



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

## **APPENDIX H**

### **Response to Comments: Proposed Amendments to Regulation 9, Rule 4 and Rule 6**

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

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## Introduction:

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

Staff received letters from 565 commenters during the comment period that was open from December 20, 2022, until February 6, 2023. This document contains responses to comments received during this period. Attachment 1 to the Response to Comments lays out the master responses that are tied to comments contained within each letter, organized alphabetically by commenter. Copies of all comment letters received are included as Attachment 2 to this document.

### i. Draft Environmental Impact Report Comments:

This document summarizes and responds to comments that were received on the proposed rule amendments. Responses to comments that specifically address the Draft Environmental Impact Report (EIR) are included in the Final EIR, which is also posted to the District’s website. Responses to comments on the Draft EIR received from public agencies must be responded to ten days in advance of a public hearing. The Air District received letters from the California Air Resources Board (CARB), Marin County, City of Berkeley et al., Pacific Gas and Electric, East Bay Community Energy, Silicon Valley Clean Energy commenting on the proposed rule amendments, however no public agencies provided comment on the Draft EIR.

### ii. Summary of Comments in Support of the Proposal:

#### General Support

***Comment:*** Commenters support the regulatory proposal because natural gas is a major source of air pollution, which can lead to a variety of health issues such as asthma, heart disease, and cancer. By transitioning to clean energy sources, we can reduce the amount of harmful pollutants in the air and promote healthier communities. Additionally, the proposal is justified because it ensures that a comprehensive approach is being taken to reducing our dependence on fossil fuels and transitioning to clean energy. It also sends a clear signal to the market that we are committed to making this transition and can accelerate the development and deployment of clean energy alternatives. Some commenters expressed an urgent need for these rule changes to improve air quality and public health in the near term and to mitigate the impacts of climate change over the long run.

***Commenters:*** Community Choice Aggregators, Companies, Government, Organizations, Utility

350 Bay Area, Abalone Alliance, BayREN, Berkeley Electrification Working Group, California Air Resources Board, Climate Action CA et al, Climate Reality Project Silicon Valley, East Bay Community Energy, Harvest Thermal, Marin County, Pacific Gas and Electric, Physicians for Social Responsibility SF Bay, RMI et al, San Jose Community Energy Advocates, Sierra Club, Silicon Valley Clean Energy, SPUR,

Commenters: Members of the Public

Abbot Foote, Adam Buck, Adam Sweeney, Aditee Kumthekar, Adrienne Etherton, AJ Cho, Alan Chen, Alan Peevers, Alexander Pakter, Alexis Georgiou, Alfredo Angulo, Alice Polesky, Allan Campbell, Amanda Bancroft, Amanda Rosenberg, Amanda Zagara, Andrea Gara, Angela Evans, Angela Gantos, Angele Price, Anna Koster, Anna Shurter, Arlene Baxter, Ashesh Parekh, Aubrey Wilson, Audrey Ichinose, Barbara Hollenbach, Barbara Kyser, Barbara Sandow, Becca Ya, Belinda Chlouber, Ben Martin, Benjamin Bingaman, Benjamin Keller, Bhima Sheridan, Bianca Molgora, Blaine Burgdtrom, Brenda Wallace, Brendan Moriarty, Bret Andersen, Brittany Dhawan, Bruce Coston, Bruce England, Bruce J Burns, Bruce Naegel, Bruce Nilles, Caephren McKenna, Carla Davis, Carly Ritter, Carol Benioff, Carol Bettencourt, Carol Mone, Carol Savary, Carol Schaffer, Caroline Ayres, Caryn Graves, Catherine Cameron, Cecile Mochnek, Celeste Anacker, Charles Wieland, Cheryl Schaff, Cheryl Weiden, Chris Lish, Christina Nielsen, Christine Goldin, Christine Patel, Christopher Ware, Cindy Haag, Cindy Sidaris, Claire Broome, Claudia Hevel, Corwin Zechar, Craig Husfeld, Damon Brown, Dan Kalb, Dani Zacky, Danielle Mieler, Dave Clark, David Bezanson, David Boyer, David Fairley, David Gassman, David Kaskowitz, David Luu, David Romano, David Sowerwine, Deanna Knickerbocker, Debbie Mytels, Deborah Holcomb, Deborah St Julien, Deirdre Fennessy, Derrick Holt, Diane Bailey, Don Jackson, Don Meehan, Don Weiden, Donna Davies, Donna Sharee, Douglas Brookes, Du Ng, Dylan Ackerman, Edward Richardson, Edwin Aiken, Eihway Su, Eileen Adams, Eileen Lepera, Elena Engel, Elizabeth Gioumousis, Elizabeth Lee, Elizabeth Levy, Ellen Beans, Ellen Leng, Ellen Rosenblum, Emily Wheeler, Emma Hitzke, Eric Brettner, Erin Foret, Ernie Walters, Evan Jane Kriss, Felix Mbuga, Fiona Hyland, Flora Rosaa, Floy Andrews, Forest Frasier, Fred Bialy, Gabriel Quinto, Gary Farber, Gary Troutt, Genevieve Deppong, Gerard Manning, Giovannina Fazio, Gladwyn D'Souza, Gloria Linda Maldonado, Greg Ratkovsky, Greg Spooner, Gregory Bell, Hala Al-Shahwany, Hannah Quirk, Harriet Harvey-Horn, Harvest Thermal, Hilary Glann, Howard Cohen, Howdy Goudey, Igor Tregub, Ingrid Kallman, J Angell, J Barry Gurdin, J Herbert, J.W. Oman, James Wu, Jamie Nahman, Jan Rhoades, Janet Creech, Janet Odell, Jason Fish, Jean Jackman, Jeff Lindquist, Jeffery Hurwitz, Jeffery Mann, Jeffery Nigh, Jeffery Suplica, Jeffrey Perrone, Jeffrey Spencer, Jency James, Jennifer Graber, Jennifer Heggie, Jennifer Mazzon, Jennifer Thilman, Jennifer Thompson, Jennifer Valentine, Jenny Green, Jessie Hagler, Jiro Yamamoto, Joanna Smiley, Joe Smith, Joel Soloksky, John Anderson, John Becker, John De Forest, John McKenna, John Neal, John Oda, Jonathan Eden, Jordan Briskin, Joseph Lam, Josephine Coffey, Josh Dickinson, Joslyn Baxter, Judith Bushey, Judith Weisman, Julia Howlett, Julie Groves, Julie Kloper, Julie Lindow, Justin Evans, Kaela Plank, Karen Kirschling, Karl Peirce, Kat Snyder, Katherine Falk, Katherine Robinson, Kathy Battat, Kathy Dervin, Kathy Kerridge, Katie Rueff, Keith Rhinehart, Kevin Branstetter, Kevin Hearle, Kevin Ma, Kiana Chandruang, Kim Messmer, Kristel Rietesel, Kristel Wickham, Kristen Conner, Lacey Hicks, Laura Bernstein, Laura Dill, Lawrence Deng, Leana Rosetti, Leane Eberhart, Leonie Terfort, Lesley Hunt, Lesley Shultz, Leslie Smith, Lin Griffith, Linda Ramey, Linh Dan Do, Lisa Segnitz, Lori Kegler, Louise Chegwiddden, Luca Donisi, Lucy Weltner, Magi Amma, Manijeh Berenji, Marcia Pratt, Margaret Fowler, Marianna Riser, Marilyn Price, Marilyn Smith, Mark Grossman, Mark Hoffberg, Mark Hurst, Martha Goldin, Mary Ann Cramer, Mary Dateo, Mary Lou Meeks, Mary Noel, Matt Passell, Megan Micco, Melanie Cross, Meldan Heaslip, Melissa Vierra, Melissa Yu, Michael Closson, Michael Kutliek, Michael Mills,

*Michael Wittig, Michele Hudson, Michelle Hudson, Michelle MacKenzie, Michelle Orengo-Mcfarlane, Michelle Peglau, Mignon Moskowitz, Mike Balma, Mira Chokshi, Mohan Sakhrani, Nancy Federspiel, Nancy Haber, Nancy Havassy, Nancy Schneider, Nanlouise Wolfe, Nicholas Cahill, Nicholas Ratto, Nicole Mo, Nikki Nafziger, Noah Armstrong, Noel Poddanchik, Nora Privitera, O Mandrussow, Pam Brigg McKown, Pamela Sieck, Pascal Bruyere, Pat Blackwell-Marchant, Pat Lang, Patricia Busk, Patricia Linder, Patrick Costello, Patrick McCully, Paul Malkin, Paul Meagher, Paul Perez, Paul Vesper, Paula Rochelle, Peter Belden, Peter Booth Lee, Philip Haves, Piper McNulty, Portland Coates, R D, Rachel Townsend, Rajan Narang, Raphael Hitzke, Rebecca Eliscu, Rebecca Young, Rich Waller, Richard Gallo, Richard Probst, Rick Edmondson, Robert Jardine, Robert Kahn, Robert Magarian, Robert Mayo, Robert Miller, Robert Raven, Robert Whitehair, Robert Zhou, Roberta Stern, Roman Capelli, Ross Simkover, Ryan Acebo, Sam Reed, Samantha Smith, Sandra Gamble, Sandra Slater, Sara Syer, Sara Theiss, Sarah Gao, Sarah Harper, Sarah Hubbard, Saran K, Scott Barlow, Scott Grinthal, Scott Nelson, Sheila Barbato, Sheila Tarbet, Sherman Lewis, Sherrill Futrell, Shirley Lutzky, Stan Fitzgerald, Steffen Rochel, Stephanie Bloom, Stephanie Nunez, Stephanie Reader, Stephanie Shindler, Stephen Rosenblum, Steve Mann, Steve Pease, Steve Shuput, Steven Mazliach, Steven Schlansker, Steven Schramm, Sue Blockstein, Summer Rogers, Susan Abby, Susan Chamberlain, Susan Green, Susan Nakashima, Susan Trivisonno, Susanna Marshland, Susannah Saunders, Sven Thesen, Sylvia De Baca, Tamara Alexa, Teresa Cheng, Terry and Martin Horwitz, Terry Nagel, Thalia Lubin, Thomas Carlino, Thomas Graly, Todd Synder, Tom Kabat, Toph Kerpan Evans, Travis Ramsey, Trish Mulvey, Tristia Bauman, Urmila Padmanabhan, Vansi Vallabhaneni, Vasu Murti, Victor Kamendrowsky, Victoria Armigo, Vince Augusta, Virginia Leslie, Wei-Tai Kwok, Wendy Chou, Yael Kisel, Yassen Roussev, Yves Decargouet, Zoe Jonick*

Response: Air District staff acknowledges and appreciates the comments in support of the amendments as proposed. However, the proposed amendments are not a natural gas ban. Should a natural gas appliance demonstrate that it meets the standard(s), it would be allowed under the proposed amendments. As discussed in the Staff Report at Section IV.A., zero-NOx natural gas burners have been developed for use in certain industrial contexts but have not yet been designed for residential or commercial space and water heating.



# Master Responses to Comments Received Critical of the Proposal and Supporting Documentation

## Cost and Cost-Effectiveness

### 1) Cost: Cost vs. Benefits

**Comment:** *Commenters express concerns about cost-effectiveness in comparison to health benefits associated with rulemaking.*

*Donald Duggan, Eric Frick*

**Response:** The Air District is required to estimate and report the cost-effectiveness of proposed regulations in terms of the cost of compliance relative to the amount of the target pollutant reduced (the ratio of the annualized cost of the proposal to the annual amount of emissions reduction expected due to the proposal). Given that technology currently available in the market that can meet the zero-NOx standard is electric-powered, this cost-effectiveness estimate assumes that gas-to-electric conversions will occur. The cost-effectiveness values presented in the Staff Report were calculated on a household basis – the potential cost associated with installing compliant equipment per ton of NOx reduced by each individual appliance.

Additionally, information on potential health benefits and valuation of the proposed amendments were included in the Staff Report to allow a more informed decision by the Board of Directors and a better understanding by the public. See also Master Response 17 (Emissions: Peer Review). The Air District undertook this modeling exercise to provide context for the Board of Directors and the public to consider. The California Health and Safety Code does not require that estimated health benefits meet a particular threshold or value. The justification and need for the proposed amendments are detailed throughout the Staff Report.

The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. Staff strongly believes that the significant improvements to regional air quality and public health benefits of the Project outweigh the potential associated costs.

### 2) Cost: Air Conditioning

**Comment:** *Commenter questions evaluating cost savings associated with air conditioning if not used in certain parts of the Bay Area.*

*Donald Duggan*

**Response:** Air District staff recognizes that not all homes have air conditioning and the cost savings associated air conditioning provided by high-efficiency heat pumps will not be realized

by those households. However, air conditioning uptake has increased in recent years, a trend that is expected to continue due to increases in summertime temperatures related to climate change, and air conditioning is already widespread in the outer, warmer Bay Area counties.

3) Cost: Market change

Comment: *Comment regarding uncertainty about how costs will change as market develops.*

*Andrew Pollack, Craig Taylor, Eric Frick, Pearl Karrer*

Response: Appliances that will be allowed under the zero-NOx emissions standards as laid out in the proposed amendments to each rule, such as heat pump water heaters and heat pump space conditioning systems, are currently widely available on the market. An evaluation of these models and those expected to come to the market soon are included in the Staff Report. Should both sets of proposed amendments be adopted, efforts of the planned implementation working group would include continued tracking of market availability of compliant appliances as well as how their cost is changing over time. These factors will be included in interim reports to the Board of Directors two years prior to the compliance dates provided in the proposed amendments.

4) Cost: Beyond Panel

Comment: *Additional costs associated with upgrades including construction costs, wall patching, and other ancillary costs.*

*AHRI, Cynthia Cima-Ivy, Eric Frick, Steve Smith, Western Propane Gas Association*

Response: Staff acknowledges that there may be situations in which additional work will be needed to accommodate compliant appliances over the average costs presented in the Staff Report and the socio-economic analysis, which is included as Appendix C to the Staff Report. Staff will endeavor to capture and evaluate these average costs throughout the implementation and interim reporting process, should the proposed amendments be adopted. It should be noted however, that these costs will vary greatly on a case-by-case basis.

5) Cost: Existing Spaces

Comment: *Retrofit costs associated with putting heat pumps in existing spaces that aren't originally designed for heat pumps (amount of space, air supply, wiring changes and related concerns).*

*AHRI, Anthony Rondoni, Brian Johnson, Eric Frick, Gary Stevens, Jim Robbins, Steve Smith*

Response: Staff appreciates comments and concerns raised about potential difficulties of installations in specific situations. Please see Master Response 19 (Existing Spaces: General) for a discussion of potential solutions to and considerations for installation of compliant appliances in existing spaces. Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided.

Staff acknowledges that there may be situations in which additional work will be needed to accommodate compliant appliances which may lead to higher average costs than those presented in the Staff Report and the socio-economic analysis, which is included as Appendix C to the Staff Report. The costs estimated in these reports do not include relocating building walls and other related concerns, as these costs are not expected to be borne by the majority of property owners due to the expected pace of advancement in zero-NOx technology. In addition, programs such as the High Efficiency Electric Home Rebate Program under the Inflation Reduction Act include funding for general electrical wiring changes. Air District staff sees the proposed rule amendment as providing a clear signal for the development of these funding sources at the federal, state and local levels, and alternative solutions should continue to grow in the years between potential adoption and the compliance dates in the proposed rule amendments.

Consolidation of this information and facilitating access to funding programs, knowledgeable contractors and educational materials will also be included in the Air District's work during the implementation period of the proposed rule amendments. The implementation working group will track accessibility factors, including cost, and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

6) Cost: Renters

Comment: *Concerns expressed about potential upgrades, costs from landlords being passed down to renters, rento-victions.*

*Adams Broadwell Joseph and Cardozo, Andrew Pollack, Michal Atz Brenzel*

Response: Staff appreciates concerns regarding potential indirect impacts of the proposed rule amendments on renters. Staff expects that since landlords are typically responsible for appliance purchases/replacements, the proposed rule amendments are expected to have a larger direct impact on landlords and building owners rather than renters in terms of capital expenses. However, staff recognizes that these costs could be passed down to renters through increases to rental rates and that there are past examples and concerns about landlords using remodels, retrofits, and/or delays as excuses to make rentals uninhabitable in order to discourage long-standing tenants who are paying rent-controlled prices from staying. Within the Bay Area, renter protections vary by city, thus whether or not costs can be passed through to renters through higher rents, and the degree to which this is legal, will vary. Concerns associated with equity issues for renters will continue to be tracked through the implementation working group and interim reporting process.

7) Cost: General

Comment: *Commenters expressed general concerns about high costs of compliance and stated that costs of compliance would be higher than those included in the Air District's analysis. Some commenters included cost estimates based on previous installations, contractor quotes, or published data sets of completed installations, with some comments indicating total project costs up to \$80,000 for a heat pump HVAC and water heater replacement and associated upgrades.*

*AHRI, Ashley Kline, Barry Robbins, Bradford White Corporation, Charles Getz, Chibby Alloway, Cynthia Cima-Ivy, D Pickham, David Luce, Diane Perrone, Duncan Moody, Families and Homes*

*San Jose, Izmirian Roofing and Sheet Metal, Jason Biggs, Jeff Calcagno, Jeremy Wright, Jo Ann Mandinach, John Accinelli, Joseph Machado, Julia Wall, Kelly Porter, Mark Reifkind, Melodie Lew, Michael DeMoss, Michal Atz Brenzel, Nancy Green, Nancy Westreich, Ned Kuypers, Pat Marriott, Paul Frantz, Pedram Navid, Peter Jon Shuler, Regan Avery, Renee Alloy, Richard Hallsted, Rick Vujovich, Rob SS, Susan Ferrone, Victor Buathier, Western Propane Gas Association, William Williams*

Response: Staff appreciates the concerns expressed by commenters regarding potential costs of compliance with the proposed rule amendments. The socioeconomic analysis, included as Appendix D to the Staff Report, evaluates potential costs to consumers as well as business and job impacts and costs to utilities. Included in this response to comments document are additional discussions of cost with regards to specific areas of concerns including costs impacting renters, landlords, housing, panel upgrades, other potential retrofit expenses, heat pump equipment, market changes, utility rates, labor, funding mechanisms and others.

Many commenters stated that costs for space heating and water heating equipment installation would be higher than the cost estimates used in the Air District's analysis, and presented cost estimates based on past project experiences, vendor/contractor quotes, or other reported data. The Air District has reviewed the comments and information submitted and maintains that the costs presented in the socioeconomic report and throughout the proposal package reflect staff's best estimate of average costs associated with the proposed rule amendments. As described in the socioeconomic report, staff reviewed and considered cost data from multiple studies and published reports, reflecting cost data collected from thousands of projects. While there are multiple potential sources of data and methodologies that may be employed when developing cost estimates, the Air District has expended considerable effort and followed a thorough process to solicit, gather, and assess information on potential compliance costs throughout the rule development process. The cost data considered and the average cost estimates used in the analysis reflect the most robust and substantiated data collected during the preparation of the socioeconomic report. While staff recognizes that costs for specific projects can vary widely and acknowledge that there are specific situations in which costs will be higher or lower than those average costs presented, the average cost estimates provide a representative and informative basis for evaluating cost impacts and socioeconomic impacts of the proposed amendments.

The Air District also acknowledges that additional cost data have been presented by commenters, and additional data continue to be generated as projects continue to be undertaken and completed. Staff has reviewed the cost data submitted during the public comment period. Air District staff understands that costs submitted to the TECH program will continue to be collected and analyzed, and staff looks forward to reviewing future report(s) on this data when released as part of its work with the implementation working group. Nevertheless, staff remains confident that the Air District's analysis includes a robust consideration of relevant cost data.

