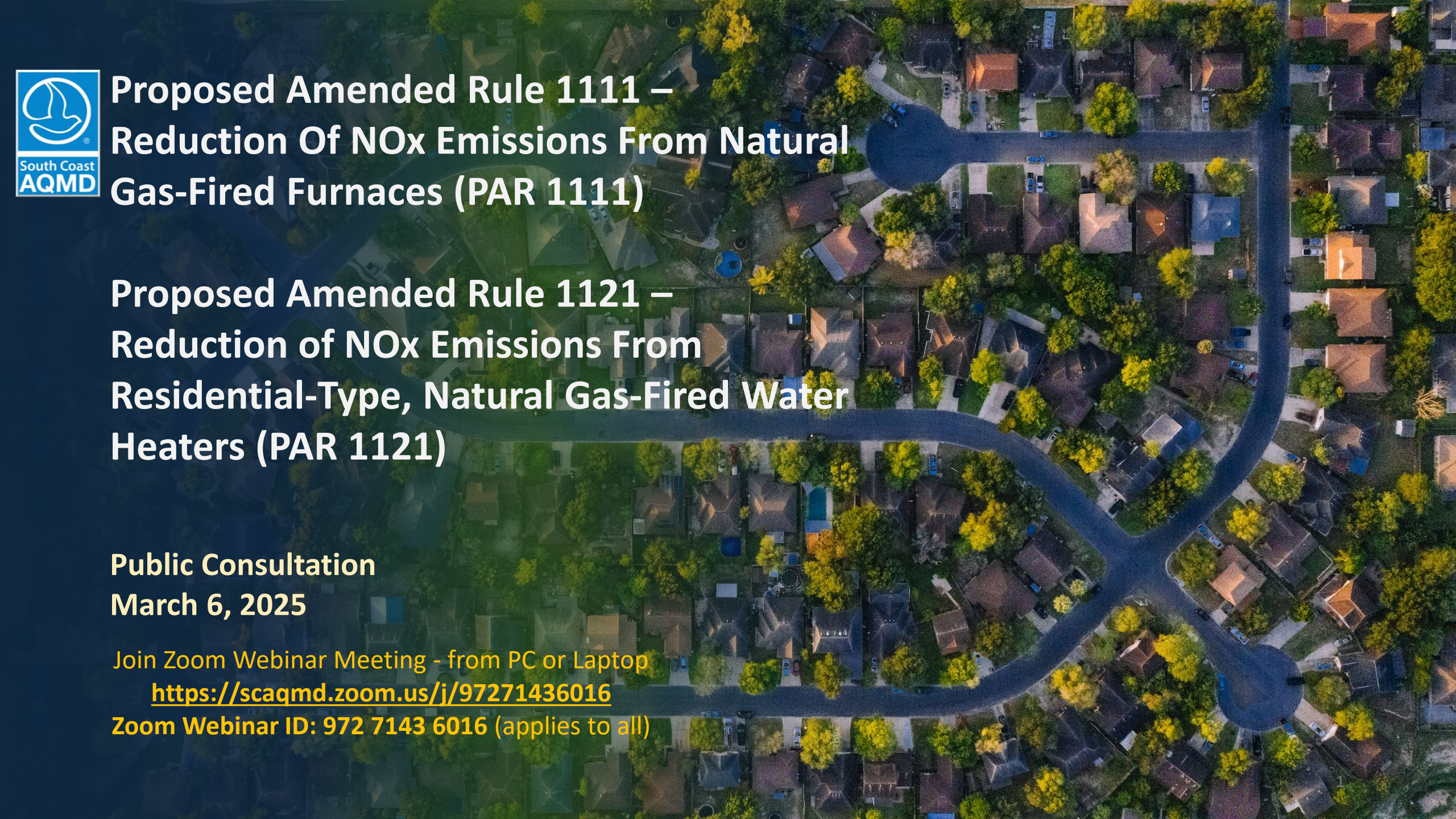


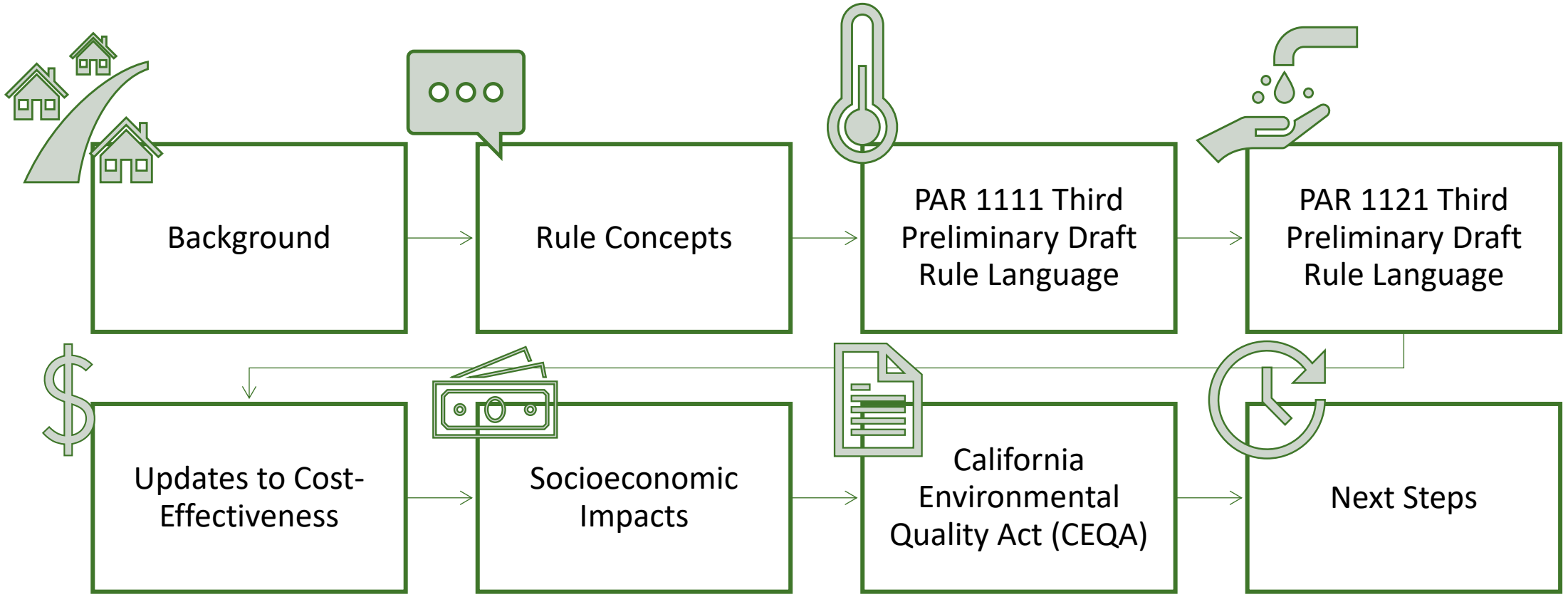
Proposed Amended Rule 1111 – Reduction Of NOx Emissions From Natural Gas-Fired Furnaces (PAR 1111)

Proposed Amended Rule 1121 – Reduction of NOx Emissions From Residential-Type, Natural Gas-Fired Water Heaters (PAR 1121)

Public Consultation
March 6, 2025

Join Zoom Webinar Meeting - from PC or Laptop
https://scaqmd.zoom.us/j/97271436016
Zoom Webinar ID: 972 7143 6016 (applies to all)

Agenda


Background
Rule Concepts
PAR 1111 Third Preliminary Draft Rule Language
PAR 1121 Third Preliminary Draft Rule Language
Updates to Cost-Effectiveness
Socioeconomic Impacts
California Environmental Quality Act (CEQA)
Next Steps

