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

ASCENT

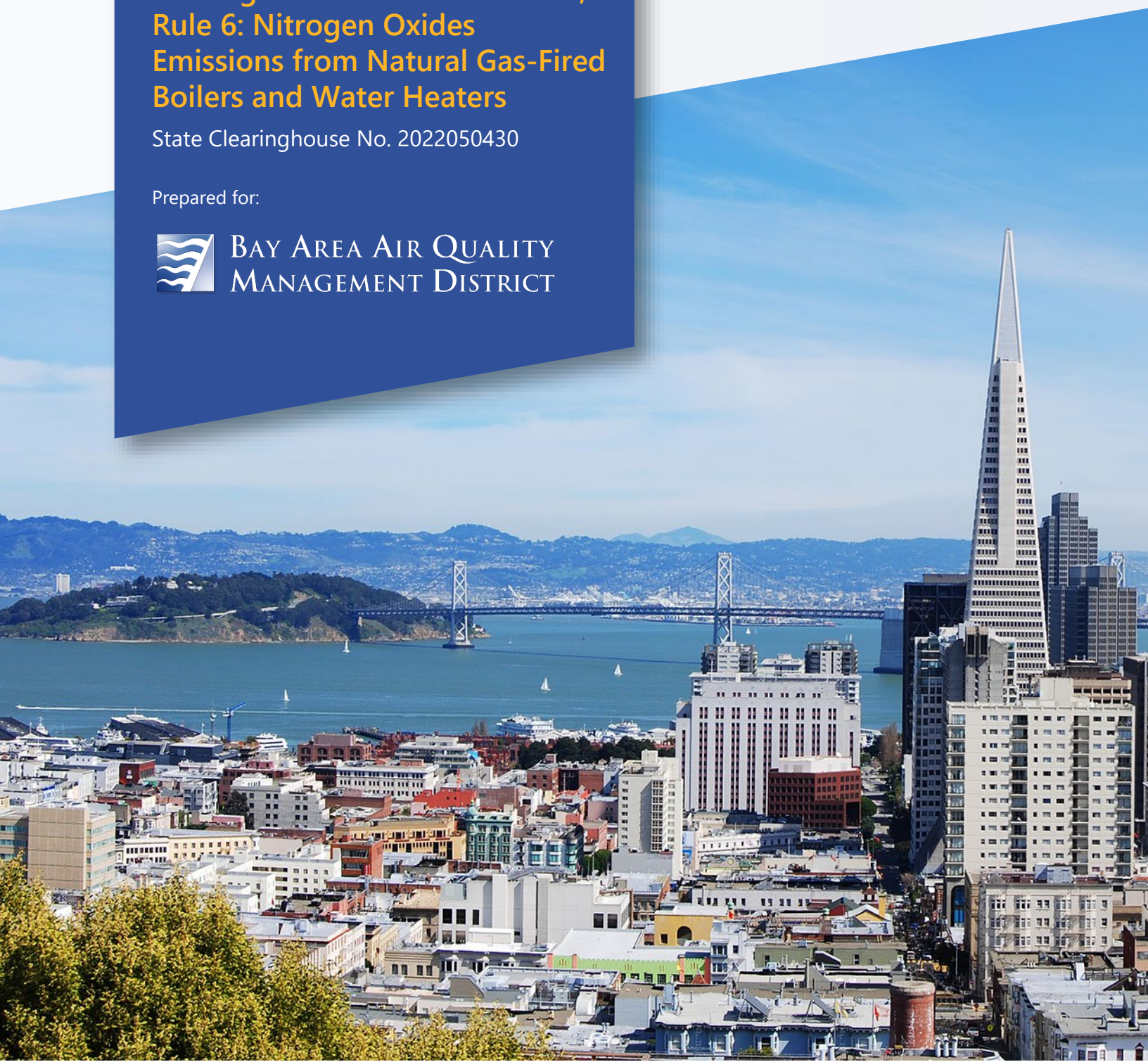

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TABLE OF CONTENTS

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
B Draft EIR

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, PM_{10}, 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.

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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

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Appendix A

Draft EIR Comments

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE

we make life better®

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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 report[6] 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 territory[9] 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 n*or *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. <u>Commercial Applications</u>

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. <u>Residential Applications</u>

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 comments[13] 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 years[14] 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(I)(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,

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:

> 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

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

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

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

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

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 Elwell,

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_AppG0940906.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

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

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

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

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

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

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 Franciso Board members Shamann Walton and Myrna Melgar, I request their staff to raise these issues with those members.

