SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report
Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

October 2017

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Rule 1111 reduces emissions of nitrogen oxides (NOx) from residential and commercial gas-fired fan-type residential 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.

Rule 1111 was adopted by the SCAQMD Governing Board in December 1978 and amended in 1983, 2009, and 2014. The more significant changes included lowering the NOx emissions from 40 to 14 nanograms per Joule (ng/J) and providing more time to comply with the new limit.

As required by the 2009 amendment, the SCAQMD worked with the original equipment manufacturers (OEMs) to develop prototype residential furnaces that meet the new 14 ng/J NOx limit in Rule 1111. The technology assessment demonstrated the new lower Rule 1111 NOx limit was achievable. However, additional time would be needed to commercialize compliant furnaces.

In the 2014 amendment, an alternative compliance option allows the OEMs to pay a per unit mitigation fee of $200 for each condensing furnace and $150 for each other type of furnace, in lieu of meeting the new lower NOx emission limit, for up to 36 months past the applicable compliance date.

To date, compliant furnaces have been developed by three OEMs but have not yet been introduced into the market. All of the OEMs are currently using the alternative compliance option by paying the mitigation fee.

Based on considerations of technology development and implementation status, stakeholders' input, and the need to encourage development and sale of compliant products, SCAQMD staff recommends maintaining the 14 ng/J NOx limit and has initially proposed the following amendments for Rule 1111: (1) increasing the mitigation fee by $200 to $300; (2) extending the mitigation fee alternative compliance option by one year for non-condensing and mobile home units, and two years for condensing and weatherized units; (3) establishing a rebate program to benefit consumers and incentivize the purchase of lower emitting compliant furnaces; and (4) preventing circumvention of the rule (i.e., propane furnaces).

CHAPTER 1: BACKGROUND

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INTRODUCTION

The purpose of Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces is to reduce NOx emissions from residential and commercial gas-fired fan-type residential 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 SCAQMD complies with the emission limit using specific test methods approved by the SCAQMD and U.S. EPA. The current rule provides manufacturers an alternative compliance option of paying a per-unit mitigation fee for up to 36 months past the applicable compliance date. Most single family homes, many multi-unit residences, and some small commercial building in the SCAQMD use this type of space heating equipment.

REGULATORY HISTORY

Rule 1111 was adopted by the SCAQMD Governing Board in December 1978, addressing all sizes of space heating furnaces. The original rule required all 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. At the December 1978 rule adoption Hearing, a rule requirement that all space heating furnaces meet a 12 ng/J NOx emission limit by 1995 was considered by the Governing Board but not adopted.

Rule 1111 was later amended in July 1983 in order to limit applicability based on a unit's size and to exempt larger commercial space heaters. The rule amendment limited applicability to furnaces with a heat input 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 July 1983 amendment also exempted units manufactured for use in mobile homes (manufactured housing), revised the definition of efficiency, and clarified testing procedures.

In November 2009, Rule 1111 was amended to be consistent with the objectives of 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 furnace – condensing (high efficiency), non-condensing (standard), and weatherized – 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, had to meet a NOx limit of 40 ng/J in October 1, 2012, with a future limit of 14 ng/J in October 1, 2018. The new lower NOx emission limit of 14 ng/J reflects a 65% reduction from the then current limit of 40 ng/J. To facilitate the depletion of existing inventories and to ensure 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 SCAQMD prior to the compliance date.
To encourage and accelerate technology development, the 2009 Rule 1111 amendment provided an incentive for early compliance with the 14 ng/Joule NOx emission limit, and a $3 million

fund was approved for this purpose. Manufacturers that deliver 14 ng/J furnaces into the SCAQMD prior to the applicable compliance date were given the opportunity to receive a payment of $75 for each standard efficiency furnace and $90 for each high-efficiency unit sold and delivered into the SCAQMD 90 days prior to the applicable compliance date. However, to date, no manufacturer has applied for this incentive.

