BOARD MEETING DATE: September 4, 2020 AGENDA NO. 31

PROPOSAL: Determine That Proposed Amendments to Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, and Revisions to the Clean Air Furnace Rebate Program Are Exempt from CEQA; Amend Rule 1111 and Approve Revisions to the Clean Air Furnace Rebate Program

SYNOPSIS: Rule 1111 establishes a NOx emission limit of 14 ng/J for residential and commercial gas furnaces. Proposed Amended Rule 1111 will extend the mitigation fee alternative compliance option from October 1, 2020 to September 30, 2021 for weatherized furnaces and extend the exemption from October 1, 2020 to September 30, 2021 for high-altitude furnaces. The proposed amendments would also include an exemption for gas-electric dual fuel systems with low-NOx furnaces (40 ng/J) installed at high altitudes until September 30, 2022. Staff is also recommending modifications to the Clean Air Furnace Rebate program to increase funding and consumer rebates.

COMMITTEE: Stationary Source, June 19 and August 21, 2020, Reviewed

RECOMMENDED ACTIONS:
Adopt the attached Resolution:

1. Determining that the proposed amendments to Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, and revisions to the Clean Air Furnace Rebate Program are exempt from the requirements of the California Environmental Quality Act;
2. Amending Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces; and
3. Recognizing into the Air Quality Investment Fund 27 (Rule 1111), $3,500,000 and revising the Clean Air Furnace Rebate Program to incentivize installation of 14 ng/J furnaces and electric heat pumps.

Wayne Nastri
Executive Officer

PMF:SN:MK:GQ:SW:YZ

Background
Rule 1111 - Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, was adopted in December 1978 and establishes a NOx emission limit for residential and commercial gas-fired fan-type space heating furnaces. In 2009, Rule 1111 was amended to lower the NOx emission limit from 40 to 14 ng/Joule (ng/J), and again amended in 2014 to include a mitigation fee alternative compliance option to allow additional time for manufacturers to commercialize 14 ng/J furnaces. The rule applies to manufacturers, distributors, sellers and installers of such furnaces.

Rule 1111 has a staggered implementation schedule, depending on the furnace type. Condensing and non-condensing furnaces installed at elevations below 4,200 feet were the first group of furnaces which had to meet the 14 ng/J NOx emission limit on September 30, 2019. On October 1, 2020 weatherized, condensing and non-condensing furnaces installed at elevations greater than or equal to 4,200 feet above sea level (high-altitude) must meet the 14 ng/J NOx emission limit. Although some manufacturers will have compliant furnaces by October 1, 2020, other manufacturers have informed staff that additional time is needed, in part due to COVID-19, to commercialize weatherized furnaces or to complete high altitude testing.

Clean Air Furnace Rebate Program
In March 2018, the Board approved $3 million to fund the Clean Air Furnace Rebate Program using monies collected through the Rule 1111 mitigation fee. Electric & Gas Industries Association (EGIA), a third-party contractor that was selected through a competitive bidding process, administers the Clean Air Furnace Rebate Program on behalf of the South Coast AQMD. In May 2020, the initial $3 million was exhausted. There is approximately $4.6 million in Fund 27 (Rule 1111 mitigation fees) from the collection of the Rule 1111 mitigation fees that is currently available.

Public Process
Staff has held ongoing individual meetings with the seven furnace manufacturers to discuss rule implementation status and upcoming compliance dates. The meetings were held individually to provide each manufacturer the ability to discuss confidential information regarding their technology development. In addition, two Proposed Rule 1111 working group meetings were held on June 10, 2020 and July 9, 2020. A public workshop was held on July 15, 2020.

Proposed Amendments
Proposed Amended Rule 1111 (PAR 1111) will provide a 12-month extension to September 30, 2021 for the mitigation fee alternate compliance option for weatherized furnaces and the exemption for high altitude condensing and non-condensing furnace installations (furnaces installed at or above elevations of 4,200 feet above sea level). To provide additional compliance options for installations in high altitude areas, PAR 1111 will allow installations of dual fuel systems with noncompliant 40 ng/J NOx furnaces

until September 30, 2022. PAR 1111 also requires recordkeeping of sales and installations for manufacturers, distributors and installers of 40 ng/J NOx furnaces for operation as propane-firing only and dual fuel systems with noncompliant 40 ng/J NOx furnaces.

Manufacturers, distributors, and installers of dual fuel systems with noncompliant 40 ng/J NOx furnaces for installations at or above 4,200 feet above sea level will need to comply with the same recordkeeping requirements for standalone noncompliant furnaces that are installed in high altitude areas through September 30, 2021. In addition, PAR 1111 includes additional labeling and system design requirements to ensure proper operation of the dual fuel system with a noncompliant 40 ng/J NOx furnace by prioritizing heat pump operation and lockout of the switchover temperature settings at the point of manufacture with a required external temperature sensor installed with every system.

Proposed Revisions to the Clean Air Furnace Rebate Program

To help commercialize and incentivize cleaner residential heating alternatives, staff is recommending that $3.5 million of the available $4.6 million from Fund 27 (Rule 1111) be used to expand the consumer rebate program for furnaces described in the table below. A minimum of 25 percent of the recommended funding will be reserved for installations in disadvantaged and low-income communities as identified under SB535 and AB1550, respectively. Staff is recommending a higher rebate for electric heat pumps of $1,500 to offset the higher cost associated with an air handler and electrical upgrades associated with this zero-emission technology. Staff will return to the Stationary Source Committee by May 2021 to provide an update on the rebate program and recommended changes to the Clean Air Furnace Rebate program, if any.

Proposed Consumer Rebate	Limit for Rebate
$500 rebate for 14 ng/J furnaces installed in high altitude areas (≥4,200 feet)	200 units and no later than September 30, 2021
$500 rebate for 14 ng/J weatherized furnaces	600 units and no later than September 30, 2021
$1,500 rebate for zero emission heat pump systems (replacements only)	2,000 units or when funds depleted

Key Issues

Staff has worked with stakeholders throughout the rulemaking process to resolve issues, however, two key issues remain: 1) an additional 60-day sell through provision for weatherized furnaces; and 2) allowing for the sale, distribution and installation of dual fuel systems with a non-compliant 40 ng/J furnace throughout the Basin. Regarding the first issue, two manufacturers have requested a 60-day sell-through provision, that would be in addition to the 12-month extension of the alternative mitigation fee for weatherized furnaces. PAR 1111 will extend the mitigation fee alternative compliance

option for all weatherized units by 12 months to September 30, 2021, an additional six months from the original proposed date of March 31, 2021. The additional six months provides manufacturers time to manage existing orders and inventory. By April 1, 2021, five of the seven manufacturers have plans to commercialize residential or commercial or both residential and commercial weatherized furnaces. It is not clear if the other two manufacturers have any plans to commercialize 14 ng/J weatherized furnaces.

Regarding the second issue, three manufacturers have requested that PAR 1111 expand the provision that allows for the sale, distribution and installation of dual fuel systems with noncompliant 40 ng/J furnaces to apply throughout the Basin, and not just for installations in high elevations. Dual fuel systems are electric heat pumps that provide cooling and heating that are paired with a separate gas furnace that provides supplemental heat when the temperature drops below a set temperature, generally below 32°F.

For the past year, Rule 1111 has only allowed dual fuel systems paired with a 14 ng/J furnace, and all seven furnace manufacturers offer dual fuel systems with a 14 ng/J furnace. Allowing dual fuel systems with a non-compliant 40 ng/J furnace is a significant departure from the Rule 1111 approach, a rule relaxation and would be backsliding. Rule 1111 regulates the emissions from the furnace and focuses on the supply chain from the manufacturer, distributor, and installer. There are enforcement challenges if Rule 1111 shifts to regulate the emissions from the furnace and how that furnace is used, since there are no requirements for the consumer to limit the use of the furnace or to prevent the consumer from disabling or modifying the configuration of a dual fuel system. In addition, a dual fuel system with a 40 ng/J non-compliant furnace would result in 65% higher NOx emissions than a dual fuel system with a 14 ng/J furnace, which are emission reductions forgone for the life of the unit until that unit is replaced. If an alternative compliance option to allow dual fuel systems with a 40 ng/J furnace is incorporated in PAR 1111, the mitigation fee for condensing and non-condensing furnaces should be considered to incentivize dual fuel systems with a compliant 14 ng/J furnace.

Based on comments from manufacturers and input from the Stationary Source Committee, staff is recommending modifying the Clean Air Furnace Rebate Program to increase the rebate from $1,000 to $1,500 for all electric heat pumps and to offer this rebate for up to 2,000 units. For most of the Basin, temperatures do not drop below 32°F, and the supplemental gas furnace in a dual fuel system is not needed. A consumer rebate of $1,500 combined with other rebates from electrical utilities will help to offset the additional cost to install an air handler or electrical upgrades for electric heat pumps. Staff removed the proposal for a $500 rebate for dual fuel systems with 14 ng/J furnaces, since this is currently required under Rule 1111 and to allow a greater offering for more electric heat pumps.

California Environmental Quality Act (CEQA)
Pursuant to the California Environmental Quality Act (CEQA) Guidelines Sections 15002(k) and 15061, the proposed project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3). A Notice of Exemption has been prepared pursuant to CEQA Guidelines Section 15062 and is included as Attachment F to this Board letter. If the project is approved, the Notice of Exemption will be filed with the county clerks of Los Angeles, Orange, Riverside, and San Bernardino counties. In addition, the Notice of Exemption will be electronically filed with the State Clearinghouse to be posted on their CEQAnet Web Portal, which may be accessed via the following weblink: https://ceqanet.opr.ca.gov/search/recent.

Socioeconomic Impact Assessment
PAR 1111 does not impose any additional requirements and will have no socioeconomic impacts. Extending compliance dates and increasing rebates will benefit consumers while achieving additional emission reductions from installation of zero-emission heat pumps.

Resource Impacts
Existing staff resources are adequate to implement the proposed rule amendments. The companion rebate program will be implemented by a third-party contractor, Electric & Gas Industries Association, with minimal staff resources required.

Attachments
A. Summary of Proposal
B. Key Issues and Responses
C. Rule Development Process
D. Key Contacts List
E. Resolution
F. Notice of Exemption
G. Proposed Amended Rule 1111
H. Final Staff Report
I. Board Meeting Presentation

ATTACHMENT A
SUMMARY OF PROPOSAL

Proposed Amended Rule 1111 – Reductions of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces
Summary of Proposed Amendments • Extend mitigation fee period for weatherized furnaces by one year to September 30, 2021 • Extend exemption for installations of condensing and non-condensing furnaces at elevations at or above 4,200 feet above sea level by one year to September 30, 2021 • Exempt installations of dual fuel systems with noncompliant furnaces which emit 40 nanogram per joule (ng/J) of nitrogen oxides (NOx), with conditions, at elevations at or above 4,200 feet above sea level until September 30, 2022 • Require manufacturers, distributors, and installers of dual fuel systems with noncompliant 40 ng/J NOx furnaces to maintain records of sales and installations • Require manufacturers, distributors, and installers of noncompliant furnaces to be sold with propane conversion kits for propane firing only to maintain records of sales and installations

ATTACHMENT B

KEY ISSUES AND RESPONSES

Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

Two manufacturers have requested a 60-day sell-through provision, that would be in addition to the 12-month extension of the alternative mitigation fee for weatherized furnaces

PAR 1111 will extend the mitigation fee alternative compliance option for all weatherized units by 12 months to September 30, 2021, an additional six months from the original proposed date of March 30, 2021. The additional six months provides manufacturers time to manage existing orders and inventory. By April 1, 2021, five of the seven manufacturers have plans to commercialize residential or commercial or both residential and commercial weatherized furnaces. It is not clear if the other two manufacturers have any plans to commercialize 14 ng/J weatherized furnaces.

Three manufacturers have requested that dual fuel systems with noncompliant 40 ng/J furnaces be allowed to be sold, distributed and installed throughout the Basin

Dual fuel systems are electric heat pumps that provide cooling and heating that are paired with a separate gas furnace that provides supplemental heat when the temperature drops below a set temperature, generally below 32^{o}F.

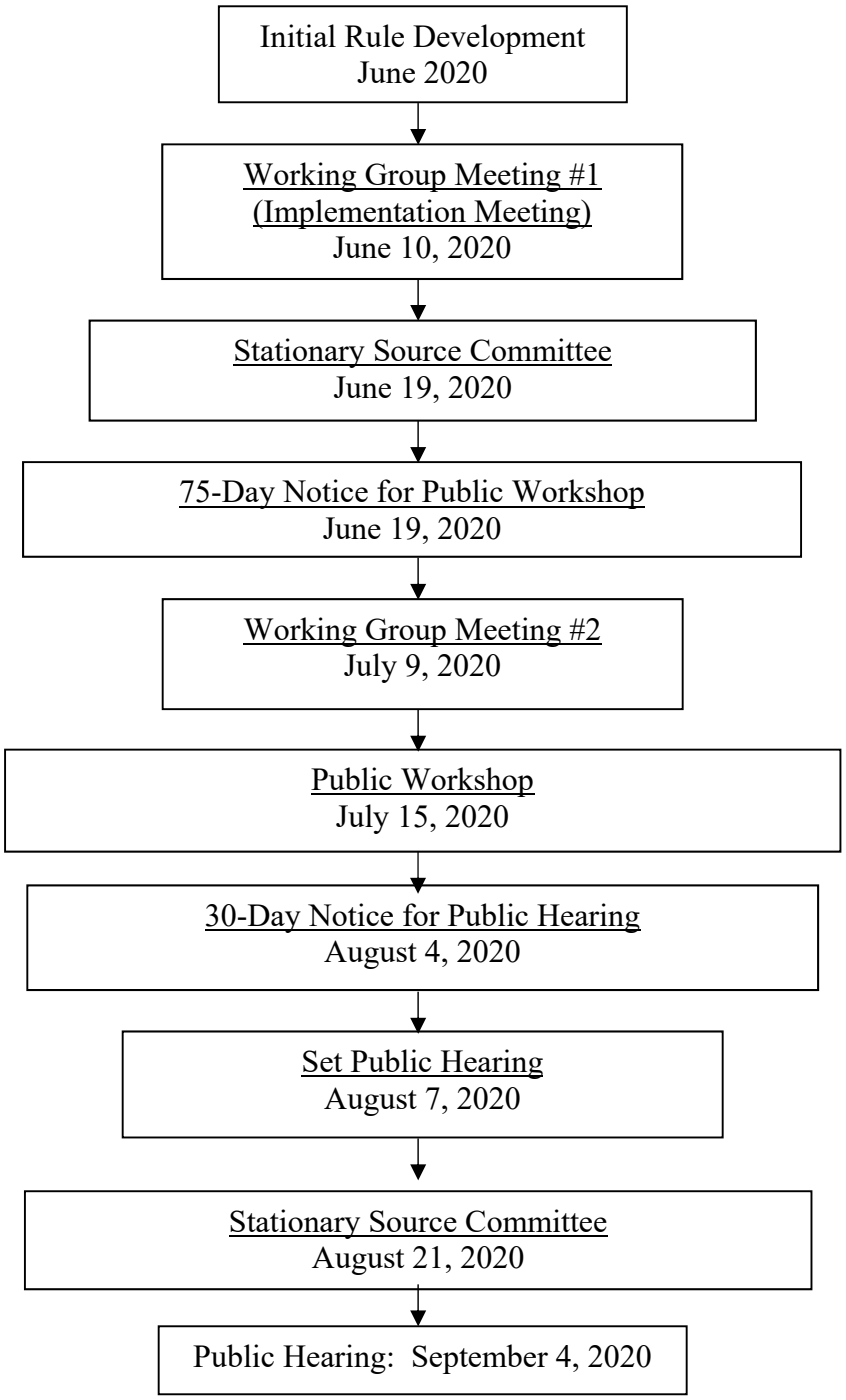
For the past year, Rule 1111 has only allowed dual fuel systems paired with a 14 ng/J furnace, and all seven furnace manufacturers offer dual fuel systems with a 14 ng/J furnace. Allowing dual fuel systems with a non-compliant 40 ng/J furnace is a significant departure from the Rule 1111 approach, a rule relaxation, and would be backsliding. Rule 1111 regulates the emissions from the furnace and focuses on the supply chain from the manufacturer, distributor, and installer. There are enforcement challenges if Rule 1111 shifts to regulate the emissions from the furnace and how that furnace is used, since there are no requirements for the consumer to limit the use of the furnace or to prevent the consumer from disabling or modifying the configuration of a dual fuel system. In addition, a dual fuel system with a 40 ng/J non-compliant furnace would result in 65% higher NOx emissions than a dual fuel system with a 14 ng/J furnace, which are emission reductions forgone for the life of the unit until that unit is replaced. If an alternative compliance option to allow dual fuel systems with a 40 ng/J furnace is incorporated in PAR 1111, the mitigation fee for condensing and non-condensing furnaces should be considered to incentivize dual fuel systems with a compliant 14 ng/J furnace.

Based on comments from manufacturers and input from the Stationary Source Committee, staff has modified the Clean Air Furnace Rebate Program to increase the rebate from $1,000 to $1,500 for all electric heat pumps. For most of the Basin, temperatures do not drop below 32°F, and the supplemental gas furnace in a dual fuel system is not needed. A consumer rebate of $1,500 combined with other rebates from electrical utilities will help to offset the additional cost to install an air handler or electrical upgrades for electric heat pumps. Staff initially considered a rebate for dual fuel systems with 14 ng/J furnaces, but decided to limit this offering for high altitude installations since these systems are currently available at lower elevations.

