements; the Proposed Amendments are not impermissibly duplicative of existing regulatory requirements; and the Proposed Amendments will implement specific provisions of law as referenced and identified.
2. The Board of Directors' approval of the Proposed Amendments is based on and supported by (among other things) the Board's consideration of the Final EIR for the Proposed Project.
3. The Board of Directors has balanced the benefits of the Proposed Project against its unavoidable environmental risks in determining whether to approve the Proposed Project. The Board of Directors finds that the Proposed Project's benefits in reducing air pollution emissions and protecting public health outweigh the adverse impacts to noise and utility resources that may result from implementing the Proposed Project. The Board of Directors therefore finds that these potentially significant impacts from the Proposed Rule are acceptable pursuant to Section

15093 of the CEQA Guidelines, 14 Cal. Code Regs. § 15093; and makes this finding as a “Statement of Overriding Considerations” pursuant to Section 15093. The specific reasons supporting this finding and Statement of Overriding Considerations are detailed in Attachment C to this Resolution, which is incorporated by reference as if fully set forth herein.

BE IT FURTHER RESOLVED that the Board of Directors directs staff to focus on equitable implementation of the amendments to Rules 9-4 and 9-6, and to include in the interim reports to the Board information on the availability and accessibility of financial incentive programs to reduce compliance costs for the Bay Area’s low income residents and disadvantaged communities;

BE IT FURTHER RESOLVED that the record documents and other materials supporting this Resolution shall be maintained and made available for public review at the headquarters of the Bay Area Air Quality Management District at 375 Beale Street, Suite 600, San Francisco, CA 94105, and that the custodian for these documents and other materials shall be Marcy Hiratzka, Clerk of the Boards.

The foregoing Resolution was duly and regularly introduced, passed and adopted at a regular meeting of the Board of Directors of the Bay Area Air Quality Management District on the Motion of Director _____, seconded by Director _____, on the ____ day of _____, 2023, by the following vote of the Board:

DRAFT



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ATTACHMENT A

Proposed Amendments to Rule 9-4

DRAFT

This page has been intentionally left blank.

DRAFT

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 4
NITROGEN OXIDES FROM NATURAL GAS-FIRED ~~FAN-TYPE RESIDENTIAL~~
~~CENTRAL~~ FURNACES

INDEX

9-4-100 GENERAL

9-4-101 Description
[9-4-102 Applicability](#)

9-4-200 DEFINITIONS

~~9-4-201 Fan-Type Central Furnace~~
9-4-201² Annual Fuel Utilization Efficiency ([AFUE](#))
[9-4-202 BTU](#)
[9-4-203 Furnace](#)
[9-4-204 Heat Input](#)
[9-4-205 Natural Gas](#)
[9-4-206 Nitrogen Oxides \(NO_x\)](#)
~~9-4-207³ Useful Heat Delivered to the Heated Space~~

9-4-300 STANDARDS

9-4-301 ~~Residential Central~~ [Natural Gas-Fired Furnace Emission Standards](#)
9-4-302 Certified Furnaces

9-4-400 ADMINISTRATIVE REQUIREMENTS

9-4-401 Certification
9-4-402 Compliance Statement
9-4-403 Identification
9-4-404 Enforcement
[9-4-405 Interim Report](#)

9-4-500 MONITORING AND RECORDS (NOT INCLUDED)

9-4-600 MANUAL OF PROCEDURES (NOT INCLUDED)

[9-4-601 Determination of Emissions](#)

REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 4
NITROGEN OXIDES FROM NATURAL GAS-FIRED ~~FAN-TYPE RESIDENTIAL~~
~~CENTRAL~~ FURNACES

9-4-100 GENERAL

9-4-101 Description: This Rule limits emissions of nitrogen oxides from natural gas-fired ~~fan type-residential-central~~ furnaces.

(Amended December 7, 1983)

9-4-102 Applicability: This Rule applies to any person who sells, installs, or offers for sale a natural gas-fired furnace for use within the District (Section 9-4-300s Standards) and any manufacturer who intends to sell or distribute for sale or installation a natural gas-fired furnace for use within the District (Section 9-4-400s Administrative Requirements and Section 9-4-600s Manual of Procedures).

9-4-200 DEFINITIONS

~~9-4-201 Fan Type Central Furnace:~~ ~~A self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 25 cm (10 in) in length with an input rate of less than 175,000 BTU/hr, excluding heating/cooling units utilizing three phase electric current.~~

~~*(Amended December 7, 1983)*~~

9-4-201² Annual Fuel Utilization Efficiency (AFUE): The efficiency as defined by Section 4.2.35 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.
(Amended December 7, 1983)

9-4-202 BTU: British thermal unit or units.

9-4-203 Furnace: A product with a heat input rate less than 175,000 BTU/hr which is designed to be a source of interior space heating.

203.1 Natural Gas-Fired Furnace: A furnace that utilizes single-phase, three-phase or direct current in conjunction with natural gas.

203.2 Natural Gas-Fired Fan Type Central Furnace: A self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 25 cm (10 in) in length with a heat input rate of less than 175,000 BTU/hr. This includes combination heating/cooling units with natural gas heating and also an electric cooling rate less than 65,000 BTU/hr.

9-4-204 Heat Input: The heat of combustion based on the gross (higher) heating value of the fuel, excluding the enthalpy of incoming combustion air.

9-4-205 Natural Gas: A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined by ASTM Standard D1945, 2003.

9-4-206 Nitrogen Oxides (NO_x): The sum of nitrogen oxide (NO) and nitrogen dioxide (NO₂), collectively expressed as nitrogen dioxide.

9-4-207³ Useful Heat Delivered to the Heated Space: The Annual Fuel utilization efficiency (expressed as a fraction) multiplied by the heat input.

(Amended December 7, 1983)

9-4-300 STANDARDS

9-4-301 **Residential Central Natural Gas-Fired Furnace Emission Standards:**—~~A person shall not sell, install or offer for sale within the District any stationary residential natural gas-fired fan type central furnace manufactured after January 1, 1984 that emits more than 40 nanograms of oxides of nitrogen expressed as NO₂ per joule of useful heat delivered to the heated space.~~ A person shall not sell, install or offer for sale within the District:

301.1 Any stationary residential natural gas-fired fan type central furnace manufactured after January 1, 1984, that emits more than 40 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space.

301.2 Any natural gas-fired fan type central furnace manufactured after January 1, 2024, that emits more than 14 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space.

301.3 Any natural gas-fired furnace manufactured after January 1, 2029, that emits more than 0.0 nanograms of nitrogen oxides expressed as NO₂ per joule of useful heat delivered to the heated space. This includes non-central installations such as wall furnaces as well as units installed in non-residential applications.

This section does not apply to furnaces used for mobile homes.

(Amended December 7, 1983)

9-4-302 **Certified Furnaces:** A person shall not sell, install or offer for sale within the District furnaces subject to the requirements of Section 9-4-301 unless such furnaces are certified in accordance with Sections 9-4-401, 402, 403, and 404.

(Amended and Renumbered December 7, 1983)

9-4-400 ADMINISTRATIVE REQUIREMENTS

9-4-401 **Certification:** The manufacturer shall have each appliance model tested in accordance with the following:

401.1 Nitrogen oxides, carbon dioxide and oxygen measurements, test equipment, and other required test procedures shall be in accordance with ~~Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with methods and standards or equivalent procedures approved by the APCO.~~ Section 9-4-601.

401.2 Operation of the furnace shall be in accordance with the procedures specified in Section 3.1 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

401.3 ~~The following calculation~~ One of the two formulas shown below shall be used to determine the ~~nanograms emissions~~ of NO_x in units of nanograms per joule of useful heat delivered to heated space:

$$N = \frac{3.655 \times 10^{10} \times P}{(20.9 - Y) \times Z \times E}$$

or

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

- N = ~~Nanograms~~ Calculated mass emissions of NO_x per unit of useful heat (~~nanograms emitted~~ per joule of useful heat delivered to the heated space).
- P = Measured concentration of NO_x in flue gas (~~P~~parts per million ~~of NO_x~~ by volume).
- Y = Measured concentration Percentage of O₂ in flue gas (percentage by volume).
- Z = Gross Heating value of gas in (joules per cubic (meter)³ at 0.0 degrees Celcius, 1 atm).
- E = AFUE (percentage), as defined in Section 9-4-201.
- U = ~~Volume-percent~~ Concentration of CO₂ in water-free flue gas for stoichiometric combustion (percentage by volume).
- H = Gross heating value of the fuel, (BTU/cu. ft. per cubic foot, (60°F, 30-in Hg.).
- C = Measured ~~volume-percent~~ concentration of CO₂ in ~~water-free~~ flue gas; (percentage by volume) ~~assuming complete combustion and no CO present~~.