Respectfully,

Terry J Houlihan
[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

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

Appendix B

Draft EIR

Draft Environmental Impact Report
for the

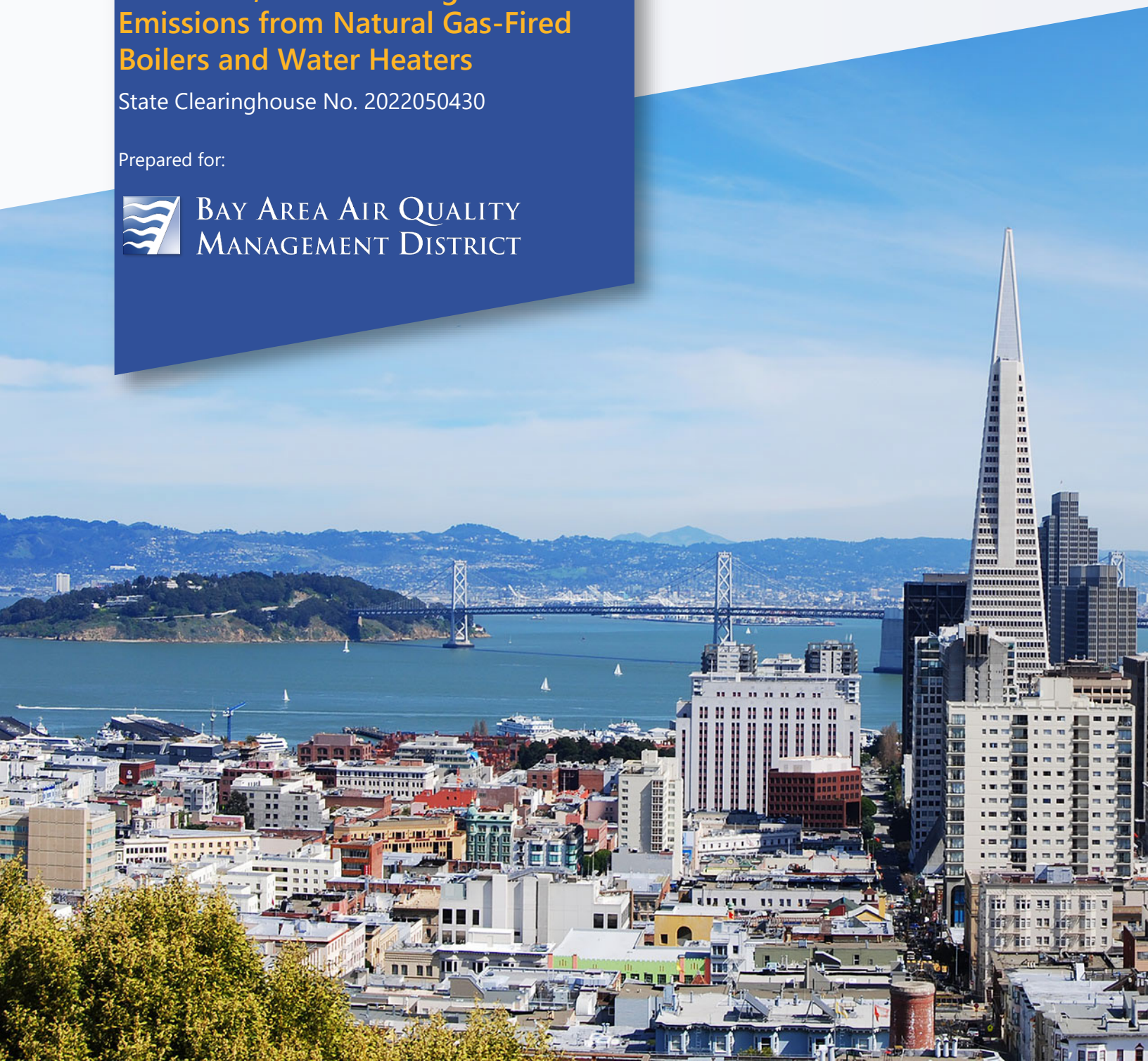
Proposed Amendments to Building Appliance Rules – Regulation 9: Inorganic Gaseous Pollutants, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Regulation 9: Inorganic Gaseous Pollutants, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

State Clearinghouse No. 2022050430

Prepared for:

Bay Area Air Quality Management District

ASCENT ENVIRONMENTAL



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
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Mike Parker, AICP
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December 2022

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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_2e	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_2SO_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
$MMTCO_2e$	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_2O	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

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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			
Impact 3.1-1: Long-Term Operational-Related Emissions of ROG, NO_X, PM_{10}, 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.	LTS (Beneficial)	No mitigation is required for this impact.	LTS (Beneficial)
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.	LTS (Beneficial)	No mitigation is required for this impact.	LTS (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 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	PS	No mitigation measures are available.	SU

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
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			
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.	PS	No mitigation measures are available.	SU
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.	LTS	No mitigation is required for this impact.	LTS
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	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

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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
- 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

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 exposure 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.

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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."