The 2009 Rule 1111 amendment also required a technology assessment and status report to the Governing Board. This technology assessment evaluated both the feasibility of the new lower NOx emission limit and the rule implementation schedule. The SCAQMD Technology Advancement Office (TAO) initiated a Request for Proposals (RFP) to develop prototype residential furnaces that meet the new 14 ng/J NOx limit. The technology development projects were initiated in 2010 and completed in 2013. The total cost of the four projects was $1,447,737 with $447,737 provided by The Gas Company and $50,000 provided by the San Joaquin Valley Unified Air Pollution Control District. The prototype furnaces developed through these four projects demonstrated that the new lower Rule 1111 NOx limit is achievable in all of the types of forced air residential heating furnaces produced for the United States market. However, additional time may be needed to commercialize 14 ng/J furnaces. This technology assessment was presented to the Governing Board meeting on January 10, 2014.

Rule 1111 was last amended in September 2014 to delay the compliance date for condensing furnaces and provide an alternative compliance option. The alternative compliance option allows manufacturers subject to Rule 1111 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 SCAQMD, in lieu of meeting the new lower NOx emission limit. The mitigation fee alternative compliance option can be used for up to 36 months past the applicable compliance date. Depending on furnace type, the mitigation fee option will end, and the NOx limit of 14 ng/J will phase in, over the period from April 1, 2018, to October 1, 2021. Industry endorsed the mitigation fee approach. The 2014 amendment was State Implementation Plan (SIP) approved in March 2016 and the mitigation fee will be used to offset foregone emissions reductions.

In April 2016, the Air Conditioning Heating and Refrigeration Institute (AHRI) and OEMs met with SCAQMD staff asserting that safety and reliability concerns had prevented the development of a compliant unit for commercialization. In response, staff conducted a survey with manufacturers from May to July 2016 and have been closely monitoring the technology development status. Furthermore, staff scheduled individual meetings with stakeholders (eight OEMs, two burner manufacturers, and other interested parties) in March, April, and May 2017. Task Force meetings were held on April 27, 2017, and May 25, 2017 in which implementation status and rule recommendations were discussed. As a result of these investigations, it was found that compliant furnaces have not yet been introduced into the market; however, three OEMs have developed products complying with the Rule 1111 NOx 14 ng/J limit with field tests underway. Moreover, one manufacturer has indicated that they will have a compliant product commercially available prior to the 2017 winter season.

EQUIPMENT AND PROCESS

Fan-type gas-fired furnaces heat a building by circulating air from inside the building 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 building air 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.

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 SCAQMD jurisdiction, they must also be certified by the SCAQMD for Rule 1111 NOx emission limit compliance by specific test methods approved by the SCAQMD and U.S. EPA. OEMs may also participate in AHRI certification program for verification test of output heating capacity and annual fuel utilization efficiency. As gas furnaces should be installed according to building Heating, ventilation, and air conditioning (HVAC) requirements, manufacturers have training programs for installers. New technology may trigger additional training; however, one OEM that is proposing early commercialization expressed that there is no new field technical training required for their compliant products. For gas furnaces with new technology, OEMs conduct extensive internal lab testing, as well as field testing, to ensure safety and reliability. Staff understands that OEMs generally apply for NOx certification after internal lab testing, but may do it before or during any phase of field testing.

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 SCAQMD. However, these companies do maintain regional sales offices and distribution centers in the SCAQMD and there are manufacturers of other types of heating furnaces in the SCAQMD.

IMPLEMENTATION STATUS

Compliant furnaces that meet the NOx limit of 14 ng/J have not yet been introduced into the market. However, one manufacturer indicated that they will have a compliant product commercially available prior to the winter season of 2017. Except the mobile home unit, the compliance dates for all furnace types have expired. The compliance date for mobile home furnaces to meet the 14 ng/J NOx limit is October 1, 2018.

All the OEMs are currently using the alternative compliance option and paying the mitigation fee for condensing, non-condensing, and weatherized units, which will end on April 1, 2018, October 1, 2018, and October 1, 2019 respectively. For mobile home units, OEMs have until October 1, 2021 to utilize the alternative compliance option.

TECHNOLOGY DEVELOPMENT STATUS

On September 20, 2016, Rheem's natural gas fired furnace Model *801TA070317UUA was determined to meet the 14 ng/J emission limit and thus was issued a Rule 1111 NOx certification by the SCAQMD. The evaluation was based on a source test conducted on June 1, 2016 (STE Source Test File Reference #R16314) with results indicating NOx emission of 7.0 ng/J. This unit is a non-condensing furnace with a maximum input rate about 70,000 btu/hr.