(Amended December 7, 1983)

9-4-402 Compliance Statement: The manufacturer shall submit to the APCO a either of the following:

402.1 A statement that each affected furnace the model-meets the standards set forth in Section 301 of this Rule. The statement shall be signed and dated, and shall attest to the accuracy of all information. The statement shall include the brand name and model number as it appears on the furnace rating plate, and be on forms provided by the APCO. or

402.2 A valid South Coast Air Quality Management District (SCAQMD) certification for SCAQMD Rule 1111 for furnaces demonstrating compliance with Section 9-4-301.2.

(Amended December 7, 1983)

9-4-403 Identification: The manufacturer shall display the model number of the furnace complying with this rule on the shipping carton and rating plate.

9-4-404 Enforcement: The APCO may require the emission test results to be provided when deemed necessary to verify compliance and may periodically conduct such tests as are deemed necessary to iensure compliance.

9-4-405 Interim Report: At least two years prior to the compliance date listed in Section 9-4-301.3, the APCO shall present to the Air District Board of Directors for consideration at a public meeting a report that includes the technology options currently (and projected to be) available to be sold, installed or offered for sale that do not conflict with the standard in Section 9-4-301.3; the projected costs of purchase and installation of such technology, including any ancillary costs, as applicable; any incentive programs available to reduce these costs; and infrastructure readiness associated with rule compliance.

9-4-600 MANUAL OF PROCEDURES

9-4-601 Determination of Emissions: Furnaces subject to Sections 9-4-301 and 302 shall be tested in accordance with the following provisions:

601.1 Each furnace model shall receive certification based on emission tests of a randomly selected unit of that furnace model.

601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance US EPA Reference Method RM-7 (40 CFR Part 60, Appendix A, Test Method 7E.

- 601.3 The measurement of carbon dioxide shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST-5 or US EPA Method 3A.
- 601.4 The measurement of oxygen shall be conducted in accordance with the Manual of Procedures, Volume IV, Method ST-14 or US EPA Method 3A.

DRAFT



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ATTACHMENT B

Proposed Amendments to Rule 9-6

This page has been intentionally left blank.

DRAFT

**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM
NATURAL GAS-FIRED BOILERS AND WATER HEATERS
INDEX**

9-6-100 GENERAL

- 9-6-101 Description
- [9-4-102 Applicability](#)
- 9-6-110 Exemptions

9-6-200 DEFINITIONS

- 9-6-201 Boilers and Water Heaters
- 9-6-202 BTU
- 9-6-203 Direct-Vent Water Heater
- 9-6-204 Heat Input
- 9-6-205 Heat Output
- 9-6-206 Instantaneous Water Heater
- 9-6-207 Mobile Home Water Heater
- 9-6-208 Natural Gas
- 9-6-209 NO_x Emissions
- 9-6-210 Pool/Spa Heater
- 9-6-211 Power Direct-Vent Water Heater
- 9-6-212 Power-Vent Water Heater
- 9-6-213 Rated Heat Input Capacity
- 9-6-214 Storage Tank Water Heater

9-6-300 STANDARDS

- 9-6-301 Natural Gas-Fired Storage Tank Water Heaters with a Rated Heat Input Capacity of 75,000 BTU/Hour or Less
- 9-6-302 Certification of Boilers and Water Heaters
- 9-6-303 Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of 75,001 to 2,000,000 BTU/Hour
- 9-6-304 Natural Gas-Fired Mobile Home Water Heaters
- 9-6-305 Natural Gas-Fired Pool/Spa Heaters

9-6-400 ADMINISTRATIVE REQUIREMENTS

- 9-6-401 Compliance with Emission Standards
- 9-6-402 [Compliance Statement](#) ~~Application for Certification~~
- 9-6-403 Identification
- [9-6-404 Interim Report](#)

9-6-500 MONITORING AND RECORDS (Not Included)

9-6-600 MANUAL OF PROCEDURES

- 9-6-601 Determination of Emissions

**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 6
NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED WATER
HEATERS**

(Adopted April 1, 1992)

9-6-100 GENERAL

9-6-101 Description: This rule limits the emissions of nitrogen oxides from natural gas-fired water heaters and boilers.

(Amended November 7, 2007)

9-6-102 Applicability: This Rule applies to any person who sells, installs, or offers for sale a natural gas-fired water heater for use within the District (Section 9-6-300s Standards) and any manufacturer who intends to sell or distribute for sale or installation a natural gas-fired water heater for use within the District (Section 9-6-400s Administrative Requirements and Section 9-6-600s Manual of Procedures).

9-6-110 Exemptions: The requirements of Section 9-6-301 shall not apply to the following:

110.1 Natural gas-fired boilers and water heaters with a rated heat input capacity of greater than 2,000,000 BTU/Hour.

110.2 Natural gas-fired water heaters used in recreational vehicles.

110.3 Water heaters using a fuel other than natural gas.

110.4 Natural gas-fired pool/spa heaters with less than 400,000 Btu/Hour rated heat input capacity used exclusively to heat swimming pools, hot tubs or spas.

(Amended November 7, 2007)

9-6-200 DEFINITIONS

9-6-201 Boilers and Water Heaters: Any combustion equipment used to heat water or produce steam and that is not exclusively used to produce electricity for sale. For the purposes of this Rule, a boiler does not include any waste heat recovery boiler that is used to recover sensible heat from the exhaust of a combustion turbine or any unfired waste heat recovery boiler that is used to recover sensible from the exhaust of any combustion equipment.

(Adopted November 7, 2007)

9-6-202 BTU: British thermal unit or units.

(Adopted November 7, 2007)

9-6-203 Direct-Vent Water Heater: A storage tank water heater with air intake and exhaust ducts that use a gravity system to collect air from outside a building for combustion and exhaust combustion byproducts to the outside of a building.

(Adopted November 7, 2007)

9-6-204 Heat Input: The heat of combustion released by fuels burned in a unit based on the higher heating value of fuel. This does not include the enthalpy of incoming combustion air.

(Adopted November 7, 2007)

9-6-205 Heat Output: The product obtained by multiplying the recovery efficiency, as defined by Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E, by the input rating of the water heater.

(Renumbered November 7, 2007)

9-6-206 Instantaneous Water Heater: A device in which water is heated only when the water flows through a heat exchanger.

(Adopted November 7, 2007)

9-6-207 Mobile Home Water Heater: A closed vessel manufactured exclusively for mobile home use in which water is heated and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F (99°C).

(Adopted November 7, 2007)

9-6-208 Natural Gas: A mixture of gaseous hydrocarbons containing at least 80 percent methane by volume as determined according to Standard Method ASTM D1945-64.

(Renumbered November 7, 2007)

9-6-209 NO_x Emissions: The sum of nitric oxide and nitrogen dioxide in the flue gas, collectively expressed as nitrogen dioxide.

(Adopted November 7, 2007)

9-6-210 Pool/Spa Heater: A device in which water is heated when pool or spa water circulates through a heat exchanger.

(Adopted November 7, 2007)

9-6-211 Power Direct-Vent Water Heater: A storage tank water heater with an air intake duct outside of a building with a blower installed to assist in the expulsion of exhaust gases.

(Adopted November 7, 2007)

9-6-212 Power-Vent Water Heater: A storage tank water heater with an air intake duct outside of a building with a blower installed to assist in the expulsion of exhaust gases.

(Adopted November 7, 2007)

9-6-213 Rated Heat Input Capacity: The heat input capacity specified on the nameplate of the combustion unit.

(Renumbered November 7, 2007)

9-6-214 Storage Tank Water Heater: A closed vessel, in which water is heated and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F.

(Renumbered November 7, 2007)

9-6-300 STANDARDS

9-6-301 Natural Gas-Fired Storage Tank Water Heaters with a Rated Heat Input Capacity of 75,000 BTU/Hour or Less:

- 301.1 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater, manufactured after July 1, 1992, with a rated heat input capacity of 75,000 BTU/Hour or less, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 301.2 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater less than or equal to 50 gallons capacity that is manufactured after January 1, 2009, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

This subsection shall not apply to direct-vent, power-vent, power direct-vent water storage tank heaters and water heaters used for mobile homes.