ATTACHMENT C

RULE DEVELOPMENT PROCESS

Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces



Three (3) months spent in rule development
One (1) Public Workshop
Two (2) Working Group Meetings
Over 25 individual meetings with stakeholders

ATTACHMENT D

KEY CONTACTS LIST

Rheem Manufacturing

Goodman Manufacturing Company

Johnson Controls

Trane Technologies

Lennox International Inc. (+Allied)

Nortek Global HVAC

Carrier Corporation

Bard Manufacturing

The Air Conditioning, Heating, and Refrigeration Institute (AHRI)

Ferguson Enterprises

US Air Conditioning Distributors

Indoor Weather, Heating, Air, and Refrigeration

SoCal Airflow Pros

M&M Mechanical

Dan Seeley's Heating & Air Conditioning

AC Pro

Burgeson’s Heating and Air Conditioning

ATTACHMENT E

RESOLUTION NO.20-_____

A Resolution of the South Coast Air Quality Management District (South Coast AQMD) Governing Board determining that Proposed Amended Rule 1111 - Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, and Revisions to the Clean Air Furnace Rebate Program are exempt from the requirements of the California Environmental Quality Act (CEQA).

A Resolution of the South Coast AQMD Governing Board amending Rule 1111 - Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces.

A Resolution of the South Coast AQMD Governing Board revising the Clean Air Furnace Rebate Program.

WHEREAS, the South Coast AQMD Governing Board finds and determines that Proposed Amended Rule 1111 and the revisions to the Clean Air Furnace Rebate Program are considered a "project" pursuant to CEQA per CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and

WHEREAS, the South Coast AQMD has had its regulatory program certified pursuant to Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l), and has conducted a CEQA review and analysis of the proposed project pursuant to such program (South Coast AQMD Rule 110); and

WHEREAS, the South Coast Governing Board finds and determines after conducting a review of the proposed project in accordance with CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA, and CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA, that Proposed Amended Rule 1111 and the revisions to the Clean Air Furnace Rebate Program are exempt from CEQA; and

WHEREAS, the South Coast AQMD Governing Board finds and determines that implementation of the proposed project would result in minimal and temporary forgone NOx emission reductions whereby it can be seen with certainty that there is no possibility that proposed project may have any significant adverse effects on the environment, and is therefore, exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption; and

WHEREAS, the South Coast AQMD staff has prepared a Notice of Exemption for the proposed project, that is completed in compliance with CEQA Guidelines Section 15062 – Notice of Exemption; and

WHEREAS, Proposed Amended Rule 1111, the revisions to the Clean Air Furnace Rebate Program, and supporting documentation, including but not limited to, the Notice of Exemption, the Final Staff Report, and the Board Letter were presented to the South Coast AQMD Governing Board and the South Coast AQMD Governing Board has reviewed and considered this information, and has taken and considered staff testimony and public comment prior to approving the project; and

WHEREAS, the South Coast AQMD Governing Board has determined that no socioeconomic assessment is required under Health and Safety Code Section 40440.8(a) because there are no adverse socio-economic impacts; and further that the proposed amended rule does not "significantly affect air quality or emissions limitations;" and

WHEREAS, California Health and Safety Code Section 40727 requires that prior to adopting, amending, or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the Final Staff Report; and

WHEREAS, the South Coast AQMD Governing Board has determined that a need exists to amend Rule 1111 to extend both the alternate compliance option with mitigation fee for weatherized furnaces and the exemption for high altitude installation of condensing and non-condensing furnaces, provide limited exemptions for dual fuel systems with noncompliant 40 ng/J NOx furnaces installed at high altitude in approved configuration, and add new definitions and recordkeeping requirements; and

WHEREAS, the South Coast AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Sections, 40000, 40001, 40440, 40702, 40725 through 40728, and 41508 of the California Health and Safety Code; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Amended Rule 1111 is written or displayed so that its meaning can be easily understood by the persons directly affected by it; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Amended Rule 1111 is in harmony with, and not in conflict with or contradictory to, existing federal or state statutes, court decisions, or regulations; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Amended Rule 1111 does not impose the same requirements as any existing state or federal regulation and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the District; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Amended Rule 1111 references the following statutes which the South Coast AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001(a) (rules to meet air quality standards); 40440(a) (rules to carry out the plan); and 40702 (adoption of rules and regulations); and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Amended Rule 1111 does not make an existing emission limit or standard more stringent, and therefore the requirements of Health and Safety Code Section 40727.2 are satisfied; and

WHEREAS, a public hearing has been properly noticed in accordance with the provisions of Health and Safety Code Section 40725; and

WHEREAS, the South Coast AQMD Governing Board has held a public hearing in accordance with all provisions of law; and

WHEREAS, the South Coast AQMD Governing Board specifies the Manager of Proposed Amended Rule 1111and revisions to the Clean Air Furnace Rebate Program, as the custodian of the documents or other materials which constitute the record of proceedings upon which the adoption of this proposed project is based, which are located at the South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, California; and

WHEREAS, the South Coast AQMD Governing Board, through the Resolution of the March 2018 amendment to Rule 1111, directed the Executive Officer to recognize into Fund 27 (Rule 1111) upon receipt the incremental amount of mitigation fee for each other unit paid by the furnace manufacturers as funding for the Clean Air Furnace Rebate Program; and

NOW, THEREFORE, BE IT RESOLVED, that the South Coast AQMD Governing Board does hereby determine, pursuant to the authority granted by law, that the proposed project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption. This information was presented to the South

Coast AQMD Governing Board, whose members reviewed, considered and approved the information therein prior to acting on the proposed project; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board directs the Executive Officer to resume the Clean Air Furnace Rebate Program, with an additional $3,500,000 from Fund 27 (Rule 1111) as funding while reserving 25% of total funding for installations in disadvantaged communities and to report to the Stationary Source Committee no later than May 21, 2021 on the progress and need for any changes to the Clean Air Furnace Rebate Program; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board directs staff to provide an update as to development of high altitude furnaces, weatherized dual fuel systems with a non-compliant 40 ng/J furnaces for the Basin, and mobile home furnaces to Stationary Source Committee no later than May 21, 2021; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board directs staff to report the effectiveness of the exemption for dual fuel systems with noncompliant 40 ng/J NOx furnace installed at high altitude in approved configuration to the Stationary Source Committee no later than May 20, 2022. This report shall include, but not be limited to, an assessment of the quantity and models of the dual fuel system being installed, and whether the exemption should be extended or expanded; and

BE IT FURTHER RESOLVED, that the Executive Officer is hereby directed to forward a copy of this Resolution and Proposed Amended Rule 1111 to the California Air Resources Board for approval and subsequent submittal to the U.S. Environmental Protection Agency for inclusion into the State Implementation Plan; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board does hereby adopt, pursuant to the authority granted by law, Proposed Amended Rule 1111, as set forth in the Attachment G and incorporated herein by reference, and revisions to the Clean Air Furnace Rebate Program with additional fund.

DATE:_____ _____

CLERK OF THE BOARDS

ATTACHMENT F

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SUBJECT: **NOTICE OF EXEMPTION FROM THE CALIFORNIA ENVIRONMENTAL QUALITY ACT**

PROJECT TITLE: **PROPOSED AMENDED RULE 1111 – REDUCTION OF NOX EMISSIONS FROM NATURAL GAS FIRED, FAN-TYPE CENTRAL FURNACES, AND REVISIONS TO THE CLEAN AIR FURNACE REBATE PROGRAM**

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, the South Coast Air Quality Management District (South Coast AQMD), as Lead Agency, has prepared a Notice of Exemption pursuant to CEQA Guidelines Section 15062 – Notice of Exemption for the project identified above.

The proposed project is comprised Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural Gas Fired, Fan-Type Central Furnaces, and revisions to the Clean Air Furnace Rebate Program. The proposed amendments to Rule 1111 will: 1) extend the existing mitigation fee alternate compliance option for weatherized units for one year until September 30, 2021; 2) extend the exemption of condensing and non-condensing furnaces for high altitude installations for one year until September 30, 2021; 3) allow installations of dual fuel systems with noncompliant furnaces which emit 40 nanograms per Joule (ng/J) of nitrogen oxides (NOx), with conditions, at elevations of 4,200 feet above sea level or higher until September 30, 2022; and 4) require manufacturers, distributors, and installers of dual fuel systems with noncompliant 40 ng/J NOx furnaces to maintain records of sales and installations. In addition, proposed revisions to the Clean Air Furnace Rebate Program are designed to fund rebates to incentivize installation of the following 14 ng/J NOx compliant equipment: dual fuel condensing or non-condensing furnaces, weatherized furnaces, furnaces installed above 4,200 feet, and all electric heat pump systems.

The proposed project has been reviewed pursuant to: 1) CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA. Since the proposed project would result in minimal and temporary forgone NOx emission reductions, it can be seen with certainty there that there is no possibility that the proposed project may have a significant adverse effect on the environment. Therefore, the project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption. If the project is approved, this Notice of Exemption will be filed with the county clerks of Los Angeles, Orange, Riverside, and San Bernardino counties. In addition, this Notice of Exemption will be electronically filed with the State Clearinghouse to be posted on their CEQAnet Web Portal which may be accessed via the following weblink: https://ceqanet.opr.ca.gov/search/recent.

Any questions regarding this Notice of Exemption should be directed to Kendra Reif (c/o Planning, Rule Development and Area Sources) at the above address. Ms. Reif can also be reached at (909) 396-2492. Mr. Shawn Wang is also available at (909) 396-3319 to answer any questions regarding Proposed Amended Rule 1111 and the revisions to the Clean Air Furnace Rebate Program.

Date: August 5, 2020

Signature: Barbara Radlein

Barbara Radlein
Program Supervisor, CEQA
Planning, Rule Development and Area Sources

Reference: California Code of Regulations, Title 14, Division 6, Chapter 3

NOTICE OF EXEMPTION FROM THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

To:	County Clerks: Counties of Los Angeles, Orange, Riverside and San Bernardino; and Governor's Office of Planning and Research - State Clearinghouse	**From:**	South Coast Air Quality Management District 21865 Copley Drive Diamond Bar, CA 91765

Project Title: Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural Gas Fired, Fan-Type Central Furnaces, and Revisions to the Clean Air Furnace Rebate Program

Project Location: The project is located within the South Coast Air Quality Management District (South Coast AQMD) jurisdiction which includes the four-county South Coast Air Basin (all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB).

Description of Nature, Purpose, and Beneficiaries of Project: The proposed project is comprised Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural Gas Fired, Fan-Type Central Furnaces, and revisions to the Clean Air Furnace Rebate Program. The proposed amendments to Rule 1111 will: 1) extend the existing mitigation fee alternate compliance option for weatherized units for one year until September 30, 2021; 2) extend the exemption of condensing and non-condensing furnaces for high altitude installations for one year until September 30, 2021; 3) allow installations of dual fuel systems with noncompliant furnaces which emit 40 nanograms per Joule (ng/J) of nitrogen oxides (NOx), with conditions, at elevations of 4,200 feet above sea level or higher until September 30, 2022; and 4) require manufacturers, distributors, and installers of dual fuel systems with noncompliant 40 ng/J NOx furnaces to maintain records of sales and installations. In addition, proposed revisions to the Clean Air Furnace Rebate Program are designed to fund rebates to incentivize installation of the following 14 ng/J NOx compliant equipment: dual fuel condensing or non-condensing furnaces, weatherized furnaces, furnaces installed above 4,200 feet, and all electric heat pump systems.

Public Agency Approving Project:	**Agency Carrying Out Project:**
South Coast Air Quality Management District	South Coast Air Quality Management District

Exempt Status: CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption

Reasons why project is exempt: Pursuant to the California Environmental Quality Act (CEQA), South Coast AQMD, as Lead Agency, has reviewed the proposed project pursuant to: 1) CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA. Since the proposed project would result in minimal and temporary forgone NOx emission reductions, it can be seen with certainty there that there is no possibility that the proposed project may have a significant adverse effect on the environment. Therefore, the project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption.

Date When Project Will Be Considered for Approval (subject to change):
South Coast AQMD Governing Board Hearing: September 4, 2020

CEQA Contact Person:	**Phone Number:**	**Email:**	**Fax:**
Ms. Kendra Reif	(909) 396-2492	kreif@aqmd.gov	(909) 396-3982
Rule/Rebate Program Contact Person:	**Phone Number:**	**Email:**	**Fax:**
Mr. Shawn Wang	(909) 396-3319	swang@aqmd.gov	(909) 396-3324

Date Received for Filing: _____ **Signature:** *(Signed Upon Board Approval)*

Barbara Radlein
Program Supervisor, CEQA
Planning, Rule Development and Area Sources

Attachment G

(Adopted December 1, 1978)(Amended July 8, 1983)(Amended November 6, 2009)
(Amended September 5, 2014)(Amended March 2, 2018)-(Amended July 6, 2018)
(Amended December 6, 2019)-(Amended September 4, 2020)

PROPOSED AMENDED RULE 1111. REDUCTION OF NO_X EMISSIONS FROM NATURAL-GAS- FIRED, FAN-TYPE CENTRAL FURNACES

(a) Purpose and Applicability

The purpose of this rule is to reduce NOx emissions from fan-type central furnaces, as defined in this rule. This rule applies to manufacturers, distributors, sellers, and installers of residential and commercial fan-type central furnaces, requiring either single-phase or three-phase electric supply, used for comfort heating with a rated heat input capacity of less than 175,000 BTU per hour, or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour.

(b) Definitions

(1) ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE) is defined in Section 10.1 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

(2) BTU means British thermal unit or units.

(3) CONDENSING FURNACE means a high-efficiency furnace that uses a second heat exchanger to extract the latent heat in the flue gas by cooling the combustion gasses to near ambient temperature so that water vapor condenses in the heat exchanger, is collected and drained.

(4) DUAL FUEL SYSTEM is a heating, ventilation, and air conditioning system utilizing a HEAT PUMP as the primary source of heating and cooling with a FAN-TYPE CENTRAL FURNACE serving as auxiliary heating.

(54) FAN-TYPE CENTRAL FURNACE is a self-contained space heater using natural gas, or any fan-type central furnace that is in natural gas-firing mode, providing for circulation of heated air at pressures other than atmospheric through ducts more than 10 inches in length that have:

(A) a RATED HEAT INPUT CAPACITY of less than 175,000 BTU per hour; or

(B) for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour.

(6~~5~~) HEAT INPUT means the higher heating value of the fuel to the furnace measured as BTU per hour.

(7) HEAT PUMP means an all-electric device that utilizes condensation and evaporation of refrigerant to absorb and release heat for heating, ventilation, and air conditioning applications.

(8) MOBILE HOME means a prefabricated structure on a permanently attached chassis.

(9) MOBILE HOME FURNACE means a furnace designed specifically and solely for installation to heat a mobile home.

(10~~6~~) NOx EMISSIONS means the sum of nitrogen oxide and nitrogen dioxide (oxides of nitrogen) in the flue gas, collectively expressed as nitrogen dioxide.

(11~~7~~) RATED HEAT INPUT CAPACITY means the gross HEAT INPUT of the combustion device.

(12~~8~~) RESPONSIBLE OFFICIAL means:

(A) For a corporation: a president or vice-president of the corporation in charge of a principal business function or a duly authorized person who performs similar policy-making functions for the corporation, or

(B) For a partnership or sole proprietorship: general partner or proprietor, respectively.

(13~~9~~) SINGLE FIRING RATE means the burners and control system are designed to operate at only one fuel input rate and the control system cycles burners between the maximum heat output and no heat output.

(14~~10~~) USEFUL HEAT DELIVERED TO THE HEATED SPACE is the AFUE (expressed as a fraction) multiplied by the heat input.

(15~~11~~) VARIABLE FIRING RATE means the burners and control system are designed to operate at more than one fuel input rate and the control system cycles burners between two or more heat output rates and no heat output.

(16~~12~~) WEATHERIZED means designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation.

(c) Requirements

(1) A manufacturer shall not, after January 1, 1984, manufacture or supply for sale or use in the South Coast Air Quality Management District fan-type central furnaces, unless such furnaces meet the requirements of paragraph (c)(3).

(2) A person shall not, after April 2, 1984, sell or offer for sale within the South Coast Air Quality Management District fan-type central furnaces unless such furnaces meet the requirements of paragraph (c)(3).

(3) Fan-type central furnaces shall:

(A) not emit more than 40 nanograms of oxides of nitrogen (calculated as NO_2) per joule of useful heat delivered to the heated space; and

(B) be certified in accordance with subdivision (d) of this rule.

(4) On or after October 1, 2012, a person shall not manufacture, supply, sell, offer for sale, or install, for use in the South Coast Air Quality Management District, fan-type central furnaces subject to this rule, unless such furnace complies with the applicable emission limit and compliance date set forth in Table 1 and is certified in accordance with subdivision (d) of this rule.

Table 1 – Furnace NOx Limits and Compliance Schedule

Compliance Date	**Equipment Category**	**NOx Emission Limit (nanograms/Joule *)**
October 1, 2012	Mobile Home Furnace	40
April 1, 2015	Condensing Furnace	14
October 1, 2015	Non-condensing Furnace	14
October 1, 2016	Weatherized Furnace	14
October 1, 2018	Mobile Home Furnace	14

* Nanograms of oxides of nitrogen (calculated as NO_2) per joule of useful heat delivered to the heated space

(5) Any manufacturer of fan-type central furnaces regulated by this rule may elect to pay a per unit mitigation fee in lieu of meeting the 14 nanogram/Joule NOx emission limit in Table 1 of paragraph (c)(4) of this rule, provided the manufacturer complies with the following requirements:

(A) Prior to the phase one mitigation fee start date specified in Table 2, pays a per unit mitigation fee of $200 for each condensing furnace

and $150 for each other type of furnace distributed or sold into the South Coast AQMD ~~SCAQMD~~, disregarding the furnace size.

(B) On and after the phase one mitigation fee start date but no later than the mitigation fee option end date specified in Table 2, pays a per unit phase one or phase two mitigation fee for each condensing, non-condensing, weatherized~~,~~ or mobile home furnace according to Table 2.

Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules

Furnace		**Phase One Mitigation Fee**		**Phase Two Mitigation Fee**		
Size Range	**Furnace Category**	**Phase One Mitigation Fee Start Date**	**Phase One Mitigation Fee ($/Unit)**	**Phase Two Mitigation Fee Start Date**	**Phase Two Mitigation Fee ($/Unit)**	**Phase Two Mitigation Fee Option End Date**
≤ 60,000 BTU/hr	Condensing	May 1, 2018	$275	October 1, 2018	$350	September 30, 2019
	Non-condensing	October 1, 2018	$225	April 1, 2019	$300	September 30, 2019
	Weatherized	October 1, 2018	$225	April 1, 2019	$300	September 30, 2021 ~~September 30, 2020~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021
> 60,000 Btu/hr and ≤ 90,000 BTU/hr	Condensing	May 1, 2018	$300	October 1, 2018	$400	September 30, 2019
	Non-condensing	October 1, 2018	$250	April 1, 2019	$350	September 30, 2019
	Weatherized	October 1, 2018	$250	April 1, 2019	$350	September 30, 2021 ~~September 30, 2020~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021
> 90,000 BTU/hr	Condensing	May 1, 2018	$325	October 1, 2018	$450	September 30, 2019
	Non-condensing	October 1, 2018	$275	April 1, 2019	$400	September 30, 2019
	Weatherized	October 1, 2018	$275	April 1, 2019	$400	September 30, 2021 ~~September 30, 2020~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021

(C) Submits an alternate compliance plan for each 12 month time period after the applicable Table 1 compliance date during which the manufacturer elects to pay the mitigation fee in lieu of meeting the NOx emission limit.

(D) Submits to the South Coast AQMD~~SCAQMD~~ an alternate compliance plan no later than 60 days prior to the applicable compliance date, or no later than March 16, 2018 for the condensing furnace compliance plan starting on April 1, 2018, which includes the following:

(i) a letter with the name of the manufacturer requesting the mitigation fee compliance option signed by a responsible official identifying the category of fan-type central furnaces and the 12 month alternate compliance period that the mitigation fees cover;

(ii) an estimate of the quantity of applicable Rule 1111 fan-type central furnaces to be distributed or sold into the South Coast AQMD~~SCAQMD~~ during the alternate compliance period, which estimate shall be based on total distribution and sales records or invoices of ~~condensing, non-condensing,~~ weatherized or mobile home fan-type central furnaces that were distributed or sold into the South Coast AQMD ~~SCAQMD~~ during the 12 month period of July 1 to June 30 prior to the applicable compliance date, along with supporting documentation;

(iii) a completed South Coast AQMD ~~SCAQMD~~ Form 400A with company name, identification that application is for an alternate compliance plan (section 7 of form), identification that the request is for the Rule 1111 mitigation fee compliance option (section 9 of form), and signature of the responsible official;

(iv) a check for payment of the alternate compliance plan filing fee (Rule 306, ~~section~~ subdivision (c)).

(E) Submits to the Executive Officer a report signed by the responsible official for the manufacturer identifying by model number the quantity of Rule 1111 fan-type central furnaces actually distributed

or sold into South Coast AQMD ~~SCAQMD~~ and a check for payment of mitigation fees for the applicable 12 month alternate compliance period for the quantity of applicable Rule 1111 fan-type central furnaces distributed or sold into the South Coast AQMD ~~SCAQMD~~ during the alternate compliance period. The report and the payment of mitigation fees must be submitted to the South Coast AQMD ~~SCAQMD~~ no later than thirty (30) days after the end of each 12-month mitigation fee alternate compliance period.

(F) Notwithstanding the requirements set forth in subparagraph (c)(5)(E), during the phase one period specified in Table 2, submits a report signed by the responsible official for the manufacturer identifying by model number the quantity of Rule 1111 fan-type central furnaces actually distributed or sold into South Coast AQMD ~~SCAQMD~~ and a check for payment of mitigation fees for the phase one period no later than thirty (30) days after the end of the phase one period. The 12-month compliance plan payment as specified in subparagraph (c)(5)(E) that includes this phase one period shall be reconciled so as not to include the phase one payment.

(G) For the last and remaining 6-month period of the condensing furnace final alternate compliance plan ending on September 30, 2019, specified in Table 2, submits a report signed by the responsible official for the manufacturer identifying by model number the quantity of Rule 1111 fan-type central furnaces - condensing furnaces actually distributed or sold into South Coast AQMD ~~SCAQMD~~ and a check for payment of mitigation fees to the SCAQMD no later than October 30, 2019.

(d) Certification

(1) The manufacturer shall have each appliance model tested in accordance with the following:

(A) Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with South Coast AQMD ~~SCAQMD~~ Method 100.1.

(B) Operation of the furnace shall be in accordance with the procedures specified in Section 4.0 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

(2) One of the two formulas shown below shall be used to determine the nanograms of oxides of nitrogen per joule of useful heat delivered to the heated space:

$$N = \frac{4.566 \times 10^4 \times P \times U,}{H \times C \times E} \qquad N = \frac{3.655 \times 10^{10} \times P}{(20.9-Y) \times Z \times E}$$

Where:

N = nanograms of emitted oxides of nitrogen per joule of useful heat.

P = concentration (ppm volume) of oxides of nitrogen in flue gas as tested.

U = volume percent CO_2 in water-free flue gas for stoichiometric combustion.

H = gross heating value of fuel, BTU/cu.ft. (60^oF, 30-in. Hg).

C = measured volume percent of CO_2 in water-free flue gas, assuming complete combustion and no CO present.

E = AFUE, percent ~~(calculated using Table 2).~~

Y = volume percent of O_2 in flue gas.

Z = heating value of gas, joules/cu. meter (0.0^oC, 1 ATM).

(3) Prior to the date a furnace model is first shipped to a location in the South Coast AQMD~~SCAQMD~~ for use in the District, the manufacturer shall obtain Executive Officer's approval for the emission test protocol and emission test results verifying compliance with the applicable NOx limit specified in Table 1, submitting the following:

(A) A statement that the model is in compliance with subdivision (c). (The statement shall be signed by a responsible official and dated, and shall attest to the accuracy of all statements.)

(B) General Information

(i) Name and address of manufacturer.

(ii) Brand name.

(iii) Model number, as it appears on the furnace rating plate.

(C) A description of the furnace and specifications for each model being certified.

(e) Identification of Compliant Units

(1) The manufacturer of the furnace complying with subdivisions (c) and (d) shall display the following on the shipping container label and rating plate of the furnace:

(A) Model number;

(B) Heat input capacity;

(C) Applicable NOx emission limit in Table 1; and

(D) Date of manufacture or date code.

(2) Any non-certified furnace shipped to a location in the South Coast Air Quality Management District for distribution or sale outside of the District shall have a label on the shipping container identifying the furnace as not certified for use in the District.

(3) Consumer Notification Requirement

(A) For the purposes of subparagraph (e)(3)(B), "Informative Materials" shall mean the following:

(i) The consumer brochure for the furnace;

(ii) The technical specification sheet for the furnace; and

(iii) The manufacturer's website that promotes, discusses, or lists the furnace.

(B) Effective October 1, 2018, for any furnace that is for distribution or sale inside of the South Coast Air Quality Management District that is using an alternate compliance plan in lieu of meeting the 14 ng/J certification limit, a manufacturer shall only distribute or publish Informative Materials that clearly display the following language: "If installed in South Coast AQMD ~~SCAQMD~~ only: This furnace does not meet the South Coast AQMD ~~SCAQMD~~ Rule 1111 NOx emission limit (14 ng/J), and thus is subject to a mitigation fee of up to $450. This furnace is not eligible for the Clean Air Furnace Rebate Program: www.CleanAirFurnaceRebate.com."

(C) A manufacturer may use alternative language in lieu of subparagraph (e)(3)(B), provided the alternative language is:

(i) Similar to the language in subparagraph (e)(3)(B);

(ii) Submitted to the Executive Officer by August 1, 2018; and

(iii) Approved by the Executive Officer no later than August 31, 2018.

The manufacturer shall use the language in subparagraph (e)(3)(B) if the alternative language is not approved.

(f) Enforcement

The Executive Officer may periodically conduct such tests as are deemed necessary to ensure compliance with subdivisions (c), (d), and (e).

(g) Exemptions

(1) The provisions of this rule shall not apply to furnaces installed in mobile homes before October 1, 2012.

(2) For furnaces manufactured, purchased, and delivered to the South Coast Air Quality Management District prior to the applicable compliance date in Table 1, any person may, until 300 days after the applicable compliance date, sell, offer for sale, or install such a furnace in the District, so long as the furnace meets the requirements of paragraph (c)(3) and subdivisions (d) and (e).

(3) For furnaces that have been encumbered in a contractual agreement, signed prior to January 1, 2018, by a furnace manufacturer or distributor for future or planned construction, the manufacturer shall be allowed to sell the units within the ~~SCAQMD~~South Coast AQMD at the mitigation fee specified in subparagraph (c)(5)(A), provided:

(A) An application for exemption is submitted to the Executive Officer prior to April 2, 2018;

(B) The total quantity of furnaces in application(s) by any one manufacturer does not exceed 15% of furnaces distributed and sold in the previous compliance plan period;

(C) Those furnaces are sold no later than their mitigation fee option end dates specified in Table 2; and

(D) The following documents and information are provided to the Executive Officer, including but not limited to:

(i) contractual agreement for the units sold or to be sold in the District;

(ii) quantity, model number, and serial number of the subject units;

(iii) contract execution date; and

(iv) name(s) of the contractor (s).

(E) Failure to comply with the requirements specified in subparagraphs (g)(3)(A) through (g)(3)(D) shall result in the requirement to paying or retroactively paying the corresponding mitigation fee specified in paragraph (c)(5) within 30 days upon notification from the Executive Officer.

(4) The manufacturer of any natural gas furnace that is not certified to meet 14 ng/J of NOx emission and is to be installed with a propane conversion kit for propane firing only in the South Coast AQMD~~SCAQMD~~, is exempt from subdivisions (c) and (d), provided:

(A) Effective June 1, 2018, the shipping carton or the name plate of the furnace clearly displays: "This furnace is to be installed for propane firing only. Operating in natural gas mode is in violation of the South Coast AQMD ~~SCAQMD~~ Rule 1111."

(B) The following documents and information shall be provided to the Executive Officer, accompanying the compliance plan report specified in subparagraphs (c)(5)(E), (c)(5)(F), and (c)(5)(G), including but not limited to:

(i) The quantity of propane conversion kits for furnaces actually distributed or sold into South Coast AQMD~~SCAQMD~~ for the applicable compliance plan period;

(ii) The quantity of propane conversion kits for furnaces distributed or sold into the South Coast AQMD ~~SCAQMD~~ during the 12 month period of July 1 to June 30 prior to the applicable compliance date; and

(iii) Photographic evidence of the required language set forth in ~~section~~ subparagraph (g)(4)(A~~a~~) as it appears on the carton or unit, including all versions utilized by the manufacturer, for approval by the Executive Officer. The photographs must be sufficient to verify the wording is correct and that it is "clearly visible," taking into account the font type, size, color, and location on the carton or unit.

(C) The manufacturer of this type of unit which has been installed in the South Coast AQMD~~SCAQMD~~ without meeting above requirements shall be in violation of South Coast AQMD~~SCAQMD~~ Rule 1111.

(5) Condensing and non-condensing natural gas furnaces installed at elevations greater than or equal to 4,200 feet above sea level are exempt from paragraph (c)(4) until ~~October 1, 2020~~September 30, 2021.

(6) Effective October 1, 2021 and until September 30, 2022, a manufacturer, distributor, or installer that manufactures, supplies, sells, offers for sale, or installs a natural gas furnace~~s~~ certified to meet 40 ng/J of NOx that is installed and operated as part of a dual fuel system at or above 4,200 feet above sea level in the South Coast AQMD, shall only install such a unit that:

(A) Is designed by the manufacturer with a system switchover point between heat pump and furnace at the external temperature of 32°F with a nonadjustable system that would prevent any person from changing the external ambient switchover temperature of 32°F;

(B) Includes installation of an external temperature sensor which acts as the sole method to determine switchover point;

(C) For systems equipped with condensing, noncondensing, or mobile home furnaces, includes communicating technology between the heat pump and furnace installed at the point of manufacture to prevent system operation without a heat pump and requires operations of only the heat pump at and above the switchover temperature outlined in (g)(6)(A); and

(D) The shipping carton or the name plate of the furnace clearly displays: "This furnace must be installed only in a dual fuel configuration with an electric heat pump. Installation of this furnace without a heat pump in a dual fuel configuration will be a violation of South Coast AQMD Rule 1111."

(7~~6~~) The manufacturer of any furnace that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Sales date to distributor;

(B) Distributor's name and full contact information (address and phone number);

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable).

(8~~7~~) The distributor that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Sales date to installer;

(B) Installer's name and full contact information (address and phone number);

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable).

(9~~8~~) The installer that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Installation date;

(B) Address of furnace installation;

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable).

Attachment H

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Staff Report
Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

September 2020

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EXECUTIVE SUMMARY

Rule 1111 reduces emissions of nitrogen oxides (NOx) from residential and commercial gas-fired fan-type space heating furnaces with a rated heat input capacity of less than 175,000 BTU per hour or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour. The rule applies to manufacturers, distributors, sellers, and installers of such furnaces.

The furnaces are categorized into four types by Rule 1111: 1) Non-condensing (standard); 2) Condensing (high efficiency); 3) Weatherized (e.g., outdoor); and 4) Mobile home furnaces. The compliance dates to meet the emission limit are different depending on the furnace type. The furnaces for installation at the high elevation regions can be any type but are most commonly non-condensing and condensing furnaces.

Rule 1111 was adopted by the South Coast AQMD Governing Board in December 1978 and amended in 1983, 2009, 2014, 2018, and 2019. The more significant changes included:

- The 2009 amendment lowering the NOx emissions from 40 to 14 nanograms per Joule (ng/J);
- The 2014 amendment providing an alternate compliance option that allows the original equipment manufacturers (OEMs) to pay a per unit mitigation fee, in lieu of meeting the new lower NOx emission limit, for up to 36 months past the applicable compliance date;
- The March 2018 amendment extending the mitigation fee alternate compliance option and increasing the mitigation fee; and
- The December 2019 amendment providing a limited exemption from the 14 ng/J emission limit for condensing and non-condensing furnace installations at elevations greater than or equal to 4,200 feet above sea level until October 1, 2020.

The compliance date has passed for condensing and non-condensing furnaces for installation at elevations below 4,200 feet above sea level. The current compliance dates for meeting the 14 ng/J NOx emission limit are: October 1, 2019 for condensing and non-condensing furnaces; October 1, 2020 for weatherized furnaces; October 1, 2021 for mobile home furnaces; and October 1, 2020 for installation of condensing and non-condensing furnaces at elevations greater than or equal to 4,200 feet above sea level (high-altitude installation).

Staff has been closely monitoring the progress of commercialization of compliant weatherized furnaces and testing of condensing and non-condensing furnaces for installations in high-altitude areas, as the October 1, 2020 compliance date approaches. Original Equipment Manufacturers (OEMs) have discussed how the COVID-19 pandemic has affected their business operation and their progress in commercializing Rule 1111 weatherized and high-altitude compliant furnaces. OEMs have also commented that the supply chains for certain parts from overseas or Mexico affected existing and future production, and travel restrictions have impacted the completion of high-altitude testing for some OEMS. In addition, some OEMS have expressed how the pandemic is affecting their overall business decisions on the development of compliant products.

The OEMs are continuing to release more ultra-low NOx models to the market for condensing and non-condensing furnaces. Manufacturing defect which caused previous reports of furnaces overheating were identified by the furnace manufacturer and modifications were made to resolve

the problem. There are no new reported large-scale issues regarding excessive noise or overheating for the current models in the market.

As for weatherized units, the rule does not distinguish between residential and commercial units. Based on discussions with OEMs on the commercialization status of weatherized units, some OEMs have different schedules for residential and commercial units. Out of the seven OEMs, ~~three~~ two OEMs are expecting to have models available that will meet the October 2020 deadline for residential and commercial applications, ~~two~~ three OEM expects they will not meet the October deadline for residential or commercial application, and two OEM has suspended any efforts to meet the deadline. Staff worked with OEMs to determine if there was a clear, enforceable definition to make the distinction between residential and commercial weatherized units such as defining these two categories of weatherized furnaces as either single-phase or three-phase units. This definition, however, was not consistent for the seven manufacturers. Staff is recommending that PAR 1111 extend the mitigation fee for all weatherized units for one year, and to provide a consumer rebate of $500 to incentivize installation of the 14 ng/J furnaces until September 30, 2021.

With regards to high altitude furnace installations, all seven furnace manufacturers are expecting to have compliant 14 ng/J NOx condensing and non-condensing furnaces available for installation at varying elevations between 4,200 feet to 7,800 feet above sea level by the October 2020 deadline. However, only two OEMs can currently provide compliant condensing and non-condensing furnaces certified for installations at around 6,800 feet and above that could service all mountain communities in the South Coast AQMD, including Big Bear City. One additional manufacturer has expressed optimism in certifying their product for elevations up to 7,000 feet above sea level by October 1, 2020. Three of the OEMs expressed concern that company travel restrictions due to the recent COVID-19 pandemic will likely delay their ability to test in high elevations and thus, delay development and commercialization of compliant furnaces to these high-altitude areas for 3 to 6 months. Staff is recommending that PAR 1111 extend the compliance date for condensing and non-condensing units installed at elevations 4,200 feet or higher for one year, and to provide a consumer rebate of $500 to incentivize installation of the 14 ng/J furnaces until September 30, 2021.

Four OEMs and the Air Conditioning, Heating and Refrigeration Institute (AHRI) have requested that ~~has urged~~ the South Coast AQMD staff ~~to~~ consider allowing a gas-electric dual fuel split system equipped with a noncompliant 40 ng/J furnace as an alternative compliance option. A dual fuel split system ~~, which~~ is composed of a separate electric heat pump that provides heating and cooling paired with a gas furnace that provides heat below a certain external temperature threshold. These OEMs requested that Rule 1111 allow~~s~~ dual fuel split systems ~~the installation of~~ to use a noncompliant 40 ng/J furnace ~~when~~ paired with an electric heat pump. Three other OEMs do not support a change to~~expressed opposition to that~~ Rule 1111 that would allow~~s~~ ~~the allowance of~~ dual fuel split systems to use ~~with~~ a noncompliant 40 ng/J furnaces because ~~as~~ it undercuts development and commercialization of compliant 14 ng/J furnaces that can also be used in a dual fuel split system.