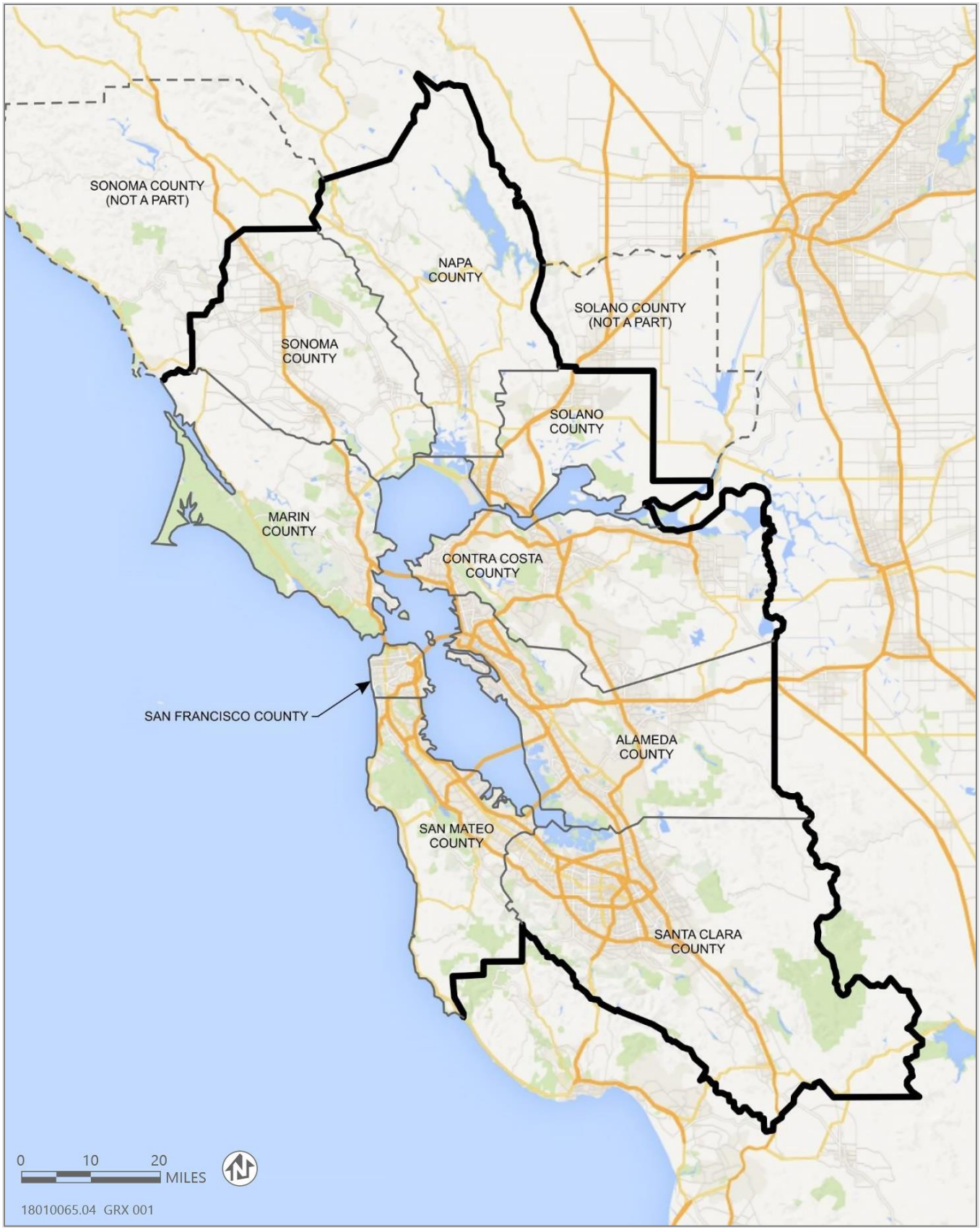
2.2 PROJECT OBJECTIVES

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

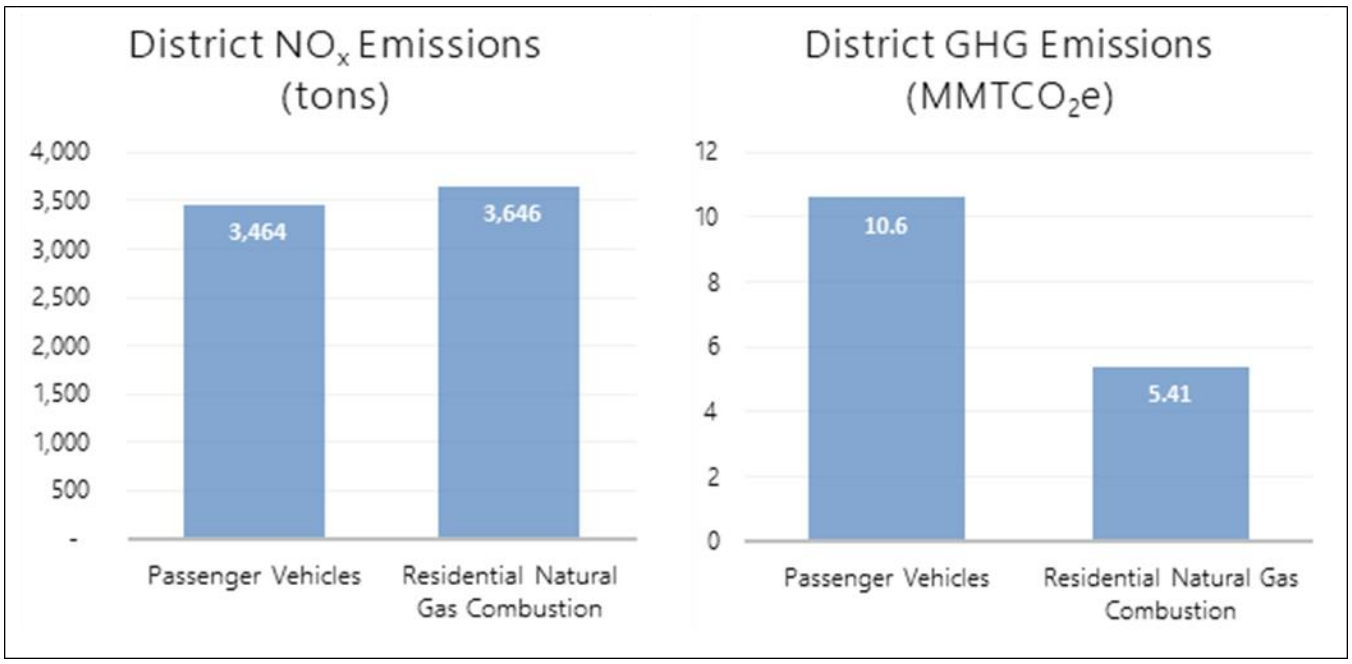
The BAAQMD has regulated NO_x emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was first adopted in 1992 and was most recently updated with more stringent NO_x-emissions standards 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.