Since August 2016, Multicalor, a Belgium furnace manufacturer, has commercialized a line of Rule 1111 emission compliant furnace (Udara furnace) in Belgium and Netherlands with six different capacities, ranging from 34,000 btu/hr to 170,000 btu/hr. Udara furnaces are single heater exchanger condensing furnaces, but can be redesigned into non-condensing compliant furnaces. Multicalor is in the process of introducing Udara furnaces to the United Kingdom market.

On August 15, 2017, Goodman's natural gas fired furnace base Models GMES960403BU**, GMES960603BU**, and GMES960805CU** were issued Rule 1111 NOx certifications by the SCAQMD. The emission test conducted on model GMES960805CU (STE Source Test File Reference #17216) indicates NOx emissions of 3.8 ng/J. The certified furnace models cover condensing furnaces with maximum input rates of 40,000, 60,000, and 80,000 btu/hr.

On September 19, 2017, Lennox's four base Models SL280UH060NV36A-*, SL280UH080NV48B-*, SL280UH080NV60C-*, and SL280UH100NV60C-* were issued Rule 1111 NOx certifications by the SCAQMD. The emission test conducted on model SL280UH100NV60C-01 (STE Source Test File Reference #17303) indicates NOx emissions of 7.0 ng/J. The certified furnace models cover non-condensing furnaces with maximum input rates of 60,000, 80,000, and 100,000 btu/hr.

Although certification does not indicate commercial availability of certified products, one of the OEMs has indicated that they may have a compliant product commercially available prior to the 2017 winter season.

PUBLIC PROCESS

The rule development effort for PAR 1111 is part of an ongoing process to evaluate low NOx technologies for combustion equipment. SCAQMD staff has held two Task Force meetings (on April 27, 2017 and May 25, 2017), and two Working Group meetings* (on July 27, 2017, and September 21, 2017). A third Working Group meeting is scheduled for November 2017. The discussions at these meetings included technology development and rule implementation status, recommended changes to the rule, and incentive and public awareness programs. Ongoing individual meetings with stakeholders (eight OEMs, two burner manufacturers, and others) have also been held prior to and during the rulemaking process to maintain confidentiality regarding technology development status.

PAR 1111 was initially discussed at the June 16, 2017, Stationary Source Committee (SSC). PAR 1111 is also scheduled to be discussed at the November 17, 2017, SSC meeting. The Public Hearing for PAR 1111 is scheduled for February 2, 2018.

* The District refers to The District refers to a meeting with stakeholders prior to the rulemaking process as a Task Force meeting, and a meeting with stakeholders during the rulemaking process as a Working Group meeting.

CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1111

PROPOSED AMENDMENTS TO RULE REQUIREMENTS

PROPOSED AMENDMENTS TO RULE REQUIREMENTS AND A NEW REBATE PROGRAM

Staff have some primary considerations with regards to the proposed amendments. First of all, OEMs who have developed compliant standard units need assurance that the Rule 1111 emission limit of 14 ng/J is maintained so that they have the proper incentive to proceed with the capital investment to commercialize their units. It is also important to continue to maintain a competitive market among OEMs and burner manufacturers, and this will help ensure more reasonably priced units for the consumers. Another consideration is to ensure that the compliant products adequately cover the size ranges. In addition, safety and reliability should not be compromised by the current emission limit. Lastly, there should be a clear path for the higher efficiency furnaces, as the application of high efficiency equipment is in line with the 2016 AQMP goal.

Based on these considerations and input from stakeholders, SCAQMD staff recommends to maintain the 14 ng/J NOx limit and has proposed the following amendments for Rule 1111.

Alternative Compliance Option Extension and Mitigation Fee Increase

In lieu of meeting the lower NOx emission limit in Table 1 of subdivision (c), paragraph (c)(5) provides furnace manufacturers subject to Rule 1111 an option to pay a per unit mitigation fee for up to 36 months past the compliance date. Since there are no compliant products available in the market and the compliance dates have expired for all but one furnace type, all OEMs have been utilizing the mitigation fee option for condensing, non-condensing, and weatherized unit. This alternative compliance option will end on April 1, 2018, for condensing units, October 1, 2018, for non-condensing units, October 1, 2019, for weatherized units, and on October 1, 2021, for mobile home units. OEMs have been more focused on non-condensing unit development, followed by condensing units, weatherized units, and mobile home units. To date, two OEMs have compliant standard units and one OEM has compliant high efficiency units with NOx certification meeting 14 ng/J limit. Although some OEMs have developed low NOx products, they are requesting more heating seasons for field testing to ensure safety and liability.