Based on the discussion with the manufactures and contractors, Proposed Amended Rule 1111 will:

- Extend the existing mitigation fee alternate compliance option for weatherized units for one year until September 30, 2021;

- Extend the exemption for high altitude condensing and non-condensing furnace installations for one year until September 30, 2021;
- Allow installations of dual fuel systems with noncompliant 40 ng/J NOx furnaces, with conditions, at elevations above 4,200 feet above sea level until September 30, 2022; and
- Require manufacturers, distributors, and installers of 40 ng/J NOx furnaces for operation as propane-firing only and dual fuel systems with noncompliant 40 ng/J NOx furnaces to maintain recordkeeping of sales and installations.

Initially staff was proposing to extend the compliance date to March 31, 2020; however, based on input from stakeholders, PAR 1111 will extend the compliance deadline to September 30, 2021 to allow for a smoother transition as it will be after the heating and cooling season. Allowing dual fuel systems with 40 ng/J NOx furnaces will provide additional options for consumers in high altitude areas after the end of exemption for high altitude areas while allowing additional time for furnace OEMs to expand high altitude guidance for existing ultra-low NOx furnaces.

CHAPTER 1: BACKGROUND

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EQUIPMENT AND PROCESS
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INTRODUCTION

The purpose of Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces is to reduce NOx emissions from residential and commercial gas-fired fan-type space heating furnaces with a rated heat input capacity of less than 175,000 BTU per hour or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour. The rule applies to manufacturers, distributors, sellers, and installers of such furnaces. It requires manufacturers to certify that each furnace model offered for sale in the South Coast AQMD complies with the emission limit using the test methods approved by the South Coast AQMD and U.S. EPA. In lieu of meeting the lower emission limit, Rule 1111 has provided manufacturers an alternate compliance option of paying a per-unit mitigation fee for up to 4 to 4.5 years past the applicable compliance date, depending on the furnace type, which includes non-condensing, condensing, weatherized, and mobile home furnaces. Most single-family homes, many multi-unit residences, and some light commercial building in the South Coast AQMD use this type of space heating equipment.

REGULATORY HISTORY

Rule 1111 was adopted by the South Coast AQMD Governing Board in December 1978. The original rule required residential and commercial space heating furnaces to meet a NOx emission limit of 40 nanograms per Joule (ng/J) of heat output (equivalent to 61 ppm at a reference level of 3% oxygen and 80% Annual Fuel Utilization Efficiency (AFUE)) beginning January 1, 1984.

In November 2009, Rule 1111 was amended to implement the 2007 Air Quality Management Plan (AQMP) Control Measure CMB-03. The 2009 amendment established a new lower NOx emission limit of 14 ng/J (equivalent to 22 ppm at a reference level of 3% oxygen and 80% AFUE), and required the three major categories of residential furnaces – condensing (high efficiency), non-condensing (standard), and weatherized furnaces to meet the new limit by October 1, 2014, October 1, 2015, and October 1, 2016, respectively. Furthermore, new mobile home heating units, which were unregulated prior to the 2009 amendment, were required to meet a NOx limit of 40 ng/J by October 1, 2012 and 14 ng/J by October 1, 2018. To facilitate the depletion of existing inventories and to ensure a smooth transition to the new limits, Rule 1111 also provided a temporary 10-month exemption (a sell-through period) for units manufactured and delivered into the South Coast Air Basin prior to the compliance date.

14 ng/J Technology Development Projects

Four technology development projects were initiated in 2010 and completed in 2013, funded by the South Coast AQMD, the Gas Company, and San Joaquin Valley APCD with a total amount of $1,447,737. Participants of the technology demonstration projects include Beckett Gas, Gas Technology Institute, Ingersoll Rand (Trane Technologies), and Nordyne (Nortek). The scope of the project for each participant as well as the contract reward amounts are shown in Table 1 - Summary of Rule 1111 Technology Demonstration Projects. Through those projects, prototype furnaces were developed demonstrating that the new lower Rule 1111 NOx limit of 14 ng/J is achievable for forced air residential heating furnaces.

Table 1 – Summary of Rule 1111 Technology Demonstration Projects

Participants	Award Amount	Project Scope
Beckett Gas	$379,386	Two furnaces: - Condensing - Non-Condensing
Gas Technology Institute (GTI)	$450,000	One furnace each for five manufacturers: - Carrier Corporation - Johnson Controls Incorporated - Rheem Manufacturing Company - Lennox International - Thermo Products LLC
Ingersoll Rand (Trane Technologies)	$368,261	Two 2-stage furnaces: - Average heat output - Higher heat output
Nordyne (Nortek)	$250,090	Three furnaces: - Single Stage (On/Off) - 2-stage (High/Low/Off) - Modulating (High to Low to Off)

Mitigation Fee to Delay Compliance of 14 ng/J Furnaces

Rule 1111 was later amended in September 2014 to delay the compliance date for condensing furnaces and to provide an alternate compliance option. The alternate compliance option allowed OEMs to pay a per unit mitigation fee of $200 for each condensing furnace and $150 for each other type of furnace distributed or sold into the South Coast Air Basin, in lieu of meeting the 14 ng/J NOx emission limit. The mitigation fee end date was based on the furnace type which phased in the NOx limit of 14 ng/J over the period from April 1, 2018, to October 1, 2021.

Extension and Increase of the Mitigation Fee

Based on the lack of 14 ng/J furnaces that were commercialized in early 2018, Rule 1111 was amended in March 2018 to increase the mitigation fee in two phases to a range of $300 to $450, depending on the furnace type and heat input capacity, and extend the mitigation fee compliance option by 1.5 years for condensing furnaces, and one year for non-condensing and weatherized furnaces. Rule 1111 was also amended to provide an exemption from the mitigation fee increase for units encumbered in a contractual agreement by OEMs and distributors for new construction, if contracts were signed prior to January 1, 2018, and included provisions to address propane conversion kits for propane firing only furnaces.

Clean Air Furnace Rebate Program

In March 2018, a rebate program for consumers who purchase and install compliant 14 ng/J furnaces in the South Coast AQMD was initiated. The purpose of the rebate program was to help commercialize and incentivize consumers to purchase 14 ng/J furnaces. On May 4, 2018, the South Coast AQMD executed the contract with Electric & Gas Industries Association (EGIA) to administer the Clean Air Furnace Rebate Program. On June 28, 2018, the rebate website was launched (www.cleanairfurnacerebate.com). The South Coast AQMD Governing Board approved

funding of $3,000,000 for the furnace rebate program, specifying a $500 rebate for each compliant furnace. The program was suspended in May 2020 when the funds were exhausted.

High Altitude Furnaces

Rule 1111 was last amended in December 2019 to include a limited exemption from the 14 ng/J NOx emission limit that applies to manufacturers, distributors, sellers, and installers of condensing and non-condensing natural gas furnaces. This exemption applies to furnaces installed at elevations greater than or equal to 4,200 feet above sea level until October 1, 2020. During this interim exemption period, condensing and non-condensing furnaces installed in high altitude areas are still required to meet the 40 ng/J NOx emission limit. This rule amendment included recordkeeping requirements for manufacturers, distributors, and installers to track the distribution, sales, and installations of these furnaces. Verification of the elevation is based on U.S. Geological Survey data.

The adoption Resolution for the December 2019 amendment directed staff to update the Stationary Source Committee on the development of high-altitude furnaces and weatherized furnaces. This update was scheduled to occur no later than May 15, 2020. However, due to the impacts resulting from the COVID-19 pandemic on staff's ability to gather information on the OEM's implementation efforts, the update to the Board was delayed for one month. At the December 2019 Governing Board meeting Supervisor Janice Rutherford also requested staff to continue working with manufacturers, distributors, and installers regarding high-altitude installations, weatherized furnaces, and the potential of allowing hybrid dual fuel split systems that use noncompliant 40 ng/J furnaces.

Since the December Board meeting, staff has been periodically meeting with all furnace manufacturers to monitor the progress of compliant furnace development and commercialization. The market availability for condensing and non-condensing compliant furnaces has increased four-fold during the past year, with 448 models released to the market as of May 2020 compared to the 112 models in February 2019. Manufacturers did not initially report complaints regarding excessive noise issues for compliant furnaces; however, recently some contractors have reached out to staff regarding noise issues. Four out of seven furnace manufacturers have informed staff of reported noise issues. The cause of the noise issues is identified to be either installer error or defective components from third party suppliers. To resolve identified noise issues, manufacturers are taking steps to increase installer training and worked with part suppliers to revise identified parts. Prior to the October 1, 2019 compliance date, an early model had an overheating issue, but the manufacturer modified the model and resolved the issue. Staff is not aware of overheating or safety issues beyond this initial report which has been resolved.

EQUIPMENT AND PROCESS

Fan-type gas-fired furnaces heat a building by circulating air from inside the building (office, home, apartment, etc.) through the furnace. In a fan-type furnace, air is heated when it passes through a heat exchanger. Combustion gases heat up the inside of the heat exchanger, and air from the building that is moving past the outside of the heat exchanger removes heat from the outside surface. A blower (fan) pulls air through one or more intake ducts and pushes the air past the heat

exchanger and through another set of ducts, which direct the heated air to different parts of the building. The heated air circulates through the building before it is again pulled into the intake ducts and re-heated. This process continues until a specific temperature is detected by a thermostat in the building, which then shuts off the furnace. When the temperature at the thermostat goes below a set point, the thermostat sends a signal for the furnace to turn on.

Rule 1111 categorizes furnaces into four types: non-condensing, condensing, weatherized, and mobile home furnaces. Condensing furnaces, also called high-efficiency furnaces, utilize a second heat exchanger to recover the latent heat in the flue gas, achieving 90 to 98 percent fuel efficiency. Non-condensing furnaces only use one heat exchanger, with a typical fuel efficiency of about 80 percent. Weatherized furnaces are designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation. A weatherized furnace is often referenced as package units by the heating, ventilation, and air conditioning (HVAC) industry as the furnace is packaged with an air conditioning condensing unit. A mobile home furnace means a furnace designed specifically and solely for installation to heat a mobile home.

Rule 1111 specifies a 14 ng/J NOx limit for gas-fired furnaces. This is different than an approach that is based on overall mass emissions for residential and commercial heating. A mass emissions approach would require some limitation on use to ensure the emissions from a unit with a higher emission rate than 14 ng/J would not be more emissive. For example, if a 40 ng/J furnace of the same size were allowed, its use would need to be limited to 8.4 hours per day to be less than a 14 ng/J furnace that operated for a full 24 hours. Staff does recognize that there are other types of configurations such as electric heat pumps, dual fuel split systems, with an electric heat pump and furnace, or a standalone furnace with or without air conditioning. Regardless of the configuration, Rule 1111 requires that when a gas furnace is used that it must meet the NOx limit in the rule.

Electric Heat Pumps

Electric heat pumps can provide heating and cooling with no combustion source and can replace an air conditioning unit and furnace. Heat pumps are electric heat transfer units utilizing compression and evaporation of refrigerant to release and absorb heat. Heat is absorbed when the refrigerant is evaporated at low pressure and released when the refrigerant is compressed at high pressure. Heat pumps consist of an outdoor and indoor unit, both equipped with a coil and fan. The coils located in both the outdoor and indoor unit can act as either a compressor or evaporator depending on whether the unit is in heating or cooling mode. The fans in both the indoor and outdoor unit move air across the coils to facilitate heat exchange. In heating mode, the outdoor unit absorbs heat by acting as an evaporator and the indoor unit releases heat by acting as a compressor. In cooling mode, the flow of the refrigerant and functions of the coils are reversed. By utilizing the reversable compression and evaporation cycles, a heat pump can move heat in and out of the home.

Dual Fuel Split Systems

Dual fuel split systems ~~comprise~~ consists of an electric heat pump paired with a gas furnace. The gas furnace has been, and continues to be, subject to the emission limits in Rule 1111. Dual fuel split systems are available from all seven furnace OEMs with 14 ng/J furnaces.

For dual fuel split systems, the dedicated air handler of the indoor unit of an electric heat pump system is replaced with a gas-fired furnace which serves as the air handler for heating and cooling

when in all electric mode. In a dual fuel split system, when external temperatures drop below a specified temperature, the system will switch over from providing heat from the electric heat pump to providing heat from the gas-fired furnace. This is referred to as the "switchover temperature." When the external temperature rises above the threshold, the gas-fired furnace turns off and the electric heat pump resumes as the primary source of heat.

REQUIREMENTS AND TESTS FOR NEW TECHNOLOGY

Gas furnaces in the United States must meet the ANSI Z21.47/CSA 2.3 standard referred as CSA certification, mainly to ensure safety. To be sold and installed in the South Coast AQMD's jurisdiction, they must also be certified by the South Coast AQMD for Rule 1111 NOx emission limit compliance by specific test methods approved by the South Coast AQMD and U.S. EPA. OEMs could also be subject to other regulations, such as ANSI/ASHRAE/IES 90.1-2013, Energy Standard for Buildings Except Low-Rise Residential building required by the U.S. Department of Energy (DOE), and AHRI certification program for verification test of output heating capacity and annual fuel utilization efficiency. For furnace installation, manufacturers provide extensive training programs and instruction material for the contractors and installers.

AFFECTED INDUSTRIES

Proposed Amended Rule 1111 affects manufacturers (NAICS 333), distributors and wholesalers (NAICS 423), and retailers and dealers (NAICS 444) of residential furnaces. Because heating units regulated by the rule are used in most residential and many commercial settings for heating small buildings, construction and building contractors and installers (NAICS 238 and 811) related to residential furnaces are also affected by PAR 1111. The Air Conditioning Heating and Refrigeration Institute (AHRI), the major manufacturer's trade organization, indicates that there are no manufacturers of fan-type gas-fired residential furnaces in the South Coast AQMD. However, these companies do maintain regional sales offices and distribution centers in the South Coast AQMD and there are manufacturers of other types of heating furnaces in the South Coast AQMD.

PUBLIC PROCESS

Staff has held ongoing individual meetings with the seven OEMs prior to and after the December 2019 Governing Board meeting. The discussions at these meetings included rule implementation status for compliant 14 ng/J condensing and non-condensing, high elevation, and weatherized furnaces. Also discussed at these meeting was the potential of utilizing dual fuel technology to comply with the Rule 1111 NOx emission limit. The meetings were held individually to provide each OEM the ability to speak about confidential information regarding their technology development.

The progress of compliant furnace commercialization and the proposed amendment were discussed during public working groups on June 10, 2020 and July 9, 2020. A Public Workshop was held on July 15, 2020.

CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1111

PROPOSED AMENDED RULE REQUIREMENTS

PROPOSED AMENDMENTS TO RULE REQUIREMENTS

The South Coast AQMD staff has been closely monitoring the progress of commercialization of weatherized compliant furnaces, accounting for and assessing the impacts resulting from the COVID-19 pandemic. Based on discussions with OEMS, Proposed Amended Rule 1111 will extend the compliance date from October 1, 2020 to September 30, 2021, for both the mitigation fee alternative compliance option for weatherized units and the exemption for installing condensing and non-condensing furnaces at high altitude areas. Other existing requirements are currently proposed to remain unchanged.

Four OEMs and AHRI urged the South Coast AQMD staff to consider allowing a dual fuel split system with a noncompliant 40 ng/J furnace as an alternative compliance option. A dual fuel split system is a separate electric heat pump paired with a natural gas furnace. The system first operates the heat pump until it reaches a set temperature (e.g., outside temperatures drop to less than 32 degrees F) at which point the gas furnace is switched on and operated. Staff supports the use of heat pumps and dual fuel split systems with compliant 14 ng/J NOx furnaces. Staff is concerned that a dual fuel system with a 40 ng/J NOx furnace will allow noncompliant furnaces to enter the Basin creating additional enforcement challenges.

Rule 1111 Definitions (Subdivision(b))

The following definitions were added to Rule 1111 to provide further clarification on rule applicability, compliance schedule, exemptions, and emission limits.

DUAL FUEL SYSTEM in paragraph (b)(4) is

> *"a heating, ventilation, and air conditioning system utilizing a HEAT PUMP as the primary source of heating and cooling with a FAN-TYPE CENTRAL FURNACE serving as auxiliary heating."*

HEAT PUMP in paragraph (b)(7)means

> *"an all-electric device that utilizes condensation and evaporation of refrigerant to absorb and release heat for heating, ventilation, and air conditioning applications."*

MOBILE HOME in paragraph (b)(8), which means:

> *"a prefabricated structure on a permanently attached chassis."*

MOBILE HOME FURNACE in paragraph (b)(9), which means:

> *"a furnace designed specifically and solely for installation to heat a mobile home."*

Rule 1111 Requirements (Subdivision(c))

Extending the mitigation fee alternative compliance option for weatherized units until September 30, 2021

When compared with condensing and non-condensing furnaces, weatherized furnaces utilize the same basic combustion technology for burner and heat exchanger design. The development work

for weatherized furnaces is focused on integration with the air conditioning unit as a package system, as well as addressing the outdoor operation environment.

To comply with the current Rule 1111, OEMs are paying the mitigation fee for weatherized furnaces distributed to the South Coast AQMD that are not meeting the 14 ng/J NOx emission limit. The mitigation fee alternative compliance option for this type of furnace will expire on September 30, 2020. OEMs, distributors, contractors, and installers would have to comply with the 14 ng/J NOx limit starting on October 1, 2020.

Multiple furnace manufacturers have reported delays in the supply chain, especially from overseas or Mexico, as a result of COVID-19. Other COVID-19 pandemic impacts include required lower worker density, plant-wide downtime to sanitize and prepare for worker distancing, and funding reallocation by corporate offices due to the unstable market and financial status. In addition, the OEMs are uncertain as to whether and how the COVID-19 pandemic will evolve to further adversely impacting their business. According to these OEMs, all these factors are contributing to the delay in furnace development and commercialization.