Background

Background

- Our region fails to meet multiple national air quality standards
  - Oxides of Nitrogen (NOx) is the key pollutant that must be controlled to address air quality
- Under Federal law, areas that fail to meet air quality standards by required deadlines face potential sanctions
  - Most severe is loss of federal highway funds
- We estimate we need to cut NOx over 67% to meet air quality standards by the 2037 deadline
- Requires that we adopt zero-emission technologies to replace combustion *wherever feasible*

2022 AQMP Control Measures

2022 Air Quality Management Plan adopted December 2, 2022

- Established path for meeting federal ozone standards
- Seeking to require zero-emission technologies across all sections, wherever feasible, to meet stringent standards

Control Measures R-CMB-01 and R-CMB-02 aim to reduce NOx emissions for residential-type space and water heating appliances, with a focus on zero-emission standards

- PAR 1111 will implement Control Measure R-CMB-02
- PAR 1121 will implement Control Measure R-CMB-01

Rule 1111 Regulatory History

Rule 1111 was adopted on December 1, 1978

- Applies to natural gas-fired furnaces less than 175,000 Btu/hr
- Established NOx emission limit of 40 ng/J for natural gas-fired furnaces

Amended on November 6, 2009

- Lowered NOx emission limit from 40 ng/J to 14 ng/J with effective dates from October 2014 to October 2016
- Set emission limit for mobile homes at 40 ng/J by October 2012 and 14 ng/J by October 2018

Amended on September 5, 2014

- Provided alternative compliance option through mitigation fees
- Amended six times from 2018 – 2023 to extend the mitigation fee end dates, increase mitigation fees, and allow limited exemptions for furnaces at high altitude

Rule 1121 Regulatory History

Rule 1121 was adopted on December 1, 1978

- Applies to natural gas-fired water heaters less than 75,000 Btu/hr
- Set emissions limit to 40 ng/J for gas-fired residential water heaters and 50 ng/J for gas-fired mobile home water heaters effective in 1982

Amended December 10, 1999

- Reduce emissions limit in two steps from 40 ng/J to 20 ng/J to 10 ng/J (effective January 2005)
  - Mitigation fee as alternative to meeting interim limit
- Mobile home emissions limit reduced to 40 ng/J (effective January 2000)

Most recently amended on September 3, 2004

- Extended the compliance dates and mitigation fee period

PAR 1111 and PAR 1121 Rulemaking Process

- PAR 1111 and PAR 1121 were developed through a public process that started in the fourth quarter of 2023
  - Includes a series of working group meetings, individual stakeholder meetings, and site visits to affected facilities
- Conducted Public Workshop on October 3, 2024
- Updated Stationary Source Committee on October 18, 2024, December 20, 2024, and February 21, 2025

Working Group Meetings:

October 5, 2023	November 28, 2023	January 31, 2024	April 4, 2024	June 20, 2024	August 15, 2024	December 4, 2024	February 13, 2025

Proposed Rule Amendment

- Preliminary draft PAR 1111 and PAR 1121 with original rule proposal shared at the Public Workshop
- Over 200 written comments and many verbal comments received for the original rule proposal
  - About 70 percent comments opposing the original rule proposal
- Staff revised the original rule proposal and proposed a new rule concept
  - Presented at Working Group Meeting #8 on February 13, 2025

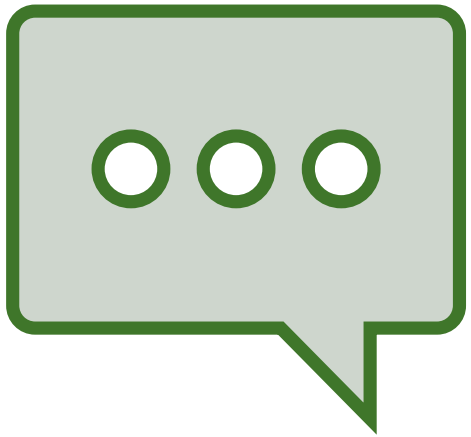
Original Rule Concept

- Zero-emission standards for new and existing buildings based on future effective dates
  - Included several alternative compliance options for emergency replacement, construction, etc.