The current mitigation fee is $200 for each condensing furnace and $150 for each non-condensing, weatherized, and mobile home furnace distributed or sold into the SCAQMD. Staff expected this fee not only to mitigate emission delay but also to discourage distribution of non-compliant product. All OEMs have been paying the mitigation fee. Since there are no compliant products available, the mitigation fee has not acted to even out costs nor motivate compliant product commercialization. With technology development maturing, some OEMs now are able to project commercialization timeline for their compliant product. Consequently, the mitigation fee may serve a more effective purpose going forward, especially when the fee is increased for non-compliant products concurrent with a rebate program for compliant products.

On this basis, for the alternative compliance option, staff recommends a 2-year extension (ending on March 31, 2020) for the condensing unit, a 1-year extension (ending on September 30, 2019) for the non-condensing unit, a 2-year extension (ending on September 30, 2021) for the

weatherized unit, and a 1-year extension (ending on September 30, 2022) for the mobile home unit. Staff also recommends increasing the mitigation fee by $200 - $300 for all unit types (fee analysis included in the next section for rebate), with schedule set forth below in Table 2.

Table 2 – Alternative Compliance Plan Mitigation Fee Schedule

Equipment Category	Alternate Compliance Plan Period		Mitigation Fee
	On and After	End Date	
Condensing Furnace	April 1, 2015	Date of Adoption	$200
	Date of Adoption	March 31, 2020	$400-$500 (TBD)
Non-condensing Furnace	October 1, 2015	Date of Adoption	$150
	Date of Adoption	September 30, 2019	$400-$500 (TBD)
Weatherized Furnace	October 1, 2016	Date of Adoption	$150
	Date of Adoption	September 30, 2021	$400-$500 (TBD)
Mobile Home Furnace	October 1, 2018	September 30, 2022	$400-$500 (TBD)

Rebate to End Users

The mitigation fee by itself has not been effective enough to motivate technology development. In addition, based on information provided by some OEMs, the compliant products will be more expensive than non-compliant products, even if the mitigation fee for non-compliant products is increased as shown above. In order to alleviate the resulting cost differential for customers between compliant and non-compliant products, and continue to encourage cleaner technologies, a rebate program has been supported in meetings by many of the OEMs.

The OEMs have suggested that the District provides rebates to end users of up to $400 or $500. With regards to mitigation fee, some OEMs made no recommendation, while one OEM recommended a $150 mitigation fee for all units, which is a decreased fee for the condensing unit and an unchanged fee for other units. There was also a suggestion from an OEM to eliminate the fee for OEMs in active commercialization of compliant products.

To help inform the proposed amount of increase in mitigation fee and the proposed rebate amount, staff developed an economic optimization model characterized by a *partial equilibrium* of the market for furnaces in the South Coast Air Basin.* This type of model can consider a single market with producers, consumers, and policy requirements and estimate the

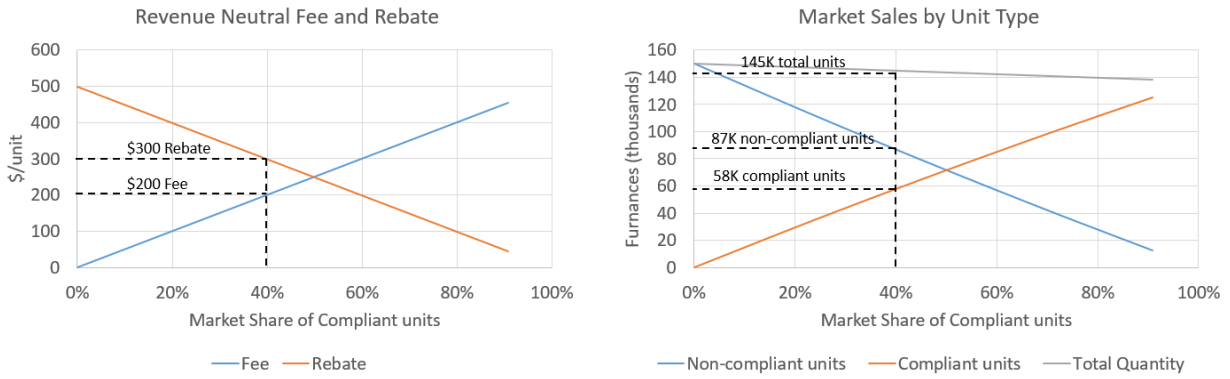
* A technical appendix will be included in the Draft Staff Report.