Out of the seven OEMs, ~~three~~ two OEMs are expecting to have coverage for both commercial and residential weatherized models available that will meet the September 30, 2020 deadline, ~~two~~ three OEMs expect they will not meet the October deadline for either commercial or residential applications, and two OEMs have suspended any efforts to meet the deadline. Initial discussions with furnace OEMs suggested that bifurcating the weatherized category into single stage and three stage may provide a clear distinction between commercial and residential furnace applications. With continued discussions, some furnace OEMs agreed that bifurcating the weatherized category into single stage and three stage power would be a clear differentiation of the two applications while other OEMs disagreed with this approach stating that power phases does not properly represent the applications and associated supply chains. Based on continued discussions with the seven OEMs, PAR 1111 will not bifurcate the weatherized furnace category but will extend the mitigation fee alternative compliance option for all weatherized units by one year. The considerations are not only based on the COVID-19 impacts, but also the winter heating season which typically takes place from October to March and the summer cooling season which takes place from March to September. Implementing any new requirement in the middle of heating or cooling season would cause additional complications in the supply chain. This proposal does not change the requirements for the mitigation fee or the recordkeeping and reporting requirements. That is, the OEMS would continue to be subject to the phase two mitigation fee identified under Rule 1111 Table 2, as well as the compliance plan and report specified under Rule 1111(c)(5), except that the phase two mitigation fee option end date would be September 30, 2021 for weatherized units. The extension of the mitigation fee alternative compliance option outlined in Table 2 – Rule 1111 Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules until September 30, 2021 will also serve as a sell-through period to allow for greater flexibility on existing inventory of 40 ng/J NOx furnace.

Table 2 – Rule 1111 Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules

Furnace		Phase One Mitigation Fee		Phase Two Mitigation Fee		
Size Range	**Furnace Category**	**Phase One Mitigation Fee Start Date**	**Phase One Mitigation Fee ($/Unit)**	**Phase Two Mitigation Fee Start Date**	**Phase Two Mitigation Fee ($/Unit)**	**Phase Two Mitigation Fee Option End Date**
≤ 60,000 BTU/hr	Condensing	May 1, 2018	$275	October 1, 2018	$350	September 30, 2019
	Non-condensing	October 1, 2018	$225	April 1, 2019	$300	September 30, 2019
	Weatherized	October 1, 2018	$225	April 1, 2019	$300	**September 30, 2021** ~~**September 30, 2020**~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021
> 60,000 Btu/hr and ≤ 90,000 BTU/hr	Condensing	May 1, 2018	$300	October 1, 2018	$400	September 30, 2019
	Non-condensing	October 1, 2018	$250	April 1, 2019	$350	September 30, 2019
	Weatherized	October 1, 2018	$250	April 1, 2019	$350	**September 30, 2021** ~~**September 30, 2020**~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021
> 90,000 BTU/hr	Condensing	May 1, 2018	$325	October 1, 2018	$450	September 30, 2019
	Non-condensing	October 1, 2018	$275	April 1, 2019	$400	September 30, 2019
	Weatherized	October 1, 2018	$275	April 1, 2019	$400	**September 30, 2021** ~~**September 30, 2020**~~
	Mobile Home	October 1, 2018	$150	April 1, 2019	$150	September 30, 2021

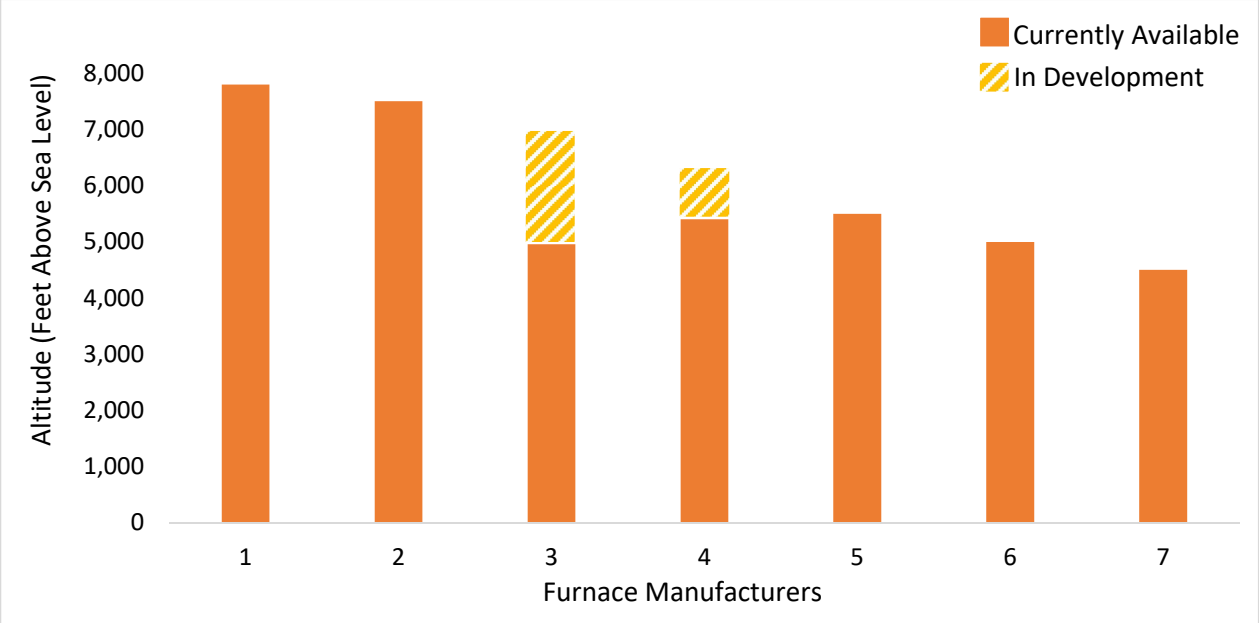
Rule 1111 Exemptions (Subdivision(g))

Extending the exemption for installing condensing and non-condensing furnace at high altitude until September 30, 2021

The furnaces at high altitude installations are mostly non-condensing and condensing furnaces. For an installation at high altitude, minor modification to the furnace are needed to accommodate different air density and oxygen levels to ensure an optimal air/fuel ratio for burner combustion. The modification involves a high-altitude kit or a built-in manifold adjustment on the 14 ng/J furnace. OEMs conduct high-altitude testing at specific types of facilities. Due to COVID-19, some OEMs had restrictions on non-essential travel and needed to suspend testing their units at high altitude facility.

Currently only two furnace manufacturers have completed high altitude testing for 14 ng/J condensing and non-condensing furnaces available for installations at around 6,800 feet above sea level or higher. Two additional OEMs were delayed due to company travel restrictions from COVID. Progress of high-altitude condensing and non-condensing furnace development is outlined in Figure 1.

Figure 1 – Development Status of High-Altitude Condensing and Non-Condensing Furnaces



Like the extension for weatherized units, the considerations include COVID-19 impacts as well as the winter heating season and summer cooling season duration. PAR 1111 paragraph (g)(5) will extend the exemption for high altitude installations by one year as follows:

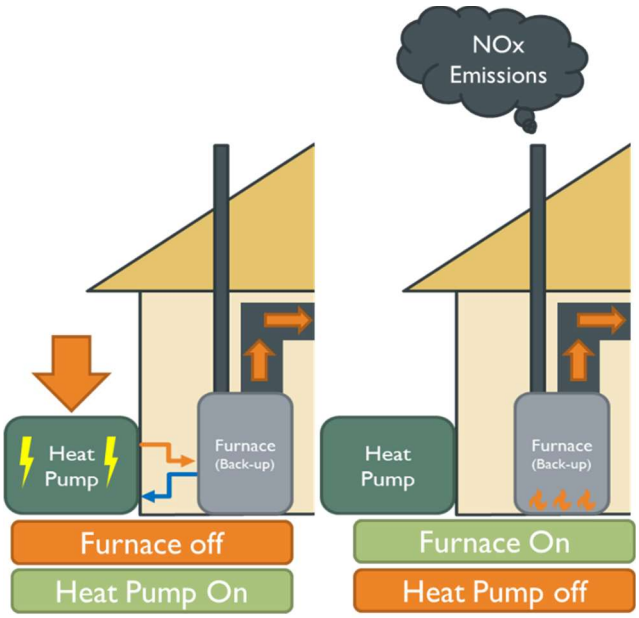
> *"(5) Condensing and non-condensing natural gas furnaces installed at elevations greater than or equal to 4,200 feet above sea level are exempt from paragraph (c)(4) until September 30, 2021. "*

Recordkeeping and reporting requirements specified under Rule 1111 paragraphs (g)(7), (g)(8), and (g)(9) will continue to apply.

Considerations of dual fuel split systems with 40 ng/J NOx furnace

Three OEMs and AHRI urged the South Coast AQMD staff to consider the dual fuel split system with a 40 ng/J noncompliant furnace as an option to comply with the Rule 1111 NOx limit. These OEMs have commented that a dual fuel split system with a 40 ng/J furnace would provide more compliance options for the consumer than a standalone 14 ng/J furnace. A dual fuel split system, also called hybrid system, is a heat pump paired with a gas furnace that provides both cooling and heating as depicted in Figure 2. Dual fuel split systems are comprised of a separate furnace and heat pump which are paired together by the installer or dealer as compared to a packaged weatherized dual fuel system where the system is packaged in a single enclosure. The heat pump operates as the primary heating source at milder temperatures with low heating demand. As temperatures get colder such as below 32°F, the heat pump does not have the capacity to keep the home warm. At this point the furnace then takes over as the auxiliary heating source, at what is called the "switchover temperature."

Figure 2 – Dual Fuel Heating System



According to the first OEM to propose this compliance option, the basis for installing a dual fuel split system would be significantly more NOx emissions reductions as compared to the operation of a 14 ng/J furnace. The OEM initially stated that there would be up to a 90 percent reduction in NOx emissions for installations in the South Coast AQMD using a dual fuel split system when compared to a 40 ng/J low NOx furnace on its own could be achieved. Based on a study that was funded by Trane Technologies and conducted by University of California, Davis, potential NOx emissions reductions can be up to 95-100 percent in high population areas of California when using a heat pump with a low NOx furnace (40 ng/J) for auxiliary heat vs. a standalone ultra-low NOx (14 ng/J) furnace. Based on a switchover temperature of 32 °F, the study concluded that most of the Southern California region could rely solely on the electric heat pump, thus generating fewer NOx emissions compared to the compliant standalone 14 ng/J NOx furnace. The emissions benefits from noncompliant 40 ng/J NOx dual fuel split systems start to decline relative to the length of operation of the furnace itself. To ensure the potential emissions reduction benefits from dual fuel system equipped with a noncompliant 40 ng/J NOx furnace, enforcement of furnace operation times (hours) would be necessary.

Staff discussed this subject with all seven OEMs and some distributors. Three OEMs oppose the allowance of dual fuel split systems with 40 ng/J furnaces because the 40 ng/J dual fuel system undercuts their development and commercialization of 14 ng/J compliant furnaces. These OEMs have expressed that they have invested significant resources to commercialize a complete portfolio of compliant furnaces and changing the requirements well after the 14 ng/J standard has been in

effect is a concern. They have also expressed concerns about the enforceability of allowing noncompliant furnaces to enter the basin because the furnace is sold as a split system and separate from the heat pump.

It is important to note that all seven furnace manufacturers have dual fuel split systems pairing a heat pump with compliant 14 ng/J NOx furnaces available. OEMs are also on schedule to certify their compliant furnaces for high altitude installations. Thus, compliant furnaces with 14 ng/J NOx emissions could be employed as part of the dual fuel split systems. Because compliant furnaces are available or actively under development, allowing noncompliant furnaces as part of dual fuel split systems would undercut the cost of existing dual fuel split systems that include compliant 14 ng/J furnaces and likely discourage new technology development, preventing or delaying further emissions reductions.

Furthermore, staff has concerns regarding the increased supply of 40 ng/J NOx furnaces in the South Coast AQMD to be used in dual fuel split systems, which could create additional enforcement challenges. With this legal pathway for stock to enter the District, noncompliant 40 ng/J NOx furnaces could be more accessible to be sold in standalone applications. In addition, the current design of the systems allows installers or consumers to be able to change the "switchover temperature" setting through the system control panel. Thus, an installation of a dual fuel system with a 40 ng/J NOx furnace could allow the noncompliant furnace to be run considerably more than what is assumed in the estimates that show emissions reductions and could result in significantly higher emissions than a compliant 14 ng/J furnace.

Lastly, the high reduction potential for NOx emissions (90 percent or higher) by using the dual fuel system as stated by the OEM is from the operation of the heat pump, not from the natural gas furnace within the system. According to the United States Energy Information Administration, the average California residential natural gas cost of $13.69/MSCF and residential electricity cost of $0.21/kwh as of March 2020. Assuming the Heat Seasonal Performance Factor (HSPF) for heat pumps to be between 7.1 to 10.2, heat pumps would cost between 33 to 53 percent more per BTU of heat generated compared to natural gas furnaces. This cost differential would create a financial incentive for homeowners to utilize gas furnaces over electric heat pumps in dual fuel systems. Using a compliant furnace instead of a noncompliant furnace would achieve an additional 65% emission reductions and not require staff inspection of the dual fuel system, risk user interference that would negate any emissions benefits, or open the door to noncompliant furnaces entering the District.

Staff acknowledges the emissions reduction benefits of dual fuel split systems; however, systems equipped with noncompliant 40 ng/J furnaces will undercut the cost of existing dual fuel split systems equipped with compliant 14 ng/J NOx furnaces as well as introduce additional compliance challenges that require regulating the end user. Dual fuel split systems with compliant 14 ng/J NOx furnaces offer the highest amount of emission reductions outside of standalone electric heat pump systems. On those bases, staff supports dual fuel systems using compliant 14 ng/J NOx furnaces but recognizes a dual fuel system with a 40 ng/J furnace has the potential, if designed properly, to generate lower NOx emissions than a standalone 14 ng/J furnace.

Exception for high altitude installations of dual fuel systems with 40 ng/J furnaces until September 30, 2022

Based on continued discussions with furnace OEMs and furnace installer representatives for communities located at high elevations, PAR 1111 paragraph (g)(6) will include an exemption for dual fuel systems with noncompliant 40 ng/J NOx furnaces for installation above 4,200 feet above sea level until September 30, 2022, as follows:

> *"(6) Effective October 1, 2021 and until September 30, 2022, a manufacturer, distributor, or installer that manufactures, supplies, sells, offers for sale, or installs a natural gas furnace certified to meet 40 ng/J of NOx that is installed and operated as part of a dual fuel system at or above 4,200 feet above sea level in the South Coast AQMD, shall only install such a unit that:*
>
> *(A) Is designed by the manufacturer with a system switchover point between heat pump and furnace at the external temperature of 32°F with a nonadjustable system that would prevent any person from changing the external ambient switchover temperature of 32°F;*
>
> *(B) Includes installation of an external temperature sensor which acts as the sole method to determine switchover point;*
>
> *(C) For systems equipped with condensing, noncondensing, or mobile home furnaces, includes communicating technology between the heat pump and furnace installed at the point of manufacture to prevent system operation without a heat pump and requires operations of only the heat pump at and above the switchover temperature outlined in (g)(6)(A); and*
>
> *(D) The shipping carton or the name plate of the furnace clearly displays: "This furnace must be installed only in a dual fuel configuration with an electric heat pump. Installation of this furnace without a heat pump in a dual fuel configuration will be a violation of South Coast AQMD Rule 1111."*

Considerations include the need for additional consumer options for high altitude areas due to development delays of COVID-19, the emission reduction potential of dual fuel systems, and the number of systems expected to be sold in the area. Manufacturers, suppliers and installers of these systems will need to comply with recordkeeping requirements in line with requirements for the existing Rule 1111 high altitude exemption. PAR 1111 will also require additional labeling and system design requirements to ensure proper operation of the dual fuel system with noncompliant 40 ng/J NOx furnaces by prioritizing heat pump operation and lockout of switchover temperature settings at the point of manufacture with required external temperature sensor installed with every system specified in Rule 1111(g)(6).

Recordkeeping and reporting requirements specified under Rule 1111 paragraphs (g)(7), (g)(8), and (g)(9) will also apply to this exemption with additional requirements added to maintain records of associated heat pumps sold as follows:

"(7) The manufacturer of any furnace that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Sales date to distributor;

(B) Distributor's name and full contact information (address and phone number);

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable).

(8) The distributor that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Sales date to installer;

(B) Installer's name and full contact information (address and phone number);

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable).

(9) The installer that elects to use the exemption in paragraph (g)(4), (g)(5) or (g)(6) shall record the following information and shall make this information available upon request to the Executive Officer:

(A) Installation date;

(B) Address of furnace installation;

(C) Model number of the furnace and heat pump (if applicable); and

(D) Serial number of the furnace and heat pump (if applicable)."

Additional Recordkeeping for Propane Exemption

Staff is including furnaces being sold under exemption in paragraph (g)(4) into recordkeeping requirements in paragraph (g)(7), (g)(8), and (g)(9) to maintain the original requirements and strengthen enforceability of the reporting requirements of the exemption once the mitigation fee period ends.

Expanded Rebate Program to End Users

As of April 28, 2020, the initial funding allocation of $3,000,000 approved by the South Coast AQMD Governing Board on December 17, 2017 to the Rule 1111 furnace consumer rebate program was exhausted. As part of the initial rebate approved by the Board allowed for the additional fees collected by the incremental mitigation fee increase from the March 2, 2018 rule

amendment to be used for consumer rebates of $300 per unit for condensing furnaces and $200 per unit for noncondensing, weatherized, and mobile home furnaces. Staff estimates the total funding collected from the incremental mitigation fee increase to be about $4,600,000.