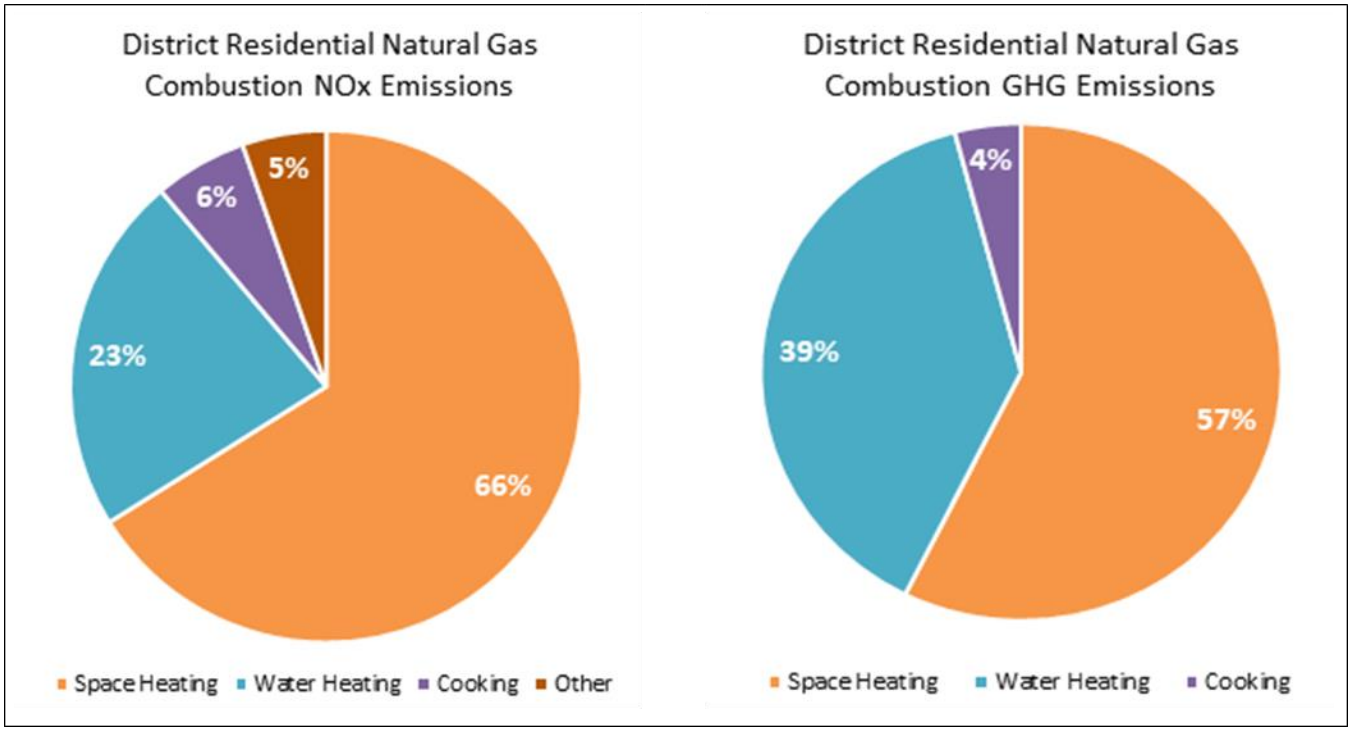
The building sector, identified as a significant Bay Area source of emissions in the BAAQMD's 2017 Clean Air Plan, was highlighted in measures SS30, BL1, and BL2 (BAAQMD 2017). For context, Figure 2-2 compares emissions from natural gas combustion in residential buildings with emissions from passenger 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

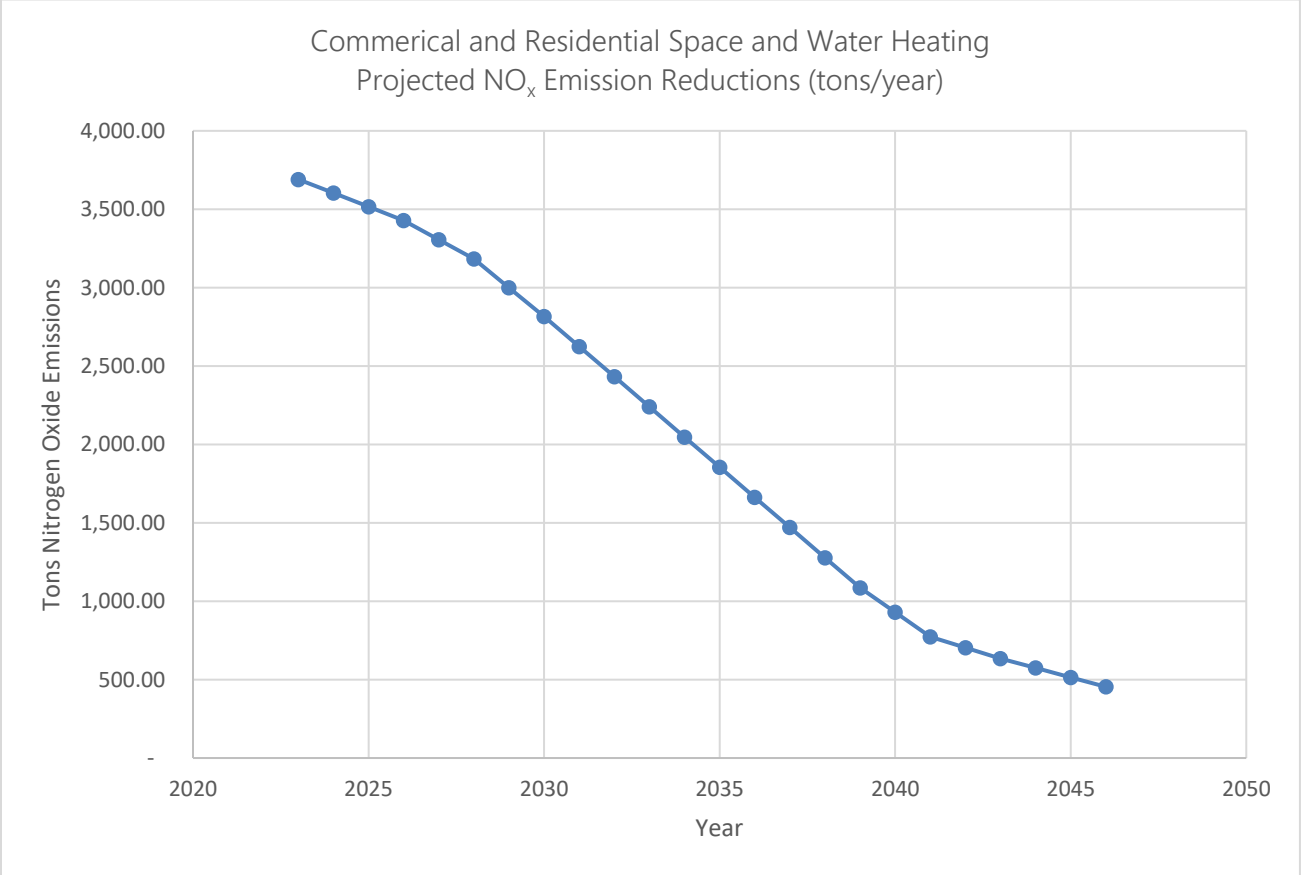
Because the applicable rules function as point-of-sale requirements, emission reductions associated with the proposed rule amendments would occur over time in relation to the lifespan of currently installed equipment. To model these predicted emission reductions, the BAAQMD made the following assumptions:

- 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.

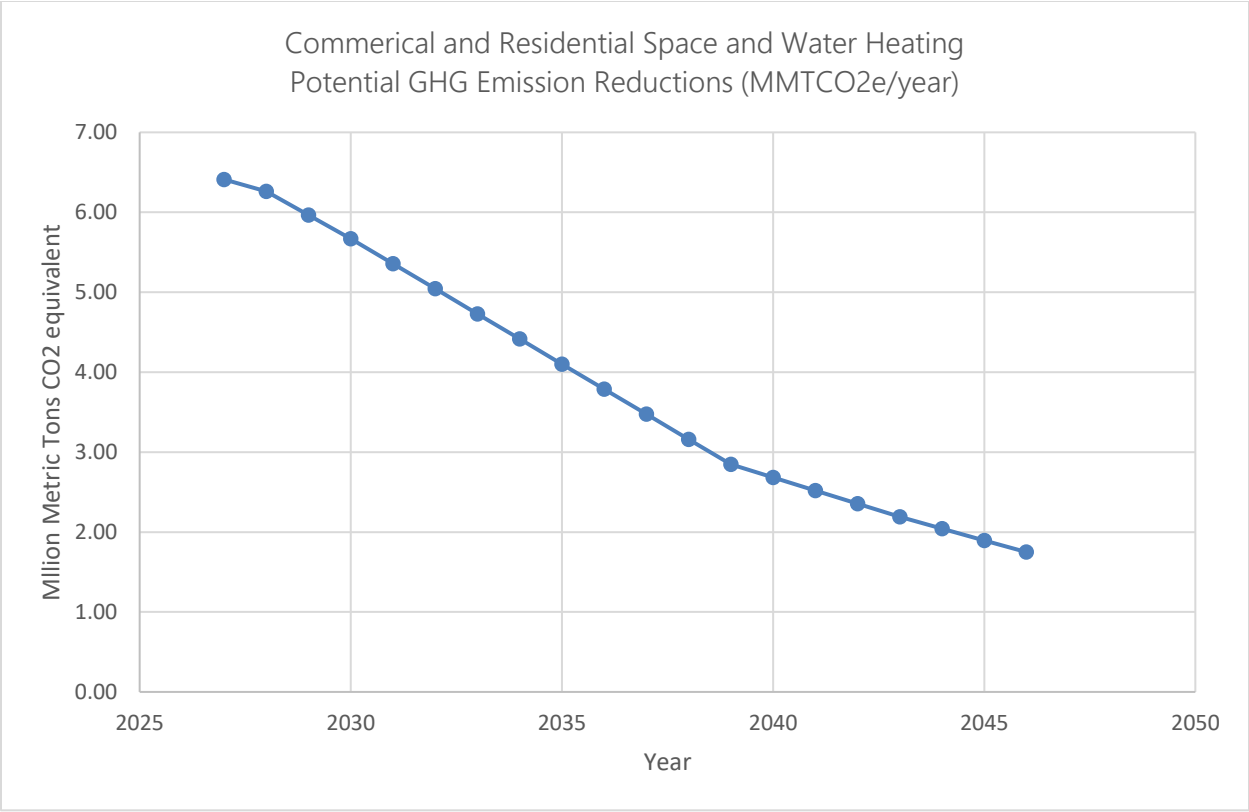
* 2018 is the baseline year for emissions inventory.

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 ($MMTCO_2e/yr$)	Potential GHG Reduction vs. Baseline ($MMTCO_2e/yr$)
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; $MMTCO_2e/yr$ = 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 (NO_2), sulfur dioxide (SO_2), respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), 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/m^3 = micrograms per cubic meter; km = kilometers; mg/m^3 = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million.

[a] California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, 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 PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 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 0clarification 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 unhealthful 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

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 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 NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 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/m^3 = 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 PM_{10} 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 PM_{10} emissions. Direct emissions of PM_{10} 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 PM_{10} 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 waters 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 PM_{10} exhaust, and 54 lb/day for $PM_{2.5}$ exhaust, or substantially contribute to emissions concentrations (e.g., PM_{10}, $PM_{2.5}$) 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 PM_{10} exhaust, and 54 lb/day or 10 tons/year for $PM_{2.5}$ exhaust, or substantially contribute to emissions concentrations (e.g., PM_{10}, $PM_{2.5}$) that exceed the applicable NAAQS or CAAQS;
- not implement the BAAQMD's Basic Construction Mitigation Measures for dust emissions (e.g., PM_{10} 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, PM_{10}, 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, PM_{10}, 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-NOx 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 (CO_2) 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 CO_2, 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 CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 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 CO_2 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 ($MMTCO_2e$) (BAAQMD 2015). Table 3.2-1 summarizes the GHG inventory for the Bay Area by $MMTCO_2e$ and percentage.