Note that cost estimates presented throughout documentation associated with the proposed rule amendments are in 2019 and 2018 year dollars, and do not account for potential cost changes since that time due to recent inflation or other factors. This could be another reason why staff's costs estimates are generally lower than those presented during the comment period. Staff notes that between 2019 and 2022, the national construction cost index increased 7.9%<sup>1</sup>. Staff expects that equipment and construction costs associated with the proposed amendments will

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<sup>1</sup> Engineering News Record 20 City Construction Cost Index. Annual averages 2019-2022. Accessed February 2023.

continue to change over time, with equipment costs expected to decrease. It is speculative to extend the short-term trends of 2019-2022 out to the compliance dates which begin in 2027. Changes to associated costs and of the proposed amendments will be evaluated over time through the implementation working group if the proposed rule amendments are adopted. Staff does not believe it is appropriate to inflate the 2018-2019 cost data to current dollars due to uncertainty related the representativeness and applicability of recent inflation trends, particularly given the long-term compliance timelines under the proposed amendments.

The Air District acknowledges that new cost data will continue to become available as projects continue to be undertaken and completed, equipment technology and markets continue to evolve, and further studies are conducted. The Air District looks forward to exploring and assessing these further developments through the implementation working group. In addition, the proposed rule amendments include a commitment from staff to provide an interim report to the Board of Directors discussing accessibility factors, of which consumer cost of compliance is central.

#### 8) Cost: Utility Costs

Comment: *Comments regarding potentially increased costs associated with electricity rates vs. natural gas rates, especially considering upkeep of stranded gas assets.*

*Adams Broadwell Joseph and Cardozo, AHRI, Anthony Rondoni, Catherine Su, Chibby Alloway, Gary Stevens, Jan Stoeckenius, Jason Biggs, Katherine Hughes, Lynn Norris, Marin County, Mary Louise Donnici, Maureen Galindo, Nancy Green, Pacific Gas and Electric, Paul Frantz, Victor Buathier, Western Propane Gas Association*

Response: For heat pump water heaters that are installed in response to the proposed amendments to Rule 9-6, the efficiency increase results in the expectation that residents, on average, will have less expensive utility bills. For heat pump space conditioning installed in the place of a furnace in response to the proposed amendments to Rule 9-4, it is expected that there will be an increase in utility bills associated with space heating. However, with a heat pump space conditioning system, air conditioning is automatically included and much more efficient than many existing air conditioning systems. Thus, Bay Area residents that don't currently have space cooling will have that added benefit. Overall space conditioning bills are expected to be lower for residents that currently use conventional air conditioning. Further information on potential utility rate savings is included in the socioeconomic report, which is included as Appendix D to the Staff Report. This report estimates an overall annual savings of nearly \$30 million in utility rate savings across the Bay Area. Staff acknowledges that savings for each specific installation and use case will vary, including among different climates within the Bay Area, pre-existence of air conditioning, equipment chosen and many other factors.

While the above recognizes potential changes to customer utility costs that could result from the proposed rule amendments, there are also concerns associated with rising natural gas rates for customers. In the scenario in which natural gas use decreases, the fixed costs associated with maintaining the natural gas infrastructure will not change. Therefore, it is expected that natural gas rates will increase in order to cover these costs over less customer usage. The Air District recognizes this risk and the potential costs to consumers. Pacific Gas and Electric as well as the California Public Utilities Commission (CPUC, which is responsible for setting utility rates in California) would be members of the implementation working group and staff expects these

entities to be involved in discussions on best practices to ensure rate equity in the implementation of the rule amendments.

The CPUC is actively working on these issues through their Long Term Gas Planning Rulemaking.<sup>2</sup> CPUC has defined affordability and continues to address it via a dedicated rulemaking, R.18-07-006. The metrics used in that proceeding include the Affordability Ratio, representing how much of a household's discretionary income is spent on utility service; the Socioeconomic Vulnerability Index, composed of metrics similar to some used in CalEnviroScreen; and Average Hours Worked at Minimum Wage.<sup>3</sup>

Air District staff understands that organizations including Pacific Gas and Electric, community choice aggregators, some local Bay Area jurisdictions and other advocacy groups are promoting whole-home electrification programs in order to alleviate the potential consumer cost burden associated with natural gas prices. Staff notes that electrification is not required by the proposed amendments. While not required by the rule amendments, staff understands the potential value in these programs and will support partner organizations as appropriate, including presenting relevant information in the interim report to the Board of Directors and assisting in public education initiatives on consumer costs and options.

#### 9) Cost: Funding

***Comment:** Comments regarding perceived lack of adequate funding for replacements, concerns regarding upfront capital costs that are still incurred with funding programs, prioritizing low-income residents for funding mechanisms, facilitating ease of access for funding programs. One commenter provides a summary of programs and that funds are increasing, another commenter claims that they are decreasing and are not available to many Bay Area families. Additional comments providing the opinion that regulation is unnecessary and that the Air District should focus on incentive programs.*

*Annette Ross, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Brian Johnson, Families and Homes San Jose, LR Jensen, Mary Porter, Patricia M Daeley, Richard Staehnke, Susan Ferrone, Western Propane Gas Association*

**Response:** Staff appreciates the comments received regarding concerns associated with access to and adequacy of funding and incentive mechanisms that could assist in offsetting costs that could be associated with compliance with the proposed rule amendments. Staff additionally recognizes comments expressing a preference for the sole use of incentive and funding mechanisms to drive the transition to zero-NOx appliances in the Bay Area. However, staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies available on the market that would be allowed under the proposed amendments. The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected

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<sup>2</sup> CPUC Long-Term Gas Planning Rulemaking. <https://www.cpuc.ca.gov/industries-and-topics/natural-gas/long-term-gas-planning-rulemaking>.

<sup>3</sup> *Ibid.*

to prevent up to 85 premature deaths per year and save up to \$890 million per year in health impacts.

There are a variety of tax credits and rebate programs for heat pump water heaters and furnaces. Section VI.D of the Staff Report includes a table of programs that are currently and expected to be available to Bay Area residents over the next decade. It is expected that the variety and level of funding will increase between potential adoption of the proposed rule amendments and the proposed compliance dates. The programs also vary in structure including upfront funding, tax rebates and other reimbursement programs as well as zero-interest loan programs such as on-bill financing offered through utilities. Some examples of available programs include up to a \$2,000 federal tax credit for heat pumps and up to \$8,000 in rebates from a local community choice aggregator (Silicon Valley Clean Energy) for heat pump equipment and electric panel upgrades or rewiring. Additional federal rebate programs targeted to moderate and low-income customers were authorized in the Inflation Reduction Act and are expected to roll out in 2023.

The program requirements for each of the programs discussed above and in the Staff Report are different. While many programs are open to a variety of households regardless of income level or rental status, others are available only to low- and moderate-income households and/or owner-occupants of homes. Staff recognizes that this makes access to these funding sources complex and possibly overwhelming for consumers. Facilitating access to these programs has also been stated as a goal by members of the Board of Directors. Should the proposed rule amendments be adopted, the implementation working group that will be convened by staff will include access to funding mechanisms and related public education efforts as a priority and a focus of the interim report that is required by the proposed rule amendments. Members of the implementation working group include many entities that administer funding programs including Pacific Gas and Electric, community choice aggregators, BayREN, local governments, the California Energy Commission and the California Public Utilities commission. Through continued coordination with these groups, staff will work to facilitate access to these programs as deemed appropriate by the Board of Directors.

10) Cost: Landlord

*Comment: Commenter is concerned about costs to landlords for required upgrades, potential lawsuits or unpaid rent associated with not providing habitable conditions for renters. Overall cost of compliance may be too much for small residential landlords to bear.*

*Lisa Taner, LR Jensen*

Response: Staff agrees with the commenter that it is the responsibility of landlords to provide habitable conditions for their renters. As with many other upgrades, it is the responsibility of the landlord to provide appropriate upgrades to the space and water heating systems as required by the proposed rule amendments.

Low-income property owners are eligible to receive additional significant assistance from programs such as those administered by community choice aggregators and the Federal Government to support their appliance upgrade. Replacing appliances is typically the responsibility of a landlord/property owner and not the tenant. Air District staff intends to ensure through the implementation working group that program operators continue to work diligently

with these property owners to ensure that they benefit from the variety of financial assistance programs.

#### 11) Cost: Equity

Comment: *Commenters raise cost concerns for low-income residents, including seniors on a fixed income. One commenter provided comments regarding a desire for inclusion of cost impacts in emissions equity analysis. Further, State law requires that these customers be offered the opportunity to arrange payment plans before they lose the ability to heat their home. Rules governing customers with serious medical conditions are stricter. The proposed zero-emission space heater rule amendments violate the intent of these laws and regulations.*

*AHRI, Andrew Pollack, Bradford White Corporation, Charles Getz, Chibby Alloway, Jamie Beckett, Jason Biggs, Jeremy Wright, Jim Beatty, Judy Weatherly, Leif Ortegren, Linnea Wickstrom, Lisa Cohen, Lisa Taner, Marin County, Mary Porter, Maureen Galindo, Meg Minto, Melanie Bieder, Melodie Lew, Michael Kopolnek, Nancy Burke, Nate Sanchez, Pacific Gas and Electric, Paul Frantz, Peter Garrison, Peter Jon Shuler, Renee Alloy, Rita Fanfelle, Houlihan, Thom Reinstein, Western Propane Gas Association*

Response: Staff appreciates and recognizes the comments concerning how the costs of compliance with the proposed amendments will impact low-income and fixed-income residents. Air District staff intends to ensure through the implementation working group that program operators continue to work diligently with these residents to ensure that they benefit from the variety of financial assistance programs, many of which are intended to assist low- and moderate-income residents specifically.

There are a variety of tax credits and rebate programs for heat pump water heaters and furnaces. Section VI.D of the Staff Report includes a table of programs that are currently and expected to be available to Bay Area residents over the next decade. It is expected that the variety and level of funding will increase between potential adoption of the proposed rule amendments and the proposed compliance dates. The programs also vary in structure including upfront funding, tax rebates and other reimbursement programs as well as zero-interest loan programs such as on-bill financing offered through utilities. Some examples of available programs include up to a \$2,000 federal tax credit for heat pumps and up to \$8,000 in rebates from a local community choice aggregator (Silicon Valley Clean Energy) for heat pump equipment and electric panel upgrades or rewiring. Additional federal rebate programs targeted to moderate and low-income customers were authorized in the Inflation Reduction Act and are expected to roll out in 2023.

The program requirements for each of the programs discussed above and in the Staff Report are different. While many programs are open to a variety of households regardless of income level or rental status, others are available only to low- and moderate-income households and/or owner-occupants of homes. Staff recognizes that this makes access to these funding sources complex and possibly overwhelming for consumers. Facilitating access to these programs has also been stated as a goal by members of the Board of Directors. Should the proposed rule amendments be adopted, the implementation working group that will be convened by staff will include access to funding mechanisms and related public education efforts as a priority and a focus of the interim report that is required by the proposed rule amendments. Members of the implementation working group would include many entities that administer funding programs including Pacific Gas and Electric, community choice aggregators, BayREN, local governments,



the California Energy Commission and the California Public Utilities commission. Through continued coordination with these groups, staff will work to facilitate access to these programs as deemed appropriate by the Board of Directors.

With regards to potential additional costs, quoted by commenters to be up to \$80,000 associated with panel upgrades, other electric upgrades and other associated renovation work, Air District staff expects that, in some instances, the electric panel for a building may be required to be upgraded in order to install technology that are allowed under the proposed rule amendments. This is not the case in many instances and new technologies are being released, such as 120V heat pump water heaters and space conditioning systems which will substantially reduce the number of upgrades required, along with other load sharing devices. Data shared by Home Energy Analytics and SPUR shows that only 15 percent of homes participating in an energy savings program used more than half of their panel's capacity. Please see Master Response 46 (Panel upgrades: Need) for further discussion of this topic.

The equity analysis included as Appendix F to the Staff Report analyzes the intensities and distributions of annual average exposures (modeled outdoor concentrations weighted by residential population) attributed to emissions targeted by the proposed rule amendments. This analysis was not intended to and does not claim to address any equity issues associated with cost. The socioeconomic report, included as Appendix D to the Staff Report breaks down anticipated cost of the proposed amendments, including evaluations for different income levels, renters vs. property owners and other categories.

#### 12) Cost: Housing

*Comment: Commenters note the potential need for relocation or other housing costs associated with potential displacement during required upgrades, estimated up to \$10,953 for 3 months of temporary housing. Commenters are additionally concerned that the proposed amendments will raise the cost of housing in the Bay Area, while another commenter is concerned that the proposed amendments will lower home values.*

*Andrew Pollack, Charles Getz, Families and Homes San Jose, Maureen Kennedy,  
Michael Kapolnek*

Response: Staff appreciates comments regarding potential additional costs associated with housing displacement. Please see Master Response 46 (Panel upgrades: Need) for a discussion of scenarios in which significant upgrade work can be avoided and Master Response 47 (Panel Upgrades: Time) for a discussion of concerns regarding potentially long wait times associated with electrical upgrades that are needed. Air District staff believes that displacement will not be required for the vast majority of installations of compliant appliances. That being said, staff acknowledges that the average cost values presented in the Staff Report and socioeconomic analysis do not represent the maximum costs that will be incurred by some residents.

Staff believes that the further market proliferation of low voltage units will alleviate significant pressure on emergency replacements or other scenarios in which commenters are concerned about housing displacement, where many replacements can be made in place with no additional electric work. In addition, community choice aggregators and water heater replacement contractors are considering a water heater loaner program that will enable a customer to have hot water while working on a panel upgrade, if one is needed. These policies are allowable

under the proposed rule amendments as long as the loaner appliance was manufactured prior to the relevant compliance date. In addition, please see Master Response 63 (Workforce: Availability/Training) for further discussion of the focus to be placed on workforce training and availability throughout the implementation process to facilitate timely upgrades when they are necessary.

Staff respectfully disagrees that the proposed rule amendments will result in a significant change, neither increase nor decrease in the cost of housing in the Bay Area. In new construction, installation of zero-NOx technologies is common practice and already required in many local jurisdictions within the Bay Area. The costs associated with compliant appliances are documented in the Staff Report and questions related to ongoing costs are addressed in Master Response 8 (Costs: Utility Costs).

#### 13) Cost-Effectiveness: General

Comment: *Commenters state that the Air District should consider the cost-effectiveness of the proposed amendments. One commenter asserts that proposed amendments fail the reasonable cost-effectiveness test and exceed the cost-effectiveness values in CARB's 2022 Scoping Plan.*

*Eric Frick, Michael Kapolnek*

Response: Cost-effectiveness is a required consideration for the adoption the proposed amendments, and the Staff Report includes the required analysis of cost impacts and cost-effectiveness. The California Health and Safety Code requires the Air District to consider cost-effectiveness and economic impacts, but it does not mandate any quantitative definition or test for cost-effectiveness. Cost-effectiveness values of other measures or from other analyses may provide further information for a consideration of cost-effectiveness, but do not limit the Air District's authority in adopting rules or amendments. As discussed in the Staff Report, the Air District evaluated and considered cost impacts in developing the proposed amendments, and found that the air quality and public health benefits presented demonstrate the value and necessity of the proposed rule amendments despite these potential impacts. Additional information on the justification of the proposed amendments is provided in the Staff Report.

Furthermore, the cost-effectiveness values from CARB's 2022 Scoping Plan Update cited by one commenter are in reference to costs per metric ton of carbon dioxide equivalent, while the cost-effectiveness being referenced in the Staff Report for the proposed amendments is per ton of NOx. Cost-effectiveness values are not typically compared between different pollutants due to differences in pollutant characteristics and their potential impacts to air quality and public health.

#### 14) Cost-Effectiveness: Emissions reductions

Comment: *One commenter asserts that emissions from impacted sources are a small percentage of regional emissions, and emissions would not be completely eliminated due to increased electricity generation. The commenter asserts that the emission reductions are insufficient justification for the costs.*

*Michael Kapolnek*

Response: The Air District recognizes that there are many sources of emissions throughout the Bay Area, however, the buildings sector is a substantial contributor to NOx emissions in the San

Francisco Bay Area. As explained in the Staff Report, the proposed amendments would result in substantial overall emission reductions from this sector, even when accounting for potential emissions from incremental electricity generation. Staff respectfully disagrees with the commenter's assertion that there is insufficient justification for the proposed amendments, and provides additional information on the benefits and justification of the proposed amendments in the Staff Report.

## Emissions

### 15) Emissions: GHG Co-Benefits

**Comment:** *Commenter expresses concern about overall carbon footprint associated with electricity emissions and refrigerants that are included in heat pumps.*

*Annette Ross, Eric Frick, Jan Stoeckenius, Lisa Cohen, Rheem, Robert Sherwood*

**Response:** Please see Master Response 25 (General opposition: Electricity generation) for a discussion of the content of and emissions associated with electricity that is delivered to consumers in the Bay Area. This information is also included in Section V of the Staff Report. Overall, due to high percentages of carbon-free electricity delivered by Pacific Gas and Electric and the community choice aggregators in the Bay Area, significant greenhouse gas emissions reductions are a co-benefit of the proposed rule amendments.

The potential GHG co-benefits estimated in the Staff Report represent maximum potential emissions reductions anticipated from the proposed rule amendments. The exact quantity of GHG co-benefits to be achieved will depend on variables including the zero-NOx technologies available throughout the compliance periods of the proposed rules, whether zero-NOx natural gas-fired technologies are developed and if so, how many consumers choose natural gas-fired technologies versus electric technologies, performance characteristics of electric technologies, emissions associated with the electric grid, and the use of hydrofluorocarbon-based refrigerants in zero-NOx technologies. Staff agrees that improper use and disposal of refrigerants is an important issue that must be addressed and that if these emissions occur the maximum GHG co-benefits as presented may not be fully realized. Air District Climate Protection staff as well as CARB staff have evaluated the emissions associated with refrigerants contained within heat pump appliances and determined that they do not outweigh the potential emissions reductions presented in the Staff report.<sup>4</sup> One commenter presented a calculation estimating an additional 0.45 million metric tons of CO<sub>2</sub> equivalent per year associated with refrigerant emissions resulting from the proposed rule amendments. While Staff does not believe there is sufficient evidence to support this value, 90 percent of GHG co-benefits estimated in the Staff Report would still be realized if the commenter's assumptions were correct. Despite this, staff recognizes the potential for emissions associated with refrigerants and supports additional actions towards minimizing and avoiding them, as summarized by CARB in its 2022 Scoping Plan:

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<sup>4</sup> Compliance data associated with Short Lived Climate Pollutant Reduction Strategy.

<https://ww2.arb.ca.gov/resources/documents/slcp-strategy->

final#:~:text=The%20Short%2DLived%20Climate%20Pollutant,)%2C%20and%20anthropogenic%20black%20carbon

“CARB has several regulations focused on reducing HFCs from the building sector and limiting the use of high [global warming potential (GWP)] refrigerants; however, if no further action is taken to reduce [hydrofluorocarbon (HFC)] emissions, the climate benefits of electrification will be partially offset, and the proportion of HFC emissions from buildings will continue to grow. Therefore, additional actions such as through incentives, regulations, and other policy measures focused on accelerating the transition to ultra-low GWP refrigerants...and recapturing, reclaiming and reusing refrigerants at end-of-life, particularly from existing equipment that utilizes high GWP refrigerants, could help reduce HFC emissions from buildings.”<sup>5</sup>

Leaks and end of life emissions of refrigerants from heat pumps can be avoided with proper equipment installation, maintenance and end of life reuse and recycling. A widely cited study of reports that ten percent of surveyed building heat pumps had detectable leaks, while 92 percent of refrigerant emissions were from a small number of catastrophic leaks<sup>6</sup>. Ensuring access to and availability of properly trained contractors and technicians will be included in the workforce initiatives of the implementation working group, which are discussed further in Master Response 63 (Workforce: Training/Availability). Additionally, the implementation working group will evaluate options for public education on and access to recycling programs in order to avoid end of life emissions from refrigerants. As noted above, potential refrigerant emissions from appliances that develop leaks or are inadequately recycled will continue to decrease over time as CARB rules further regulating these compounds will phase out the highest global warming potential gases. Recent CARB rulemakings and measures include the following:

- New heat pump equipment will be required to contain refrigerants with a GWP less than 750, with implementation dates between 2023 and 2026.<sup>7</sup>
- In conjunction with these rules, CARB developed an “F-gas Reduction Incentive Program” (FRIP) to increase the voluntary adoption of low-GWP climate-friendly refrigerant technologies that reduce GHG emissions in advance of any regulatory requirements.