Through discussions with furnace manufacturers, additional technologies to further reduce NOx emissions were introduced to staff in the form of gas-electric hybrid dual fuel split systems and electric heat pump systems. Staff agrees that dual fuel split systems with a compliant 14 ng/J furnaces as well as pure electric heat pump systems can provide greater reductions of NOx than a standalone furnace. Dual fuel split systems and electric heat pump systems are generally costlier when compared to conventional standalone furnace and air conditioner HVAC systems. Staff initially contemplated ~~I~~incentivizing ~~these new equipment categories~~dual fuel systems;~~,~~ however, since 14 ng/J furnaces in any configuration is a current requirement under Rule 1111 and ~~the~~ greater reductions can be achieved through an all-~~-~~electric heat pump, no consumer rebate is proposed for gas-electric hybrid dual fuel split systems.~~ will further advance the South Coast AQMD mission to further reduce NOx emissions in the region.~~ Since the initial proposal for revisions to the consumer rebate, staff has increased the amount of the rebate for all-electric heat pumps from $1,000 to $1,500 as this configuration will have~~there is~~ additional costs for an air handler and electrical upgrades, ~~and~~ this provides the greatest NOx reductions for home heating, and there are currently no requirements for electric heat pumps. This offering would be available for the first 2,000 consumers~~, with the 25 percent set aside for disadvantaged communities. Staff will be using SB535 and AB1550 to identify disadvantaged and low-income communities, respectively.~~

To incentivize early adoption of compliant 14 ng/J furnaces for weatherized and mobile home furnaces as well as furnaces for high altitude applications and all-electric pumps~~alternative heating technologies~~, staff proposes to include additional funding not to exceed $3,500,000 ~~$3,000,000~~ into the Rule 1111 rebate program and modify the existing rebate amount as follows:

Category	Original Rebate	New Proposed Rebate	Applicability
~~**Condensing**~~	~~$500 for first the 6,000; $300 thereafter~~	~~$500~~	~~Compliant 14 ng/J NOx furnace installed at or above 4,200 Feet Above Sea Level~~
Condensing and Non-condensing	$500 for first 6,000; $200 thereafter	$500	Compliant 14 ng/J NOx furnace installed at or above 4,200 Feet Above Sea Level Limited to 200 units and ends no later than September 30, 2021
Weatherized	$200	$500	Compliant 14 ng/J NOx furnace installed within the South Coast AQMD Limited to 600 units and ends no later than September 30, 2021
~~**Dual Fuel Split Systems**~~	~~-~~	~~$500~~	~~Gas-electric dual fuel heating system with compliant 14 ng/J NOx furnace installed within the South Coast AQMD~~

Category	Original Rebate	New **Proposed** Rebate	Applicability
Electric Heat Pumps	-	$1,500 ~~$1,000~~	Full electric central HVAC system installed within the South Coast AQMD for replacements only Limited to 2.000 units or when funds depleted

Of the total recommended funding amount, 25% will be reserved for furnace and heat pump installations in disadvantaged communities. Staff will be using SB535 and AB1550 to identify disadvantaged and low-income communities, respectively. Proposed additional rebate funding amount will be divided among the equipment categories as indicated in the table above~~and adjusted according to observed demand~~. Rebates for weatherized, ~~mobile home,~~ high altitude condensing, and high altitude non-condensing furnaces will end on September 30, 2021 and any remaining funds will be reallocated for all-~~dual fuel systems with compliant 14 ng/J furnaces and~~ electric heat pump systems. Rebates for all-~~to compliant 14 ng/J dual fuel split systems and~~ electric heat pump systems will conclude once rebate funds are exhausted. The 25% set aside for disadvantaged communities can only be for units installed in those geographic locations.

CHAPTER 3: IMPACT ASSESSMENT

EMISSION REDUCTIONS

COST EFFECTIVENESS

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

SOCIOECONOMIC IMPACT ASSESSMENT

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

INCREMENTAL COST-EFFECTIVENESS

COMPARATIVE ANALYSIS

~~**CONCLUSION AND RECOMMENDATIONS**~~

DELAY OF EMISSION REDUCTIONS

Based on the 2016 AQMP emission inventory for fuel consumption, the annual average NOx emissions from residential heating using natural gas was 9.51 tons per day in 2012. Staff estimates that there are about four million residential type heating furnaces in the South Coast AQMD. Based on a furnace life of 25 years, a typical furnace emits 1.5 to 2.0 pounds of NOx per year. The emission rate reduction from 40 ng/J to 14 ng/J results in more than one pound per year of NOx emissions reductions for each furnace.

Total weatherized furnace annual sales are estimated at 15,000 units in the South Coast AQMD. A one-year delay in compliance would result in about 0.026 tons per day emission reduction delay for the next 25 years [calculated as: (15,000 x (2 x 0.65))/(2,000x365)].

Staff tracked furnace sales to be approximately 50 units for high altitude installations during the two-month period of October and November 2019. Based on this information, the estimated total installations during the one year~~six-month~~ exemption extension would be between ~~200 and~~ 400 and 800 units. The one-year extension of the exemption for high altitude installations would result in a negligible (near zero tons per day) emission reduction delay. Assuming a dual fuel system with noncompliant 40 ng/J NOx furnace operates less than 35% than a standalone 14 ng/J furnace and the dual fuel system has the appropriate switchover temperature that cannot be modified, no emissions forgone are expected with a dual fuel system with a noncompliant 40 ng/J furnace as compared to a standalone compliant 14 ng/J furnace.

Consequently, the emission reduction delay by this proposal is not significant. The proposed amendments do not result in any significant effect on air quality or significant changes to emissions reductions.

On the other hand, the final year (2046, based on a 25-year useful life expectancy) to achieve the overall emission reductions for this rule remains unchanged, as the proposed compliance date of September 30, 2021 for both weatherized units and high-altitude installation is still consistent with the mobile home furnace compliance date of September 30, 2021~~October 1, 2021~~.

COST EFFECTIVENESS

A cost effectiveness analysis is not required for PAR 1111. The proposed amendment does not impose additional requirements on manufacturers of compliant residential furnaces meeting the 14 ng/J NOx emission limit.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA), South Coast AQMD, as Lead Agency, has reviewed the proposed project pursuant to: 1) CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA. Since the proposed project would result in minimal and temporary forgone NOx emission reductions, it can be seen with certainty there that there is no possibility that the proposed project may have a significant adverse effect on the

environment. Therefore, the project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption. If the proposed project is approved, the Notice of Exemption will be filed with the county clerks of Los Angeles, Orange, Riverside, and San Bernardino counties. In addition, the Notice of Exemption will be electronically filed with the State Clearinghouse to be posted on their CEQAnet Web Portal, which may be accessed via the following weblink: https://ceqanet.opr.ca.gov/search/recent.

SOCIOECONOMIC IMPACT ASSESSMENT

The proposed amendments to Rule 1111 does not impose any additional requirements and will have no adverse socioeconomic impacts. The consumer rebate provides an incentive to install 14 ng/J weatherized and furnaces in high altitude areas before the end of the mitigation fee and compliance dates. In addition, for homeowners that elect to install ~~a 14 ng/J dual fuel split system, or~~ an all-electric heat pump system will be eligible for a ~~$500 and~~ $1,500~~$1,000~~ rebate~~, respectively~~.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

California Health and Safety Code Section 40727 requires that prior to adopting, amending, or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with section 40727, 40727.2 requires a written analysis comparing the proposed amended rule with existing regulations, if the rule meets certain requirements.

The following provides the draft findings.

Necessity: A need exists to amend Rule 1111 to provide extension to both the mitigation fee alternative compliance option for weatherized units and the exemption for installing condensing and non-condensing furnaces at high altitude areas to ensure there are sufficient units available to the consumer.

Authority: The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations from California Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, 41508, and 41700.

Clarity: PAR 1111 has been written or displayed so that its meaning can be easily understood by the persons affected by the rule.

Consistency: PAR 1111 is in harmony with, and not in conflict with or contradictory to, existing federal or state statutes, court decisions, or federal regulations.

Non-Duplication: PAR 1111 does not impose the same requirement as any existing state or federal regulation and is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference: In amending this rule, the South Coast AQMD hereby implements, interprets, or makes specific reference to the following statues: Health and Safety Code sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5.

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code section 40920.6 requires an incremental cost-effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option that would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SOx, NOx, and their precursors. The proposed amendment does not include new BARCT requirements; therefore, this provision does not apply to the proposed amendment.

COMPARATIVE ANALYSIS

Health & Safety Code section 40727.2(g) for comparative analysis is applicable when the proposed amended rules or regulations impose, or have the potential to impose, a new emissions limit or standard, or increased monitoring, recordkeeping, or reporting requirements. In this case, a comparative analysis is not required because the amendments do not impose such requirements.

REFERENCES

REFERENCES

South Coast CAQMD, 2009. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, November 2009.

South Coast AQMD, 2014. *Rule 1111 Technology Assessment for Residential Furnaces*. South Coast Air Quality Management District, January 2014.

South Coast AQMD, 2014. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, September 2014.

South Coast AQMD, 2017. *Final 2016 Air Quality Management Plan.* South Coast Air Quality Management District, March 2017.

South Coast AQMD, March 2018. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, September 2014.

South Coast AQMD, March 2018. *Board letter: Execute Contract to Implement Consumer Rebate Program for Rule 1111 Compliant Natural Gas-Fired, Fan-Type Central Furnaces*

South Coast AQMD, December 2019. *Board letter: Determine That Proposed Amendments to Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, Are Exempt from CEQA and Amend Rule 1111*

Dichter, Nelson. 2020. *Report WCEC 2020-01: Analysis of NOx Emissions Hybrid Heating Technologies in California.* University of California, Davis Western Cooling Efficiency Center

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

South Coast AQMD staff held a public workshop on July 15, 2020 via Zoom video conference. Six comments were received during the public workshop, and one comment letter was received prior to end of comment period on July 24, 2020. The following responses summarize the key comments received during the public workshop:

High Altitude Installations

Comment WS-1: Furnace manufacturers have yet to provide guidance on product offerings available for high altitude installations.

Response WS-1: At the Working Group Meeting and Public Workshop, staff encouraged furnace manufacturers to reach out to installers regarding their product offerings for high altitude installations. Staff treats the discussions with OEMs regarding the status of commercialization of specific products as business confidential information. OEMs may also share commercialization status more generally, but not identify specific models and release dates. At this point, staff is aware that two furnace manufacturers are currently able to provide compliant condensing and non-condensing furnaces for installations up to around 6,800 feet above sea level or higher for communities within the South Coast AQMD, such as Big Bear City, with an additional furnace OEM expected to have units available at that elevation by October 1, 2020. To provide additional time for furnace manufacturers to develop high altitude kits and guidance for compliant 14 ng/J furnaces, staff is proposing to delay the compliance date for high altitude furnace installations one year to September 30, 2021, while maintaining existing recordkeeping requirements for the manufacturer, distributor, and installer. Staff is also proposing to offer rebates for compliant furnaces installed in high altitude areas to incentivize early adoption of compliant units prior to the September 30, 2021 compliance date.

Weatherized Furnaces

Comment WS-2: A sell-through provision should be provided for existing inventory of non-compliant weatherized furnaces beyond the end of the extended mitigation fee period.

Response WS-2: Based on continued discussions with the furnace manufacturers, PAR 1111 will extend the mitigation fee alternative compliance option for all weatherized units by one year to September 30, 2021, an additional six months from the original proposed date of March 30, 2021. The considerations are not only based on the COVID-19 impacts, but also the

winter heating season which typically takes place from October to March and the summer cooling season which takes place from March to September. Staff believed that the additional six months will provide extra flexibility for manufacturers and distributors to manage existing inventory by allowing companies to set their own compliance date tailored to their unique situations. Because the mitigation fee would still apply during a sell through period, the impact of extending the mitigation fee alternative compliance option is the same, but the proposed amendments provide the additional benefits of greater flexibility for inventory management.

Dual Fuel Systems with Noncompliant 40 ng/J Furnaces

Comment WS-3: Dual fuel systems with noncompliant 40 ng/J furnaces should be available as an alternative compliance option to all areas within the South Coast AQMD jurisdiction.

Response WS-3: PAR 1111 will include ~~an~~ a narrow exemption for dual fuel systems with noncompliant 40 ng/J NOx furnaces for installations above 4,200 feet above sea level until September 30, 2022 to provide additional consumer options for high altitude areas. Manufacturers, distributors, and installers of these systems will need to comply with the same recordkeeping requirements for standalone noncompliant furnaces that are installed in high altitude areas through September 30, 2021. PAR 1111 will also require additional labeling and system design requirements to ensure proper operation of the dual fuel system with a noncompliant 40 ng/J NOx furnace by prioritizing heat pump operation and lockout of switchover temperature settings at the point of manufacture with a required external temperature sensor installed with every system. Staff is also proposing to offer a rebate~~s~~ for all--electric heat pumps~~dual fuel systems with compliant 14 ng/J furnaces to support alternative low emission technologies~~.

Comment Letter #1:

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
we make life better®

2311 Wilson Boulevard Suite 400 Arlington VA 22201 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

Comment Letter #1

July 9, 2020

Mr. Shawn Wang
Planning, Rule Development and Area Sources
South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765
Email: swang@aqmd.gov

Re: AHRI Comments on Proposed Revisions to South Coast Air Quality Management District Rule 1111

Dear Mr. Wang:

This letter is submitted in response to the proposed revisions to the South Coast Air Quality Management District's proposed revisions to Rule 1111 to reduce NOx emissions from natural-gas-fired, fan-type central furnaces.

The Air-Conditioning, Heating and Refrigeration Institute (AHRI) represents 332 air-conditioning, heating, and refrigeration equipment manufacturers. In North America, the annual output of the HVACR and water heating industry is worth more than $44 billion. In the United States, the industry supports 1.3 million jobs and $256 billion in economic activity annually. AHRI represents the vast majority of the furnace manufacturers selling products in the United States. 1-1

AHRI appreciates South Coast Air Quality Management District's (SCAQMD) staff consideration in extending the compliance date for Rule 1111 due in part to the unprecedented circumstances surrounding the COVID-19 pandemic and resulting shelter-in-place orders issued around the country and world.

The original compliance date of October 1, 2020 was originally chosen because most furnaces are installed as part of an air-conditioning package during the Spring and Summer months. Therefore, AHRI respectfully requests that the SCAQMD staff considers extending the mitigation period to October 1, 2021 to minimize any disruptions to the seasonal supply chain. 1-2

AHRI also requests that SCAQMD staff consider including a sell-through period of 6-months to allow wholesalers and contractors to use the appliances they currently have in stock. Heating and cooling appliances are ordered in bulk at least 90 days prior to the intended installation date. Additionally, construction projects designed and approved prior to the enforcement date include existing appliance types and would potentially require redesign of the building. 1-3

AHRI's last request is for SCAQMD to consider the use of dual-fuel systems incorporating a gas-fired furnace rated at 40 ng/J and a heat-pump furnace to meet emission requirements. There is a limited number of Ultra-low NOx furnaces currently available in the marketplace and mandating their installation now would add an unnecessary cost burden for the consumer. AHRI believes that a duel-fuel system will enable the SCAQMD to attain its goal in reducing emissions while providing consumers with product choice and comfort. 1-4

AHRI appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me at (703) 293-4864 or SCorcoran@AHRInet.org.

Sincerely,

Shannon M. Corcoran
Lead Advisor, Regulatory Affairs for Heating Technologies

Response to Comment Letter #1

Response 1-1: Thank you for your comments and ongoing participation in the amendments to Rule 1111.

Response 1-2: We recognize the concern with a compliance date at the end of the heating season. PAR 1111 has been revised to provide the additional time needed and extend the compliance date to September 30, 2021

Response 1-3: Staff initially recommended to extend the mitigation fee period for weatherized furnaces six months to March 31, 2021, but later revised the recommendation to extend it one year to September 30, 2021. Staff believes that the additional six months serves as a sell-through period that provides additional flexibility to manage existing inventory by allowing companies to set their own compliance date tailored to each company's unique situations

Response 1-4: Staff's proposal provides for the installation of dual fuel HVAC systems with 40 ng/J furnaces in high altitude areas with conditions to ensure these systems operate in configurations that implement proper "anti-override" technologies. Staff will also conduct periodic "check-ins" to ensure the program is working effectively.

Comment Letter #2:

Comment Letter #2

Shawn Wang

From: Chris M Forth <chris.m.forth@jci.com>
Sent: Friday, June 19, 2020 7:01 AM
To: Shawn Wang; Susan Nakamura; Michael Krause; Gary Quinn; Yanrong Zhu
Cc: Doug McLeish; David Stephens
Subject: Johnson Controls Rule 1111 Positions

To South Coast Staff and Board Members:

Thank you for the recent discussions on this topics. The below is offered to help clarify JCI's positions regarding the upcoming Rule 1111 update.

Please let us know if you have any questions.

Chris M Forth
Executive Director
Regulatory, Codes & Environmental Affairs
Johnson Controls
chris.m.forth@jci.com
(405) 826-5802

David Stephens, Ph.D., P.E., PEM
Director
Global Product Safety Compliance
Johnson Controls
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(405) 416-6573

JCI Rule 1111 Positions

Non-weatherized, High Altitude (Residential Split Furnace)

- While we / JCI are supportive of the AHRI / industry position to request additional time due to COVID impacts we are good with the current September 30, 2020 date. 2-1

Weatherized ULNx, Residential (Single Packaged Unit – primarily 1 ph)

- If the sector is going to be separated between residential and commercial, we are good with the current September 30, 2020 date. If the sectors are not going to be split then we agree with the AHRI / Industry position to support a 1 year delay to September 30, 2021.

Weatherized ULNx, Commercial (Rooftop, Single Package Unit- primarily 3 ph)

- If the sector is going to be separated, we / JCI agree with the AHRI / Industry position of a 1 year delay to Sept 30th, 2021. While the current 6 month delay to April 1, 2021 is appreciated, the April timeframe still falls within the industry busy season (April – Sept) where manufacturers and distributors are building and pre-loading inventory in anticipation of the summer peak which cannot be filled as orders come in; the demand is simply too great for any manufacturer to "build to order". As previously agreed to by all OEM's, an October transition is the least disruptive to all stakeholders. Because of the change in the heating system we are better off with the October date. The units will be run in the "heating "mode shortly after being installed (if there are field issues they will surface and get addressed), instead of starting sales going into the cooling season where they will may not be noticed for several months. 2-2
    - We / JCI also need additional time to develop a new, packed, 40 Ng/J dual fuel offering which we do not have in our product portfolio today; 6 months is simply not enough time for the required product development process to work in the current COVID situation which continue to impact our operations.
- We / JCI agree with distributions' request for at least a brief 90 day sell through to avoid stranding inventory in the channel as commercial jobs have longer lead times and require specific models to align with roughed in

curbs. In the replacement market existing ductwork and curbs which comprises the majority of the jobs in the commercial market.