- 301.3 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater greater than 50 gallons capacity that is manufactured after January 1, 2010, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to direct-vent, power-vent, power direct-vent storage tank water heaters and water heaters used for mobile homes.
- 301.4 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater that is manufactured after January 1, 2011, and that emits more than 10 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to water heaters used for mobile homes.
- 301.5 No person shall sell, install, or offer for sale within the District any natural gas-fired storage tank water heater that is manufactured after January 1, 2027, with a rated heat input rating of 75,000 BTU/hour or less, that emits more than 0 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output. This subsection shall not apply to mobile home water heaters.

(Amended November 7, 2007)

9-6-302 Certification of Boilers and Water Heaters: No person shall sell, install, or offer for sale within the District any water heaters subject to Section 9-6-301, 303, 304, or 305 unless the water heater manufacturer brand name and model is certified in accordance with Sections 9-6-401 and 402.

(Amended November 7, 2007)

9-6-303 Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of 75,001 to 2,000,000 BTU/Hour:

- 303.1 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 303.2 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 400,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.
- 303.3 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 20 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 30 ppm NO_x at 3% O₂, dry.
- 303.4 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.
- 303.5 No person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater with a rated heat input capacity from 75,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2031, that emits more than 0.0 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

(Adopted November 7, 2007)

- 9-6-304 Natural Gas-Fired Mobile Home Water Heaters:** No person shall sell, install, or offer for sale within the District any natural gas-fired mobile home water heater manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output.

(Adopted November 7, 2007)

9-6-305 Natural Gas-Fired Pool/Spa Heaters:

- 305.1 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2008, that emits more than 40 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 55 ppm NO_x at 3% O₂, dry.
- 305.2 No person shall sell, install, or offer for sale within the District any natural gas-fired pool/spa heater with an input rating from 400,001 to 2,000,000 BTU/Hour, inclusive, manufactured after January 1, 2013, that emits more than 14 nanograms of nitrogen oxides (calculated as NO₂) per joule of heat output, or more than 20 ppm NO_x at 3% O₂, dry.

(Adopted November 7, 2007)

9-6-400 ADMINISTRATIVE REQUIREMENTS

- 9-6-401 Compliance with Emissions Standards:** The manufacturer shall obtain confirmation from an independent testing laboratory that each boiler or water heater model it intends to sell or distribute for sale into the District that is subject to the requirements of Sections 9-6-301, 303, 304, or 305 has been tested in accordance with the procedures in [Section 9-6-601](#).

(Amended November 7, 2007)

- 9-6-402 Compliance Statement: ~~Application for Certification:~~ The manufacturer shall submit to the APCO either of the following:**

- 402.1 ~~The Each~~ manufacturer shall submit ~~an application a statement~~ to the APCO ~~that each boiler or water heater model meets the emission standard set forth in Section 9-6-301 or 9-6-303, for certification of their compliant boiler or water heater model.~~ The compliance statement application must:
- 402.1.1 Provide the following general information: name and address of manufacturer, brand name, trade name, model number and heat input rating as it appears on the water heater rating plate.
- 402.1.2 Provide a description of the model being certified
- 402.1.3 Include a complete certification source test report demonstrating that the boiler or water heater model was tested in accordance with procedures in Section 9-6-601 and a written statement that the model complies with Section 9-6-301, 303, 304, or 305 ~~and is tested in accordance with procedures in Section 9-6-601.~~
- 402.1.4 Be submitted to the ~~District~~ APCO no more than 90 days after the date of the emissions compliance test conducted in accordance with Section 9-6-401.
- 402.1.5 Be submitted to the ~~District~~ APCO no less than 90 days before the intention to sell or distribute a new water heater model within the District, or no less than 90 days before the effective dates in Section 9-6-301, 303, 304, 305.
- ~~402.2 After completing review of the application for certification and source test report, the APCO will approve, or will deny approval of, the device.~~
- ~~402.3 Certification status shall be valid for three years from the date of approval by the APCO. After the third year, recertification shall be required according to the requirements in 9-6-402.~~

402.24 ~~In lieu of submitting an application as provided in Section 9-6-402.1, t~~The manufacturer ~~may shall~~ submit to the ~~District~~ APCO an approved ~~South Coast Air Quality Management District (SCAQMD)~~ certification ~~issued pursuant to SCAQMD Rules 1121 and 1146.2 to demonstrate compliance that complies~~ with Section 9-6-301.1 through 301.4, 303.1 through 303.4, 304, or 305. ~~This option does not apply to units demonstrating compliance with Sections 9-6-301.5 and 303.5.~~

(Amended November 7, 2007)

9-6-403 Identification: The water heater manufacturer shall display the model number and the certification status of a water heater complying with this rule on the shipping carton and on the rating plate of each unit.

(Amended November 7, 2007)

9-6-404 Interim Report: At least two years prior to the compliance date listed in Sections 9-6-301.5 and 303.5, the APCO shall present to the Air District Board of Directors for consideration at a public meeting a report that includes the technology options currently (and projected to be) available to be sold, installed or offered for sale that do not conflict with the standard in Section 301.3; the projected costs of purchase and installation of such technology, including any ancillary costs, as applicable; any incentive programs available to reduce these costs; and infrastructure readiness associated with rule compliance.

9-6-600 MANUAL OF PROCEDURES

9-6-601 Determination of Emissions: Emissions of oxides of nitrogen from water heaters subject to Section 9-6-301, 303, 304, or 305 shall be tested in ~~accordance with the South Coast Air Quality Management District Protocol: "Nitrogen Oxides Emission Compliance Testing for Natural Gas-Fired Water Heaters and Small Boilers, January 1995", or in~~ accordance with the following provisions:

- 601.1 Each water heater model shall receive certification ~~Confirmation shall be~~ based on emission tests of a randomly selected unit of ~~that each~~ water heater model.
- 601.2 The measurement of nitrogen oxides emissions shall be conducted in accordance with ~~the Manual of Procedures, Volume IV, Method ST-13B or~~ EPA Reference Method 7, including 7A-7E.
- 601.3 Each tested water heater shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1990 at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emissions tests.
- 601.4 The following procedure shall be used to calculate the NO_x emission rate in nanograms of NO_x per joule of heat output:

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E}$$

Where:

N = NO_x Emission Rate in nanograms of NO_x emitted per joule of heat output

P = Concentration of NO_x in the flue gas in parts per million (volume)

U = Dry volume percent of CO₂ in flue gas necessary for stoichiometric combustion

H = Gross heating value of the gas, BTU/ft³ (at 60°F and 30"Hg)

C = Dry volume percent of CO₂ in flue gas

E = Recovery efficiency, percentage, as defined in Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E.

(Amended November 7, 2007)

DRAFT



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ATTACHMENT C

CEQA Findings of Fact and Statement of Overriding Considerations

DRAFT

This page has been intentionally left blank.

DRAFT

ATTACHMENT C

CEQA FINDINGS OF FACT AND STATEMENT OF OVERRIDING CONSIDERATIONS OF THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT FOR PROPOSED AMENDMENTS TO BUILDING APPLIANCE RULES – REGULATION 9: INORGANIC GASEOUS POLLUTANTS, RULE 4: NITROGEN OXIDES FROM FAN TYPE RESIDENTIAL CENTRAL FURNACES AND REGULATION 9: INORGANIC GASEOUS POLLUTANTS, RULE 6: NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED BOILERS AND WATER HEATERS

The Bay Area Air Quality Management District (BAAQMD), as lead agency, prepared an environmental impact report (EIR) for the proposed amendments to Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces (Rule 9-4) and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters (Rule 9-6) (proposed rule amendments or Project). The document consists of the December 2022 Draft EIR and the March 2023 Final EIR (State Clearinghouse No. 2022050430) (collectively referred to as the EIR). The EIR for the Project presents an assessment of the reasonably foreseeable and potentially significant adverse environmental effects that may occur from implementing the Project. These findings have been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and its implementing guidelines (CEQA Guidelines) (California Code of Regulations [CCR] Title 14, Section 15000 et seq.). The BAAQMD Board of Directors (Board) is the lead agency under CEQA and is the decision-making authority for the Project. The Board adopts these findings in that capacity.