New Rule Concept

- Replace other alterative options with manufacturer sales target for zero-emission and NOx-emitting appliances
- Not expanding space heating rule applicability to commercial size furnaces
  - Propose including those units in future rule

Original Rule Concepts



Original Rule Concept

Applicability

- Expand PAR 1111 applicability from 175,000 Btu/hr to 2 million Btu/hr
- No change to PAR 1121 applicability

New Residential Structures

- Require zero-emission appliances California building code already requires zero-ready starting 2026

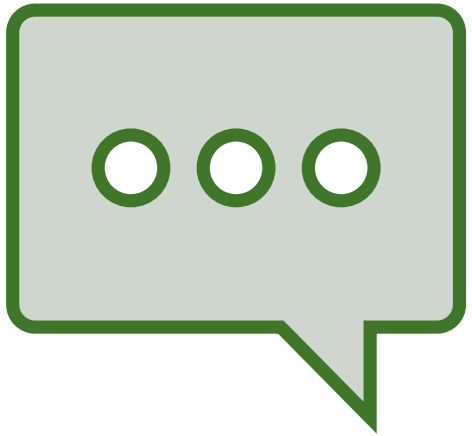
Existing Residential Structures

- Require replaced appliances to meet zero-NOx-emissions standard *beginning in 2029* when equipment needs to be replaced
- Staff proposed alternative compliance options for certain situations
  - Emergency replacements
  - Stranded asset from newer AC unit
  - Multifamily buildings
  - Installations in high altitude regions

Key Comments on Original Rule Concept

- Over 200 comment letters received from October 2024 to February 2025 for the original rule concept
  - ~70% letter opposed the original rule concept
- Key comments include:
  - Affordability, especially for low-income
  - Lack of consumer choice if rule mandates a complete conversion to zero-emission technologies
  - Concerns about zero-emission technology readiness
  - Concerns about electricity demand and grid sustainability
  - Proposed rules will impact small units in schools and businesses

New Rule Concepts



New Rule Concept – Revert PAR 1111 Applicability

Both PAR 1111 and PAR 1121 apply to appliances based on size (e.g., rated heat input capacity)

Initially PAR 1111 (space heating) proposed to expand applicability from 175,000 Btu/hr to 2 million Btu/hr

Staff recommending to revise proposal to keep current PAR 1111 applicability (up to 175,000 Btu/hr)

Future rulemaking will address commercial furnaces with heat input between 175,000 Btu/hr and 2 million Btu/hr

Revised Proposal for PARs 1111 and 1121

Zero-Emission and NOx Emission Standard Manufacturer Approach

- Removed mandate to meet zero-emission standard
- Set compliance goals that allow manufacturers to sell NOx-emitting units and zero-emission units (new and existing buildings)
- Compliance goals change over time, creating a glide path for zero-emission units
- Allows manufacturers to sell units that meet current NOx limit
- Mitigation fee applicable to NOx-emitting units

Manufacturer Alternative Compliance Targets and Effective Dates

Target Dates	2027-2028	2029-2032	2033-2035	2036 and after
NOx Emitting Units (e.g. gas)	70%	50%	25%	10%
Zero-NOx Emission Units	30%	50%	75%	90%

Manufacturer Alternative Compliance Mitigation Fee

- Zero-emission manufacturer option would be combined with mitigation fees
  - Fee will partially mitigate emissions forgone from the alternative compliance option
  - Provide a revenue stream for Go Zero incentive program
- Manufacturers previously paid $150 - $450 mitigation fee per 40 ng/J gas furnace
  - Proposing nominal fee to incentivize transition to zero-emission technologies without putting undue financial burden on homeowners