#### 16) Emissions: Necessity, Health

*Comment: Commenters question the need for a zero-NOx standard including why lower, non-zero standards are not proposed as well as concerns regarding the lack of indoor air pollution impact data.*

*Bill Nugteren, Daniel Feldman, Izmirian Roofing and Sheet Metal, Jan Stoeckenius*

**Response:** The proposed amendments will improve outdoor regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances. Through the reduction of NOx emissions, and

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<sup>5</sup> CARB 2022 Scoping Plan Appendix F. November 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-f-building-decarbonization.pdf>

<sup>6</sup> Eunomia. Impacts of Leakage from Refrigerants in Heat Pumps. <https://www.eunomia.co.uk/reports-tools/impacts-of-leakage-from-refrigerants-in-heat-pumps/>

<sup>7</sup> CARB HFC Reduction Measures Rulemaking. <https://ww2.arb.ca.gov/our-work/programs/hfc-reduction-measures/rulemaking>

resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts.

Staff appreciates comments regarding non-zero standards however staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies available on the market that would be allowed under the proposed amendments.

The proposed amendments only apply to furnaces and water heaters as defined in Sections 9-4-101 and 9-6-101. The proposed rule amendments do not include requirements for stoves, dryers or other appliances. All emissions reductions calculations, air quality modeling, health impacts analysis and other studies that are used as the basis for the Staff Report are specific to the potential impacts of the proposed rule amendments and evaluate the impact of emissions and potential reductions on overall outdoor air quality in the Bay Area.

#### 17) Emissions: Peer Review

*Comment: The Amendments appear to have been created without any indoor air monitoring whatsoever in homes in the San Francisco Bay Area to show what NOx and PM<sub>2.5</sub> concentrations result from new water heaters and furnaces that comply with existing BAAQMD standards. The findings of the Staff Report on premature deaths, asthma, and economic analysis require both an observational basis and peer-review. Therefore, the claims listed in the Fact Sheet about premature deaths avoided and PM<sub>2.5</sub> exposure would not and should not withstand scientific scrutiny.*

*Daniel Feldman*

Response: The evaluation of health impacts conducted by the Air District in support of draft amendments, as summarized in the Staff Report and further documented in the Appendices, did not consider any impacts from indoor air pollution. Rather, it was assumed that existing appliances are properly vented to the outdoors. All the impacts evaluated were attributable to outdoor air pollution from space and water heating appliances covered by Rules 9-4 and 9-6.

The health impacts and economic analyses conducted by the Air District made use of EPA-approved models and methods that have been extensively peer-reviewed. Estimates of changes in outdoor air pollutant concentrations projected to result from the proposed appliance rule amendments were prepared using EPA's Community Multiscale Air Quality (CMAQ) Model, one of two photochemical grid models approved by EPA for regulatory applications. Health impacts and associated monetary valuations resulting from the concentration changes were estimated using EPA's Environmental Benefits Mapping and Analysis Program (BenMAP), which has been widely used to estimate the health impacts of changes in levels of outdoor air pollution.

The District's overall approach is consistent with recent regulatory impact analyses (RIAs) performed by EPA for proposed air quality regulations. Reliance on modeling results for such analyses is needed because air monitoring data cannot provide information on proposed future changes in emissions and air quality. For example, in 2022, EPA conducted an RIA for proposed reconsideration of national air quality standards for particulate matter. In that analysis, potential health benefits of emissions controls were estimated using a similar modeling-based approach, with the same modeling tools (CMAQ and BenMAP), as those applied by the Air

District (see Regulatory Impact Analysis for the Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, EPA-452/P-22-001, December 2022).

## Existing Spaces

### 18) Existing Spaces: Permits/Setbacks

Comment: *Concerns regarding potential issues associated with outdoor installations of heat pump compressors, permitting needs, and potential conflict with city setback or other building code requirements.*

*Annette Ross, Eric Frick, Izmirian Roofing and Sheet Metal, Jim Robbins, Linnea Wickstrom, Palo Alto Green Gables Residents, Renee Alloy, Richard Hallsted, Terry Houlihan*

Response: Unlike water heaters which can frequently be replaced in the footprint of an existing natural gas appliance, heat pump space conditioning equipment may require installation of a condenser or other equipment outdoors. In the current market, low voltage systems taking up a smaller footprint exist for space heating but they typically only serve very small units or individual rooms. In order to provide the opportunity for development of additional or improved low voltage solutions as well as to allow for local jurisdictions such as cities to consider adjusting their setback and permitting requirements for outdoor installations, Air District staff has proposed a compliance date of January 1, 2029, for zero NOx furnaces. Air District staff also plans to convene an ongoing Implementation Working Group to further investigate a number of implementation topics, including the status of technology development and availability, as well as actions/activities of local jurisdictions that could support the adoption of zero-NOx technologies.

Staff has begun and intends to continue coordinating with local jurisdictions such as cities and counties on how they can support the adoption of zero-NOx technologies in their communities. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted, if the local jurisdiction so chooses, to align with the proposed rule amendments, should they be adopted by the Air District's Board of Directors.

### 19) Existing Spaces: General

Comment: *General concerns about retrofits and available space in existing homes for heat pump installations.*

*Bradford White Corporation, Eric Frick, Families and Homes San Jose, Linnea Wickstrom, Marin County, Mary Porter, Maureen Kennedy, Michael Kopolnek, Ned Kuypers, Rheem*

Response: Staff understands potential concerns associated with the installation of heat pump appliances in existing spaces. Please see Master Response 18 (Existing Spaces: Permits/Setbacks) for a discussion of scenarios in which compressors for heat pump space conditioning systems must be installed on the exterior of buildings. With regards to heat pump water heaters, it is typically recommended that the unit be installed in a space in which there is sufficient air flow for the unit to pull hot air out of the space in order to function optimally, transferring that heat to the water within the water heater. Manufacturer recommendations range from 600 to 1000 cubic feet of space to allow for optimal heat transfer for a heat pump

water heater unit. In cases where this space is not available and the existing appliance is in a smaller space such as a closet, staff acknowledges that there may be additional costs involved in the installation of a heat pump water heater, however solutions exist to minimize these concerns and associated costs. First, installation in a closet or other small existing space is still possible should the space have adequate provisions for air exchange such as venting or louvered doors. City staff that set local codes and CEC staff that is involved in the state building code process will be present on the working group to ensure that local codes allow for, and assist with, the installation of zero-NOx water heaters including heat pumps.

Additionally, with newer low voltage heat pump water heaters coming onto the market, less retrofitting work is needed for a heat pump water heater to be installed in a different space within the home, if desired. Finally, tankless water heaters are classified under Section 9-6-303.5, meaning that natural gas-fired tankless water heaters that are manufactured up to January 1, 2031 can continue to be installed under the proposed rule amendments. Tankless residential water heaters are not subject to the compliance date of January 1, 2027 in Section 9-6-301.5. Tankless heat pump technology exists and is on the market today but typically serves smaller loads. This technology is expected to improve over time and an updated evaluation of its efficacy will be included in the interim reporting to the Board of Directors that is required by the proposed rule amendments.

#### 20) Existing Spaces: Exemptions

Comment: *Commenter explains a situation for a need for an exemption in a case where someone may live in a condominium and are unable to coordinate and/or execute a panel upgrade due to their HOA and/or a heat pump due to lack of space.*

*Annette Ross*

Response: Staff appreciates comments and concerns raised about potential difficulties of installations in specific situations. Please see Master Response 19 (Existing Spaces: General) for a discussion of potential solutions to and considerations for installation of compliant appliances in existing spaces. Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided.

Staff understands the commenters concerns associated with complications and costs of the installation of currently available zero-NOx appliances (heat pumps) in existing spaces. However, Air District staff did not propose to include exemptions in Rules 9-4 and 9-6 for specific installation scenarios. While installation of zero-NOx appliances may be more difficult and/or costly in some situations compared to others, depending on the types of zero-NOx technology available upon future compliances dates, installation of zero-NOx appliances is currently possible across all appliance categories subject to the proposed amendments, and costs and installation challenges are expected to go down in the coming years.

Air District staff plans to consolidate information and facilitate access to funding programs, knowledgeable contractors and educational materials as part of the Air District's work during the implementation period of the proposed rule amendments, should they be adopted. The implementation working group will track accessibility factors including cost and these will be

reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

## General Opposition

### 21) Fifth Amendment: Takings Clause

Comment: *The proposed amendments constitute a taking under the 5th Amendment of property by forcing conversion to electric higher-priced and inferior products.*

*Charles Getz, Jeremy Wright, Maureen Galindo*

Response: The commenter states that adoption of the Proposed Amendments would constitute a taking in violation of the Fifth Amendment. Staff respectfully disagrees. The Fifth Amendment forbids the taking of private property for public use without just compensation. This Constitutional guarantee is “designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.” *Penn Central Transp. Co. v. City of New York*, 438 U.S. 104 (1978). Courts have found regulatory takings where regulations fully deprive property owners of the right to use their property, or unreasonably interfere with investment-backed expectations. Staff acknowledges the commenter’s concerns regarding price and performance of currently available zero-NOx appliances. These concerns are addressed at Master Responses 39 (Heat Pump: Reliability) and 40 (Heat Pump: Efficiency). Importantly, the Proposed Amendments would not “force conversions” or “take” existing operational appliances away from Bay Area property owners. Rather, they would require that when property owners purchase and install new appliances, these new appliances meet updated emissions standards. Further, the Proposed Amendments would not result in an unconstitutional taking if adopted because the Amendments would apply to appliances evenly throughout the Bay Area, would not deprive appliance owners of using their property or introduce unwanted occupants onto private property, would not reduce the value of property and have a valid and important public purpose of decreasing harmful NOx and PM<sub>2.5</sub> emissions to improve air quality and public health.

### 22) General Opposition: Emergency Situations

Comment: *Commenters explain the potential issues associated with emergency situations and/or natural disasters where they may be unable to install compliant equipment, including some commenters’ request for exemptions in these scenarios.*

*AGC of CA, AHRI, Bradford White Corporation, Michael Kapolnek, Mike Thompson, Randy Breunling, Rheem*

Response: Staff understands that potential emergency replacements are a large concern for residents of the Bay Area and acknowledges that additional options to accommodate emergency changeouts need to be considered by the implementation working group, should the proposed rule amendments be adopted. These options additionally need to be a focus of public education campaigns leading up to the compliance dates of the proposed amendments. Please see Master Response 46 (Panel upgrades: Need) for a discussion of scenarios in which panel upgrades and other potentially time-consuming upgrades can be avoided in many scenarios. In particular, Staff believes that the further market proliferation of low voltage units will alleviate



significant pressure on emergency replacements where many replacements can be made in place with no additional electric work.

In addition, community choice aggregators and water heater replacement contractors are considering a water heater loaner program that will enable a customer to have hot water while working on a panel upgrade. These policies are allowable under the proposed rule amendments as long as the loaner appliance was manufactured prior to the relevant compliance date. Another potential approach to space heating concerns during emergencies is by the utilization of portable electric space heaters which are currently available in the market today. In addition, please see Master Response 63 (Workforce: Availability/Training) for further discussion of the focus to be placed on workforce training and availability throughout the implementation process to facilitate timely upgrades when they are necessary.

#### 23) General Opposition: Exemptions

Comment: *Commenters request exemptions for locations with power outages, low-income households, seniors, locations where installations are impractical, where panel upgrades are required.*

*AHRI, Annette Ross, Bill Maimone, BOMA, Daniel Hachigian, Gary Stevens, Kelly Porter, Lisha Mainz, Mats Lundgren, Michael Kapolnek, Niall Ferguson, Rick Yost*

Response: Staff understands and appreciates the commenters concerns regarding power outages and costs of zero NOx appliances and their installation. However, Air District staff has not proposed to include exemptions in Rules 9-4 and 9-6 for specific installation scenarios. While installation of zero-NOx appliances may be more difficult and/or costly in some situations compared to others, zero-NOx appliances are currently available across all appliance categories subject to the proposed amendments, and depending on the types of zero-NOx technology available upon future compliances dates, costs and installation challenges are expected to go down in the coming years.

Air District staff plans to consolidate information and facilitate access to funding programs, knowledgeable contractors and educational materials as part of the Air District's work during the implementation period of the proposed rule amendments, should they be adopted. The implementation working group will track accessibility factors including cost and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

#### 24) General Opposition: Necessity, Health

Comment: *General opposition comment regarding the need for the proposed rule amendments in terms of emissions from covered appliances, impacts to regional air quality and health impacts.*

*Andrew Pollack, Ashley Kline, Bill Hough, Bill Maimone, Bill Nugteren, Brian Avery, Bruce Adornato, Catherine Su, Charles Getz, Chibby Alloway, Craig Talyor, D Pickham, David Luce, Diane Perrone, Emy Baldwin, Eric Frick, Fred Ortiz, Ginnie Plato, Henry Riggs, Henry Riggs, Holly Lazzarini, Jamie Beckett, Jan Stoeckenius, Janet Garcia, Jay Feldis, Jeremy Wright, Jim Beatty, Jim Clark, John Accinelli, Joseph Machado, Judy Weatherly, Katherine Hughes, Lada Adamic, Larry Thompson, Leif Ortegren, Linnea Wickstrom,*

*Lisa Cohen, Lisa Taner, Lynn Norris, Malcolm Post, Marilyn Barrett, Marsha Adams, Mary Gilles, Mary Porter, Mary Schumacher, Meg Minto, Melanie Bieder, Michael DeMoss, , Michael Kapolnek, Michal Atz Brenzel, Nancy Green, Niall Ferguson, Peter Jon Shuler, Philip Ragozzino, Randy Breunling, Regan Avery, Rick Vujovich, Rita Fanfelle, Rob SS, Robert Horstmeyer, Robert Sherwood, Rocky Fort, Roger Melen, Ronald Dow, Sandra Pachaud, Terry Houlihan, Thomas Pfaeffle, Victor Buathier, William Williams*

Response: The proposed amendments will improve regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances.

Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. The standards will also improve overall regional air quality. The Bay Area does not currently attain all of the state and national ambient air quality standards for ozone or particulate matter, as discussed in Section V. of the Staff Report, and implementation of the proposed amendments will assist the Air District in its efforts to reach attainment.

#### 25) General Opposition: Electricity generation

Comment: *General concerns expressed regarding electricity generation capacity and associated emissions.*

*AGC of CA, Michael DeMoss, Mitch Lerman, Nancy Green, Thom Reinstein, Western Propane Gas Association*

Response: As shown in the Staff Report associated with the proposed amendments, for electric replacements, the electricity provided is from the community choice aggregator local to the customer, or direct from Pacific Gas and Electric (PG&E). The emissions associated with each of these electricity sources as well as their contribution to projected Bay Area electric load are shown in Section V of the Staff Report. The resulting weighted average is 85 percent carbon and NOx-free electricity generation. The continued build out of utility-scale renewable development has greatly increased the reliability and availability of low-emission electricity in the Bay Area and beyond.

The emissions reductions calculated in the Staff Report also take into account the potential emissions associated with natural gas-fired power plant electricity generation. NOx emissions standards for natural gas-fired power plants represent a significant reduction over existing standards for residential space and water heaters. For example, the existing standard for furnaces in Rule 9-4 is 40 ng/J, or 55 parts per million NOx (ppm). In comparison, nearly all natural gas-fired power plants in the Bay Area are required to meet a 2.5 ppm NOx emission limit NOx. In addition as stated above, natural gas-fired power plants only provide for a small portion of electricity generation in the Bay Area. Potential air quality and greenhouse gas emissions impacts associated with the proposed rule amendments are discussed in detail in Sections 3.1 and 3.2 of the EIR respectively.

26) General Opposition: Propane

Comment: *Question regarding whether propane fueled appliances are covered by the rule amendments and potential concerns about rural needs for propane fueled appliances.*

*Daniel Hachigian, Jeff Calcagno, Lisha Mainz, Niall Ferguson, Rick Yost, Tamara Gabel, Tony Gaughan, Western Propane Gas Association*

Response: Appliances that utilize propane as fuel are not covered by the proposed rule amendments as Rules 9-4 and 9-6 have previously and would continue to specifically apply only to natural gas-fired sources, as stated in Sections 9-4-101 and 9-6-101 of the two rules.

27) General Opposition: Stove Study

Comment: *Commenter believes that rule applies to stoves. Additional comments associated with meta-data RMI study and lack of new data.*

*Catherine Su, Chanel Harris, David Luce, Emy Baldwin, John Sheakley, Maureen Kennedy, Meg Minto, Regan Avery, Sally Giese, Sandra Pachaud, William Garrett*

Response: The proposed amendments to each rule will only apply to furnaces and water heaters as defined in Sections 9-4-101 and 9-6-101, respectively. The proposed rule amendments do not include requirements for stoves. All emissions reductions calculations, air quality modeling, health impacts analyses, and other studies that are used to support the basis for the Staff Report are specific to the potential impacts of the proposed rule amendments. The recent study issued by Rocky Mountain Institute and other authors is focused on stoves, which are not included in the proposed rule amendments, and is not included in analysis associated with the proposed rule amendments.

28) General Opposition: CARB

Comment: *Comment regarding CARB's SIP commitment and suggestion that the Air District defer to CARB's future rulemaking.*

*Rheem*

Response: In the 2022 California State Implementation Plan Strategy, CARB signaled its intention to develop zero emission building appliance rules with a potential 2030 implementation date. No draft rulemaking has yet been proposed. The Air District's proposed rule amendments specifically regulate NOx emission requirements for the same or similar sources.

Air District staff sees the proposed amendments to Rules 9-4 and 9-6 and potential CARB rules as different, but complementary to each other and not in conflict. CARB agrees and strongly supports the Air District's efforts, stating in its comment letter:

*CARB supports the Air District's proposed amendments to these rules and applauds Air District efforts to take action in this area where there is demonstrated technology ready to deploy at scale with tremendous health benefits. Bay Area's adoption of zero-NOx emission limits for space and water heaters will be an*

*essential contribution to California's strategy for attainment of air quality standards. CARB staff look forward to coordinating with the Bay Area on implementation of the rule amendments.*

Air District staff is and will continue to be in close contact with CARB staff as they develop their regulations. Should the Air District's proposed amendments be adopted, CARB will be represented on our implementation working group. Through being involved in our implementation process, CARB will be able to apply lessons learned in development of their state-wide regulation and through our interim reporting process, we will have the space to adjust our administrative requirements if needed to alleviate any potential future conflict (although this is not necessarily anticipated).

#### 29) General Opposition: Regional Regulation

Comment: *Concern was raised that proposed amendments will result in piecemealing, jurisdiction by jurisdiction electrification requirements.*

*Adams Broadwell Joseph and Cardozo*

Response: The proposed amendments are not electrification requirements, but rather are NOx emission standards for space- and water-heating appliances. Electric heat pumps are currently available and would not conflict with the proposed emissions standards, but natural gas-fired appliances that emit zero-NOx would also comply with the proposal. The Air District has been regulating NOx emissions from furnaces and water heaters for several decades. The current proposed amendments are in line with previous iterations of Rules 9-4 and 9-6 and would apply to space- and water-heating appliances within the Air District's jurisdiction. The Air District lacks authority to regulate appliances sold or installed outside of the Bay Area, but the proposed amendments will best address emissions from all replacement space and water heating appliances within the Bay Area region. As described in Master Response 28 (General Opposition: CARB), CARB and District staff sees the proposed amendments as complementary to potential state rulemaking efforts that would address air pollutant emissions from space and water heating appliances.