SECTION 1 – PROJECT DESCRIPTION

The BAAQMD is proposing amendments to Rules 9-4 and 9-6. Rule 9-4 applies to the natural gas-fired space-heating furnaces commonly found in single-family homes, and Rule 9-6 applies to natural gas-fired water heaters commonly found in residential and commercial applications. Space- and water-heating appliances generate a large portion of nitrogen oxide (NO_x) emissions from sources in the Bay Area. NO_x is formed during natural gas combustion when ambient nitrogen and oxygen combine at high temperatures. If adopted, the proposed rule amendments would substantially reduce NO_x emissions from these appliances.

A. PROJECT LOCATION

The proposed amendments to Rules 9-4 and 9-6 would apply to building appliances within the BAAQMD's jurisdiction, which encompasses 5,600 square miles. The area of BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast.

B. BACKGROUND AND NEED FOR THE PROJECT

The BAAQMD has regulated NO_x emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was first adopted in 1992 and was most recently updated with more stringent NO_x emissions standards for certain equipment in 2007. All versions of these rules have included a NO_x emissions standard expressed as nanograms of NO_x per joule of useful heat (ng/joule) delivered by the appliance.

In addition, the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) have adopted regulations that are similar in structure and standards to Rules 9-4 and 9-6. SCAQMD Rule 1111 and SJVAPCD Rule 4905, which are similar to Rule 9-4 in applicability to furnaces, have been updated within the last ten years and require a NO_x emissions standard of 14 ng/joule, the same initial standard identified in the proposed amendments. Rule 9-6 for water heaters and small boilers currently contains NO_x emission standards equivalent to those in SCAQMD Rules 1146.2 and 1121 and SJVAPCD Rules 4308 and 4902 for similar equipment.

The proposed rule amendments to the two rules focus on NO_x emissions from natural gas-fired space- and water-heating appliances in buildings. Space and water heaters are the greatest source of NO_x emissions in the building sector.

Nitrogen oxides are a key criteria pollutant as a precursor to ozone and secondary particulate matter (PM) formation. Secondary PM is formed from the conversion of NO_x to ammonium nitrate through atmospheric chemical reactions with ammonia. Particulate matter, a diverse mixture of suspended particles and liquid droplets, is the air pollutant most harmful to the health of Bay Area residents. The Bay Area is currently classified as non-attainment for particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less (PM_{2.5}) under the annual and 24-hour California Ambient Air Quality Standards (CAAQS) and non-attainment (24-hour standard) and unclassifiable (annual standard) under National Ambient Air Quality Standards (NAAQS). Exposure to PM_{2.5}, on either a short-term or long-term basis, can cause a wide range of respiratory and cardiovascular health effects, including strokes, heart attacks, and premature deaths. Because NO_x compounds in the atmosphere contribute to the formation of secondary PM, any NO_x emission reduction would also result in PM_{2.5} reductions.

In addition, the Bay Area is currently designated as a non-attainment area for ozone, a regional pollutant, under all CAAQS and NAAQS. Emissions of reactive organic gases (ROG) and NO_x throughout the Bay Area contribute to ozone formation in downwind areas. ROG and NO_x react through atmospheric chemical reactions to form ozone. Therefore, reductions in emissions of ROG and NO_x are needed throughout the region to decrease ozone levels. As the ambient temperature rises, ground-level ozone forms at an accelerated rate. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Exceedances of State or national ozone standards in the Bay Area occur only on hot, relatively stagnant days. Because weather conditions have a strong impact on ozone formation, ozone levels can vary significantly from day to day or from one summer to the next. Longer and more severe heat waves expected as a result of climate change may cause more ozone formation, resulting in more frequent exceedances of ozone standards.

C. PROJECT OBJECTIVES

The overall purpose of the proposed amendments is to reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area. Specifically, the objectives of the proposed amendments to Rules 9-4 and 9-6 are to:

- ▶ for Rule 9-4, introduce an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024;
- ▶ for Rule 9-4, establish a zero-NO_x standard in 2029;
- ▶ for Rule 9-6, establish a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size;
- ▶ expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances;
- ▶ update and clarify the certification and calculation methods contained in the rules;
- ▶ ensure equitable implementation of the rules; and
- ▶ improve the clarity and enforceability of the rules.

(Draft EIR, p. 2-1.)

D. CHARACTERISTICS OF THE PROJECT

The proposed amendments for Rule 9-4 include introducing an “ultra-low” NO_x standard for space-heating appliances with a compliance date in 2024 and setting a zero-NO_x standard in 2029. Like the current rule, amended Rule 9-4 would apply only to new devices and only to natural gas-fired devices. The proposed new lower and zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces.

The proposed amendments for Rule 9-6 include setting a zero-NO_x standard for water heaters with compliance dates ranging from 2027 to 2031 based on equipment type, use, and size. Like the current rule, amended Rule 9-6 would apply only to new devices and only to natural gas-fired devices. The proposed new zero-NO_x standards would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing water heaters.

The proposed rule amendments would be in effect beginning in 2024. They would apply to appliance retailers/wholesalers, and installers and would affect Bay Area consumers when they replace their existing furnaces and water heaters. The equipment changeout is projected to be completed in 2046.

E. DISCRETIONARY APPROVALS

The following actions from the Board are necessary to implement the Project:

- certification of the Final EIR for the Project, and
- approval of the Project.

SECTION 2 – ENVIRONMENTAL REVIEW PROCESS

The BAAQMD issued a notice of preparation (NOP) and Initial Study on May 19, 2022, to inform agencies and the general public that an EIR was being prepared and to invite comments on the scope and content of the document. The NOP and Initial Study were submitted to the State Clearinghouse, which then distributed the NOP to potential responsible and trustee agencies; posted on the BAAQMD's website (<https://www.baaqmd.gov/>); posted with the applicable County Clerks; and made available at the BAAQMD's office. In addition, the NOP was distributed directly to public agencies. The NOP was circulated for a 34-day review period, with comments accepted through June 21, 2022. In accordance with CCR Section 15082(c), a noticed scoping meeting for the EIR was held virtually on June 9, 2022, from 6:00 p.m. to 8:00 p.m. The NOP, Initial Study, and all comments received on the NOP are presented in Appendix A of the Draft EIR.

The BAAQMD published the Draft EIR for public and agency review on December 20, 2022. A 48-day public review period was provided, ending on February 6, 2023. The Draft EIR was submitted to the State Clearinghouse for distribution to reviewing agencies (State Clearinghouse No. 2022050430); posted on the BAAQMD's website (<https://www.baaqmd.gov/>); and was made available at the BAAQMD's office during normal business hours. A notice of availability (NOA) of the Draft EIR was published in the San Francisco Chronicle, East Bay Times and the Mercury News on December 20, 2022 and distributed to a project-specific mailing list. A public meeting for the Draft EIR was not conducted.

As a result of these notification efforts, written and verbal comments were received from 3 comment letters from state and local agencies, 22 letters from organizations, and more than 500 letters from individuals. Those comments relevant to CEQA were addressed in compliance with the State CEQA Guidelines (Sections 15088, 15132). While 3 comment letters were received from public agencies, none of these comments presented issues related to the Draft EIR or CEQA compliance; rather, these comments were related to policy considerations regarding the proposed amendments. A public hearing was conducted on March 15, 2023, and the Final EIR was released in advance of the hearing.

The Final EIR includes comments received on the Draft EIR and responses to these comments. The Draft and Final EIR were made available for public review on the BAAQMD's website (<https://www.baaqmd.gov/>).

SECTION 3 – RECORD OF PROCEEDINGS

In accordance with PRC Section 21167.6(e), the record of proceedings for the BAAQMD's decision on the Project includes the following documents:

- The NOP, comments received on the NOP, and all other public notices issued by the BAAQMD regarding the Project (e.g., NOA);

- ▶ The Draft EIR and Final EIR, including comment letters and responses, and technical materials cited in the documents;
- ▶ All official reports and memoranda prepared by the BAAQMD and consultants in relation to the EIR;
- ▶ Minutes and transcripts of the discussions regarding the Project and/or Project components at public meetings held by the BAAQMD;
- ▶ Staff reports associated with Board meetings on the Project;
- ▶ Those categories of documents, materials, and testimony included in the record or proceedings identified in PRC Section 21167.6.

The documents and materials that constitute the record of proceedings are available for review during normal business hours at the BAAQMD office (375 Beale Street, Suite 600, San Francisco).

SECTION 4 – CONSISTENCY WITH APPLICABLE PLANS

The Project is in alignment and consistent with BAAQMD's most recent air quality plan, the 2017 Clean Air Plan: Spare the Air – Cool the Climate.