Table 3.2-1 Bay Area GHG Emissions by Economic Sector

Sector	$MMTCO_2e$	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: $MMTCO_2e$ = 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 CO_2 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. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water) and are two of the most common processes for removing CO_2 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 waters 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 than 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 $MMTCO_2e$ 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 $MMTCO_2e$/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 ($MMTCO_2e/yr$)	Potential GHG Reduction vs. Baseline ($MMTCO_2e/yr$)
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; $MMTCO_2e/yr$ = 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.

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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 mandator 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 NOx 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 NOx 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 (0.00000000001) 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-NOx units upon implementation of the proposed amendments. Currently, zero-NOx 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-NOx appliances that are natural gas-fired. If such appliances are developed, consumers would be able to choose between zero-NOx electric heat pumps and zero-NOx natural gas-fired units upon implementation of the proposed amendments, and the result would be that some combination of electric heat pumps and zero-NOx 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 ordnances 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

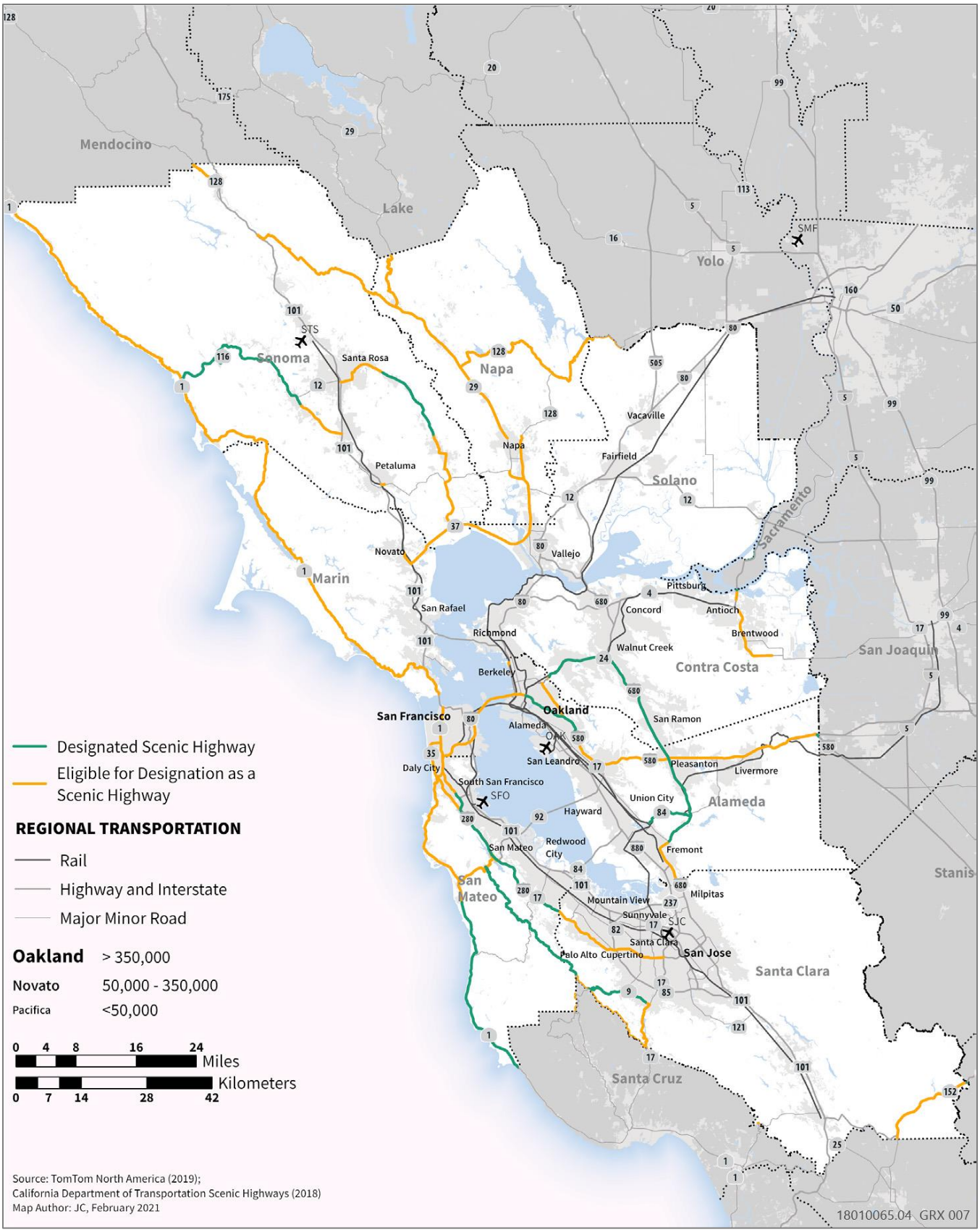
California Scenic Highway Program

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

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.