#### 30) General Opposition: Authority

Comment: The commenters question whether the Air District has the authority to adopt the Proposed Amendments, and whether the state already has adopted the same or similar requirements for appliances.

*Charles Getz, Randy Breunling, Steven Wilk*

Response: The California Legislature vested the Air District with primary authority to control all sources of air pollution (except motor vehicles) in the San Francisco Bay Area, and the authority to adopt rules and regulations in support of its mission. It is the oldest regional air pollution control district in the nation, acting to protect the health of the Bay Area since 1955. Sections 40000, 40001, 40200, 40702, and 40725 through 40728.5 of the California Health and Safety Code outline these authorities. The Air District has regulated NOx emissions from space- and water-heating appliances for several decades. Rule 9-4 for furnaces was first adopted in 1983, with this version of the rule still in place. Rule 9-6 was adopted in 1992 and was most recently updated with more stringent NOx emissions standards for certain equipment in 2007. The State

has not yet adopted regulatory requirements for emissions from space and water heating appliances, but has indicated plans to do so through the California Air Resources Board (CARB). CARB has commented that it strongly supports the Air District's Proposed Amendments and finds them complementary to its planned future efforts in this space.

### 31) General Opposition: Grandfathering

Comment: *Commenter explains the need for a grandfathering exemption for existing homes and for the new limits to only apply to new housing developments.*

*A Yvette Huginnie, Barry Robbins, Linda Chin, Ned Kuypers*

Response: The proposed rule amendments are intended to apply to all newly sold and installed appliances that are manufactured after the proposed compliance dates. The vast majority of housing in the Bay Area is existing housing and the overall emissions associated with natural gas combustion in buildings is a significant source of emissions that staff believes is necessary to address in order to improve the air quality and health outcomes for residents of the Bay Area. As stated in the Staff Report, Section VI, the proposed amendments are expected to prevent up to 85 premature deaths per year and save up to \$890 million in reduced health impacts due to reductions in fine particulate matter exposure.

### 32) General Opposition: Safety

Comment: *If affected residents cannot find affordable temporary housing, they may be tempted to heat their homes using unsafe means, this may include using a gas range to heat their home. Besides the safety hazards of the practice, it exposes residents to unhealthy indoor air.*

*Michael Kapolnek*

Response: Staff appreciates the commenter's concern for this safety / health issue and intends to examine these concerns during the implementation phase should the proposed amendments be adopted. As zero-NOx technology advances, the need for and/or potential delays involved with panel installations is expected to decrease significantly, allaying the commenter's concern regarding temporary housing. See Master Response 46 (Panel Upgrades: Need). Should delays remain a potential issue upon the compliance dates, one potential approach to avoid both the issues of temporary housing and the use of unsafe gas range heating is the utilization of portable electric space heaters during the transition from natural gas space heating to heat pumps. Portable space heaters are capable of heating a single room with costs ranging from \$30 to \$400 each, with most costing less than \$100.<sup>8</sup> However, staff recognizes that this transitional approach may result in energy cost increases and an additional burden on the electric grid, but as mentioned earlier, it may avoid the need for temporary housing and unsafe heating practices.

## Grid Capacity

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<sup>8</sup> Google Search: [Portable Electric Space Heater](#)

### 33) Grid Capacity: Insufficient Capacity

Comment: *Including concerns about additional electric load associated with capacity availability from PG&E at transformer/neighborhood scale, generation capacity including renewable build out and peaker plants.*

*Adams Broadwell Joseph and Cardozo, AGC of CA, Annette Ross, Anthony Rondoni, Brian Avery, Carolyn Mar, Chibby Alloway, EJ Cire SMART Local Union 104, Families and Homes San Jose, Henry Riggs, Izmirian Roofing and Sheet Metal, Jason Biggs, Jeremy Wright, John Accinelli, Julia Wall, Katherine Hughes, Linnea Wickstrom, Lisa Taner, Malcolm Post, Marin County, Mark Reifkind, Marsha Adams, Mats Lundgren, Melanie Bieder, Michael DeMoss, Mitch Lerman, Nancy Green, Ned Kuypers, Pat Marriott, Peter Jon Shuler, Randy Breunling, Regan Avery, Robert Horstmeyer, Ronald Vinsant, Sergio Marti, Steve Simons, Steven Wilk, Terry Houlihan, Thomas Tilden, TJ Giuli, Tony Gaughan, Victor Buathier*

Response: Appendix D of the Staff Report associated with the proposed rule amendments includes an electric infrastructure analysis prepared by Energy and Environmental Economics (E3). This analysis investigates the potential electric load increases that would result from the proposed amendments. This analysis also shows the expected incremental load increases over two state-wide planning scenarios in the coming decades.

This analysis also details the potential costs associated with these potential infrastructure upgrades. These costs are additionally incorporated into the socioeconomic analysis, which is included as Appendix C to the Staff Report.

The E3 analysis shows that under California Energy Commission (CEC) and California Public Utility Commission's (CPUC) planning scenarios, the Bay Area will see an increase in electricity demand due to building and transportation electrification. Relative to the Low Policy Reference in the E3 analysis, which assumes no major state policy changes in support of building electrification, the proposed zero NOx standards could result in 6.2 TWh (terawatthours) per year of additional electric load by 2050. For comparison, California's 2020 electric load was approximately 280 TWh/year<sup>9</sup> and is modeled to grow to 338 TWh/year by 2045 in the Low Policy Reference.<sup>10</sup> Relative to the High Policy Reference, which assumes major state policy support for building electrification by the 2030s, the zero NOx standards result in earlier load growth, seeing 1.5 TWh/year of incremental load in the 2030s. However, the incremental load falls to near zero load impact by 2050.

There is time to continue to make the necessary investments to add supply and ensure reliability and sufficient capacity at the state, regional and neighborhood level. Grid investments are being made by PG&E and supported by the State and federal government on a continuing basis. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with capacity, including generation capacity, transmission capacity, and all scales of distribution capacity with members including representatives from PG&E, the CPUC and the CEC.

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<sup>9</sup> California Energy Commission. <https://ecdms.energy.ca.gov/electbycounty.aspx>

<sup>10</sup> California Air Resources Board. <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

### 34) Grid Capacity: Air Conditioning

Comment: *Concerns about additional electric load associated with air conditioning that would come online as a result of heat pumps.*

*Daniel Hachigian, Lisha Mainz, Rick Yost*

Response: The electric infrastructure analysis prepared by Energy and Environmental Economics (E3), analyzed the potential electric load increases from space heating, water heating, and air conditioning as well as the associated electric grid impacts.

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

Conversely, heat pumps installed in residential buildings that currently have air conditioning may decrease cooling loads for the building, as new heat pump technologies generally perform better than existing air conditioners. The E3 analysis lays out the incremental load associated with new space heating, water heating, and air conditioning load anticipated as a result of the proposed rule amendments.

### 35) Grid Capacity: Reliability

Comment: *Concerns regarding reliability of electrical grid, including power outages, length of power outages, rural concerns etc. Including reliability and safety concerns associated with decreased maintenance worker resources associated with lower natural gas usage.*

*Adams Broadwell Joseph and Cardozo, AGC of CA, Alfred Who, Bill Hough, Bill Nugteren, Brian Johnson, Bruce Jackson, Bryce Vree, Chanel Harris, Chibby Alloway, Colin Daley, Dan Winter, Daniel Hachigian, David Luce, EJ Cire SMART Local Union 104, Families and Homes San Jose, Henry Riggs, Jason Biggs, Jason Friedrichs, Jeff Burke, Jeff Calcagno, Jo Ann Mandinach, Katherine Hughes, Kelly Porter, Kristie Eglsaer, Lewis Paris, Lisha Mainz, Lynn Norris, Malcolm Post, Marilyn Barrett, Mark Reifkind, Mary Louise Donnici, Maureen Galindo, Michael DeMoss, Nancy Green, Nancy Westreich, Ned Kuypers, Niall Ferguson, Patricia M Daeley, Pearl Karrer, Peter Jon Shuler, Renee Alloy, Rick Yost, Robert Horstmeyer, Robert Sherwood, Rocky Fort, Ronald Vinsant, Sally Giese, San Mateo 19<sup>th</sup> Ave Homeowners, Steven Wilk, Susan Ferrone, Tamara Gabel, Terry Houlihan, Thomas Tilden, Tony Gaughan, Victor Buathier*

Response: Staff recognizes the commenters concerns regarding the reliability of the electric grid and the potential for increased reliance on electricity as consumers may transition to heat pumps and other electric technologies in response to the proposed rule amendments. Staff notes that a transition to heat pumps is not required by the proposed amendments, and that the amendments would allow for the development of natural gas-fired zero NOx appliances should manufacturers choose to develop and offer them for sale. However, based on currently available zero-NOx technology, staff did assume for purposes of a “worst case” analysis on the electric grid that heat pumps would be adopted in response to the proposed amendments.

Appendix D to the Staff Report for the proposed rule amendments is the evaluation of electric infrastructure impacts performed by E3. This analysis includes an evaluation of maximum daily loads. The risk of blackouts is driven by high, inefficient AC demand and extreme heat and storm events. While the E3 analysis finds new peak load days associated with increased air conditioning uptake from heat pump adoption, heat pumps cool more efficiently than traditional AC and can thus reduce grid strain, rather than exacerbate it.

Potential electric grid impacts were evaluated in E3's report relative to two reference scenarios: a Low Policy Reference, which assumes no major state policy changes in support of building electrification, and a High Policy Reference, which assumes major state policy support for building electrification by the 2030s. The E3 study concludes that the Project would, under the "worst case" Low Policy Reference Scenario evaluated by E3, result in increased energy demand beyond the planned electric grid capacity growth represented in this scenario. The E3 study estimates the amount of utility-scale solar capacity that would need to be developed to meet this demand and the Draft EIR describes the types of environmental impacts that would result from these energy projects, as well as the Project's potential contribution to this significant cumulative impact.

The E3 analysis in Appendix D to the Staff Report also describes the CPUC and CEC planning processes and the projected buildout of utility scale solar (or other renewable energy generation sources) through the state Integrated Resource Planning process.

Based on these evaluations, staff recognizes the need for expansion of the grid from existing infrastructure but believes that the required resource build out to support compliance with the proposed rule amendments is reasonable and will be supported by existing and developing state policies. The delayed implementation of the proposed rule amendments and appliance updates over time at the end of life will result in this increased load not being necessary immediately or all at once. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with reliability of the grid, including availability of trained workforce to continue appropriate maintenance of both gas and electric systems, with members including representatives from PG&E, the CPUC and the CEC.

Staff also recognizes that there may be more grid reliability concerns in rural communities, and that these communities have lost power for long periods of time recently. Staff commits to focus on these serious concerns in the implementation working group should the proposed amendments be adopted. Staff notes that use of propane appliances is more common in rural areas, and that the proposed amendments do not address propane-fired appliances. While staff does not encourage the use of propane-fired appliances due to their air quality and public health impacts, Air District rules do not currently regulate these appliances.

### 36) Grid Capacity: Statewide Planning

Comment: *Comment regarding CPUC planning proceedings and how Air District/E3 projections are integrated.*

*Adams Broadwell Joseph and Cardozo, AGC of CA, Bryce Vree, Dan Winter, Julia Wall,  
Michael Kapolnek*



Response: The E3 analysis in Appendix D to the Staff Report also describes the CPUC and CEC planning processes and the projected buildout of utility scale solar through the state Integrated Resource Planning process. Based on these evaluations, staff believes that the required resource build out to support compliance with the proposed rule amendments is reasonable and complementary to existing state policies. Should the proposed rule amendments be adopted, the implementation working group will also continue to evaluate any potential issues associated with reliability, with members including representatives from PG&E, the CPUC and the CEC. Any issues identified will be presented by staff to the Air District Board of Directors as appropriate.

The EIR, included as Appendix G to the Staff Report, also includes discussion of the potential impacts of additional utility buildout that is expected as a result of California's existing policies and utility planning processes as well as potential additional incremental need associated with the proposed rule amendments.

With respect to concerns about stranded natural gas assets, staff notes that the Proposed Amendments would not require the elimination of natural gas use, rather they would only regulate emissions from natural gas-fired appliances, and the proposed amendments do not address all appliances or other sources that use natural gas. The Proposed Amendments would not regulate gas stoves, gas dryers, or other natural gas-fired appliances. The proposed amendments additionally do not impact institutional, industrial or commercial boilers, steam generators, process heaters, cogeneration or any other natural gas-fired processes. Thus, adoption of the Proposed Amendments would not force or cause the stranding of natural gas assets. More widespread building decarbonization and other efforts at the state level may have an impact on natural gas assets, and staff understands that these important issues are being addressed by the state through the CPUC. See also Master Response 8 (Cost: Utility Costs).

## Heat Pumps

### 37) Heat Pump: Noise

Comment: *Commenter expressed concern about noise associated with heat pump water heaters.*

*Izmirian Roofing and Sheet Metal, Paul Frantz*

Response: Staff recognizes the potential concerns associated with noise from heat pump technologies, which are compliant with the proposed rule amendments. Potential noise impacts resulting from the Project are addressed in the Draft EIR (see Impact 3.4-1). As described therein, the potential operational noise impacts associated with new heat pump units could be potentially significant depending on the existing ambient noise environment, noise levels associated with the units, and the noise standards of the jurisdiction in which the units would be installed. Additional explanation of potential operational noise impacts associated with new heat pump units can be found in Final EIR. The Draft EIR concludes that the Project's long-term operational noise impact would be potentially significant and unavoidable because the Air District does not have jurisdiction to monitor or enforce mitigation measures. Staff additionally notes that the Draft EIR identifies improvements to regional air quality and public health while also achieving co-beneficial greenhouse gas reductions. While it is difficult to balance competing environmental interests, staff strongly believes that the significant improvements to regional air quality and public health benefits of the Project outweigh the potential adverse environmental impacts of the Project.

38) Heat Pump: Availability/Delay

Comment: *Commenters assert that heat pumps may not be readily available.*

*AHRI, Bradford White Corporation*

Response: The Staff Report includes an evaluation of technologies that are currently available on the market that comply with the zero-NOx requirements included in proposed amendments to Rule 9-4 and Rule 9-6. Should the proposed amendments be adopted, the planned implementation working group's work will include tracking the cost and availability of zero-NOx technologies. This work will include an interim report to the Board of Directors that will report on accessibility factors for compliant appliances as laid out in Sections 9-4-405 and 9-6-404 of the proposed amendments. While staff does not anticipate issues with availability of compliant appliances, particularly with more than four years until the first zero-NOx compliance date, the implementation working group will include representation from manufacturers and distributors to provide up-to-date, best available information on appliance availability.

39) Heat Pump: Reliability

Comment: *Commenter asserts that heat pumps may not be reliable and proven technologies.*

*Jeremy Wright*

Response: Heat pumps are an energy-efficient alternative to air conditioning (heating and cooling) and water heating for all climates and function similar to a refrigerator – they use electricity to transfer heat from a cool space to a warm space, making the cool space cooler and the warm space warmer. Heat pump technologies have been in use for decades and installations continue to grow both internationally and in the US, with similar appliance lifetimes to traditional natural gas appliances.<sup>11</sup> This is discussed further in Master Response 35 (Grid Capacity: Reliability).

40) Heat Pump: Efficiency

Comment: *Commenters raise questions about efficiency as well as assertions about need to prioritize funding etc. of heat pumps over electric resistance technologies.*

*Ashley Kline, Center For Sustainable Neighborhoods, Eric Frick, Hollenback Avenue Residents, Izmirian Roofing and Sheet Metal, Jan Stoeckenius, Maureen Galindo, Michael Kapolnek, Renee Alloy, Terry Houlihan*

Response: The proposed amendments phase out emissions of nitrogen oxides from natural gas-fired space and water heating appliances, but do not mandate electric appliances. Any space and water heating appliances that are designed to have no nitrogen oxides emissions would comply with the rule proposal. Electric appliances are, however, the only currently available space and water heating appliances that do not emit nitrogen oxides, so much of Air District staff's analysis has focused on the potential proliferation of electric appliances in response to the rule proposal.

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<sup>11</sup> Heat Pumps. IEA. <https://www.iea.org/reports/heat-pumps>.

Heat pumps are an energy-efficient alternative to natural gas-fired appliances and can be four times more energy efficient than natural gas fired appliances as they are simply moving heat from one place to another instead of creating it through combustion. Incentive programs prioritize efficient technologies over less efficient or older electrical appliances such as electric resistance technologies. However, both of these technologies would be compliant with the proposed rule amendments as they do not emit NOx upon operation. Electric hybrid systems which utilize resistance and heat pump technologies are also available and may be preferred by some consumers. Uptake of electric resistance appliances is not expected to be significant as the technology is less efficient and therefore considerably more expensive to operate than modern heat pump technologies. Electric resistance appliances also face the same potential electric upgrade challenges as 240V heat pumps and therefore do not offer a benefit or additional ease of installation over heat pumps.

For heat pump water heaters that are installed in response to the proposed amendments to Rule 9-6, the efficiency increase results in the expectation that residents, on average, will have less expensive utility bills. For heat pump space conditioning installed in the place of a furnace in response to the proposed amendments to Rule 9-4, it is expected that there will be an increase in utility bills associated with space heating. However, with a heat pump space conditioning system, air conditioning is automatically included and much more efficient than many existing air conditioning systems. Thus, Bay Area residents that don't currently have space cooling will have that added benefit and overall space conditioning bills could be lower depending on household usage and specific location within the Bay Area.

With regards to water heater capacity and efficiency, many heat pump water heaters have the same size tank as traditional natural gas appliances. In some cases, and depending on the specific installation, air flow and other factors, additional water can take longer to heat up than consumers may be accustomed to with their natural gas-fired water heater. These appliances still provide sufficient water for an average sized household and function with greater thermal efficiency. Additionally, the technology has improved greatly in recent years and is expected to continue this trend, which will be included in the interim report to the Board of Directors as appropriate.

#### 41) Heat Pump: Cold Weather Operation

Comment: *Concerns expressed regarding the operation of heat pumps during cold weather.*

*AGC of CA, Nancy Westreich*

Response: In the past, there have been concerns about the ability of heat pump space conditioning units to continue to work during cold weather as there is less heat in the outside air to extract and move into the space to heat it. The technology of heat pump appliances has improved significantly over the past 20 years and recent evidence shows that newly manufactured heat pumps can work well in cold weather in Mountain West and Northeastern states. Modern cold weather heat pump technology is certified to operate in conditions as low as

-20 degrees Fahrenheit. This gives Air District staff confidence that the technology is well suited to the climate in the Bay Area and the technology is only expected to continue to improve.<sup>12,13,14</sup>

#### 42) Heat Pump: Operation

Comment: *Comment asserting that lifetime of heat pumps and ability to repair is less than natural gas.*

*John Accinelli*

Response: The commenter estimates that a heat pump space conditioning unit has an average lifespan of 20 years. While appliance lifetimes will vary with usage, setting and the specific unit, this is consistent with staff's understanding and is two years longer than the average lifespan of a natural gas furnace utilized in the Staff Report (initially determined by an E3 report referenced therein). Staff's understanding is that the anticipated lifetime of a heat pump water heater is also similar to that of an existing natural gas water heater. Therefore, staff disagrees that there is a significant difference in lifespan of appliances and therefore continued overall cost to a property owner. This is discussed further in Master Response 7 (Cost: General). Similarly, heat pump appliances can be maintained and repaired by qualified technicians to extend their lifetimes in a similar manner to natural gas appliances.