SECTION 5 – FINDINGS REQUIRED UNDER CEQA

PRC Section 21002 provides that “public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects[.]” The same statute provides that the procedures required by CEQA “are intended to assist public agencies in systematically identifying both the significant effects of projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.” Section 21002 goes on to provide that “in the event [that] specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof.”

The mandate and principles presented in PRC Section 21002 are implemented, in part, through the requirement that agencies must adopt findings before approving projects for which EIRs are required. For each significant environmental effect identified in an EIR for a project, the approving agency must issue a written finding reaching one or more of three permissible conclusions. The first such finding is that “changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR.” The second permissible finding is that “such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding, and such changes have been adopted by such other agency or can and should be adopted by such other agency.” The third potential conclusion is that “specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.” (State CEQA Guidelines Section 15091.) PRC

Section 21061.1 defines “feasible” to mean “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, legal, and technological factors.” The State CEQA Guidelines Section 15364 adds another factor: “legal” considerations. (See *Citizens of Goleta Valley v. Bd. of Supervisors* (“*Goleta II*”) (1990) 52 Cal.3d 553, 565.)

The concept of “feasibility” also encompasses the question of whether a particular alternative or mitigation measure promotes the underlying goals and objectives of a project. (*City of Del Mar v. City of San Diego* (1982) 133 Cal.App.3d 410, 417.) Moreover, “feasibility” under CEQA encompasses ‘desirability’ to the extent that desirability is based on a reasonable balancing of the relevant economic, environmental, social, legal, and technological factors.” (*Ibid.*; see also *Sequoyah Hills Homeowners Assn. v. City of Oakland* (1993) 23 Cal.App.4th 704, 715; *California Native Plant Society v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 1001 (“*CNPS*”).)

For purposes of these findings, the term “avoid” refers to the effectiveness of one or more mitigation measures to reduce an otherwise significant effect to a less-than-significant level. In contrast, the term “substantially lessen” refers to the effectiveness of such measure or measures to substantially reduce the severity of a significant effect, but not to reduce that effect to a less-than-significant level. These interpretations appear to be verified by the holding in *Laurel Hills Homeowners Association v. City Council* (1978) 83 Cal.App.3d 515, 519-521 (“*Laurel Hills*”), in which the Court of Appeal held that an agency had satisfied its obligation to substantially lessen or avoid significant effects by adopting numerous mitigation measures, not all of which rendered the significant impacts in question less than significant.

Although the State CEQA Guidelines Section 15091 requires only that approving agencies specify that a particular significant effect is “avoid[ed] or substantially lessen[ed],” these findings, for purposes of clarity, in each case will specify whether the effect in question has been reduced to a less-than-significant level, or has simply been substantially lessened but remains significant. Moreover, although Section 15091, read literally, does not require findings to address environmental effects that an EIR identifies as merely “potentially significant,” these findings will nevertheless fully account for all such effects identified in the Final EIR.

CEQA requires that the lead agency adopt mitigation measures or alternatives, where feasible, to substantially lessen or avoid significant environmental impacts that would otherwise occur. Project modification or alternatives are not required, however, where such changes are infeasible or where the responsibility for modifying the project lies with some other agency. (State CEQA Guidelines Section 15091[a], [b].)

With respect to a project for which significant impacts are not avoided or substantially lessened, a public agency, after adopting proper findings, may nevertheless approve the project if the agency first adopts a statement of overriding considerations setting forth the specific reasons why the agency found that the project’s “benefits” rendered “acceptable” its “unavoidable adverse environmental effects.” (State CEQA Guidelines Sections 15093, 15043[b]; see also PRC Section 21081[b].) The California Supreme Court has stated, “[t]he wisdom of approving . . . any development project, a delicate task which requires a balancing of interests, is necessarily left to the sound discretion of the local officials and their constituents who are responsible for such decisions. The law as we interpret and apply it simply requires that those decisions be informed, and therefore balanced.” (*Goleta II, supra*, 52 Cal.3d at p. 576.)

The Board has adopted the third permissible finding with respect to all significant and unavoidable effects identified in the EIR, concluding that not all effects can be mitigated to less-than-significant levels. The Board therefore must consider the feasibility of project alternatives. (PRC Section 21002; *Laurel Hills, supra*, 83 Cal.App.3d at p. 521; see also *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 730-731; and *Laurel Heights Improvement Assn. v. Regents of the Univ. of Cal.* (1988) 47 Cal.3d 376, 400-403.)

As noted above, certain significant environmental impacts of the Project will not be mitigated to less-than-significant levels. Thus, the BAAQMD is required to adopt a Statement of Overriding Considerations for the Project.

SECTION 6 - LEGAL EFFECT OF FINDINGS

These findings constitute the BAAQMD's best efforts to set forth the evidentiary and policy bases for its decision to approve the Project in a manner consistent with the requirements of CEQA. These findings, in other words, are not merely informational, but rather constitute a binding set of obligations that will come into effect when the Board adopts a resolution approving the Project.

SECTION 7 - MITIGATION MONITORING AND REPORTING PROGRAM

PRC Section 21081.6(a)(1) requires lead agencies to "adopt a reporting and mitigation monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." An MMRP has not been prepared for the Project because no mitigation measures are available for adoption by the BAAQMD to reduce the Project's significant and unavoidable impacts.

SECTION 8 - SIGNIFICANT EFFECTS AND MITIGATION MEASURES

The potential environmental impacts that would result from implementation of the Project are listed in Table ES-1 in the Executive Summary of the Draft EIR. In some cases, there would be no impact or impacts would be less than significant. In other instances, there are no feasible mitigation measures, or alternatives, that would avoid or reduce the impact to a less-than-significant level. Those impacts would remain as significant unavoidable adverse impacts. (See Section 5.2, "Significant and Unavoidable Adverse Impacts," in the Draft EIR.) For these impacts, the BAAQMD has adopted a Statement of Overriding Considerations.

The BAAQMD's findings with respect to the Project's significant and potentially significant effects and mitigation measures are set forth in **Section 10**, below. This section does not attempt to describe the full analysis of each environmental impact contained in the EIR. Instead, the section provides a summary description of each impact, describes applicable mitigation measures identified in the EIR, and states the Board's findings on the residual significance of each impact. A full explanation of these environmental findings and conclusions can be found in the EIR, and these findings hereby incorporate by reference the discussion and analysis in those documents supporting the EIR's determinations regarding mitigation measures and the Project's mitigation measures designed to address those impacts. In making

these findings, the Board ratifies, adopts, and incorporates into these findings the analysis and explanation in the EIR, and ratifies, adopts, and incorporates in these findings the determinations and conclusions of the EIR relating to environmental impacts and mitigation measures, except to the extent any such determinations and conclusions are specifically and expressly modified by these findings.

SECTION 9 - FINDINGS REGARDING RECIRCULATION OF THE DRAFT EIR

The Board adopts the following findings with respect to whether to recirculate the Draft EIR. Under Section 15088.5 of the State CEQA Guidelines, recirculation of an EIR is required when “significant new information” is added to the EIR after public notice is given of the availability of the Draft EIR for public review but prior to certification of the Final EIR. The term “information” can include changes in the project or environmental setting, as well as additional data or other information. New information added to an EIR is not “significant” unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project’s proponents have declined to implement. “Significant new information” requiring recirculation includes, for example, a disclosure showing that:

- (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
- (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
- (3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project’s proponents decline to adopt it.
- (4) The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. (State CEQA Guidelines Section 15088.5.)

Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR. The above standard is “not intend[ed] to promote endless rounds of revision and recirculation of EIRs.” (*Laurel Heights Improvement Assn. v. Regents of the University of California* (1993) 6 Cal. 4th 1112, 1132.) “Recirculation was intended to be an exception, rather than the general rule.” (*Ibid.*)

The BAAQMD finds that recirculation of the Draft EIR is not required because no revisions were made to the Draft EIR.