- Please note that JCI will not be building additional, 40 Ng/J inventory during this period; this request is simply to support distribution inventory sell through as the timing of individual sales is very hard to predict.

2-2 cont'd

Non-weatherized, Dual Fuel (Residential Split Furnaces)
Weatherized, Dual Fuel (Single Packaged Units)

- JCI supports the 40 Ng/J - Dual Fuel alternative for both non-weatherized and weatherized applications for the following reasons:
  - It will reduce overall NOx emissions compared to a standalone 14 Ng/J Ultra Low NOx furnace
  - It will increase consumer choice as there are significantly more models available in the market with the current 40 Ng/J Low NOx furnace from all OEM's versus the 14 Ng/J models which require a complete new, more complex technology.
  - It will improve overall market efficiency as several manufacturers including JCI do not have their high efficiency systems designed for with Ultra Low NOx operation (16 SEER packaged units, 20+ SEER split units and not available with the Ultra-Low NOx); the market demand is simply not great enough due to cost / price.
  - It will reduces consumer cost as the technology to achieve the 40 Ng/J threshold is far less expensive than the technology required to achieve the lower 14 Ng/J level.
- **Explanation**
  - Please note that JCI does not support the Hybrid proposal of a heat pump paired with an Ultra-Low NOx (14 Ng/J) furnace due to increased consumer cost (the design required to comply with a 14 Ng/J Ultra Low NOx furnace is simply more expensive than a 40 Ng/J) and less consumer choice as there will be far more models available in the market with the 40 Ng/J design.

2-3

  - Overall Energy efficiency has also been sacrificed as there are far fewer high efficiency models available with Ultra Low NOx versus the current 40 Ng/J models. Note that only 9% of available rebates went to non-weatherized furnaces as there are simply far fewer models available and the added cost/price deters consumer adoption. Several manufacturers including JCI do not offer the highest efficiency equipment in a Dual Fuel application due to technology challenges and cost issues of adding even more cost to an already premium priced system.

  - To Address South Coast Staff concerns regarding field adjustment of the balance point and inspector confusion with both 14 and 40 Ng/J furnaces in the market JCI offers the following comments:
    - There is technology available in the market that can prevent home owners from adjusting the balance point of a dual fuel system to ensure the heat pump operates the majority of operating hours versus the furnace. This can either be through thermostat's with password protection or diagnostic software provided by the manufacturer to the contractor. Access to this adjustment can be limited to trained service technicians familiar with the equipment. Future enhancements could include utility access to adjust the balance point setting similar to that which occurs today with cooling "demand shed", (energy savings) programs that consumers can "opt into".
    - A dual fuel system always includes a heat pump versus an air-conditioner. Contractors and installers clearly know the difference between a heat pump and an air-conditioner. Rule 1111 requires clear labeling of furnace NOx emission levels. Therefore inspectors can easily determine if there is a clearly marked 40 Ng/J furnace; it must be mated with a heat pump. Heat pumps are easily discernable from air-conditioning units by physical configuration, model numbers, literature / application data, etc. Several OEM's (including JCI) have QR / Bar codes on their equipment labeling which enables inspectors, installers, homeowners, etc. to quickly access available public information as to the equipment type. Thus JCI believes this is easily controlled.

- JCI also notes that California is a leader in the decarbonization and electrification initiative. As such, dual fuel applications support this effort and provide the lower cost alternative to a stand-alone heat pump with backup electric heat. Most of California's installed home base is comprised of older homes which were designed for use with gas heat thus retrofitting to a heat pump will often require additional electrical capacity increases. Often times this will include increasing the homes Amp service capacity from 100 amps to 150 ~ 200 amp service which can cost several thousand dollars (please confirm with electrical contractors). A dual fuel option will prevent the need for this costly increase and still support the decarbonization initiative and keep consumer cost low.

2-3 cont'd

Response to Comment Letter #2

Response 2-1: Thank you for your comment.

Response 2-2: Please see response to comment WS-2 regarding weatherized furnaces from the public workshop.

Response 2-3: Please see response to comment WS-3 regarding dual fuel systems with non-compliant 40 ng/J NOx furnaces from the public workshop.

Comment Letter #3

Comment Letter #3

Lennox International Inc.
2140 Lake Park Boulevard
Richardson, Texas 75080-2254

Mailing Address:
P.O. Box 799900
Dallas, Texas 75379-9900

Telephone: 972.497.6659
Facsimile: 972.497.6991
LennoxInternational.com

Dave Winningham
Sr. Engineering Manager
Regulatory Affairs
Telephone: 803-738-4085

July 28, 2020

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Submitted via: e-mail

Re: South Coast Air Quality Management District Rule 1111 Amendment Proposal

Lennox International Inc. (Lennox) is one of two American-based manufacturers who compete in the residential furnace market subject to Rule 1111. Lennox is a leading provider of climate control solutions for the heating, air-conditioning and refrigeration equipment markets (HVACR). Lennox has a long history of innovation leadership since our founding over 120 years ago in Marshalltown, Iowa. Lennox manufactures some of the most efficient and environmentally friendly products available while maintaining the levels of product safety and reliability required by the HVACR market.

Lennox has consistently supported the advancement of South Coast Air Quality Management District's ("SCAQMD") Rule 1111 which significantly reduces furnace NOx emissions. Lennox supports the continued progression of the Rule for weatherized and high-altitude furnace products but the impacts of the current COVID-19 pandemic and resulting economic hardship are causing delays in product development programs. Lennox supports the current SCAQMD Rule 1111 Amendment proposal as it allows for a rationale transition to compliant products ensuring adequate product availability and reasonable consumer cost.

A. Lennox supports the SCAQMD Rule 1111 Amendment as proposed. 3-1

The establishment of the 14 ng/jl limit for furnaces covered by Rule 1111 was finalized in November 2009. Lennox introduced the first commercially available SCAQMD Rule 1111 compliant furnaces in November 2017. Following this initial introduction Lennox has launched a complete range of compliant products that range from non-condensing furnaces to premium high efficiency condensing furnaces in configurations. This includes furnaces that match with our highest efficiency air conditioning and heat pump systems with variable capacity.

Lennox is continuing its commitment to expand its offering to include high altitude and weatherized products as well as to further expand its furnace offering. But due to obvious recent events caused by the COVID-19 pandemic these development efforts have been delayed. Lennox finds the current SCAQMD Amendment Proposal strikes the proper balance to allow for development of these products while incentivizing the transition to compliant products through the Clean Air Rebate program. Since our initial offering of compliant furnaces in late 2017 the volume of compliant products has consistently grown and offers future opportunity for investment to improve manufacturing productivity and consumer cost of these products.

The proposed extension of the mitigation period/compliance date for weatherized and high-altitude furnaces will ensure consumers have an adequate choice of products and a reasonable level of competition to ensure their interest are protected.

B. Lennox opposes further Rule 1111 Amendment proposals for dual fuel systems that allow continued use of non-compliant furnaces.

Further Amendment of Rule 1111 to allow non-compliant furnaces in dual fuel application is not aligned with the intent of the rule and disadvantage compliant furnace manufacturers. It will also cause further uncertainty in the market and perpetuate a cycle of resistance to low emission furnace technology by manufacturers, distributors and installers.

Lennox has spent millions of dollars in research and development investments and production capability to commercialize a technically feasible product and has paid millions in mitigation fees to comply with SCAQMD Rule 1111 regulations. During the ongoing Rule 1111 Amendment process Lennox consistently indicated that compliant manufacturers were being placed at a disadvantage in the market. While Lennox agrees that dual fuel systems can provide additional emission reductions, all Lennox compliant furnace can be used in dual fuel applications to provide additional reductions. SCAQMD efforts to incent dual fuel systems with compliant furnaces through the Clean Air Rebate program is the recommended approach and is well aligned with the objectives of Rule 1111 to reduce NOx emissions. 3-2

SCAQMD has correctly identified that further amendment of the rule for non-compliant dual fuel systems will open potential loopholes and create unnecessary enforcement issues regarding non-compliant furnaces and should not be considered in the current Rule Amendment.

C. Clean Air Rebate Program

Lennox supports the SCAQMD recommendation for the Clean Air Rebate Program to incentivize compliant weatherized, high altitude and dual fuel systems. While our current development for weatherized and high-altitude furnaces has been delayed, we support rewarding compliant product in these as well as dual fuel applications. 3-3

D. Summary

In summary Lennox supports the work of SCAQMD to move forward with the current Rule 1111 Amendment as proposed. Lennox has upheld its commitment to support Rule 1111 with its resulting significant reduction in NOx emission to help SCAMQD achieve its air quality objectives and finds that further amendment for non-compliant dual fuel systems will disadvantage manufacturers who have invested heavily in compliant products. 3-4

Sincerely,

David Winningham

Dave Winningham,
Sr. Engineering Manager, Regulatory Affairs

Response to Comment Letter #3

Response 3-1: Staff acknowledges the work Lennox has conducted over the past years to achieve low NOx furnaces and appreciates both your comments and ongoing participation in the rule development process.

Response 3-2: Staff's current proposal will allow for dual fuel systems with non-compliant 40 ng/J furnaces to be installed at elevations at or above 4,200 feet until September 30, 2022. As stated in Response 1-4, conditions will be imposed on the systems sold under this exemption and staff will conduct periodic updates of the supply chain to ensure proper implementation.

Response 3-3: Staff appreciates the continued input the commenter provided toward revision of the Clean Air Furnace Rebate Program.

Response 3-4: Staff appreciates the commenter's support of the amendments to Rule 1111,

Comment Letter #4

TRANE TECHNOLOGIES

Comment Letter #4

July 28, 2020

Shawn Wang
Air Quality Specialist
South Coast Air Quality Management District
21865 Copely Drive
Diamond Bar, CA 91765

Re: PAR 1111: 30-Day Preview Version

Dear Mr. Wang,

We would like to submit the following comments regarding the most recent 30-Day Preview version of the PAR 1111. 4-1

- Currently, paragraph (g)(6)(A) lists a requirement of "an external ambient switchover temperature of 32°F with a nonadjustable system that would prevent any person from changing the external ambient switchover temperature of 32°F". We request that the mandated switchover temperature be adjusted to 40°F. Studies conducted by Trane Technologies and others have consistently shown the efficacy of dual fuel systems at 40°F, demonstrating a potential annual NOx reduction of 96%. 4-2

- Seeing as there are different methods to prevent switchover temperature tampering, the requirements listed in paragraphs (g)(6)(B) and (g)(6)(C) should be noted as an and/or statement.
    - Currently, the document indicates that both an external ambient temperature sensor ***and*** communicating technology need to be present in order for the system to be acceptable. The weatherized furnace solution proposed by Trane Technologies does not encompass communicating technology and relies solely on a nonadjustable, external ambient temperature sensor. This sensor and associated hard-wired software satisfy all of the requirements set in PAR 1111 without the use of communicating technology. Given this method of satisfying the PAR 1111 requirements, we propose that an and/or clause is adopted, or that weatherized and condensing and non-condensing requirements are listed separately. 4-3

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TRANE
TECHNOLOGIES

We are thankful for South Coast Air Quality Management District's (SCAQMD) continued dialog and coordination in regard to PAR 1111. We are confident that together we can work toward providing the best heating, ventilating, and air conditioning (HVAC) solutions that help limit Nitrous Oxide (NOx) and Carbon Dioxide (Co_2) emissions. Should you have any questions, please don't hesitate to contact us. 4-4

Best Regards,

Kellie Lindenmoyer

Kellie Lindenmoyer
Furnace Product Manager

Trane Technologies
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Response to Comment Letter #4

Response 4-1: Thank you for your comments on the amendments to Rule 1111.

Response 4-2: The switchover temperature for dual fuel systems referenced in the proposed amendments to Rule 1111 was based on a publicly available study conducted by University of California, Davis, and formally presented to staff and the Governing Board at last year's public hearing. That study demonstrated potential NOx emissions reductions of up to 95-100 percent in high population areas of California when using a heat pump with a low NOx furnace (40 ng/J) for auxiliary heat as compared to the emissions from the operation of a standalone ultra-low NOx (14 ng/J) furnace. One of the parameters of the study assumed a switchover temperature of 32 °F, and since most of the Southern California region do not typically drop to temperatures below 32°F, the study concluded this region could rely solely on the electric heat pump, thus generating fewer NOx emissions compared to the compliant standalone 14 ng/J NOx furnace. While the amendments support the use of dual fuel systems, the lower switchover temperature ensures more operation of the electric heat pump and emission reductions expectations as presented in the UC Davis study.

Response 4-3: Staff agrees with the commenter that weatherized dual fuel systems do not face the same challenges as split dual fuel systems that utilize condensing, noncondensing, or mobile home furnaces. As such PAR 1111 language does not require weatherized furnaces to include communicating technology for exemption (g)(6).

Response 4-4: Staff appreciates the commenter's ongoing participation and collaboration during the development of the amendments to Rule 1111.

Comment Letter #5

Comment Letter #5

July 31, 2020

Shawn Wang
Air Quality Specialist
South Coast Air Quality Management District
21865 Copely Drive
Diamond Bar, CA 91765

Re: PAR 1111: 30-Day Preview Version

Dear Mr. Wang,

Trane Technologies™ is a climate company with well-known brands such as Trane®, American Standard Heating and Air Conditioning® and Thermo King®, which are global leaders in stationary and transport air conditioning and transport refrigeration products. Trane Technologies is well-known for its global sustainability leadership in reducing emissions, where it reduced more than 35% of its operational GHG footprint and 50% of its product refrigerant GHG footprint between 2015 and 2020. Trane Technologies has also committed to having a carbon neutral footprint and reducing our customers' emissions by one gigaton (1 billion metric tonnes) CO_2e by 2030.

It is with these commitments in mind that we would like to submit the following comments regarding the most recent 30-Day Preview version of the PAR 1111. We will first address our issues with the specific proposed language, and then discuss our request for general dual fuel application. 5-1

Paragraph (g)(6)(A) lists a requirement of "an external ambient switchover temperature of 32°F with a nonadjustable system that would prevent any person from changing the external ambient switchover temperature of 32°F". We request that the mandated switchover temperature be adjusted to 40°F. Studies conducted by Trane Technologies and others have consistently shown the efficacy of dual fuel systems at 40°F, demonstrating a potential annual NOx reduction of 96%.

- Paragraph g(6) only allows for low NOx furnace (40 ng/J) dual fuel systems that have both an external ambient temperature sensor ***and*** communicating technology. However, the weatherized furnace solution proposed by Trane Technologies does not include communicating technology and relies solely on a

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nonadjustable, external ambient temperature sensor. This sensor and associated hard-wired software satisfy all of the requirements set in PAR 1111 without the use of communicating technology. As such, we propose clarifying this issue as suggested below. 5-1 (cont'd)

- Paragraph g(6) only allows for low NOx dual fuel systems at altitudes at or above 4,200 feet above sea level. However, given that Trane Technologies and other manufacturers have definitively demonstrated how weatherized units and communicating condensing and non-condensing dual fuel systems will include adequate safeguards to prevent installers, distributors and homeowners from tampering with the furnace and heat pump configuration and programming, **low NOx dual fuel systems should be allowed at all altitudes for weatherized units and communicating systems** as suggested below. We have presented the following solutions:
    - Weatherized solution:
        - Weatherized units, also known as packaged units, come with each piece of equipment in one central location. Since the equipment is 'packaged' together, we are able to implement a temperature sensor and locked switchover point that cannot be tampered with or adjusted. The locked switchover temperature of 40°F is not accessible physically or digitally by installers, distributors, or homeowners. 5-2
    - Communicating, condensing and non-condensing furnaces:
        - In condensing and non-condensing applications, the equipment comes in two different pieces. Our communicating systems would ensure that the outdoor unit is always a heat pump and that the switchover temperature cannot be changed from 40°F. The heat pump and thermostat's "communication" with one another begins upon startup, and if the thermostat detects that it is installed with anything other than a heat pump, it will not work. Furthermore, if the thermostat detects that it is installed with a designated 40 ng/J furnace (which will have a special model number) and a heat pump, it will lock the temperature switchover point at 40°F and cannot be modified by any user or repair person. This communication method is hard-wired and does not rely on any outside internet or data connections.

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- With respect to the mitigation fees listed in Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules, we request that the mitigation fees be waived for dual fuel systems sold into the District beginning September 30, 2020. Since these systems have lower annual NOx emissions than a standard 40 ng/J furnace and air conditioner system we believe the mitigation fee, which serves to encourage compliance and subsequently reduce NOx emissions, should not apply. 5-3

We hereby propose the following changes to the preview version of PAR 1111:

Add definition of Communicating System as follows:

COMMUNICATING SYSTEM means:

A communicating system is enabled with microprocessors that allow for two-way communication between the indoor unit, outdoor unit and thermostat. This communicating capability allows for functionality such as: unit recognition upon install, optimizing system performance, performance data, and monitoring/alerts.

Modify Paragraph 6 as follows: 5-4

(6) ~~Effective October 1, 2021 and until September 30, 2022, a~~A manufacturer, distributor, or installer that manufactures, supplies, sells, offers for sale, or installs a natural gas furnace~~s~~ certified to meet 40 ng/J of NOx that is installed and operated as part of a dual fuel system ~~at or above 4,200 feet above sea level~~ in the South Coast AQMD, shall only install such a unit that:

(A) Is designed by the manufacturer with an external ambient switchover temperature of ~~3~~240°F with a nonadjustable system that would prevent any person from changing the external ambient switchover temperature of ~~3~~240°F;

(B) Includes installation of an external temperature sensor which acts as the sole method to determine ambient temperature; ~~switchover point;~~

(C) For Communicating Systems, ~~i~~includes communicating technology between system components at the point of manufacture to prevent system operation without a heat pump and prioritizes operation of the heat pump over the furnace; and

(D) The shipping carton or the name plate of the furnace clearly displays: "This furnace must be installed only in a dual fuel configuration with an electric heat pump. Installation of this furnace without a heat pump

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in a dual fuel configuration will be a violation of South Coast AQMD Rule 1111."