Mitigation fee for all gas units sold after 2027

- $100/NOx emitting furnace
- $50/NOx emitting water heater
- $500 mitigation fee for each NOx emitting unit sold over target*
- Discounted fee if zero-emission goal exceeded

* Considering increasing fee over time

Zero-NOx Standard for New Buildings

- California Title 24 Building Code includes zero-NOx emission appliance ready requirements *starting January 1, 2026*
  - Requirement is not prescriptive, some NOx-emitting units can be installed
- Proposed space and water heating rules include flexibility to sell both NOx-emitting and zero-NOx emission appliances
  - Zero-NOx Emission Manufacturer Alternative Compliance Option *starting January 1, 2027*
- 2026 calendar year will have limited flexibility in current form
- Staff proposing to delay the New Building zero-NOx emission standard until January 1, 2027 to align with Zero-NOx Emission Manufacturer Alternative Compliance Option

How the New Rule Concept Addresses Comments

Affordability, especially for low-income residents

- Individual decision as gas units will still be available

Lack of consumer choice

- Homeowners will have a choice to purchase gas unit or zero-emission unit

Concerns about zero-emission technology readiness

- Slower transition to zero-emission allows more technology development

Concerns about electricity demand and grid sustainability

- Slower transition will slow demand increase and time to meet future demand

Concerns on implementation in schools and small business

- With revised applicability, units are small size and mainly for residential installation

Other Benefits to New Proposed Rule Concept Address Concerns

Simplifies the proposed rules, removes other alternative compliance options

- Original concept put more responsibility on the installer
  - Request delays for construction
  - Notify for emergency replacements

Mitigation fee will help fund Go Zero

- Provides funding source
- Longer life of the program
- Focus on low-income residents

Proposed Changes to Mobile Home Appliance Requirements

Changes Proposed for Mobile Home Appliances

Prior rule proposal included future effective date for zero-NOx emission limit for existing mobile home appliances

- Mobile home appliances have unique challenges such as:
  - Special design to accommodate smaller closet space for installations; and
  - Additional regulation by Department of Housing and Urban Development
- Compared to single-family homes, mobile homes are more frequently replaced by new mobile homes
- Proposing to remove future effective zero-NOx emission limit for existing mobile homes
  - Appliances to transition to zero-NOx emissions once mobile homes are replaced, not when appliance is replaced
    - Exemption for mobile homes located at master metered mobile home parks due to electricity limitations at the parks

Mobile Home Furnaces NOx Limit Background

NOx limit for Mobile Home Furnaces lowered from 40 to 14 ng/J at the 2009 amendment

- Rule 1111 includes an alternative compliance option in the 2014 amendment that allowed for mitigation fees in lieu of complying with NOx limit

Mobile home furnaces currently designed to meet 40 ng/J standard

- All manufacturers opting to comply through the alternative compliance mitigation fee option
  - Current sunset date is September 30, 2025
- Manufacturers have zero-NOx emission units commercially available and installed in new mobile homes

Staff Proposal for Mobile Home Furnaces

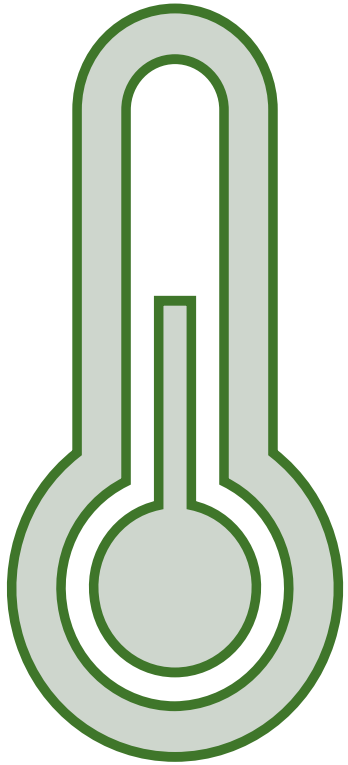
Require zero-NOx emission appliances for new mobile homes