SECTION 10 - FINDINGS REGARDING IMPACTS THAT CANNOT BE MITIGATED BELOW A LEVEL OF SIGNIFICANCE

A. SECTION 3.3: UTILITIES AND SERVICE SYSTEMS (ENERGY RESOURCES)

Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact

Assuming that heat pumps are used to replace existing natural gas-fired space and water heating appliances, the Project would, under the “worst case” Low Policy Reference Scenario evaluated by Energy + Environmental Economics (E3) (Appendix C of the Draft EIR), over the long term, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. E3 estimated that the proposed zero-NO_x standards could result in 6.2 terrawatt-hours per year of additional electric load growth by 2050, which would represent 2.2 percent of the total statewide electrical load by 2020 standards. The E3 study estimates that this level of demand could be met by the development of approximately 2,180 megawatts (MW) of incremental utility-scale solar capacity, corresponding to 19,500 acres of direct land use impacts, under the “worst case” Low Policy Reference Scenario. For context, this represents 0.6 to 1.2 percent of the State’s total projected land needed for the State to meet its stated climate goals, which is estimated to be between 1.6 and 3.1 million acres for solar and wind projects (not including off-shore wind and other energy sources). Almost all of this energy production is anticipated to occur outside of the Bay Area, and a portion of it will likely be developed outside California. The potential construction and operational impacts associated with these energy facilities could be potentially significant, and may include substantial changes to visual character; obstruction of views; increased light and glare; conversion of Farmland and other impacts to agricultural resources and operations; construction-related air pollution, greenhouse gas (GHG) emissions, and noise; archaeological resources; tribal cultural resources; adverse effects to wildlife species and habitat; adverse effects to other natural resources and waterways; impacts related to geology and paleontological resources; operational noise; conflicts with air traffic; transportation and storage of hazards and hazardous materials; and wildfire and associated environmental effects. Mitigation measures are likely available to minimize these impacts to a less-than-significant level for many of the environmental issue areas; however, it is likely that some would remain significant and unavoidable. Therefore, under the Low Policy Reference Scenario, the Project would result in a substantial contribution to a significant cumulative impact, and this impact would be potentially significant.

Mitigation Measures

As described under Impact 3.3-1 in the Draft EIR, the location and type of these energy projects are currently speculative but based on current projections as presented in the E3 study, their associated environmental impacts would generally be located outside the Bay Area, and potentially outside California. The energy projects located in California would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these

other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the BAAQMD cannot identify feasible mitigation to reduce the Project's contribution to these impacts and the impact remains potentially significant and unavoidable under the Low Policy Reference Scenario.

FINDING

Specific economic, legal, social, and technological, or other considerations make infeasible any further mitigation, and the effects therefore remain significant and unavoidable. (PRC Section 21081[a][3]; State CEQA Guidelines Section 15091[a][3].) The BAAQMD concludes, however, that the Project's benefits outweigh the potentially significant and unavoidable effects of the Project, as set forth in the Statement of Overriding Considerations below. (PRC Section 21081[b].)

This potentially significant impact would result from the Project's long-term increase in electricity demand as more electric appliances are installed. To serve new energy loads in California (including the Project), utility-scale solar resources will be developed as well as land-based-wind, offshore wind, geothermal, biomass, and/or other energy resources. These energy projects would be evaluated in separate, future EIRs by various lead agencies and would ultimately be implemented by these other agencies. For these reasons, the BAAQMD has no jurisdiction over the approval of these projects and cannot identify, monitor, or enforce mitigation. Therefore, the BAAQMD cannot identify feasible mitigation to reduce the Project's contribution to these impacts. Thus, this impact would remain potentially significant and unavoidable.

B. SECTION 3.4: NOISE

Impact 3.4-1: Potential to Generate Long-Term Operational Noise

The proposed amendments would include installation of stationary sources such as heat pump units, which would be installed inside and outside of existing buildings. The potential operational noise impacts associated with this equipment could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Mitigation measures are likely available to minimize these impacts to a less-than-significant level; however, it is likely that noise from some units would remain significant and unavoidable, especially because the BAAQMD does not have jurisdiction to monitor or enforce any of these mitigation measures. Therefore, the Project would result in a substantial long-term operational noise impact, and this impact would be potentially significant.

Mitigation Measures

As described under Impact 3.4-1 in the Draft EIR, the installation of appliances that meet the proposed NO_x standards would occur throughout the nine-county Bay Area and operation of these appliances would generate noise. Mitigation measures, such as enclosures or screening, are likely available to minimize operational noise impacts to a less-than-significant level;

however, it is likely that some would remain significant and unavoidable. The BAAQMD does not have land use authority to require these mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures. Therefore, the Project's contribution to these impacts and the impact remains potentially significant and unavoidable.

FINDING

Specific economic, legal, social, and technological, or other considerations make infeasible any further mitigation, and the effects therefore remain significant and unavoidable. (PRC Section 21081[a][3]; State CEQA Guidelines Section 15091[a][3].) The BAAQMD concludes, however, that the Project's benefits outweigh the potentially significant and unavoidable effects of the Project, as set forth in the Statement of Overriding Considerations below. (PRC Section 21081[b].)

This potentially significant impact would result from the Project's long-term increase in operational noise from operation of new appliances that meet the proposed NO_x standards. Mitigation measures, such as enclosures or screening, are likely available to minimize operational noise impacts to a less-than-significant level; however, it is likely that some would remain significant and unavoidable. The BAAQMD does not have land use authority to require these mitigation measures for individual equipment installations nor jurisdiction to monitor or enforce any of these measures. Therefore, the Project's contribution to these impacts and the impact remains potentially significant and unavoidable.

SECTION 11 – FINDINGS REGARDING IMPACTS THAT ARE NOT SIGNIFICANT OR THAT CAN BE MITIGATED BELOW A LEVEL OF SIGNIFICANCE

A. SECTION 3.1: AIR QUALITY

Impact 3.1-1: Long-Term Operational-Related Emissions of ROG, NO_x, PM₁₀, and PM_{2.5}

The proposed amendments would result in a reduction in NO_x emissions generated by natural gas-fired space- and water-heating appliances. This would be achieved through the replacement of these appliances with ultra-low and zero-NO_x natural gas appliances or electric appliances. Operation of ultra-low and zero-NO_x natural gas appliances would inherently result in a reduction in NO_x emissions within the San Francisco Bay Area Air Basin (SFBAAB). Moreover, any turnover to electric appliances would eliminate emissions of all criteria air pollutants from on-site natural gas combustion and associated emissions from this activity. For these reasons, the proposed amendments would have a less-than-significant (beneficial) impact to regional air quality.

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

B. SECTION 3.2: GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Impact 3.2-1: Potential to Generate GHG Emissions

The proposed amendments would result in a decrease in GHG emissions over the next 24 years. This decrease exceeds the net zero threshold of significance and would assist the state in meeting its long-term GHG reduction goals extending to 2045. Therefore, the proposed amendments would not have a cumulatively considerable contribution to climate change. This impact would be less than significant (beneficial).

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

C. SECTION 3.5: AESTHETICS

Impact 3.5-1: Substantial Adverse Effects on a Scenic Vista

The proposed Project—specifically proposed Rule 9-4, which imposes NO_x limitations on residential and commercial central furnaces—could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Even the largest of these units would not likely be large enough to substantially adversely affect a scenic vista, especially given that the outdoor units would be mounted on or next to structures that would be much larger and more noticeable than the equipment. For these reasons, the Project would result in a less-than-significant impact related to scenic vistas.

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

Impact 3.5-2: Substantially Damage Scenic Resources, Including, but not Limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway

Proposed amendments to Rule 9-4, which impose NO_x limitations on residential and commercial central furnaces, could result in replacement of existing furnaces located entirely within a building's interior with a heat pump unit that includes exterior equipment (similar in size and appearance to an air conditioner). Implementation of this rule change would not affect trees, rock outcroppings, or other natural scenic resources. Although furnace replacement in existing historic buildings may include exterior heat pumps where no pumps currently exist, any such equipment to be placed on the exterior of historic structures is typically regulated by local municipalities. Even if such regulations did not apply, heating ventilation and air conditioning (HVAC) and air conditioning units are commonplace on historic structures, and the addition of this equipment to the exterior of a historic structure would not be considered "substantial damage" to the historic building itself or to a scenic resource as viewed from a State Scenic Highway. The Project would therefore result in a less-than-significant impact.