#### 43) Heat Pump: Commercial

Comment: *Concerns associated with commercial applications including questioning reasoning for longer timeline, concerns associated with high temperature needs for large boilers in hospitals and research centers, and commercial HVAC systems.*

*AHRI, Annette Ross, BOMA, Bradford White Corporation, Hollenback Avenue Residents, Michal Atz Brenzel, Rheem*

Response: As a result of the more complicated installation scenarios associated with multifamily and commercial buildings that typically have water heaters with a heat input rating over 75,000 BTU/hr, staff has proposed a longer timeline for these larger units to ensure appropriate paths to compliance and implementation prior to 2031. With regards to Rule 9-4, the definition of a natural gas furnace preserves the existing size constraint of furnaces up to 175,000 BTU/hr.

Staff would also like to note that the proposed amendments to Rule 9-6 continue to only apply to water heaters up to 2 million BTU/hr. Units larger than 2 million BTU are covered under Air District Rule 9-7<sup>15</sup> for which no amendments are currently proposed. Staff's current understanding is that many concerns associated with high temperature needs and other commercial and industrial applications are mainly served by larger water heaters and boilers

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<sup>12</sup> Building Decarbonization Coalition. <https://switchison.org/news/how-cold-climate-heat-pumps-passed-a-winter-storms-test/>

<sup>13</sup> Department of Energy. <https://www.energy.gov/articles/doe-announces-breakthrough-residential-cold-climate-heat-pump-technology>

<sup>14</sup> BlocPower. <https://www.blocpower.io/posts/cold-climate-heat-pumps>

<sup>15</sup> BAAQMD Regulation 9 Rule 7. <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?la=en&rev=ab95f36c2dd146528f1cf3c10596bce3>

that are not subject to the proposed rule amendments. In a 2005 report released by the Department of Energy, the averaged sized boiler capacity at health care facilities in the U.S. was 20.9 Million BTU/hr.<sup>16</sup> Additionally, with regards to hospital boiler systems, these are already presently engineered with redundancy in mind, and in the event of system failures the National Fire Protection Association requires available backup power via emergency backup generators.<sup>17</sup> Air District Rule 9-8 Section 331 allows the use of emergency standby engines for essential public services, such as hospitals.<sup>18</sup>

## Natural Gas

### 44) Natural Gas: Ban

Comment: *Commenter believes that rule intends to ban natural gas appliances.*

*Andrew Morse, Andrew Pollack, Anne Prescott, Annette Ross, Anthony Pratali, Anthony Rondoni, Bill Nugteren, BOMA, Brian Johnson, Bryce Vree, Charles Getz, Colin Daley, Dan Winter, Eric Frick, Gary Stevens, Henry Riggs, Howard Crittenden, Jason Biggs, Jason Friedrichs, Larry Thompson, Linda Tolosano, Linnea Wickstrom, Lisa Cohen, Malcolm Post, Marilyn Barrett, Mark Reifkind, Marsha Adams, Mary Louise Donnici, Maureen Kennedy, Meg Minto, Michael DeMoss, Michal Atz Brenzel, Mike Thompson, Nancy Westreich, Niall Ferguson, Pat Marriott, Patricia M Daeley, Pearl Karrer, Renee Alloy, Rick Vujovich, Rob SS, Robert Horstmeyer, Robert Sherwood, Ronald Vinsant, Sally Giese, Sandra Pachaud, Steve Gazzera, Steven Wilk, Susan Ferrone, Terah James*

Response: The proposed amendments are not a natural gas ban. Should a natural gas appliance demonstrate that it meets the standard(s), it would be allowed under the proposed amendments. As discussed in the Staff Report at Section IV.A., zero-NOx natural gas burners have been developed for use in certain industrial contexts, but have not yet been designed for residential or commercial space and water heating.

The Proposed Amendments include zero-NOx emissions standards for natural gas fired furnaces and water heaters that are typically found in residential and commercial buildings. Any subject space and water heating appliance manufactured after the compliance date will not be allowed to be sold or installed in the Bay Area if it emits NOx upon operation. The proposed amendments only apply to newly installed appliances.

### 45) Natural Gas: Continued Operation

Comment: *Commenter is concerned about operation of electric appliances during power outages vs. the perceived ability to utilize natural gas appliances during extended power outages. Commenters also commonly note need to use gas stoves during power outages.*

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<sup>16</sup> Department of Energy.

[https://www.energy.gov/sites/prod/files/2013/11/f4/characterization\\_industrial\\_commerical\\_boiler\\_population.pdf](https://www.energy.gov/sites/prod/files/2013/11/f4/characterization_industrial_commerical_boiler_population.pdf)

<sup>17</sup> National Fire Protection Association. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=110>

<sup>18</sup> BAAQMD Regulation 9 Rule 8. <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-8-nitrogen-oxides-and-carbon-monoxide-from-stationary-internal-combustion-engines/documents/rg0908.pdf?la=en&rev=29ec2b409134481a8d73a88f242e6f00>

*AHRI, Alfred Who, Colin Daley, David Luce, Jeff Burke, Katherine Hughes, Melanie Bieder, Pedram Navid, Ronald Vinsant, Sally Giese*

Response: Staff recognizes the concerns associated with operation during power outages. The proposed rule amendments only require compliance with the emissions standards for newly sold and installed space and water heating appliances (not stoves) that are manufactured after the compliance dates that are set forth. Modern gas and electric appliances have similar performance challenges when the power goes out. Most modern gas furnaces that would be installed when a replacement would be necessary require an electric fan to operate and for both modern natural gas-fired furnaces and water heaters, electric starters are common, in lieu of older technologies such as continuously lit pilot lights. Like gas water heaters, electric heat pumps store hot water, even when the power is out. Therefore, for appliance replacements that would be performed in 2027 and beyond, the functionality of electric and natural gas appliances would be expected to be similar. The reliability of the electric grid is discussed in Master Response 35 (Grid Capacity: Reliability).

## Panel Upgrades

### 46) Panel Upgrades: Need

Comment: *Commenters are concerned about the potential need for a panel upgrade – for emergencies in case of water heater installation as well as for furnaces. Concern includes need for panel voltage increase as well as lack of room on existing panel. Commenters additionally explain the need for an exemption for a situation where a panel upgrade is not feasible due to their home and/or neighborhood infrastructure being outdated and unable to accommodate upgrades.*

*AGC of CA, Ashley Kline, Bradford White Corporation, Brian Avery, Brian Johnson, Bryce Vree, Carolyn Mar, Dan Winter, Daniel Hachigian, Joseph Machado, Lisha Mainz, Lynn Norris, Malcolm Post, Michael Kapolnek, Mike Thompson, Niall Ferguson, Philip Ragozzino, Randy Breunling, Regan Avery, Rheem, Rick Yost, Robert Sherwood, Ronald Vinsant, Sergio Marti*

Response: The proposed amendments focus on phasing out emissions of nitrogen oxides from these appliances, but do not mandate electric appliances. Any space and water heating appliances that are designed to have no nitrogen oxides emissions would comply with the rule proposal. Electric appliances are, however, the only currently available space and water heating appliances that do not emit nitrogen oxides, so much of staff's analysis has focused on the potential proliferation of electric appliances in response to the rule proposal.

Air District staff expects that, in some instances, the electric panel for a building may be required to be upgraded in order to install certain zero-NOx electric appliances. This is not the case for many instances and new technologies are being released, such as 120V heat pump water heaters and space conditioning systems which will reduce the number of upgrades required substantially, along with other load sharing devices. Data shared by Home Energy Analytics and SPUR (via SPUR's comment letter, available on the District website) show that only 15 percent of homes participating in an energy savings program used more than half of their panel's capacity.

The Staff Report associated with the proposed rule amendments includes a technology

evaluation of 120V appliances available on the market, some of which are new but are expected to continue to increase in variety and supply availability in the time between potential rule adoption and zero-NOx compliance dates. In addition, low amperage 240V appliances are available where electric service to the home is newer but panel space is at a premium. Many of these appliances have very similar functionality to traditional appliances that residents are used to and efficiency and functionality are expected to continue to increase over time.

Organizations such as the community choice aggregators and other groups that administer funding and training have developed different materials that outline options and strategies to avoid the need for electrical upgrades in homes. For example, Peninsula Clean Energy recently published design guidelines with breakdowns of available appliances and methodologies for electrifying pre-1985 homes up to 3,400 square feet on 100 amp service. Multiple solutions including circuit pauser on non-urgent functions such as EV charging, circuit sharing devices, and smart panels that share loads amongst different appliances as needed. Documentation such as this will be expanded as part of the public education component of the implementation working group, should the proposed rule amendments be adopted.

Finally, if home electrical infrastructure upgrades are needed, funding from the federal, state and local levels may be available. Consolidation of this information and facilitating access to these programs will also be included in the Air District's work during the implementation period of the proposed rule amendments and is discussed further in Master Response 48 (Panel upgrades: Cost).

#### 47) Panel Upgrades: Time

Comment: *Time to get panel upgrade needed for installation is too long, in some cases can be months for PG&E to do the necessary work. Concerns also included potential building permits from cities and general electrician work in emergency scenarios for water heating.*

*AGC of CA, AHRI, Bryce Vree, Dan Winter, Daniel Feldman, David Eichar, Eric Frick, Families and Homes San Jose, Jeremy Wright, Joseph Machado, Leif Ortgren, LR Jensen, Michael Kapolnek, Mitch Lerman, Pedram Navid, Randy Breunling, Regan Avery, Richard Staehnke, Sergio Marti, TJ Giuli, Western Propane Gas Association*

Response: As noted in Master Response 46 (Panel upgrades: Need), there are many cases in which staff believes that panel upgrades and electric service requirements will not be necessary as they have been in the past for higher voltage and lower efficiency appliances. Therefore, a large surge in need for contractors and backlog of work is not expected. In addition, the rule amendments apply to the sale and installation of new appliances when they are replaced and does not require pre-emptive replacement of any existing appliance at any date. This allows for the proposed rule amendments to phase in over time, again avoiding a large surge in demand on the workforce.

In addition, the time required to receive electric upgrades and potential workforce shortages, in the cases that upgrades are needed, will be tracked by implementation working group and accessibility factors will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments. Pacific Gas and Electric would be a member of the implementation working group if the rule amendments are adopted, and its knowledge of wait times for requested work and neighborhood infrastructure needs will be key to the interim reporting process.

See also Master Response 22 (General Opposition: Emergency Situations) for a discussion of appliance replacements in emergency situations.

#### 48) Panel Upgrades: Cost

Comment: *Panel upgrades and other electric work can be cost prohibitive. Commenters stated that costs for panel upgrades and electrical service work would be higher than the costs included in the Air District's analysis. Some commenters included cost estimates based on previous electrical upgrades or contractor quotes, with some figures indicating estimated total project costs of more than \$80,000 for newly installed heat pump HVAC and water heater systems and all required upgrades.*

*AGC of CA, AHRI, Bryce Vree, Dan Winter, Daniel Feldman, David Eichar, Eric Frick, Families and Homes San Jose, Jeremy Wright, Joseph Machado, Leif Ortegren, LR Jensen, Michael Kapolnek, Mitch Lerman, Pedram Navid, Randy Breunling, Regan Avery, Richard Staehnke, Sergio Marti, TJ Giuli, Western Propane Gas Association*

Response: Staff appreciates the concerns expressed by commenters regarding potential costs of panel upgrades and other electrical service work (groundwiring, rewiring and additional concerns). The socioeconomic analysis, included as Appendix D to the Staff Report, evaluates potential costs to consumers, including potential panel upgrade costs where applicable. Staff recognizes that individual contractor costs for a specific project can vary widely and acknowledges that there are specific situations in which panel upgrade costs will be higher or lower than those presented. The panel upgrade costs presented in the socioeconomic report and throughout the proposal package reflect staff's best estimate of average costs for these types of panel upgrades at the time of preparation. Additionally, the proposed rule amendments include a commitment from staff to provide an interim report to the Board of Directors discussing accessibility and cost factors, including costs for panel upgrades, as these continue to evolve.

As noted in Master Response 46 (Panel upgrades: Need), while panel and electric service upgrades were commonly needed for high voltage and lower efficiency electric technologies, these upgrades may not be necessary with the newer low voltage appliances coming to market and would not be needed if zero-NOx gas appliances are developed and chosen by consumers. In addition, funding may be available for any necessary panel upgrades and related costs. For example, the High Efficiency Home Rebate program under the Federal Inflation Reduction Act provides up to \$6,500 for electric panel or breaker upgrades and electric wiring updates. This program is income restricted with the funds available to households earning less than 80 percent of the area median income. California expects to receive \$280 million associated with this program. State programs, currently planned to be funded at \$835 million through the California Energy Commission, are also scheduled to come online in 2023.

Consolidation of this information and facilitating access to these programs will also be included in the Air District's work during the implementation period of the proposed rule amendments. The implementation working group will track accessibility factors including cost and these will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

#### Public Education



49) Public Education: Compass

Comment: *General comments regarding need for more public education on how homeowners can access funding, compliant appliances and for all citizens to be made aware of the proposed rule amendments.*

*Annette Ross, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Catherine Su, Jason Biggs*

Response: Air District staff appreciates comments and suggestions received regarding public outreach and education on the proposed rule amendments. Should the proposed amendments be adopted, staff views this as the beginning of a very important implementation period prior to the first zero-NOx compliance date in 2027, which would include a public outreach and educational campaign. The Air District has been involved in incentive programs for residential appliances as well as developing educational campaigns such as the Clean Building Compass and The Switch is On campaigns. Staff intends to build on this work through the implementation working group and call upon volunteer member cities, counties, community choice aggregators and community organizations, among others, to assist in spreading information on the requirements as well as other technical and logistical information for property owners.

Additionally, the structure of the regulations is intended to place the primary compliance obligation on retailers, distributors, and installation contractors, who are prohibited from selling or installing non-compliant appliances. Air District staff endeavors to ensure through the implementation working group that, if an appliance is available for sale within the Air District, a resident should be safe in assuming that it meets all requirements of the proposed rule amendments at that time.

For the reasons set forth in Master Response 24 (General Opposition: Necessity, Health), staff believes that the associated emissions and health benefits are important to realize as soon as practicable through regulatory action as opposed to allowing more polluting appliances to be installed, therefore delaying emissions reductions by the lifetime of another non-compliant appliance.

50) Public Education: Equity

Comment: *Commenter made a request for additional assistance with funding and education for low- and moderate-income households.*

*BEI, Rising Sun, Greenlining, City of Berkeley*

Response: Staff understands the need for more accessible information regarding funding sources, how to access them and how to take advantage of all of the programs available to residents, particularly low- and moderate-income households. While staff plans to include the development of public education materials as part of the implementation strategy, the details of this plan would be informed by members of the implementation working group, including community advocacy and environmental justice organizations. Through consultations with these groups, community listening sessions, and continued coordination with organizations that are distributing funding and financing mechanisms (BayREN, CPUC, community choice aggregators), Air District staff intends to produce materials that would facilitate access to and assist in navigating these programs.

## Rule Language

### 51) Rule Language: Manufacture Date

Comment: *Request for clarification that emissions standards apply based on manufacture date, not sale or installation date.*

*Rheem*

Response: Staff agrees and believes this is clearly stated in Sections 9-4-301.1, 301.2, 301.3, as well as Sections 9-6.301.5 and 303.5. The emissions standards of the proposed rule amendments apply to appliances that are *manufactured after* the relevant compliance date. The date of sale or installation of the appliance is not relevant to determining compliance with the proposed rule amendments.

### 52) Rule Language: Certification Calculation

Comment: *Commenters request additional detail on how certification calculation should be completed, including potential averaging for dual fuel appliances.*

*AHRI, BOMA, Rheem*

Response: Staff appreciates comments regarding non-zero standards, however staff's recommendation of zero-NOx standards is based on achieving maximum air quality and health benefits and is supported by technologies currently available on the market that do not emit NOx upon operation.

With regards to certification calculations, models will be certified on a case-by-case basis and all natural-gas-fired appliances seeking to be certified for compliance with the ultra-low NOx requirements of 14 ng/J (Section 9-4-301.2) must demonstrate that the emissions standards will not be exceeded through the certification calculations as laid out in the Determination of Emissions (Section 9-4-601). All natural-gas-fired appliances seeking to be certified for compliance with the zero-NOx requirements pursuant to Sections 9-4-301.3, 9-6-301.5 or 9-6-303.5 must demonstrate the emissions standards will not be exceeded through the certification calculations as laid out in the Determination of Emissions pursuant to Sections 9-4-601 or 9-6-601, respectively. Electric appliances are not subject to Rules 9-4 or 9-6, as these rules only apply to natural gas-fired appliances. As such, no certification is needed for electric appliances.

### 53) Rule Language: Replacements

Comment: *Request for clarification that rule only applies to replacements and not repairs.*

*BOMA*

Response: The emissions standards of the proposed rule amendments apply specifically to the sale and installation of appliances that are manufactured after the relevant compliance date. Therefore, the proposed amendments will not impact the ability to repair an existing appliance at

any time. However, repaired appliances could not be relocated to (installed in) another building within the Air District to circumvent the proposed standard.

54) Rule Language: General

Comment: *Multiple comments regarding rule language and clarifications.*

AHRI

Response: Within the emissions standards section of proposed changes to Rule 9-4, there is a differentiation between a “Natural-Gas Fired Furnace” (defined in Section 9-4-203.1) and a “Natural-Gas Fired Fan Type Central Furnace” (defined in Section 9-4-203.2). The ultra-low NOx emissions standard as proposed in Section 9-4-301.2 is intended to only apply to natural gas-fired fan type central furnaces, in line with the scope of appliances to which the current Rule 9-4 applies. Thus, as proposed, NOx emissions standards through 2029 would apply only to natural-gas fired fan type central furnaces.

The zero-NOx standard as proposed in Section 9-4-301.3 would apply to an expanded universe of appliances beyond fan type central furnaces, which would include all natural gas-fired furnaces (Section 9-4-203.1). The definition of a natural gas furnace stated in Section 9-4-203.1 was developed with the intent to be complementary to the Department of Energy’s definition for a furnace. Should wall heaters and other direct vent units meet the specifications of the definition of a natural gas furnace in the proposed amendments (a product with a heat input rate less than 175,000 BTU/hr which is designed to be a source of interior space heating that utilizes single-phase, three-phase or direct current in conjunction with natural gas), then those units would be subject to the emissions standards in Section 9-4-301.3 as well. Should additional clarification be required by the industry prior to the implementation dates of the proposed rule amendments, Staff may develop guidance with input of members of the implementation working group that represent manufacturers and other industry segments.

AHRI also requests clarification regarding the exemption of mobile homes in Section 9-4-301 and how weatherized units will be treated. Other than units installed for use in mobile homes, staff has not proposed any differentiation in emissions standards for weatherized and non-weatherized natural gas furnaces in the proposed amendments to Rule 9-4. Mobile homes refer to homes that can be transported in one or more sections and designed without a permanent foundation.

AHRI also requests a definition for dual-fuel systems be included with control requirements to ensure the weighted average NOx emissions are below the requirements. Rule 9-4 applies to natural gas-fired furnaces and all natural gas-fired units must be able to demonstrate average compliance with the requirements of 9-4-30

1.2 through the certification methods of 9-4-601. Dual-fuel units are not intended to be exempted from the ultra-low NOx requirements and are therefore not treated or defined differently. As part of the Air District’s work during the implementation period of the proposed rule amendments, should they be adopted, the implementation working group will track technological advancements in the market, which may or may not include compliant dual-fuel appliances. The implementation working group will include representation from manufacturers and distributors to provide up-to-date, best available information on appliance availability and technological advancements. These updates will be reported on as part of interim reporting process to the Board of Directors as required in the proposed rule amendments.