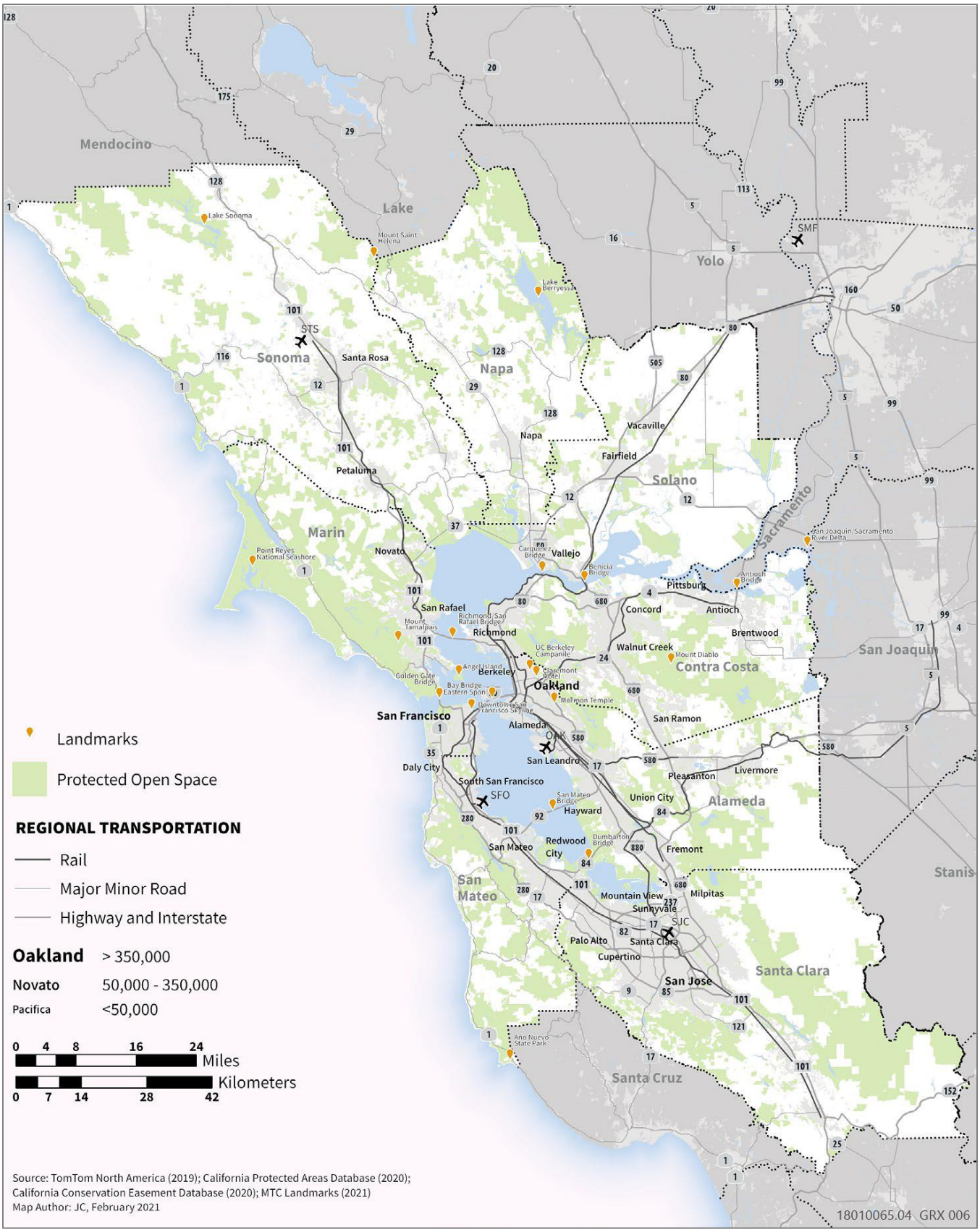
Between these ranges and hills are numerous valleys, both broad and narrow. San Francisco Bay, for example, is bordered along the east and west by a narrow, heavily urbanized plain. This plain widens in the south into the Santa Clara Valley, which, until World War II, was primarily agricultural. The 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

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 NOx 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

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 NOx emissions limit for space heating appliances and forgo the zero NOx 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 NOx 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-NOx 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 NOx 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 to do not include exterior equipment. Alternatives were considered to reduce these impacts. Because any enhancement to the NOx 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-NOx 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.