5-4 (cont'd)

Mitigation fees set forth in Table 2 shall not apply to 40 ng/J NOx furnaces that are installed and operated as part of a dual fuel system.

5-5

As Trane Technologies has repeatedly indicated given that the studies we have presented, including the study conducted by the University of California, Davis, have demonstrated that dual fuel systems including a low NOx furnace reduce annual NOx emissions by 96%. This technology includes many additional benefits, such as:

- Annual CO_2 emission reductions of more than 67%[1]
- Proven, robust technology with reliable operation
- Readily available to all manufacturers
- Installer familiarity with the technology and equipment
- Expanded size and capacity selections to allow for proper equipment sizing
- An economical path toward electrification for existing homes
  - Traditional all-electric systems can come with substantial conversion costs in order to accommodate for the new system's physical size and required voltage. Dual fuel eliminates this need by allowing consumers to utilize their existing installation space and voltage connections.
- Functionality at all altitudes, including high altitudes
- Expanded consumer choice which would include high efficiency, communicating air conditioning systems
  - These systems are incredibly limited today with current ultra-low NOx offerings

5-6

We understand and appreciate the concerns discussed with District Staff regarding dual fuel systems and their enforcement. However, we maintain our position that altering switchover temperatures would be highly improbable and impractical. Testimony from installers in our recent workshops has confirmed that there is simply no incentive for installers and homeowners to adjust switchover temperatures, or to purchase an entire dual fuel system to only install the low NOx furnace. If the District is willing to allow dual fuel for high altitude application, it would need to deal with the same enforcement issues and track the same recordkeeping requirements. As such, in light of all the benefits of

[1] Based on findings in a study conducted by the University of California, Davis Western Cooling Efficiency Center. Dichter, Nelson. "Analysis of NOx Emissions from Hybrid Heating Technologies in California." Western Cooling Efficiency Center. Accessed July 29, 2020. https://wcec.ucdavis.edu/wp-content/uploads/Analysis-of-NOx-Emissions.WCEC-Technical-Report.2020-01.pdf.

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dual fuel systems and the added benefit of further reducing California's GHG emissions, we respectfully request that you consider allowing dual fuel systems for all applications, not just at high altitude.

5-6
(cont'd)

We truly appreciate the District's ongoing dialog and coordination with Trane Technologies with respect to PAR 1111. We are confident that together we can work toward providing the best heating, ventilating, and air conditioning (HVAC) solutions that substantially reduce NOx and CO_2 emissions. Should you have any questions, please don't hesitate to contact us.

Best Regards,

Kellie Lindenmoyer

Kellie Lindenmoyer
Furnace Product Manager

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Response to Comment Letter #5

Response 5-1: This comment letter expands upon the previously received comment letter #4. Please see Responses 4-2 and 4-3 regarding dual fuel switchover temperatures and weatherized dual fuel systems, respectively.

Response 5-2: Staff acknowledges a dual fuel system with a 40 ng/J furnace has the potential, if designed properly, to generate lower NOx emissions than a standalone 14 ng/J furnace; however, allowing dual fuel systems with non-compliant 40 ng/J furnaces could create enforcement challenges. Such challenges include the ability for installers or consumers to change the "switchover temperature" setting through the system control panel. This could lead to noncompliant 40 ng/J NOx furnaces becoming more accessible for sale and installation in standalone applications within the District, adding uncertainty to the actual emission reductions. Comparatively, a dual fuel system with a 14 ng/J furnace provides even more emissions reduction, encourages new technology, and avoids additional enforcement concerns.

On this basis, staff does not recommend installation of dual fuel systems with noncompliant 40 ng/J NOx furnaces at elevations below 4,200 feet above sea level. On the other hand, staff is recommending an incentive through the Clean Air Rebate Program for- all electric heat pump systems~~dual fuel systems with compliant 14 ng/J NOx furnaces~~. Additional information on the considerations, comparative operating cost estimates, and enforcement concerns for dual fuel systems with 40 ng/J furnaces can be found in Chapter 2 of this report

Response 5-3: The current rule proposal is to allow dual fuel systems equipped with noncompliant 40 ng/J furnace in high altitude areas to not be subject to the mitigation fees listed in Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules.

Response 5-4: The current rule proposal further elaborates on the definition of communicating technology in subsection (g)(6)(C). For further discussion on how the switchover temperature of 32°F was determined, please see Response 4-2 to Comment Letter #4.

Response 5-5: Please see Response 5-3 with regard to mitigation fees.

Response 5-6: Staff appreciates the commenter's ongoing participation and collaboration during the development of the amendments to Rule 1111. Considerations were made with information provided by commenter's referenced study conducted by the UC Davis Western Cooling Efficiency Center (WCEC). Additional information on the determination of switchover temperature can be found in Response 4-2 to Comment Letter #4.

Additional information on the considerations, comparative operating cost estimates, and enforcement concerns for dual fuel systems with 40 ng/J furnaces can be found in Chapter 2 of this report.

Comment Letter #6

August 19, 2020

Stationary Source Committee
South Coast AQMD
21865 Copley Drive
Diamond Bar, CA 91765

Subject: PAR 1111 Proposed Revisions, Natural Gas Fired, Fan Type Central Furnaces

Johnson Controls respectfully submits the following comments in regards to proposed updates to Rule 1111, Reduction of NOx Emissions from Natural-Gas- Fired, Fan-Type Central Furnaces and believe it is of high importance board members are fully informed. 6-1

Weatherized Furnace Mitigation Period Extension

- We / JCI are supportive of the South Coast staff and AHRI / industry position to the request to extend the end of the weatherized furnace mitigation period from the current September 30, 2020 for one year to September 30, 2021. This position is based on the magnitude of the COVID-19 impacts and the uncertainty regarding the easing of the pandemic.

Weatherized Furnace Sell-Through Period

- We / JCI agree with distributions' request for at least a brief 60 day sell-through to avoid stranding inventory in the channel as commercial jobs have longer lead times and require specific models to align with existing ductwork and mounting curbs. This can have major impacts on new construction projects due to the potential construction delays.
- We / JCI strongly disagree with South Coast staff position regarding using the last six months of the mitigation fee extension as a sell-through period. Along with COVID-19 impacts a primary reason for extending the mitigation fee period is to avoid the rule change driven disruptions during the April to September part of the business cycle. These are the most active time for HVAC business cycle and introducing a new product in that time period is unsafe and disruptive. As an active business period, this results in an increased number of jobs starting and being delayed past the end of the mitigation period. 6-2

Dual Fuel **Weatherized** (Single Packaged Units) Systems

- JCI supports the staff recommendations to allow the use of weatherized dual fuel systems at all elevations.
  - On an annual basis, dual fuel systems reduce overall furnace NOx emissions compared to a standalone 14 ng/J ultralow NOx furnace.
  - The weatherized 40 ng/J low NOx furnace with standard heat pump (HP) will cost[1] consumers 28% less than the ultralow NOx counterpart and will emit less NOx than the 14 ng/J ultralow NOx furnace / with AC combination. 6-3
  - The option of weatherized low NOx furnaces offers greater consumer choice in terms of consumer cost and availability of more efficient systems.
  - It will provide South Coast staff the data to support a more thorough review of the benefits of dual fuel systems.

[1] Cost estimates are based on Johnson Controls general supply chain review and are not reflective of industry wide pricing.

Dual Fuel **Non-Weatherized** Systems (Residential Split Furnaces)

- JCI disagrees with South Coast staff position on non-weatherized dual fuel systems below 4,200 ft. JCI supports the 40 ng/J dual duel alternative for non-weatherized applications at all elevations for the following reasons:
  - On an annual basis, dual fuel will reduce overall furnace NOx emissions compared to a standalone 14 ng/J ultralow NOx furnace.
  - The non-weatherized (residential split systems) 40 ng/J low NOx furnace paired with standard heat pump (HP) is 14%[2] less expensive and emits less NOx than the combination 14 ng/J ultralow NOx furnace and air conditioner (AC).
  - It will improve overall market efficiency as several manufacturers including JCI do not have their high efficiency systems designed for with Ultra Low NOx operation (16 SEER packaged units, 20+ SEER split units and not available with the Ultra-Low NOx); the market demand is simply not great enough due to cost / price.

6-3 (cont'd)

Increased Rebate Incentives

- JCI supports and increase in the rebate incentive amount from the planned $500 per unit rebate incentive to a rebate of $1,000 per unit. Cost information indicates the cost difference between the low NOx (40 ng/J) unit and the ultralow NOx (14 ng/J) unit is in excess of $1,000. To incentivize consumers to select the ultralow NOx unit, JCI supports a rebate incentive closer to the cost difference of $1,000.

6-4

Dual Fuel Emissions Study

- JCI supports the continuation of third party studies for dual fuel system. JCI supports taking the proposed extended time for dual fuel installations to complete a third party study of dual fuel systems by an independent agent using field based data.

6-5

Dual Fuel Switchover Point

- Technology is available in the market to prevent home owners from adjusting the dual fuel system balance point thus ensuring the heat pump operates the majority of operating. This can either be through thermostats with password protection or diagnostic software provided by the manufacturer to the contractor. Future enhancements could include utility access to adjust the balance point setting similar to that which occurs today with cooling "demand shed", (energy savings) programs that consumers can "opt into".

6-6

Respectfully,

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[2] Cost estimates are based on Johnson Controls general supply chain review and are not reflective of industry wide pricing.

Response to Comment Letter #6

Response 6-1: Thank you for your comments and continuing participation as rule amendments are developed.

Response 6-2: Please see response to comment WS-2 from the public workshop comments regarding extending the mitigation fee deadline for weatherized furnaces. With regard to adding a sell-through provision, PAR 1111 will extend the mitigation fee alternate compliance option for all weatherized units by one year to September 30, 2021, an additional six months from the original proposed date of March 30, 2021. The additional six months provides manufacturers time to manage existing orders and inventory. Staff believes that any time extension should require collection of the mitigation fee.

Response 6-3: Please see Response to Comment 5-2 regarding dual fuel systems with noncompliant 40 ng/J furnaces in lower altitude areas.

Response 6-4: Staff has reached out to all furnace OEMs to request furnace pricing information to determine the average cost difference between 40 ng/J and 14 ng/J furnaces. The previous rebate proposal was determined based off the pricing information gathered from the furnace OEMs who participated in the data request, as well as one furnace installer.

Response 6-5: While a third-party study is not proposed, staff will continue to monitor the effectiveness of the exemption for dual fuel systems with noncompliant 40 ng/J furnaces installed at high altitudes (≥4,200 feet) in approved configurations and will report back to the Stationary Source Committee no later than May 21, 2022. This report shall include, but not be limited to, an assessment of the quantity and models of the dual fuel system being installed, and whether the exemption should be extended or expanded

Response 6-6: Concerns surrounding the switchover point and enforcement for dual fuel systems with noncompliant 40 ng/J furnaces can be found in Response to Comment 5-2 as well as Chapter 2 of this staff report.

Attachment I

PROPOSED AMENDED RULE 1111

REDUCTION OF NO_X EMISSIONS FROM NATURAL-GAS-FIRED, FAN-TYPE CENTRAL FURNACES

BOARD MEETING

SEPTEMBER 4, 2020

Background

- Rule 1111 was adopted in 1978 and applies to residential and commercial gas furnaces
- In November 2009, the NOx limit was lowered from 40 ng/J to 14 ng/J
  - Manufacturers could pay a mitigation fee in lieu of meeting the lower emission limit
- On October 1, 2019 the mitigation fee ended for condensing and non-condensing furnaces, requiring manufacturers to meet the 14 ng/J NOx limit
  - All seven manufacturers have furnaces that meet the 14 ng/J limit
  - Condensing and non-condensing units represent approximately 80% of residential and commercial gas furnaces
- On December 6, 2019 Rule 1111 was amended to allow 40 ng/J furnaces to be installed in high altitude areas as no furnaces were available for higher elevations

Amendments Needed to Address October 1, 2020 Compliance Date

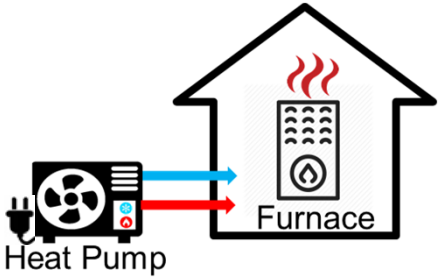
- Two furnace categories have October 1, 2020 compliance dates
  - Condensing and non-condensing furnaces for high altitude areas (≥ 4,200 feet)
  - Weatherized furnaces
- PAR 1111 will extend the compliance date one year for both categories
  - Less than half of the manufacturers have furnaces that can be commercialized by October 1, 2020
  - Delays due to COVID-19: temporary plant closures, travel restrictions, slower development and reduced production due to social distancing
  - Staff will provide an update on the development of testing for high altitude furnaces by the May 2021 Stationary Source Committee meeting
- Proposed amendments would result in a one-year delay of NOx emissions reductions of 0.026 tons/day

Two Remaining Key Issues

- **Key Issue #1:** Two manufacturers requested an additional 60-day sell through period beyond the 12-month mitigation fee extension for weatherized furnaces
- **Staff Response:**
  - 5 of the 7 manufacturers will have either or both residential or commercial weatherized furnaces by April 1, 2021
  - The additional six months to September 30, 2021 allows time to manage inventories
  - **Recommendation:** Maintain current proposal of a 12-month mitigation fee extension for weatherized furnaces
- **Key Issue #2:** Some stakeholders have requested the use of dual fuel systems with noncompliant 40 ng/J furnaces to provide additional consumer choice

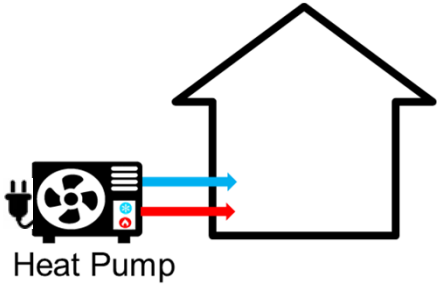
Overview of Dual Fuel System with a Gas Furnace and an All Electric Heat Pump

Dual Fuel System with Gas Furnace (Heat Pump and Gas Furnace)



- Dual fuel heating system is an electric heat pump paired with a gas furnace
- Dual fuel systems with a 14 ng/J furnace have been available since October 1, 2019
- Primary cooling and heating provided by the electric heat pump
- Gas furnace is used as auxiliary heat at low temperatures, generally below 32°F

All Electric Heat Pump Only



- All electric heat pump provides all cooling and heating with heat pump
- No combustion source – **zero emissions**
- For most areas in Southern California, temperatures do not drop below 32°F so auxiliary furnace is not needed

Concerns About 40 ng/J Dual Fuel Systems

Rule Relaxation

- For past year, manufacturers could only offer 14 ng/J furnaces with dual fuel systems
- Allowing dual fuel systems with a 40 ng/J furnace is backsliding

Increased Emissions

- 40 ng/J dual fuel system is 65% more emissive than a 14 ng/J dual fuel system
- 40 ng/J dual fuel system is not always less emissive than a standalone 14 ng/J furnace

Enforcement Challenges

- Most inspections at distributor's warehouse
- Difficult to distinguish a 40 ng/J furnace that is intended for a dual fuel system or standalone installation

Rule 1111 Approach

- Rule 1111 regulates furnace emissions
- Shifts focus to how furnace is used
- Need to ensure consumer does not tamper or disconnect heat pump

Additional Incentives Through the CLEANair Furnace Rebate Program

- South Coast AQMD initiated the Clean Air Furnace Rebate Program in 2019 to incentivize commercialization of 14 ng/J furnaces
- Initial funding of $3 million has been distributed
- Approximately $4.6 million from Fund 27 (Rule 1111) available from Rule 1111 mitigation fees
- Staff recommendations:
  - Use $3.5 million of available funding to incentivize consumer rebates for 14 ng/J furnaces in high altitude, weatherized and all electric heat pumps
  - Maintain a minimum of 25% set aside for disadvantaged and low income communities*
  - Rebate program would end when $3.5 million is exhausted
  - Electric and Gas Industries Association would continue to manage the Rebate Program

* *Disadvantaged and low-income communities will be identified using SB535 and AB1550, respectively*

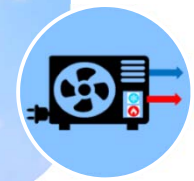
Proposed Consumer Rebate Incentives

CLEANair
FURNACE REBATE PROGRAM

South Coast AQMD's consumer rebate program funded through Rule 1111 mitigation fees

$500 rebate for 14 ng/J furnaces installed in high altitude areas (≥4,200 feet)
Limit: 200 units and no later than September 30, 2021

$500 rebate for 14 ng/J weatherized furnaces
Limit: 600 units and no later than September 30, 2021



$1,500 rebate for zero emission heat pump systems (replacements only)
Limit: 2,000 units or when funds depleted

A minimum of 25 percent of the recommended funding will be reserved for installations in disadvantaged and low-income communities as identified under SB535 and AB1550

Staff Recommendations

- Adopt Resolution
  - Determining PAR 1111 and revisions to the CLEANair Furnace Rebate Program are exempt from CEQA
  - Amending Rule 1111
  - Recognizing into the Air Quality Investment Fund 27 (Rule 1111), $3,500,000 and revising the Clean Air Furnace Rebate Program to incentivize installation of 14 ng/J furnaces and electric heat pumps
  - Commitment to report back to the Stationary Source Committee by May 2021 on:
    - Status of furnaces for high altitude installations
    - Status of rebate program and recommended changes, if any