## Suggestions

### 55) Suggestion: Funding

Comment: *Commenters suggest that funding and incentive mechanisms are a preferred method to regulatory action at this time.*

*AHRI, Bradford White Corporation, Duncan Moody, Jan Stoeckenius, Jason Biggs, Kristie Eglsaer, Mary Porter, Maureen Galindo, Randy Breunling, Tom Kabat*

Response: Staff appreciates all comments that suggest that funding and incentive mechanisms (of varying types) may be a preferred path forward for encouraging the installation of zero-NOx appliances over regulatory action at this time. However, for the reasons set forth in Master Response 24 (General Opposition: Necessity, Health), staff believes that the associated emissions and health benefits are necessary to realize as soon as practicable through regulatory action as opposed to allowing more polluting appliances to be installed, therefore delaying emissions reductions by the lifetime of another appliance.

Staff understands the need for more accessible information regarding funding sources, how to access them and how to take advantage of all of the programs available to residents, particularly low- and moderate-income households. While staff plans to include the development of public education materials as part of the implementation strategy, the details of this plan would be informed by members of the implementation working group, including community advocacy and environmental justice organizations. Through consultations with these groups, community listening sessions, and continued coordination with organizations that are distributing funding and financing mechanisms (BayREN, CPUC, community choice aggregators), Air District staff intends to produce materials that would facilitate access to and assist in navigating these programs.

### 56) Suggestion: Enforcement

Comment: *Partner with and provide guidance to local jurisdictions with regards to compliance with the proposed standards.*

*BEI, City of Berkeley, Greenlining, Marin County, Rising Sun*

Response: Staff has begun and intends to continue coordinating with local jurisdictions such as cities and counties on the proposed rule amendments. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted to align with the proposed rule amendments, if the local jurisdiction so chooses, should they be adopted. This also includes guidance for building inspections to ensure that new installations of equipment are in compliance with the proposed rule amendments. Air District enforcement of the proposed amendments is intended to be focused on retailers and distributors of appliances. Air District staff endeavors to ensure through the implementation working group that, if an appliance is available for sale from a retailer or distributor within the Air District, a resident should be safe in assuming that it meets all requirements of the proposed rule amendments at that time. See Master Response XX (Public Education: Compass) for additional information.

57) Suggestion: Equity

Comment: *Recommendations for continued consideration of equitable implementation of rule amendments through implementation working group.*

*AHRI, BEI, Bradford White Corporation, City of Berkeley, Greenlining, Marin County, Pacific Gas and Electric, Rising Sun*

Response: Staff appreciates comments including suggestions on how to continue to integrate equitable and community centered processes in all of our projects and rule-making efforts. Should the proposed rule amendments be adopted, staff looks forward to continuing to work with partners from many jurisdictions around the Bay Area, including organizations that distribute incentives and other funding as well as community based and environmental justice focused organizations. The intention of the delayed implementation date, the implementation working group and the interim reporting process included in the proposed rule amendments is to allow for time and checkpoints along the pathway to implementation to ensure that the proposed rule amendments are meeting the equity goals and accessibility standards of the Air District.

58) Suggestion: Advocacy

Comment: *Air District should communicate with other regional and local agencies to coordinate decarbonization policies.*

*Center for Sustainable Neighborhoods*

Response: Air District staff notes that the Proposed Amendments are not decarbonization policies and do not require building decarbonization. Zero-NOx natural gas space and/or water heating technologies may be developed and if so, they would be in compliance with the Proposed Amendments. However, staff appreciates the identification of cross-sectional issues where comment and other education could be provided to other governmental agencies in the Bay Area and will continue to consider potential comments on these issues in the future. Staff looks forward to continuing to coordinate with other agencies outside of as well as within the implementation working group, should the proposed rule amendments pass.

59) Suggestion: Zonal Electrification

Comment: *PG&E comments that zonal electrification is a more efficient method for supporting the installation of zero-NOx appliances.*

*Pacific Gas and Electric*

Response: Staff appreciates Pacific Gas and Electric's input on its approach to updating the electrical and natural gas utility systems on a neighborhood or zonal basis. Staff is not proposing to require electrification of building appliances, but rather elimination of harmful NOx emissions. The Air District is tasked with protecting regional air quality and public health, and the proposed amendments best address the Air District's regional air quality concerns by prohibiting the sale or installation of all new appliances that emit NOx after the proposed compliance dates, regardless of location in the Bay Area. This allows for the proposed rule amendments for emissions reductions to be achieved across all neighborhoods of the Bay Area without locking in additional emissions in certain neighborhoods with continued installation of

appliances that negatively impact health outcomes. However, the proposed amendments will not preclude a utility from taking a geographical approach to grid upgrades, incentives, and outreach.

## Supply Chain and Timeline

### 60) Supply Chain: Appliances availability

Comment: Commenters express concern associated with appliance availability and potential supply chain shortages.

*Bill Maimone, Chibby Alloway, Randy Breunling, Rheem*

Response: Staff's research concluded the timeline included in the proposed rule amendments is viable and important to send a signal and provide a goal for the market as well as other agencies and organizations to facilitate compliance. Section IV of the Staff Report contains a technology evaluation that outlines the equipment that is currently available to consumers that would be allowed under the proposed rule amendments. As has been the trend in recent years, it is expected that the variety and number of zero-NOx technologies available will increase between potential adoption of the proposed amendments and the compliance dates contained therein, the first zero-NOx compliance date being for small water heaters manufactured after January 1, 2027. The implementation working group additionally includes representatives for appliance manufacturers and other organizations that can alert Air District staff to any potential issues associated with the appliance supply chain.

### 61) Timeline: Permits/Setbacks

Comment: Commenters express concerns associated with city permitting issues, specifically with regards to setbacks for heat pumps installed outdoors, and potential extended timelines associated with these processes in retrofit scenarios.

*Carolyn Mar, Daniel Feldman, Eric Frick, Joseph Machado, Katherine Hughes, Linda Chin, Linnea Wickstrom, Michael Kapolnek*

Response: Please see Master Response 46 (Panel upgrades: Need) for a discussion of the potential need for panel or other electrical upgrades and considerations for how unnecessary upsizing of electric panels can be avoided. The proposed rule amendments would require an upgrade to zero-NOx appliances at the time that currently installed covered appliances reach the end of their useful life. Not all appliances will need to be replaced immediately upon the proposed compliance dates. This will alleviate pressure on a large number of replacements (and therefore potential panel upgrades) to be required at once.

Staff understands that commenters are concerned about timelines associated with utility upgrades, specifically those that are required by Pacific Gas and Electric. Pacific Gas and Electric will be a key member of the implementation working group, should the proposed rule amendments be adopted. Data and information from Pacific Gas and Electric on its response times and workforce availability will be a key input to the interim report to the Board of Directors that is included in the proposed rule amendments. Staff additionally has begun and intends to continue coordinating with local jurisdictions such as cities and counties on how implementation

of the proposed rule amendments would be interpreted at the city level. Air District staff intends to provide guidance to local jurisdictions on how building permitting and codes could be adjusted to align with the proposed rule amendments, if the local jurisdiction so chooses, should they be adopted.

#### 62) Timeline: Delay Implementation

**Comment:** *Commenters suggest that the compliance dates for the proposed rule amendments should be delayed in order to account for a variety of factors.*

*AHRI, Bradford White Corporation, Jason Biggs, Jeremy Wright, Joseph Machado, Melodie Lew, Peter Jon Shuler, Randy Breunling, Rocky Fort*

**Response:** The proposed amendments will improve regional air quality and public health. In 2019, emissions from residential natural gas combustion accounted for roughly the same amount of NOx emissions as passenger vehicles. Furnaces and water heaters, which vent emissions to the outdoors and therefore impact regional air quality, account for over 90 percent of emissions from building appliances.

Through the reduction of NOx emissions, and resultant particulate matter formation, the proposed amendments are projected to prevent up to 85 premature deaths per year and save up to \$890 million per year in reduced health impacts. The standards will also improve overall regional air quality. As a result, the timeline proposed in the rule amendments is a reasonable balance between achieving the health and air quality benefits for the region and its residents as soon as practicable while allowing sufficient time for market growth, supply chain and workforce response and to address equity considerations.

If the Proposed Amendments are adopted, staff will monitor the availability and cost of zero-NOx appliances, and infrastructure readiness concerns, in advance of the future compliance dates and report to the Air District Board of Directors through the interim reporting process on these issues.

#### Workforce

#### 63) Workforce: Availability/Training

**Comment:** *Comment regarding potential lack of workforce to competently install compliant appliances and support related infrastructure such as utility maintenance and upgrades. Additional comments from unions regarding need to support appropriate workforce training.*

*Adams Broadwell Joseph and Cardozo, BEI, Rising Sun, Greenlining, City of Berkeley, Brendan Moriarty, Dan Winter, EJ Cire SMART Local Union 104, Kristie Eglsaer, Leif Ortegren, Linnea Wickstrom, Lisa Taner, Michael Kopolnek, Ronald Vinsant, San Jose Community Energy Advocates, Victor Buathier*

**Response:** Staff understands that the availability of trained workers for appliance installation, potential associated additional upgrades and utility upgrades and maintenance is key to a successful implementation of the proposed rule amendments. Workforce training and availability is an important issue that will be monitored by the implementation working group and will be a

focus of interim report. The implementation working group will include representation from unions and contractor trade associations as well as entities that provide workforce training such as BayREN. Electric heat pumps have been on the market for 75 years and have been commonly used since the 1970s. Many contractors have been installing heat pumps at residences and businesses for decades and are very experienced with installation and repairs. Workforce training for these appliances has increased significantly in recent years and this growth is expected to continue with the potential passage of the proposed amendments as an important signal in spurring this workforce growth. Should the amendments be adopted, Air District staff intends to work with the groups on the implementation working group as well as others in the coming years to assist in the facilitation of available and trained workforce that can efficiently and safely support the implementation of the proposed rule amendments.

64) Workforce: Transition

Comment: *Commenter is concerned about job guarantees for utility workers and ensuring a just transition.*

*Adams Broadwell Joseph and Cardozo, Bradford White Corporation*

Response: Staff appreciates the concern raised by the commenter regarding a just transition for the workforce including utility workers. While not within the direct control of the Air District, staff intends to continue working with unions, trade associations and organizations that administer training programs to help facilitate the transition of workers across different aspects of the industry to the extent needed to support deployment of zero-NOx appliances.



Attachment 1: Organizations and Individuals Who Submitted Written Comments on the Proposed Amendments to Rule 9-4 and Rule 9-6

Commenter	Organization/Affiliation	Date	Comment Category	Subcategory
350 Bay Area	Organization	2/6/2023	Support	General
A Yvette Huginnie	Public	2/5/2023	General opposition	Grandfathering
Abalone Alliance	Public	2/6/2023	Support	General
Abbot Foote	Public	2/6/2023	Support	General
Adam Buck	Public	1/18/2023	Support	General
Adam Sweeney	Public	2/4/2023	Support	General
Adams Broadwell Joseph and Cardozo	Organization	2/6/2023	Grid Capacity	Statewide planning
		2/6/2023	Cost	Renters
		2/6/2023	Grid Capacity	Reliability
		2/6/2023	Cost	Utility Costs
		2/6/2023	Grid Capacity	Insufficient capacity
		2/6/2023	Workforce	Transition
		2/6/2023	Workforce	Availability/Training
		2/6/2023	General opposition	Regional regulation
Aditee Kumthekar	Public	2/4/2023	Support	General
Adrienne Etherton	Public	2/6/2023	Support	General
AGC of CA	Organization/Labor	2/2/2023	General opposition	Electricity generation
			Heat Pump	Cold weather operation
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
			Grid Capacity	Statewide planning
			Panel upgrades	Need
			Panel upgrades	Time
			Heat Pump	Availability/Training
			General opposition	Emergency situations
AHRI	Organization/Manufacturer	2/6/2023	Cost	General
			Natural Gas	Continued operation
			Cost	Utility Costs
			Cost	Equity

			General Opposition	Emergency situations
			Panel upgrades	Time
			EIR	Alternatives
			Rule Language	Certification calculation
			Suggestion	Appliances availability
			Heat pump	Commercial
			General Opposition	Exemptions
			Rule Language	General
			Heat Pump	Availability/Delay
			Cost	Beyond panel
			Cost	Existing spaces
			Timeline	Delay implementation
			Suggestion	Funding
			Suggestion	Equity
AJ Cho	Public	2/6/2023	Support	General
Alan Chen	Public	2/6/2023	Support	General
Alan Peevers	Public	2/6/2023	Support	General
Alexander Pakter	Public	2/6/2023	Support	General
Alexis Georgiou	Public	2/3/2023	Support	General
Alfred Who	Public	1/19/2023	Natural gas	Continued operation
			Grid Capacity	Reliability
Alfredo Angulo	Public	2/6/2023	Support	General
Alice Polesky	Public	2/6/2023	Support	General
Allan Campbell	Public	2/3/2023	Support	General
Amanda Bancroft	Public	2/6/2023	Support	General
Amanda Rosenberg	Public	2/6/2023	Support	General
Amanda Zagara	Public	2/4/2023	Support	General
Andrea Gara	Public	2/6/2023	Support	General
Andrew Morse	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
Andrew Pollack	Public	1/23/2023	Natural gas	Ban
			Cost	Housing
			Cost	Market change
			Cost	Renters

			Panel upgrades	Cost
			Cost	Equity
			General opposition	Necessity, health
Angela Evans	Public	2/4/2023	Support	General
Angela Gantos	Public	2/6/2023	Support	General
Angele Price	Public	2/3/2023	Support	General
Anna Koster	Public	2/3/2023	Support	General
Anna Shurter	Public	2/6/2023	Support	General
Anne Prescott	Public	2/6/2023	Natural gas	Ban
Annette Ross	Public	2/6/2023	Cost	Funding
			Heat Pump	Commercial
			EIR	Noise
			Public Education	Compass
			Existing Spaces	Permits/Setbacks
			Existing Spaces	Exemptions
			Emissions	GHG co-benefits
			EIR	General
			Grid Capacity	Insufficient capacity
			Natural gas	Ban
			General opposition	Exemptions
Anthony Pratali	Public	2/6/2023	Natural gas	Ban
Anthony Rondoni	Public	1/18/2023	Cost	Utility Costs
			Natural gas	Ban
			Cost	Existing spaces
			Grid Capacity	Insufficient capacity
Arlene Baxter	Public	2/6/2023	Support	General
Ashesh Parekh	Public	2/6/2023	Support	General
Ashley Kline	Public	2/5/2023	Heat Pump	Efficiency
			Cost	General
			Panel upgrades	Need
			General opposition	Necessity, health
Aubrey Wilson	Public	2/6/2023	Support	General
Audrey Ichinose	Public	2/6/2023	Support	General
Barbara Hollenbach	Public	2/6/2023	Support	General
Barbara Kyser	Public	2/3/2023	Support	General
Barbara Sandow	Public	2/6/2023	Support	General

Barry Robbins	Public	2/6/2023	General opposition	Grandfathering
Barry Robbins	Public	2/6/2023	Cost	General
BayREN	Organization	2/2/2023	Support	General
Becca Ya	Public	2/2/2023	Support	General
BEI, Rising Sun, Greenlining, City of Berkeley	Government	2/6/2023	Public Education	Compass
			Public Education	Equity
			Cost	Funding
			Suggestion	Equity
			Suggestion	Enforcement
			Workforce	Availability/Training
Belinda Chlouber	Public	2/1/2023	Support	General
Ben Martin	Public	2/3/2023	Support	General
Benjamin Bingaman	Public	2/3/2023	Support	General
Benjamin Keller	Public	2/6/2023	Support	General
Berkeley Electrification Working Group	Organization	2/4/2023	Support	General
Bhima Sheridan	Public	2/6/2023	Support	General
Bianca Molgora	Public	2/6/2023	Support	General
Bill Hough	Public	1/19/2023	Grid Capacity	Reliability
Bill Hough	Public	1/19/2023	General opposition	Necessity, health
Bill Maimone	Public	2/6/2023	General opposition	Exemptions
			General opposition	Necessity, health
			Supply Chain	Appliances availability
Bill Nugteren	Public	2/6/2023	Natural gas	Ban
			Emissions	Necessity, health
			Grid Capacity	Reliability
			General opposition	Necessity, health
Blaine Burgdtrom	Public	2/3/2023	Support	General
BOMA	Organization/Building Management	2/6/2023	Natural gas	Ban
			Rule Language	Replacements
			Heat Pump	Commercial
			General opposition	Exemptions

Bradford White Corporation	Organization/Manufacturer	2/6/2023	Timeline	Delay Implementation
			Rule Language	Certification Calculation
			General opposition	Emergency situations
			Heat pump	Availability/Delay
			Panel upgrades	Need
			Existing Spaces	General
			Suggestion	Equity
			Suggestion	Funding
			Heat pump	Commercial
			Cost	General
			Cost	Equity
			EIR	Alternatives
Workforce	Transition			
Brenda Wallace	Public	2/6/2023	Support	General
Brendan Moriarty	Public	1/21/2023	Support	General
			Cost	Funding
			Public Education	Compass
			Workforce	Availability/Training
Bret Andersen	Public	2/6/2023	Support	General
Brian Avery	Company	2/6/2023	General opposition	Necessity, health
			Panel upgrades	Need
			Grid Capacity	insufficient capacity
Brian Johnson	Public	1/18/2023	Panel upgrades	Need
			Natural gas	Ban
			Grid Capacity	Reliability
			Cost	Existing spaces
			Cost	Funding
Brittany Dhawan	Public	2/6/2023	Support	General
Bruce Adornato	Public	2/6/2023	General opposition	Necessity, health
Bruce Coston	Public	2/6/2023	Support	General
Bruce England	Public	2/3/2023	Support	General
Bruce J Burns	Public	2/6/2023	Support	General
Bruce Jackson	Public	2/6/2023	Grid Capacity	Reliability
Bruce Naegel	Public	2/6/2023	Support	General
Bruce Nilles	Public	2/6/2023	Support	General

Bryce Vree	Public	1/18/2023	Panel upgrades	Need
			Natural gas	Ban
			Panel upgrades	Time
			Panel upgrades	Cost
			Grid Capacity	Reliability
			Grid Capacity	Statewide planning
Caephren McKenna	Public	2/6/2023	Support	General
CARB	Government	2/3/2023	Support	General
Carla Davis	Public	2/6/2023	Support	General
Carly Ritter	Public	2/6/2023	Support	General
Carol Benioff	Public	2/6/2023	Support	General
Carol Bettencourt	Public	2/6/2023	Support	General
Carol Mone	Public	2/4/2023	Support	General
Carol Savary	Public	2/6/2023	Support	General
Carol Schaffer	Public	2/6/2023	Support	General
Caroline Ayres	Public	2/6/2023	Support	General
Carolyn Mar	Public	2/5/2023	Grid Capacity	Insufficient Capacity
			Panel upgrades	Need
			Timeline	Permits/Setbacks
			General opposition	Equity
Caryn Graves	Public	2/6/2023	Support	General
Catherine Cameron	Public	2/3/2023	Support	General
Catherine Su	Public	2/6/2023	General opposition	Necessity, health
			Cost	Utility Costs
			General opposition	Stove Study
			Public Education	Compass
Cecile Mochnek	Public	2/6/2023	Support	General
Celeste Anacker	Public	2/6/2023	Support	General
Center For Sustainable Neighborhoods	Organization	2/6/2023	Heat Pump	Efficiency
			Suggestion	Advocacy
Chanel Harris	Public	1/30/2023	General opposition	Stove study
Chanel Harris	Public	1/30/2023	Grid Capacity	Reliability