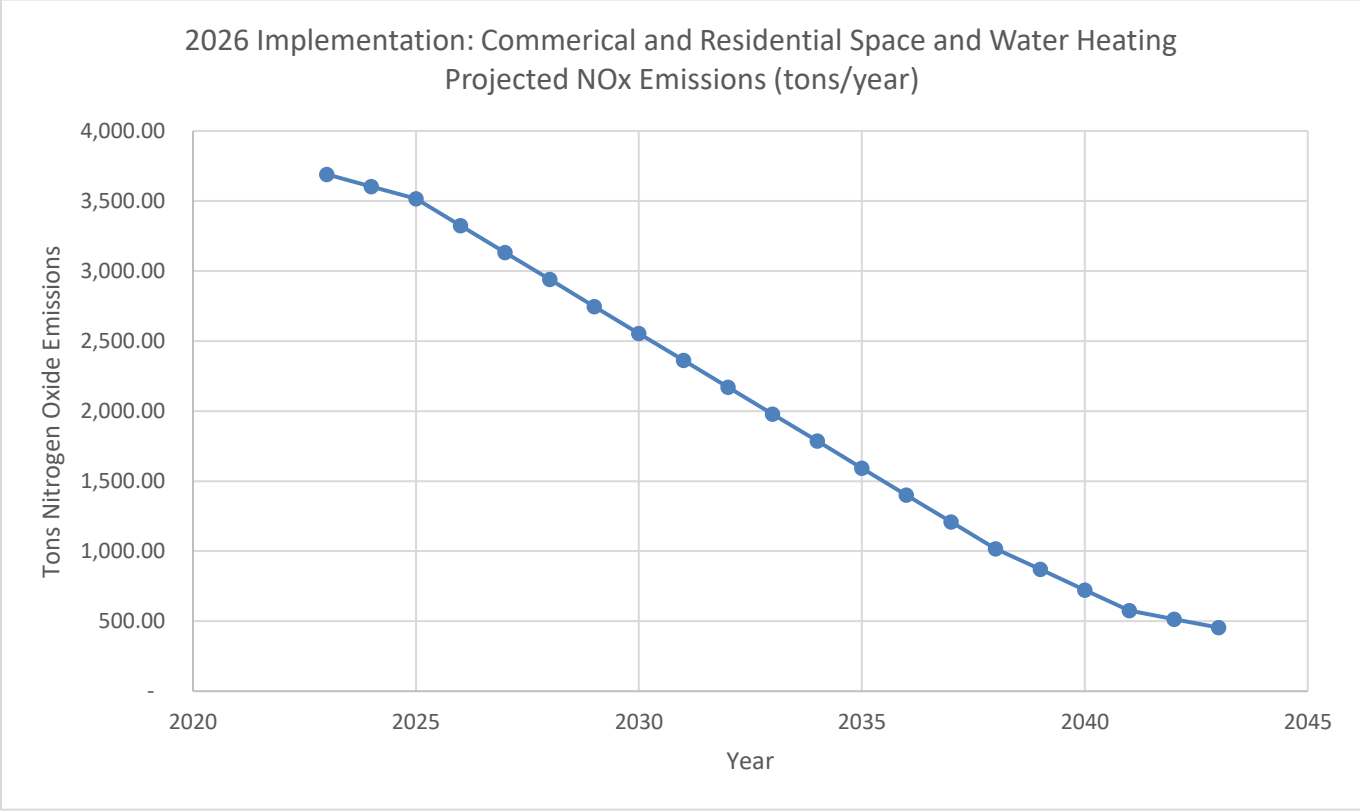
Under the Low Policy Reference scenario, heat pump adoption would occur consistent with the 2022 Draft Scoping Plan Business-as-Usual Reference Scenario. As such, this scenario assumes existing and currently planned levels of incentives for heat pumps and no major policy changes supporting building electrification 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 CO_2e 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 NOx Emissions Reductions, 2024-2052 (tons)	Total GHG Emissions Reductions, 2024-2052 (MT CO_2e)
Proposed Project	60,161	83.42
Alternative 2	64,461	94.43

Notes: GHG = greenhouse gases; MT CO2e = MTCO_2e = metric tons of carbon dioxide equivalent; NOx = 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.

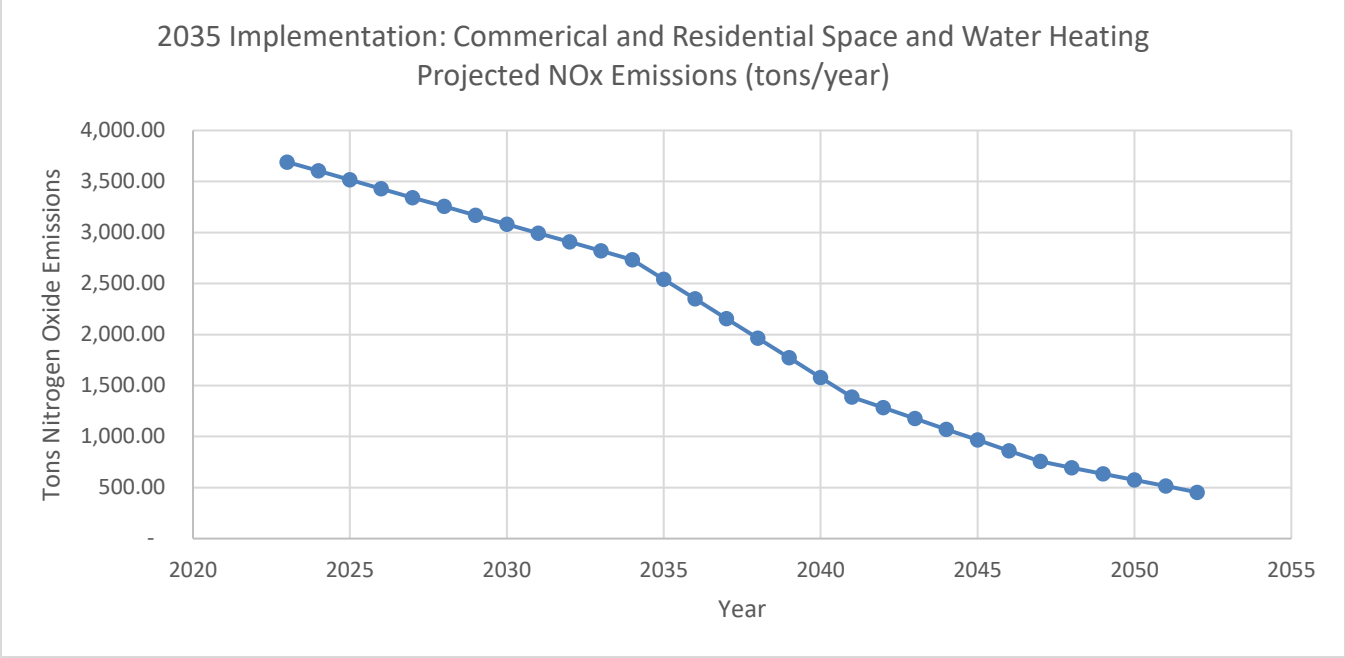
Source: Data provided by BAAQMD in 2022.

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 NOx Emissions Reductions, 2024-2052 (tons)	Total GHG Emissions Reductions, 2024-2052 (MT CO2e)
Proposed Project	60,161	83.42
Alternative 3	49,439	51.14

Notes: GHG = greenhouse gases; MT CO2e = $MTCO_2e$ = metric tons of carbon dioxide equivalent; NOx = 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 CO_2 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 NOx 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 NOx 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.

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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.

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