"equilibrium" price and quantity/sales, where producer supply is equal to consumer demand. In this case, consumers would be any end users of furnaces and producers would be furnace manufacturers. The model was developed based on the current sales and price data in the regional furnace market and the observed consumer behavior for similar products. The annual sale of furnaces in the region was approximately 150,000, with an average price of $1,250 per non-compliant unit† and an expected price of $1,750 per compliant unit. While the rebate would lower the effective price paid by consumers for the compliant units, therefore affecting consumer demand, the mitigation fees would raise furnace manufacturer's production costs of the non-compliant units and affect the number of such units they would produce. The results of the model provided the estimated fee and rebate combinations that would achieve a certain market share of compliant furnaces in the region.

Figure 1a shows how the mitigation fee and rebate work together in the model. To achieve a higher market share of compliant units, an increase in mitigation fee provides a disincentive to the production of non-compliant furnaces, and it is also necessary in providing sufficient revenue to fund the rebate program for all compliant units sold in the region. Correspondingly, the rebate amount per compliant furnace must decrease with a higher market share of these units as there are more units to pay a rebate for. As a consequence, the average price of all furnaces sold would increase with a higher market share of the compliant units that are costlier without rebates. Figure 1b further demonstrates that, as consumers respond to the higher average price, the total sales of all furnaces would decrease slightly as a result

Figure 1 – Partial Equilibrium Model Analysis for Mitigation Fee Increase and Rebate

(a) (b)



The dotted lines in Figures 1a and 1b show a modeling example of fee and rebate combination that is within the range being considered for the proposed rule amendment. This example shows that a $300 rebate per compliant furnace, when combined with an increase in mitigation fee by $200 per non-compliant furnace, would achieve a 40-percent market share of compliant units (Figure 1a). The total sales in the modeled regional furnaces market consist of 58,000 compliant furnaces and 87,000 non-compliant furnaces, therefore amounting to 145,000 all units sold in the market (Figure 1b). This represents a modeled decrease in total sales by 5,000 units, or a 3-percent decrease from the baseline, which is a result of consumer response to the higher average price of $1,450.

† It is reasonable to assume that the existing mitigation fees were factored into the prices of non-compliant furnaces.

It should be noted that, for the sake of parsimonious modeling, nominal administrative costs were assumed so that all revenue collected from mitigation fees would be used to fund the rebate program (meaning the program is "revenue neutral"). In the modeling exercise, a 40-percent market share of compliant furnaces would correspond to a rebate program of approximately $17.4 million in total, with a rebate of $300 per compliant unit and an increase in mitigation fee by $200 per non-complaint unit. However, a larger increase in mitigation fee will be necessary in reality where the actual administrative costs need to be taken into account.

Based on the results of this model, staff initially recommends $300 rebate value to end users purchasing compliant units prior to the applicable rebate end date as shown in Table 3, using the proposed increased portion ($200-$300/unit) of the mitigation fees as funding. However, the way in which the program would be administered is still under consideration as part of the working group discussion, and staff is seeking input from all stakeholders.

Table 3 – Compliant Furnace Rebate Date

Equipment Category	Rebate End Date
Condensing Furnace	October 1, 2020
Non-condensing Furnace	April 1, 2019
Weatherized Furnace	April 1, 2021
Mobile Home Furnace	April 1, 2022

Other Proposed Rule Changes

Rule 1111 does not apply to propane furnaces, which account for about 4% of the market in California. Stakeholders expressed concern that some manufacturers may produce more propane furnaces with natural gas kits (for conversion) to circumvent Rule 1111 applicability. Staff proposes to add applicability to any fan-type central furnace that is in natural gas-firing mode. As a result, a fan-type central furnace configured to be LP-fired, which is distributed/sold into the District with an NG conversion kit, with the intent to convert the furnace to NG, is also subject to this rule if NG conversion is allowed to occur.