Charles Getz	Public	1/23/2023	Natural gas	Ban
			EIR	Benefits
			EIR	Grid Impacts
			Cost	Housing
			5th Amendment	Takings Clause
			EIR	General
			Cost	General
			General opposition	Authority
			Cost	Equity
			General opposition	Necessity, health
Charles Wieland	Public	2/6/2023	Support	General
Cheryl Schaff	Public	2/6/2023	Support	General
Cheryl Weiden	Public	2/3/2023	Support	General
Chibby Alloway	Public	2/1/2023	Cost	Equity
			Grid Capacity	Reliability
			Supply Chain	Appliances availability
			General opposition	Necessity, health
			Grid Capacity	Insufficient capacity
			Cost	Utility Costs
			Cost	General
Chris Lish	Public	2/5/2023	Support	General
Christina Nielsen	Public	2/6/2023	Support	General
Christine Goldin	Public	2/6/2023	Support	General
Christine Patel	Public	2/5/2023	Support	General
Christopher Ware	Public	2/6/2023	Support	General
Cindy Haag	Public	2/6/2023	Support	General
Cindy Sidaris	Public	2/3/2023	Support	General
Claire Broome	Public	2/6/2023	Support	General
Claudia Hevel	Public	2/3/2023	Support	General
Climate Action CA et al	Organization	2/6/2023	Support	General
Climate Reality Project Silicon Valley	Organization	2/2/2023	Support	General
Colin Daley	Public	1/18/2023	Grid Capacity	Reliability
Colin Daley	Public	1/18/2023	Natural gas	Continued operation
			Natural gas	Ban
Corwin Zechar	Public	2/6/2023	Support	General
Craig Husfeld	Public	2/3/2023	Support	General

Craig Talyor	Public	1/25/2023	Cost	Market change
			General opposition	Necessity, health
Cynthia Cima-Ivy	Public	2/6/2023	Cost	General
			Cost	Beyond Panel
D Pickham	Public	2/6/2023	Cost	General
			General opposition	Necessity, health
Damon Brown	Public	2/6/2023	Support	General
Dan Kalb	Public	2/6/2023	Support	General
Dan Winter	Public	1/18/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Panel upgrades	Need
			Panel upgrades	Cost
			Workforce	Availability/Training
			Panel upgrades	Time
			Grid Capacity	Statewide planning
Dani Zacky	Public	2/6/2023	Support	General
Daniel Feldman	Public	2/3/2023	Emissions	Necessity, health
			Emissions	Peer Review
			EIR	Grid Capacity
			Panel upgrades	Time
			Timeline	Permits/Setbacks
Daniel Hachigian	Public	2/6/2023	Grid Capacity	Reliability
			General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
Danielle Mieler	Public	2/6/2023	Support	General
Dave Clark	Public	2/2/2023	Support	General
David Bezanson	Public	2/4/2023	Support	General
David Boyer	Public	2/6/2023	Support	General
David Eichar	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
David Fairley	Public	1/19/2023	Support	General
David Gassman	Public	2/6/2023	Support	General



David Kaskowitz	Public	2/6/2023	Support	General
David Luce	Public	2/6/2023	General opposition	Necessity, health
			General opposition	Stove study
			Cost	General
			Grid Capacity	Reliability
			Natural gas	Continued operation
David Luu	Public	2/3/2023	Support	General
David Romano	Public	2/6/2023	Support	General
David Sowerwine	Public	2/6/2023	Support	General
Deanna Knickerbocker	Public	2/6/2023	Support	General
Debbie Mytels	Public	2/6/2023	Support	General
Deborah Holcomb	Public	2/6/2023	Support	General
Deborah St Julien	Public	2/3/2023	Support	General
Deirdre Fennessy	Public	2/6/2023	Support	General
Derrick Holt	Public	2/6/2023	Support	General
Diane Bailey	Public	2/6/2023	Support	General
Diane Perrone	Public	2/6/2023	General opposition	Necessity, health
			Cost	General
Don Jackson	Public	2/6/2023	Support	General
Don Meehan	Public	2/6/2023	Support	General
Don Weiden	Public	1/27/2023	Support	General
Donald Duggan	Public	1/18/2023	Cost	Cost vs. Benefits
			Cost	Air Conditioning
			EIR	Travel
Donna Davies	Public	2/3/2023	Support	General
Donna Sharee	Public	2/6/2023	Support	General
Douglas Brookes	Public	2/2/2023	Support	General
Du Ng	Public	2/3/2023	Support	General
Duncan Moody	Public	2/3/2023	Cost	General
			Suggestion	Funding
Dylan Ackerman	Public	2/2/2023	Support	General
East Bay Community Energy	Community Choice Aggregator	2/6/2023	Support	General
Edward Richardson	Public	2/6/2023	Support	General
Edwin Aiken	Public	2/3/2023	Support	General
Eihway Su	Public	2/6/2023	Support	General
Eileen Adams	Public	2/6/2023	Support	General
Eileen Lepera	Public	2/6/2023	Support	General

EJ Cire SMART Local Union 104	Organization/Labor	2/6/2023	Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Workforce	Availability/Training
Elena Engel	Public	2/2/2023	Support	General
Elizabeth Gioumousis	Public	2/3/2023	Support	General
Elizabeth Lee	Public	2/4/2023	Support	General
Elizabeth Levy	Public	2/6/2023	Support	General
Ellen Beans	Public	2/6/2023	Support	General
Ellen Leng	Public	2/2/2023	Support	General
Ellen Rosenblum	Public	2/6/2023	Support	General
Emily Wheeler	Public	2/6/2023	Support	General
Emma Hitzke	Public	2/3/2023	Support	General
Emy Baldwin	Public	1/29/2023	General opposition	Stove study
			General opposition	Necessity, health
Eric Brettner	Public	2/6/2023	Support	General
Eric Frick	Public	2/6/2023	Cost- Effectiveness	General
			Natural gas	Ban
			Cost	Beyond panel
			Cost	Existing spaces
			Panel upgrades	Time
			Timeline	Permits/Setbacks
			EIR	Noise
			Existing Spaces	permits/setbacks
			Emissions	GHG co-benefits
			EIR	General
			EIR	Alternatives
			General Opposition	Necessity, health
			Cost	Cost vs. Benefits
			Cost	Market change
Heat Pump	Efficiency			
Existing Spaces	General			
Erin Foret	Public	2/6/2023	Support	General
Ernie Walters	Public	2/6/2023	Support	General
Evan Jane Kriss	Public	2/6/2023	Support	General
Families and Homes San Jose	Public	2/6/2023	Cost	General

			Panel upgrades	Time
			Cost	Housing
			Grid Capacity	Insufficient capacity
			Panel upgrades	Cost
			Existing Spaces	General
			Cost	Funding
			Grid Capacity	Reliability
Felix Mbuga	Public	2/6/2023	Support	General
Fiona Hyland	Public	2/3/2023	Support	General
Flora Rosaa	Public	2/6/2023	Support	General
Floy Andrews	Public	2/6/2023	Support	General
Forest Frasier	Public	2/6/2023	Support	General
Fred Bialy	Public	2/6/2023	Support	General
Fred Ortiz	Public	2/3/2023	General opposition	Necessity, health
Gabriel Quinto	Public	2/6/2023	Support	General
Gary Farber	Public	2/6/2023	Support	General
Gary Stevens	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
			Cost	Existing spaces
			Cost	Utility Costs
			General opposition	Exemptions
Gary Troutt	Public	2/1/2023	Support	General
Genevieve Deppong	Public	2/6/2023	Support	General
Gerard Manning	Public	2/6/2023	Support	General
Ginnie Plato	Public	2/3/2023	General opposition	Necessity, health
Giovannina Fazio	Public	2/3/2023	Support	General
Gladwyn D'Souza	Public	2/6/2023	Support	General
Gloria Linda Maldonado	Public	2/3/2023	Support	General
Greg Ratkovsky	Public	2/6/2023	Support	General
Greg Spooner	Public	2/6/2023	Support	General
Gregory Bell	Public	2/6/2023	Support	General
Hala Al-Shahwany	Public	2/6/2023	Support	General
Hannah Quirk	Public	2/4/2023	Support	General
Harriet Harvey-Horn	Public	2/6/2023	Support	General
Harvest Thermal	Company	2/6/2023	Support	General

Henry Riggs	Public	2/6/2023	General opposition	Necessity, health
			Natural gas	Ban
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
			General opposition	Necessity, health
Hilary Glann	Public	2/6/2023	Support	General
Hollenback Avenue Residents	Public	1/19/2023	Panel upgrades	Cost
			Heat Pump	Efficiency
			Heat Pump	Commercial
Holly Lazzarini	Public	1/27/2023	General opposition	Necessity, health
Howard Cohen	Public	2/6/2023	Support	General
Howard Crittenden	Public	2/7/2023	Natural gas	Ban
Howdy Goudey	Public	2/6/2023	Support	General
Igor Tregub	Public	2/6/2023	Support	General
Ingrid Kallman	Public	2/6/2023	Support	General
Izmirian Roofing and Sheet Metal	Company	2/6/2023	Heat Pump	Efficiency
			Cost	General
			Heat Pump	Noise
			Grid Capacity	insufficient capacity
			Existing Spaces	Permits/Setbacks
			EIR	Noise
			Emissions	Necessity, health
J Angell	Public	2/6/2023	Support	General
J Barry Gurdin	Public	2/6/2023	Support	General
J Herbert	Public	2/4/2023	Support	General
J.W. Oman	Public	2/6/2023	Support	General
Jake Cosenza	Public	1/19/2023	Panel upgrades	Cost
James Wu	Public	2/6/2023	Support	General
Jamie Beckett	Public	2/4/2023	Cost	Equity
			Panel upgrades	Cost
			General opposition	Necessity, health
Jamie Nahman	Public	2/6/2023	Support	General
Jan Rhoades	Public	2/6/2023	Support	General

Jan Stoeckenius	Public	1/31/2023	General opposition	Necessity, health
			Emissions	GHG co-benefits
			Emissions	Necessity, health
			Heat Pump	Efficiency
			Cost	Utility Costs
			Suggestion	Funding
Janet Creech	Public	2/6/2023	Support	General
Janet Garcia	Public	2/3/2023	General opposition	Necessity, health
Janet Odell	Public	2/3/2023	Support	General
Jason Biggs	Public	2/6/2023	Cost	General
			Cost	Equity
			Cost	Utility Costs
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
			Natural gas	Ban
			Suggestion	Funding
			Timeline	delay implementation
			Public Education	compass
Jason Fish	Public	2/6/2023	Support	General
Jason Friedrichs	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
			Grid Capacity	Reliability
Jay Feldis	Public	2/6/2023	General opposition	Necessity, health
Jean Jackman	Public	2/6/2023	Support	General
Jeff Burke	Public	1/18/2023	Grid Capacity	Reliability
			Natural gas	Continued operation
Jeff Calcagno	Public	2/6/2023	Cost	General
			General opposition	Propane
			Grid Capacity	Reliability
Jeff Lindquist	Public	2/3/2023	Support	General
Jeffery Hurwitz	Public	2/6/2023	Support	General
Jeffery Mann	Public	2/6/2023	Support	General
Jeffery Nigh	Public	2/6/2023	Support	General
Jeffery Suplica	Public	2/6/2023	Support	General
Jeffrey Perrone	Public	2/4/2023	Support	General
Jeffrey Spencer	Public	2/3/2023	Support	General
Jency James	Public	2/6/2023	Support	General

Jennifer Graber	Public	2/3/2023	Support	General
Jennifer Heggie	Public	2/5/2023	Support	General
Jennifer Huber	Public	1/20/2023	Panel upgrades	Cost
Jennifer Mazzon	Public	2/4/2023	Support	General
Jennifer Thilman	Public	2/3/2023	Support	General
Jennifer Thompson	Public	2/3/2023	Support	General
Jennifer Valentine	Public	2/3/2023	Support	General
Jenny Green	Public	2/2/2023	Support	General
Jeremy Wright	Public	2/4/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Cost	General
			Heat Pump	Reliability
			Cost	Equity
			Grid Capacity	insufficient capacity
			General opposition	Necessity, health
			5th Amendment	Takings Clause
Timeline	Delay Implementation			
Jessie Hagler	Public	2/6/2023	Support	N/A
Jim Beatty	Public	2/6/2023	cost	Equity
			General opposition	Necessity, health
Jim Clark	Public	1/18/2023	General opposition	Necessity, health
Jim Robbins	Public	1/18/2023	Cost	Existing spaces
			Existing Spaces	Permits/Setbacks
Jiro Yamamoto	Public	2/6/2023	Support	General
Jo Ann Mandinach	Public	2/6/2023	Grid Capacity	Reliability
			Cost	General
Joanna Smiley	Public	2/3/2023	Support	General
Joe Smith	Public	2/6/2023	Support	General
Joel Soloksky	Public	2/6/2023	Support	General
John Accinelli	Public	1/18/2023	Cost	General
			Heat Pump	Operation
			Grid capacity	Insufficient capacity
			General opposition	Necessity, health
John Accinelli	Public	1/25/2023	Grid Capacity	Insufficient capacity

			Cost	General
John Anderson	Public	2/5/2023	Support	General
John Becker	Public	2/4/2023	Support	General
John De Forest	Public	2/6/2023	Support	General
John McKenna	Public	2/6/2023	Support	General
John Neal	Public	2/4/2023	Support	General
John Oda	Public	2/3/2023	Support	General
John Sheakley	Public	2/6/2023	General opposition	Stove study
			EIR	Grid Impacts
Jonathan Eden	Public	2/6/2023	Support	General
Jordan Briskin	Public	2/3/2023	Support	General
Joseph Lam	Public	2/3/2023	Support	General
Joseph Machado	Public	2/3/2023	Cost	General
			Panel upgrades	Need
			Timeline	Permits/Setbacks
			Panel upgrades	Time
			Timeline	Delay Implementation
			General opposition	Necessity, health
Josephine Coffey	Public	2/6/2023	Support	General
Josh Dickinson	Public	2/6/2023	Support	General
Joslyn Baxter	Public	2/6/2023	Support	General
Judith Bushey	Public	2/4/2023	Support	General
Judith Weisman	Public	2/6/2023	Support	General
Judy Weatherly	Public	2/6/2023	Cost	Equity
			General opposition	Necessity, health
Julia Howlett	Public	2/3/2023	Support	General
Julia Wall	Public	2/3/2023	Grid Capacity	Insufficient capacity
			Grid Capacity	Statewide planning
			Cost	General
Julie Groves	Public	2/3/2023	Support	General
Julie Kloper	Public	2/3/2023	Support	General
Julie Lindow	Public	2/6/2023	Support	General
Justin Evans	Public	2/5/2023	Support	General
Kaela Plank	Public	2/6/2023	Support	General
Karen Kirschling	Public	2/6/2023	Support	General
Karl Peirce	Public	2/6/2023	Support	General
Kat Snyder	Public	2/6/2023	Support	General
Katherine Falk	Public	2/2/2023	Support	General

Katherine Hughes	Public	2/6/2023	General opposition	Necessity, health
			Natural gas	continued operation
			Grid Capacity	Reliability
			Grid Capacity	insufficient capacity
			Timeline	Permits/Setbacks
			Cost	Utility Costs
Katherine Robinson	Public	2/5/2023	Support	N/A
Kathy Battat	Public	2/6/2023	Support	General
Kathy Dervin	Public	2/6/2023	Support	General
Kathy Kerridge	Public	2/6/2023	Support	General
Katie Rueff	Public	2/4/2023	Support	General
Keith Rhinehart	Public	2/6/2023	Support	General
Kelly Porter	Public	2/6/2023	Grid Capacity	Reliability
			Panel upgrades	cost
			Cost	General
			General opposition	Exemptions
Kevin Branstetter	Public	2/6/2023	Support	General
Kevin Hearle	Public	2/4/2023	Support	General
Kevin Ma	Public	2/6/2023	Support	General
Kiana Chandruang	Public	2/6/2023	Support	General
Kim Messmer	Public	2/3/2023	Support	General
Kristel Rietesel	Public	2/6/2023	Support	General
Kristel Wickham	Public	2/6/2023	Support	General
Kristen Conner	Public	2/6/2023	Support	General
Kristie Eglsaer	Public	2/3/2023	Workforce	Availability/Training
			Suggestion	Funding
			Grid Capacity	Reliability
Lacey Hicks	Public	2/3/2023	Support	General
Lada Adamic	Public	2/2/2023	General opposition	Necessity, health
Larry Thompson	Public	1/30/2023	Natural gas	Ban
			General opposition	Necessity, health
Laura Bernstein	Public	2/6/2023	Support	General
Laura Dill	Public	2/6/2023	Support	General
Lawrence Deng	Public	2/3/2023	Support	General
Leana Rosetti	Public	2/6/2023	Support	General
Leane Eberhart	Public	2/6/2023	Support	General
Leif Ortegren	Public	1/20/2023	Workforce	Availability/Training



			Panel upgrades	Time
			Panel upgrades	Cost
			Cost	Equity
			General opposition	Necessity, health
Leonie Terfort	Public	2/6/2023	Support	General
Lesley Hunt	Public	2/6/2023	Support	General
Lesley Shultz	Public	2/6/2023	Support	General
Leslie Smith	Public	2/6/2023	Support	General
Lewis Paris	Public	2/6/2023	Grid Capacity	Reliability
Lin Griffith	Public	2/6/2023	Support	General
Linda Chin	Public	2/5/2023	General opposition	Grandfathering
			Panel upgrades	Cost
Linda Chin	Public	2/5/2023	Timeline	Permits/Setbacks
Linda Ramey	Public	2/6/2023	Support	N/A
Linda Tolosano	Public	1/18/2023	Natural gas	Ban
			Panel upgrades	Cost
Linh Dan Do	Public	2/3/2023	Support	General
Linnea Wickstrom	Public	1/23/2023	General opposition	Necessity, health
			Natural gas	Ban
			Cost	Equity
			Workforce	Availability/Training
			Timeline	Permits/Setbacks
			Existing Spaces	Permits/Setbacks
			Grid Capacity	Insufficient capacity
			Existing Spaces	General
Lisa Cohen	Public	1/20/2023	Natural gas	Ban
			Cost	Equity
			Emissions	GHG co-benefits
			General opposition	Necessity, health
Lisa Segnitz	Public	2/6/2023	Support	General
Lisa Taner	Public	1/30/2023	Cost	Equity
			Cost	Landlord
			General opposition	Necessity, health
			Grid Capacity	Insufficient capacity

			Workforce	Availability/Training
Lisha Mainz	Public	2/6/2023	Grid Capacity	Reliability
			General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
Lori Kegler	Public	2/6/2023	Support	General
Louise Chegwiddden	Public	2/6/2023	Support	General
LR Jensen	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Cost	Landlord
			Cost	Funding
Luca Donisi	Public	2/6/2023	Support	General
Lucy Weltner	Public	2/6/2023	Support	General
Lynn Norris	Public	1/20/2023	Panel upgrades	Need
			Cost	Utility Costs
			Grid Capacity	Reliability
			General opposition	Necessity, health
Magi Amma	Public	2/6/2023	Support	General
Malcolm Post	Public	1/18/2023	Natural gas	Ban
			Panel upgrades	Cost
			Grid capacity	Reliability
			General opposition	Necessity, health
			Panel upgrades	Need
			Grid Capacity	Insufficient capacity
Manijeh Berenji	Public	2/6/2023	Support	General
Marcia Pratt	Public	2/6/2023	Support	General
Margaret Fowler	Public	2/6/2023	Support	General
Marianna Riser	Public	2/6/2023	Support	General
Marilyn Barrett	Public	1/23/2023	Natural gas	Ban
			Grid Capacity	Reliability
			General opposition	Necessity, health
Marilyn Price	Public	2/6/2023	Support	General