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

Impact 3.5-3: Substantially Degrade the Existing Visual Character or Quality of Public Views Sites in Rural Areas, or Conflict with Applicable Zoning or Other Regulations Governing Scenic Quality in Urban Areas

In rural areas, replacement of furnaces that would place exterior equipment on existing buildings where no such equipment currently exists would not substantially degrade the visual character of the site because, by definition, an existing building would already exist in these circumstances, and addition of a small piece of external equipment on an existing building would not change the visual character of the site or adversely affect public views. In urbanized areas, exterior equipment is commonplace and the addition of outdoor heat pump units as a result of the Project would not likely conflict with any existing zoning or other regulations governing scenic quality. If such regulations exist, the entity replacing the equipment would be required to comply. For these reasons, the Project would not substantially degrade the existing visual character or quality of public views of the Bay Area or conflict with applicable zoning or other regulations governing scenic quality, and this impact would be less than significant.

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

Impact 3.5-4: Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area

Outdoor heat pump units do not include bright lights and are not made of reflective materials (i.e., polished metal or mirrored glass). The proposed rule amendments would not require new lighting fixtures. Therefore, the Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. No impact would occur.

FINDING

Under CEQA, no mitigation measures are required for impacts that are less than significant. (PRC Section 21002; State CEQA Guidelines Sections 15126.4[a][3], 15091.)

SECTION 12 - FINDINGS REGARDING INFEASIBILITY OF PROJECT ALTERNATIVES

A. BASIS FOR ALTERNATIVES FEASIBILITY AND ENVIRONMENTAL IMPACT ANALYSIS

CEQA mandates that every EIR evaluate a no project alternative, plus a range of potentially feasible alternatives to the project or its location that would avoid or substantially lessen the significant impacts of the project (State CEQA Guidelines Section 15126.6[a][b]). The Board finds that the range of alternatives studied in the EIR reflects a reasonable range of alternatives.

These findings consider the feasibility of each alternative analyzed in the EIR. Under CEQA, “feasible” means “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.” (State CEQA Guidelines Section 15364.) As described above, the concept of feasibility permits agency decisionmakers to consider the extent to which an alternative is able to meet some or all of a project’s objectives. In addition, the definition of feasibility encompasses desirability to the extent that an agency’s determination of infeasibility represents a reasonable balancing of competing economic, environmental, social, and technological factors. (See *CNPS, supra*, 177 Cal.App.4th 957, 1001.) An “alternative that ‘is impractical or undesirable from a policy standpoint’ may be rejected as infeasible.” (*Ibid.*) Additionally, an alternative “may be found infeasible on the ground it is inconsistent with the project objectives as long as the finding is supported by substantial evidence in the record.” (*Ibid.*)

B. ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

The EIR identified and compared the significant environmental impacts of the alternatives listed below. In accordance with the provisions of the State CEQA Guidelines Section 15126.6, the following alternatives were evaluated:

- ▶ **Alternative 1: No Project Alternative** assumes no actions would be taken by the BAAQMD and the proposed rule amendments would not be adopted. The BAAQMD's existing Rules 9-4 and 9-6, which already establish NO_x emissions standards for natural gas-fired space- and water-heating appliances, would remain in effect without any changes.
- ▶ **Alternative 2: Earlier Compliance Date** would establish a zero-NO_x standard with a compliance date of January 1, 2026, which is approximately three years earlier than the compliance date for the Project (phased in between 2027 and 2031). Except for the earlier compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.
- ▶ **Alternative 3: Later Compliance Date** would establish a zero-NO_x standard with a compliance date of January 1, 2035, which is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031). Except for the later compliance date, the proposed amendments to Rules 9-4 and 9-6 would be the same as the Project.

Further details on these alternatives, and an evaluation of their environmental effects relative to the environmental effects of the Project, are provided below. Table 4-7 in Chapter 4, "Alternatives," in the Draft EIR provides a qualitative summary of the environmental effects of these alternatives in comparison to the effects of the Project.

1. Alternative 1: No Project Alternative

DESCRIPTION

Under Alternative 1, the No Project Alternative, no actions would be taken by the BAAQMD and the proposed rule amendments would not be adopted. The BAAQMD's existing Rules 9-4 and 9-6, which already establish NO_x emissions standards for natural gas-fired space- and water-heating appliances, would remain in effect without any changes. For a description of these current rules, see Section 2.4, "Background," in Chapter 2, "Project Description," in the Draft EIR.

COMPARISON OF ENVIRONMENTAL IMPACTS

Compared to existing conditions, the No Project Alternative would not reduce NO_x emissions from natural gas-fired space- and water-heating appliances in buildings in the Bay Area beyond what is required under the existing rules. Therefore, compared with the Project, the No Project Alternative would have greater air quality and GHG impacts because the No Project Alternative would not reduce the existing significant impacts related to air quality and GHG emissions and climate change. However, the No Project Alternative would avoid significant potential Project impacts associated with noise and would also avoid the Project's potential considerable contribution to significant impacts related to electrical infrastructure expansion (including renewable energy expansion). Similar to the Project, no impacts related to aesthetics would occur under the No Project Alternative.

FEASIBILITY AND ATTAINMENT OF PROJECT OBJECTIVES

The No Project Alternative would not meet the project objectives. For example, the No Project Alternative would not establish a zero-NO_x standard; expand the applicability of Rule 9-4 to a larger breadth of space-heating appliances; update and clarify the certification and calculation methods contained in the rules; or improve the clarity and enforceability of the rules. For these reasons, the No Project Alternative's desirability is not on balance with the Project in terms of its economic, environmental, social, and technological elements. The Project is the more desirable choice for the region. Therefore, the Board rejects the No Project Alternative.

2. Alternative 2: Earlier Compliance Date

As described in Chapter 2, "Project Description," in the Draft EIR, the Project would establish a zero-NO_x standard with a compliance date in 2029 for Rule 9-4 and compliance dates ranging from 2027 to 2031 based on equipment type, use, and size for Rule 9-6.

There are currently appliances available on the market that meet the zero-NO_x requirements included in the proposed rule amendments. As such, Alternative 2 would require compliance with the zero-NO_x standard at an earlier date compared with the Project. This alternative would establish a zero-NO_x standard with a compliance date of January 1, 2026 for all appliances covered by the proposed zero-NO_x requirements in Rules 9-4 and 9-6. That is approximately three years earlier than the compliance date for the Project (phased in between 2027-2031).

Alternative 2 would achieve an 88-percent reduction of NO_x emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2043; comparatively, the Project would not achieve the same 88-percent reduction until 2046, three years later than could be achieved under Alternative 2 (see Table 2-1 in Chapter 2, "Project Description," in the Draft EIR). While electric heat pump technology is available to meet the earlier compliance dates in Alternative 2, this technology is currently more expensive to install and can be in short supply. The later compliance dates in the proposed Project provide time for additional technology development (including potential natural gas-fired zero NO_x technology) and expected decreases in cost and increases in supply of electric heat pump technology.

COMPARISON OF ENVIRONMENTAL IMPACTS

Alternative 2 would achieve reductions in NO_x emissions three years earlier than could be achieved under the Project (2043 as compared with 2046) and lead to greater NO_x reductions over the long term due to the earlier implementation date. Alternative 2 would result in similar air quality, GHG, noise, and aesthetic impacts compared to the Project. However, this change in compliance date would ultimately result in greater impacts related to the construction of new or expanded grid capacity. Alternative 2 would also not reduce the Project's significant noise impacts.

FEASIBILITY AND ATTAINMENT OF PROJECT OBJECTIVES

Alternative 2 is a feasible alternative to the Project. Further, implementation of Alternative 2 would achieve most of the project objectives except those related to specific compliance dates that allow for equitable implementation of the amendments. However, because of Alternative

2's greater impacts related to the construction of new or expanded grid capacity and its failure to address the significant cost and equity concerns with earlier implementation dates, Alternative 2's desirability is not on balance with the Project in terms of its economic, environmental, social, and technological elements. The Project is the more desirable choice for the region. Therefore, the Board rejects Alternative 2.

3. Alternative 3: Later Compliance Date

Alternative 3 would require compliance with the zero-NO_x standard at a later date compared with the Project. A later compliance date could have potential benefits related to consumer costs, technology development timelines, and electric infrastructure expansion and updates. Later compliance dates would allow for the market of zero-NO_x appliances to mature further, likely resulting in decreased consumer costs for appliance replacement. Based on current projections for State policies requiring building decarbonization and renewable energy development, a later compliance date would also result in removing the need for an accelerated build of electric resources to supply the project. This alternative would establish a zero-NO_x standard with a compliance date of January 1, 2035 for all appliances covered by the proposed zero-NO_x requirements in Rules 9-4 and 9-6. That is approximately six years later than the compliance date for the Project (phased in between 2027 and 2031).