CHAPTER 3: IMPACT ASSESSMENT

IMPACT ANALYSIS

Based on the District's 2016 AQMP emission inventory for fuel consumption, the annual average NOx emissions from residential heating using natural gas were 9.51 tons per day in 2012. Staff estimates that there are about four million residential type heating furnaces in the SCAQMD. 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. Based on a furnace life of 20 to 25 years, the current rule is estimated to reduce annual average emissions of NOx by about 0.80 to 1.00 ton per day in 2018 and 2.03 to 2.54 tons per day in 2023 with emissions mitigation included. It is estimated that complete replacement with 14 ng/J furnaces will not occur until 2046. The complete emission reduction benefit of this rule is estimated to be about 6.18 tons per day (annual average) from the 9.51 tons per day baseline emissions.

PAR 1111 would delay the NOx emissions reductions from residential furnaces by 0.07 to 0.09 tons per day in 2018, 0.31 to 0.38 tons per day in 2023, and 0.31 to 0.38 tons per day in 2031. However, the proposed amendment does not cause any overall change for future year emissions. A mitigation fee is collected for the period the alternative compliance option is utilized, and will then be used to fund emission reductions through a variety of projects that has cost effectiveness in the range of $10,000 to $16,000 per ton.

According to the Air Conditioning Heating and Refrigeration Institute (AHRI), the manufacturer's trade organization, there are no facilities manufacturing fan-type gas-fired residential furnaces in the SCAQMD. However, the affected companies do maintain regional sales offices and distribution centers in the SCAQMD.

COST EFFECTIVENESS

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. While a mitigation fee increase is proposed, it is only for manufacturers selling non-compliant units through the alternate compliance option. On the other hand, manufacturers of compliant furnaces will have their customers incentivized by a rebate funded by the increased portion of mitigation fee.

The cost effectiveness analysis was performed in support of the 2009 amendment when the 14 ng/J NOx limit was introduced. Staff used three different approaches to estimate the cost effectiveness for that amendment. The results of that analysis estimated a cost effectiveness of between $8,600 and $19,000 per ton with an increased cost to the consumer of between $108 and $240 per furnace.

Table 2 – Cost Effectiveness Summary

Cost Effectiveness Approach	Cost Effectiveness
Previous Rule Amendments	$10,000 to $16,000 per ton
Water Heater Price Increases	$19,000 per ton
Material Cost & Markups	$8,600 per ton

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

The California Environmental Quality Act (CEQA) requires that all potential adverse environmental impacts of proposed projects be evaluated and that methods to reduce or avoid identified significant adverse environmental impacts of these projects be implemented, if feasible. The purpose of the CEQA process is to inform the SCAQMD Governing Board, public agencies, and interested parties of potential adverse environmental impacts that could result from implementing the proposed project and to identify feasible mitigation measures or alternatives, when an impact is significant.

Public Resources Code Section 21080.5 allows public agencies with regulatory programs to prepare a plan or other written documents in lieu of a negative declaration or environmental impact report once the secretary of the resources agency has certified the regulatory program. The SCAQMD's regulatory program was certified by the secretary of resources agency on March 1, 1989, and has been adopted as, and is implemented by, SCAQMD Rule 110 – Rule Adoption Procedures to Assure Protection and Enhancement of the Environment. Pursuant to Rule 110, the SCAQMD typically prepares an Environmental Assessment (EA) to evaluate the environmental impacts for rule projects proposed for adoption or amendment.

PAR 1111 is considered a "project" as defined by CEQA. PAR 1111 contains amendments that revise existing requirements included in Rule 1111, as amended in September 2014, in order to resolve compliance issues raised by stakeholders. In particular, PAR 1111 proposes to further extend the compliance dates in the alternative compliance option for the following equipment categories: 1) Condensing Furnace from April 1, 2018, to April 1, 2020; 2) Non-Condensing Furnace from October 1, 2018, to October 1, 2019; 3) Weatherized Furnace from October 1, 2019, to October 1, 2021; and 4) Mobile Home Furnace from October 1, 2021, to October 1, 2022. If the alternative compliance option is extended, PAR 1111 is expected to result in foregone NOx emissions reductions of 0.07 to 0.09 tons per day in 2018, 0.31 to 0.38 tons per day in 2023, and 0.31 to 0.38 tons per day in 2031, all of which exceed the SCAQMD's regional air quality CEQA significance threshold. As such, SCAQMD staff has determined that PAR 1111 contains new information of substantial importance which was not known and could not have been known at the time the Final Environmental Assessment (EA) was certified for the September 2014 amendments to Rule 1111 (referred to herein as the September 2014 Final EA). Because new potentially significant effects were not analyzed in the September 2014 Final EA, the SCAQMD, as lead agency for the proposed project will prepare a Subsequent EA with significant impacts.