Marilynn Smith	Public	2/3/2023	Support	General
Marin County	Government	2/6/2023	Support	General
			Suggestion	Enforcement
			Cost	Equity
			Cost	Utility Costs
			Existing Spaces	General
			Grid Capacity	insufficient capacity
			Suggestion	Equity
Mark Grossman	Public	2/3/2023	Support	General
Mark Hoffberg	Public	2/4/2023	Support	General
Mark Hurst	Public	2/6/2023	Support	General
Mark Reifkind	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Marsha Adams	Public	2/6/2023	Natural gas	Ban
			General opposition	Necessity, health
Marsha Adams	Public	2/6/2023	Grid Capacity	Insufficient capacity
Martha Goldin	Public	2/6/2023	Support	General
Mary Ann Cramer	Public	2/6/2023	Support	General
Mary Dateo	Public	2/2/2023	Support	General
Mary Gilles	Public	2/6/2023	General opposition	Necessity, health
Mary Lou Meeks	Public	2/4/2023	Support	General
Mary Louise Donnici	Public	1/23/2023	Panel upgrades	Cost
			Cost	Utility Costs
			Grid capacity	Reliability
			Natural gas	Ban
Mary Noel	Public	2/6/2023	Support	General
Mary Porter	Public	2/6/2023	General opposition	Necessity, health
			Cost	Equity
			Suggestion	funding
			Cost	funding
			Existing Spaces	General
Mary Schumacher	Public	2/3/2023	General opposition	Necessity, health
Mats Lundgren	Public	2/6/2023	Grid Capacity	Insufficient capacity
			General opposition	Exemptions
Matt Passell	Public	2/6/2023	Support	General

Maureen Galindo	Public	2/6/2023	5th Amendment	Takings Clause
			Suggestion	funding
			Heat Pump	Efficiency
			Cost	Equity
			Cost	Utility Costs
			Grid Capacity	Reliability
			Natural gas	Ban
			Existing Spaces	General
			Cost	Housing
			General opposition	Stove study
Meg Minto	Public	2/6/2023	Natural gas	Ban
			General opposition	Necessity, health
			General opposition	Stove study
			Cost	Equity
Megan Micco	Public	2/6/2023	Support	General
Melanie Bieder	Public	2/6/2023	General opposition	Necessity, health
			Cost	Equity
			Grid Capacity	Insufficient Capacity
			Natural Gas	Continued Operation
Melanie Cross	Public	2/3/2023	Support	General
Meldan Heaslip	Public	2/6/2023	Support	General
Melissa Vierra	Public	2/6/2023	Support	General
Melissa Yu	Public	2/6/2023	Support	General
Melodie Lew	Public	2/4/2023	Timeline	Delay Implementation
			Cost	Equity
			Cost	General
Michael Closson	Public	2/5/2023	Support	General
Michael DeMoss	Public	2/6/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Cost	General
			General opposition	Necessity, health
Michael DeMoss	Public	1/20/2023	Natural gas	Ban
			General opposition	Electricity generation
			Grid Capacity	Insufficient capacity

			General opposition	Necessity, health
Michael Kapolnek	Public	1/7/2023	Panel upgrades	Cost
			Panel upgrades	Need
			Heat Pump	Efficiency
			Existing Spaces	General
			Cost	Panel upgrades
			Panel upgrades	Time
			Workforce	Availability/Training
			Cost	Housing
			Cost-Effectiveness	General
			Cost-Effectiveness	Emissions reductions
			General opposition	Necessity, health
			Michael Kapolnek	Public
Grid Capacity	Statewide planning			
Timeline	Permits/Setbacks			
General opposition	Emergency situations			
Panel upgrades	Time			
Cost	housing			
General opposition	Safety			
General opposition	Necessity, health			
Panel upgrades	cost			
Cost-Effectiveness	General			
General opposition	Exemptions			
Michael Kutliek	Public	2/4/2023		
Michael Mills	Public	2/6/2023	Support	General
Michael Wittig	Public	2/3/2023	Support	General
Michal Atz Brenzel	Public	1/19/2023	Natural gas	Ban
			Panel upgrades	Cost
			Cost	General
			Heat Pump	Commercial

			Cost	Renters
			General opposition	Necessity, health
Michele Hudson	Public	2/1/2023	Support	General
Michelle Hudson	Public	2/6/2023	Support	General
Michelle MacKenzie	Public	2/3/2023	Support	General
Michelle Orengo-Mcfarlane	Public	2/6/2023	Support	General
Michelle Peglau	Public	2/6/2023	Support	General
Mignon Moskowitz	Public	2/6/2023	Support	General
Mike Balma	Public	2/6/2023	Support	General
Mike Thompson	Public	1/24/2023	Natural gas	Ban
			General opposition	Emergency situations
			Panel upgrades	Need
Mira Chokshi	Public	2/6/2023	Support	General
Mitch Lerman	Public	1/25/2023	General opposition	Electricity generation
			Panel upgrades	Cost
			Panel upgrades	Time
			Grid Capacity	Insufficient capacity
Mohan Sakhrani	Public	2/6/2023	Support	General
Nancy Burke	Public	1/26/2023	Cost	Equity
Nancy Federspiel	Public	2/6/2023	Support	General
Nancy Green	Public	1/25/2023	Grid Capacity	Reliability
			Cost	General
			Cost	Utility Costs
			Grid Capacity	Insufficient capacity
			General opposition	Electricity generation
			Panel upgrades	Cost
General opposition	Necessity, health			
Nancy Haber	Public	1/31/2023	Support	General
Nancy Havassy	Public	2/6/2023	Support	General
Nancy Schneider	Public	2/3/2023	Support	General
Nancy Westreich	Public	1/23/2023	Natural gas	Ban
			Heat Pump	Cold weather operation
			Grid Capacity	Reliability

			Cost	General
			Panel upgrades	Cost
Nanlouise Wolfe	Public	2/6/2023	Support	General
Nate Sanchez	Public	1/28/2023	Cost	Equity
Ned Kuypers	Public	2/5/2023	General opposition	Grandfathering
			Cost	General
			Panel upgrades	Cost
			Existing Spaces	General
			Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
Niall Ferguson	Public	2/6/2023	Natural gas	Ban
			General opposition	propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Reliability
			General opposition	Necessity, health
Nicholas Cahill	Public	2/6/2023	Support	General
Nicholas Ratto	Public	2/6/2023	Support	General
Nicole Mo	Public	2/6/2023	Support	General
Nikki Nafziger	Public	2/6/2023	Support	General
Noah Armstrong	Public	2/6/2023	Support	General
Noel Poddanchik	Public	2/6/2023	Support	General
Nora Privitera	Public	2/6/2023	Support	General
O Mandrussow	Public	2/6/2023	Support	General
Pacific Gas and Electric	Utility	2/6/2023	Support	General
			Cost	Equity
			Suggestion	Zonal Electrification
			Cost	Utility Costs
			Suggestion	Equity
Palo Alto Green Gables Residents	Public	1/23/2023	Existing Spaces	Permits/Setbacks
			Panel upgrades	Cost
			EIR	Noise
Pam Brigg McKown	Public	2/4/2023	Support	General

Pamela Sieck	Public	2/6/2023	Support	General
Pascal Bruyere	Public	2/3/2023	Support	General
Pat Blackwell-Marchant	Public	2/6/2023	Support	General
Pat Lang	Public	2/3/2023	Support	General
Pat Marriott	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Grid Capacity	Insufficient capacity
Patricia Busk	Public	2/6/2023	Support	General
Patricia Linder	Public	2/6/2023	Support	General
Patricia M Daeley	Public	1/19/2023	Natural gas	Ban
			Cost	Funding
			Grid capacity	Reliability
Patrick Costello	Public	2/4/2023	Support	General
Patrick Mccully	Public	2/6/2023	Support	General
Paul Frantz	Public	1/31/2023	Panel upgrades	Cost
			Cost	Equity
			Heat Pump	Noise
			Cost	Utility Costs
			Cost	General
Paul Malkin	Public	2/6/2023	Support	General
Paul Meagher	Public	2/6/2023	Support	General
Paul Perez	Public	2/6/2023	Support	General
Paul Vesper	Public	2/6/2023	Support	General
Paula Rochelle	Public	2/3/2023	Support	General
Pearl Karrer	Public	2/6/2023	Grid Capacity	Reliability
			Natural gas	Ban
			Cost	Market change
Pedram Navid	Public	1/18/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Natural gas	Continued operation
			Cost	General
Peter Belden	Public	2/6/2023	Support	General
Peter Booth Lee	Public	2/6/2023	Support	General
Peter Garrison	Public	2/6/2023	Cost	Equity
Peter Jon Shuler	Public	2/4/2023	Grid Capacity	insufficient capacity
			Grid Capacity	Reliability
			General opposition	Necessity, health
			Cost	Equity
			Cost	General



			Timeline	Delay Implementation
			EIR	General
Philip Haves	Public	2/6/2023	Support	General
Philip Ragozzino	Public	1/30/2023	Panel upgrades	Need
			General opposition	Necessity, health
Physicians for Social Responsibility SF Bay	Organization	2/3/2023	Support	General
Piper McNulty	Public	2/3/2023	Support	General
Portland Coates	Public	2/6/2023	Support	General
R D	Public	2/6/2023	Support	General
Rachel Townsend	Public	2/6/2023	Support	General
Rajan Narang	Public	2/3/2023	Support	General
Randy Breunling	Public	2/5/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Panel upgrades	Need
			Supply Chain	Appliances availability
			Suggestion	Funding
			Grid Capacity	insufficient capacity
			Timeline	Delay Implementation
			General opposition	Emergency situations
			General opposition	Necessity, health
			General opposition	Authority
Raphael Hitzke	Public	2/2/2023	Support	General
Rebecca Eliscu	Public	2/3/2023	Support	General
Rebecca Young	Public	2/2/2023	Support	General
Regan Avery	Company	2/6/2023	Panel upgrades	Need
			Panel upgrades	Cost
			Grid Capacity	Insufficient capacity
			Cost	General
			Panel upgrades	Time

			General opposition	Stove Study
			General opposition	Necessity, health
Renee Alloy	Public	1/27/2023	Cost	General
			Existing Spaces	Permits/Setbacks
			Heat Pump	Efficiency
			Grid Capacity	Reliability
			Panel upgrades	Cost
			Cost	Equity
			Natural gas	Ban
Rheem	Organization/Manufacturer	2/6/2023	Emissions	GHG co-benefits
			Supply Chain	Appliances Availability
			Heat Pump	Availability/Training
			General opposition	Emergency situations
			Panel upgrades	Need
			Existing Spaces	General
			Heat Pump	Commercial
			Rule Language	Certification Calculation
			General opposition	CARB
			Rule Language	Manufacture Date
Rich Waller	Public	2/6/2023	Support	General
Richard Gallo	Public	2/3/2023	Support	General
Richard Hallsted	Public	2/6/2023	Existing Spaces	Permits/Setbacks
			Panel upgrades	Cost
			Cost	General
Richard Probst	Public	1/24/2023	Support	General
Richard Staehnke	Public	2/6/2023	Panel upgrades	Cost
			Panel upgrades	Time
			Cost	Funding
Rick Edmondson	Public	2/6/2023	Support	General
Rick Vujovich	Public	2/7/2023	Natural gas	Ban

			General opposition	Necessity, health
			Cost	General
Rick Yost	Public	2/6/2023	General opposition	Propane
			Panel upgrades	Need
			General opposition	Exemptions
			Grid Capacity	Air Conditioning
			Grid Capacity	Reliability
Rita Fanfelle	Public	1/23/2023	Cost	Equity
			General opposition	Necessity, health
RMI et al	Organization	2/6/2023	Support	General
Rob SS	Public	2/7/2023	Natural gas	Ban
			Cost	General
			General opposition	Necessity, health
Robert Horstmeyer	Public	2/6/2023	Natural gas	Ban
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			General opposition	Necessity, health
Robert Jardine	Public	2/3/2023	Support	General
Robert Kahn	Public	2/4/2023	Support	General
Robert Magarian	Public	2/6/2023	Support	General
Robert Mayo	Public	2/7/2023	Support	General
Robert Miller	Public	2/6/2023	Support	General
Robert Raven	Public	2/4/2023	Support	General
Robert Sherwood	Public	1/19/2023	Natural gas	Ban
			Grid Capacity	Reliability
			Panel upgrades	Cost
			Panel upgrades	Need
			Emissions	GHG co-benefits
			General opposition	Necessity, health
Robert Whitehair	Public	2/3/2023	Support	General
Robert Zhou	Public	2/1/2023	Support	General
Roberta Stern	Public	2/6/2023	Support	General
Rocky Fort	Public	1/19/2023	Panel upgrades	Cost

			Timeline	Delay Implementation
			Grid Capacity	Reliability
			General opposition	Necessity, health
Roger Melen	Public	2/6/2023	General opposition	Necessity, health
Roman Capelli	Public	2/6/2023	Support	General
Ronald Dow	Public	2/6/2023	General opposition	Necessity, health
Ronald Vinsant	Public	2/7/2023	Natural gas	Ban
			Panel upgrades	Need
			Grid Capacity	Insufficient capacity
			Grid Capacity	Reliability
			Natural gas	Continued operation
			Workforce	Availability/Training
Ross Simkover	Public	2/6/2023	Support	General
Ryan Acebo	Public	2/6/2023	Support	General
Sally Giese	Public	2/6/2023	Natural gas	Ban
			General opposition	Stove Study
			Natural gas	Continued operation
			Grid Capacity	Reliability
Sam Reed	Public	2/3/2023	Support	General
Samantha Smith	Public	2/6/2023	Support	General
San Jose Community Energy Advocates	Organization	1/30/2023	Support	General
			Workforce	Availability/Training
San Mateo 19th Ave Homeowners	Public	2/6/2023	Grid Capacity	Reliability
Sandra Gamble	Public	2/6/2023	Support	General
Sandra Pachaud	Public	2/6/2023	Natural gas	Ban
			General opposition	Stove Study
			General opposition	Necessity, health
Sandra Slater	Public	2/6/2023	Support	General
Sara Syer	Public	2/6/2023	Support	General
Sara Theiss	Public	2/4/2023	Support	General
Sarah Gao	Public	2/3/2023	Support	General
Sarah Harper	Public	2/6/2023	Support	General

Sarah Hubbard	Public	2/6/2023	Support	General
Saran K	Public	2/6/2023	Support	General
Scott Barlow	Public	2/3/2023	Support	General
Scott Grinthal	Public	2/4/2023	Support	General
Scott Nelson	Public	2/6/2023	Support	General
Sergio Marti	Public	2/6/2023	Grid Capacity	Insufficient capacity
			Panel upgrades	Need
			Panel upgrades	Time
Sheila Barbato	Public	2/6/2023	Support	General
Sheila Tarbet	Public	2/6/2023	Support	General
Sherman Lewis	Public	2/6/2023	Support	General
Sherrill Futrell	Public	2/6/2023	Support	General
Shirley Lutzky	Public	2/6/2023	Support	General
Sierra Club	Organization	2/6/2023	Support	General
Silicon Valley Clean Energy	Community Choice Aggregator	2/6/2023	Support	General
SPUR	Organization	2/6/2023	Support	General
Stan Fitzgerald	Public	2/3/2023	Support	General
Steffen Rochel	Public	2/6/2023	Support	General
Stephanie Bloom	Public	2/5/2023	Support	General
Stephanie Nunez	Public	2/6/2023	Support	General
Stephanie Reader	Public	2/3/2023	Support	General
Stephanie Shindler	Public	2/6/2023	Support	General
Stephen Rosenblum	Public	2/2/2023	Support	General
Steve Gazzera	Public	2/6/2023	Natural gas	Ban
Steve Mann	Public	2/6/2023	Support	General
Steve Pease	Public	2/6/2023	Support	General
Steve Shuput	Public	2/6/2023	Support	General
Steve Simons	Public	2/6/2023	Grid Capacity	Insufficient capacity
Steve Smith	Public	1/19/2023	Cost	Beyond panel
			Cost	Existing spaces
Steven Mazliach	Public	2/6/2023	Support	General
Steven Schlansker	Public	1/18/2023	Support	General
Steven Schramm	Public	2/6/2023	Support	General
Steven Wilk	Public	2/6/2023	Natural gas	Ban
			General opposition	Authority
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Sue Blockstein	Public	2/6/2023	Support	General

Summer Rogers	Public	2/6/2023	Support	General
Susan Abby	Public	2/6/2023	Support	General
Susan Chamberlain	Public	2/3/2023	Support	General
Susan Ferrone	Public	2/6/2023	Natural gas	Ban
			Cost	General
			Cost	Funding
			Grid Capacity	Reliability
Susan Green	Public	1/27/2023	Support	General
Susan Nakashima	Public	2/6/2023	Support	General
Susan Trivisonno	Public	2/3/2023	Support	General
Susanna Marshland	Public	2/6/2023	Support	General
Susannah Saunders	Public	2/4/2023	Support	General
Sven Thesen	Public	2/3/2023	Support	General
Sylvia De Baca	Public	2/6/2023	Support	General
Tamara Alexa	Public	2/4/2023	Support	General
Tamara Gabel	Public	1/24/2023	General opposition	Propane
			Grid Capacity	Reliability
Terah James	Public	2/6/2023	Natural gas	Ban
Teresa Cheng	Public	2/6/2023	Support	General
Terry and Martin Horwitz	Public	2/6/2023	Support	General
Terry Grasso	Public	1/18/2023	Panel upgrades	Cost
Terry Houlihan	Public	2/5/2023	General opposition	Necessity, health
			Existing Spaces	Permits/setbacks
Terry Houlihan	Public	2/5/2023	Heat Pump	Efficiency
			Grid Capacity	Statewide planning
			EIR	General
			Cost	Equity
			Grid Capacity	insufficient capacity
Grid Capacity	Reliability			
Terry Nagel	Public	2/1/2023	Support	General
Thalia Lubin	Public	2/3/2023	Support	General
Thom Reinstein	Public	2/1/2023	Cost	Equity
			General opposition	Electricity generation
Thomas Carlino	Public	2/3/2023	Support	General
Thomas Graly	Public	2/6/2023	Support	General

Thomas Pfaeffle	Public	2/4/2023	General opposition	Necessity, health
Thomas Tilden	Public	1/18/2023	Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
TJ Giuli	Public	2/3/2023	EIR	Grid Emissions
			Grid Capacity	Insufficient capacity
			Panel upgrades	Cost
			Panel upgrades	Time
Todd Synder	Public	2/3/2023	Support	General
Tom Kabat	Public	2/2/2023	Support	General
			Suggestion	Funding
Tony Gaughan	Public	2/6/2023	General opposition	Propane
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
Toph Kerpan Evans	Public	2/6/2023	Support	General
Travis Ramsey	Public	2/6/2023	Support	General
Trish Mulvey	Public	2/3/2023	Support	General
Tristia Bauman	Public	2/4/2023	Support	General
Urmila Padmanabhan	Public	2/6/2023	Support	General
Vansi Vallabhaneni	Public	1/18/2023	Support	General
Vasu Murti	Public	2/6/2023	Support	General
Victor Buathier	Public	2/6/2023	General opposition	Necessity, health
			Cost	Utility Costs
			Grid Capacity	Reliability
			Grid Capacity	Insufficient capacity
			Heat Pump	Cost
			Workforce	Availability/Training
Cost	General			
Victor Kamendrowsky	Public	2/6/2023	Support	General
Victoria Armigo	Public	2/3/2023	Support	General
Vince Augusta	Public	2/6/2023	Support	General
Virginia Leslie	Public	2/6/2023	Support	General
Wei-Tai Kwok	Public	2/6/2023	Support	General
Wendy Chou	Public	2/2/2023	Support	General
Western Propane Gas Association	Organization	2/6/2023	Heat Pump	Availability/Training

			Panel upgrades	Time
			Cost	General
			Cost	Funding
			Cost	Beyond panel
			Cost	Utility Costs
			Cost	Equity
			General opposition	Electricity generation
			General opposition	Propane
William Garrett	Public	2/6/2023	General opposition	Stove Study
William Williams	Public	2/5/2023	General opposition	Necessity, health
			Cost	General
Yael Kisel	Public	2/6/2023	Support	General
Yassen Roussev	Public	2/6/2023	Support	General
Yves Decargouet	Public	2/6/2023	Support	General
Zoe Jonick	Public	2/6/2023	Support	General



## Attachment 2: Comments Received