Alternative 3 would achieve an 88 percent reduction of NO_x emissions compared to the baseline by the time the equipment changeout is projected to be completed in 2052; comparatively, the Project would achieve the same 88-percent reduction in 2046, six years earlier than could be achieved under Alternative 3 (see Table 2-1 in Chapter 2, "Project Description," in the Draft EIR).

COMPARISON OF ENVIRONMENTAL IMPACTS

Alternative 3 would not achieve the same rate of reduction in NO_x emissions until six years after the Project could achieve the same rate of reduction (2052 as compared with 2046) and would achieve fewer NO_x reductions overall due to the later implementation date. Alternative 3 would result in similar GHG, noise, and aesthetic impacts compared to the Project. However, under Alternative 3, a significant and unavoidable impact of the Project could be slightly reduced (although not eliminated) because the compliance date would be delayed six years, thereby requiring a slightly smaller amount of new solar, new batteries, new transmission capacity, and distribution capacity compared with the Project.

FEASIBILITY AND ATTAINMENT OF PROJECT OBJECTIVES

Alternative 3 is a feasible alternative to the Project. Except for the compliance date, Alternative 3 would meet most of the project objectives. However, delayed implementation of the proposed rule amendments would result in delayed health benefits resulting from air quality improvements in the region and an overall increase in total NO_x emissions in the Bay Area versus the Project. Because the Project would achieve higher levels of NO_x and GHG reduction than Alternative 3 and would address existing significant air quality impacts in the Air Basin, Alternative 3's desirability is not on balance with the Project in terms of its economic, environmental, social, and technological elements. The Project is the more desirable choice for the region. Therefore, the Board rejects Alternative 3.

SECTION 13 - STATEMENT OF OVERRIDING CONSIDERATIONS

As set forth in the findings above, the Board's approval of the Project will result in significant adverse environmental effects that cannot be avoided and there are no feasible alternatives or mitigation measures that would mitigate or substantially lessen the impacts. Despite the occurrence of these effects, however, the Board chooses to approve the Project because, in its view, the air quality and public health benefits that the Project will produce will render the significant effects acceptable.

In making this Statement of Overriding Considerations in support of the findings of fact and the Project, the Board has considered the information contained in the EIR for the Project as well as the public testimony and the record of proceedings in which the Project was considered. The Board has balanced the Project's benefits against the unavoidable adverse impacts identified in the EIR. The Board hereby determines that the Project's benefits outweigh the significant unmitigated adverse impacts, as discussed in **Section B**, below.

A. SIGNIFICANT AND UNAVOIDABLE IMPACTS

As discussed in the findings above, the Project will result in the following significant and unavoidable impacts:

Utilities and Service Systems (Energy Resources)

- ▶ Impact 3.3-1: Require the Relocation or Construction of New or Expanded Electric Facilities That Would Result in an Adverse Environmental Impact

Noise

- ▶ Impact 3.4-1: Potential to Generate Long-Term Operational Noise

B. OVERRIDING CONSIDERATIONS

In the Board's judgment, the Project and its benefits outweigh its unavoidable significant effects. The following statement identifies the reasons why, in the Board's judgment, the benefits of the Project as approved outweigh its unavoidable significant effects. The Board finds that the noted benefits are individually meritorious, and taken together, provide substantial public benefits that are sufficient to justify approval of the Project.

The Rule Amendments are expected to have significant benefits from the reduction of air pollution. NO_x emissions reductions are estimated to be 3,236 tons per year upon full implementation of the proposal. These reductions are significant, with an 88 percent reduction of emissions from the baseline by the projected date of complete equipment changeout in 2046. Exposure to NO_x and their atmospheric reaction products can greatly impact health. Breathing air with a high concentration of NO_x can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms, hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO_x may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.

Implementation of the Project would result in significant air quality improvements due to the reduction of NO_x emissions, and resultant reductions in ozone and secondary particulate

matter pollution. NOx reacts with other chemicals in the air to form both fine particulate matter and ozone. Both of these pollutants are also harmful when inhaled. Fine particulate matter has been linked to a broad range of health effects, including premature mortality, adverse respiratory health effects, cardiovascular diseases, impacts to cognitive function, and cancer. Particulate matter pollution disproportionately impacts residents of color throughout the nine Bay Area counties. Reducing NOx will reduce the formation of and exposure to secondary particulate matter, thus improving health and saving lives, especially those most impacted by air pollution.

The NOx reductions achieved by the Project are projected to result in the prevention of an estimated 23-52 deaths per year and 71 new cases of asthma per year. Should electric heat pumps be used in large scale for compliance with the Rules, these benefits would increase (due to the co-benefit reduction of primary particulate matter) to the prevention of 37-85 premature deaths and 110 new cases of asthma per year. These health benefits can be valued between 400 to 890 million U.S. dollars annually, based on EPA's Environmental Benefits Mapping and Analysis Program.

The Bay Area is not in attainment with the federal and state ambient air quality standards for particulate matter and ozone, and must take all feasible measures to achieve these standards as soon as possible. The Project represents a feasible measure that the Board can take in furtherance of its goal to attain the federal and state ambient air quality standards.

Exposures associated with emissions from building appliances are not distributed equally amongst different communities and race/ethnicity groups. The Project would have benefits for residents throughout the Bay Area, but modeling indicates that these benefits will be greater in denser communities.

The Project also may result in significant GHG emissions reductions, in furtherance of the Board's goals to address climate change. Though these benefits are not guaranteed, based on currently available zero-NOx technology, if electric heat pumps are employed at scale upon implementation of the Rule amendments, GHG emissions would be reduced significantly in the Bay Area.

These significant air pollution reduction and public health benefits must be weighed against the Project's potentially significant environmental impacts related to noise and utility resources. While the Board does not have jurisdiction to mitigate the potentially significant noise and utility resources impacts, and thus they must remain unmitigated and potentially significant for purposes of this analysis, it is aware that local jurisdictions have the authority to adopt, and have adopted, noise ordinances that may mitigate any noise impacts of the Project. Similarly, state, local and public utility entities will undergo thorough CEQA review and approval processes prior to construction of new utility resources, at which time all available mitigation will be considered and required to the extent feasible. Notwithstanding this, assuming the noise and utility impacts remain potentially significant because the Board lacks jurisdiction to mitigate these impacts, the Board determines that the air pollution and public health benefits outweigh these potentially significant impacts to noise and utility resources. The Board is tasked with protecting and improving air quality in the Bay Area and is committed to taking all feasible measures in support of this mission.

C. CONCLUSION

The Board has balanced these benefits and considerations against the potentially significant unavoidable environmental effects of the Project and has concluded that the impacts are outweighed by these benefits, among others. After balancing environmental costs against Project benefits, the Board has concluded that the benefits the Bay Area will derive from the Project, as compared to existing and planned future conditions, outweigh the risks. The Board believes the Project benefits outlined above override the significant and unavoidable environmental costs associated with the Project.

In sum, the Board approves the Project and finds that any residual or remaining effects on the environment resulting from the Project, identified as significant and unavoidable in the Findings of Fact, are acceptable due to the benefits set forth in this Statement of Overriding Considerations.

DRAFT

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson John J. Bauters and Members
of the Board of Directors

From: Philip M. Fine
Executive Officer/APCO

Date: March 15, 2023

Re: Referral of the Proposed Budget for Fiscal Year Ending (FYE) 2024 to the Finance
and Administration Committee

RECOMMENDED ACTION

The Board of Directors will consider referring the proposed budget for the Fiscal Year Ending (FYE) on June 30, 2024, to the Finance and Administration Committee for review and consideration.

BACKGROUND

Pursuant to Administrative Code Division II, Section 3.2 Fiscal Policies and Procedures and in compliance with Health and Safety Code Section 40276, the Executive Officer/APCO requests that the Board of Directors refer the proposed budget for Fiscal Year Ending 2024 to the Finance and Administration Committee for review and consideration.

DISCUSSION

The Finance and Administration Committee will consider the FYE 2024 proposed budget at its April 5th and, if needed, its May 3rd meeting before making recommendations to the full Board of Directors. Pursuant to Section 29080 of the Government Code, the Board of Directors will hold two public hearings on the proposed budget before taking action to adopt the FYE 2024 Proposed Budget.

BUDGET CONSIDERATION/FINANCIAL IMPACT

No fiscal impact at this time.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: Stephanie Osaze
Reviewed by: John Chiladakis

ATTACHMENTS:

None