In addition, PAR 1111 could have statewide, regional, or areawide significance such that a CEQA scoping meeting is required to be held for the proposed project pursuant to Public Resources Code Section 21083.9(a)(2). The CEQA scoping meeting is scheduled to be held in conjunction with the Public Workshop. Upon completion, the Draft Subsequent EA will be released for a 45-day public review and comment period in 2017. Comments received at the Public Workshop/CEQA Scoping Meeting will be considered when preparing the Draft Subsequent EA and the responses to comments will be included in the Draft Subsequent EA.

Prior to making a decision on the adoption of PAR 1111, the SCAQMD Governing Board must review and certify the Final Subsequent EA, including responses to comments, as providing adequate information on the potential adverse environmental impacts that may occur as a result of adopting PAR 1111.

SOCIOECONOMIC ASSESSMENT

A socioeconomic analysis will be conducted and released for public review and comment at least 30 days prior to the SCAQMD Governing Board Hearing on PAR 1111, which is anticipated to be heard on February 2, 2018.

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 SCAQMD 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 Sections 40727, 40727.2 require a written analysis comparing the proposed amended rule with existing regulations.

The following provides the draft findings.

Necessity: A need exists to amend Rule 1111 to provide residential furnace manufacturers additional time to develop the technology to meet the NOx emission limit.

Authority: The SCAQMD obtains its authority to adopt, amend, or repeal rules and regulations from California Health and Safety Code Sections 39002, 40000, 40001, 40440, 40440.1, 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 SCAQMD.

Reference: In amending this rule, the following statues which the SCAQMD hereby implements, interprets or makes specific are referenced: 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 only option for reducing NOx emission from equipment affected by PAR 1111 is replacement of current burners in new manufactured equipment with low NOx burners. Some furnaces do use electricity to provide heat and other kinds of units use heated water from a small boiler or water heater. However, these equipment are either not regulated by the SCAQMD (electric furnaces or heat pumps) or are regulated by other SCAQMD rules (Rules 1121 or 1146.2). Because this rule amendment provides furnace manufacturers with an alternate compliance option and there is only one control option, a typical incremental cost-effectiveness analysis cannot be prepared.

However, for the 2009 rule amendment, staff did evaluate the incremental cost effectiveness as compared to a less stringent option. The same technology used to achieve a NOx limit of 14 ng/J can also be used to achieve less stringent limits of 17 ng/J (25 ppm) or the upper bound limit of 20 ng/J (30 ppm) included in Control Measure CMB-03. For these less stringent limits the cost of the technology is the same but because emission reductions are less, the cost effectiveness deteriorates rapidly. In other words, the less stringent option is less cost-effective.

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the SCAQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal or state requirements, existing or proposed SCAQMD rules, and air pollution control requirements and guidelines that are applicable to industrial, institutional, and commercial combustion equipment.

The SCAQMD is not aware of any state or federal requirements regulating air pollution that are applicable to new or in-use PAR 1111 units. Rule 1111 is also the only SCAQMD rule regulating this type of equipment. Because there are no state or federal requirements for PAR 1111 units, the proposed amendments are not in conflict with and do not duplicate any SCAQMD, state, or federal requirement.

CONCLUSION AND RECOMMENDATIONS

Although compliant condensing and non-condensing furnace products have been available for the last seven years, none of these products have achieved commercialized status. Recent product certifications have shown that commercialized compliant products are forthcoming within the next few months. However, based on stakeholder input, meeting customer demands and developing broader product availability would require additional time beyond the current mitigation fee period. In addition, the application of economic modeling shows that compliant product availability will be enhanced with an increase in the mitigation fee in conjunction with

the application of a rebate. All of these recommendations introduced into Rule 1111 will lead to the much needed SIP approved NOx emissions reductions.

REFERENCES

REFERENCES

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

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