- Mobile home furnaces for installation in existing buildings continue to comply with Table 1 NOx emission limit or comply with Mitigation Fee Alternative Compliance Option

Align mobile home mitigation fee with proposed zero-NOx emission manufacturer fee

- Current mitigation fee is $150 per unit
- Proposing to change to $100 on and after October 1, 2025

PAR 1111
Third Preliminary Draft Rule



PAR 1111 Applicability

- Reverted to current rule applicability
  - Rated heat input capacity less than 175,000 Btu/hr, or for combination heating and cooling units, a cooling rate of less than 65,000 Btu per hour
- Furnaces with heat input rated between 175,000 Btu/hr and 2 million Btu/hr will be addressed in future rulemaking

(b) Applicability

The provisions of this rule are applicable to manufacturers, distributors, retailers, Resellers, and Installers of Furnaces used for interior space heating with a Rated Heat Input Capacity less than ~~or equal to 2,000,000~~ 175,000 British thermal units (Btu) per hour, or, for combination heating and cooling units, a cooling rate of less than 65,000 Btu per hour.

Definitions

- Removed the definition for Commercial Furnace
- Updated Floor Furnace and Wall Furnace definitions on the rated heated input capacity to less than 175,000 Btu per hour
- Added Zero-NOx Emission Unit definition
  - Used in the new manufacturer alternative compliance option

WALL FURNACE means a wall-mounted, self-contained space heater using natural gas without ducts that exceed 10 inches that has a Rated Heat Input Capacity ~~at or~~ less than ~~2,000,000~~ 175,000 Btu per hour.

ZERO-NOx EMISSION UNIT means an appliance that provides space heating with heating capacity equivalent to Furnaces subjected to this rule and emits no more than zero nanograms of NOx per joule of Useful Heat Delivered to the Heated Space (ng/J).

Table 1 Emission Requirements

- Table 1 limits are applicable prior to Table 2 zero-NOx emission limit compliance date
  - Not proposing zero-NOx emission limit for mobile home furnaces in existing buildings, which will remain subject to Table 1

(41) ~~On or after October 1, 2012~~No person shall ~~not~~ manufacture, supply, sell, resell, offer for sale, import, or ~~install~~Install, for use within the South Coast AQMD, ~~fan-type central furnaces subject to this rule~~ any of the following Furnaces, unless such ~~furnace~~Furnace is certified pursuant to subdivision (e) not to exceed ~~complies with~~ the applicable Table 1 emission limit ~~and compliance date set forth in Table 1 and is certified in accordance with subdivision (d) of this rule.~~, expressed by nanograms of NOx per joule of Useful Heat Delivered to the Heated Space (ng/J):

(A) Any Residential Fan-Type Central Furnace prior to the applicable Table 2 compliance date, except for Mobile Home Furnaces for Existing Buildings; and

(B) Any Mobile Home Furnace for Existing Buildings.

Table 1 – Residential Fan-Type Central Furnace
NOx Limits and Compliance Schedule

Equipment Category	NOx Emission Limit (ng/J)
Condensing Furnace	14
Non-Condensing Furnace	14
Weatherized Furnace	14
Mobile Home Furnace	14

Zero-NOx Emission Requirements Table 2

- Removed commercial furnace requirement
- Removed Mobile Home Furnace Zero-NOx emission requirement for existing buildings
- Changed new buildings compliance dates
  - From January 1, 2026, to January 1, 2027
  - Aligns with the zero-NOx emission compliance option

Table 2 – Zero-Emission Limits and Compliance Schedule

Equipment Category	NOx Emission Limit (ng/J)	Building Type	Compliance Date
Residential Fan-Type Central Furnace[1]	0	New	January 1, ~~2026~~2027
		Existing	January 1, 2029
~~Commercial Furnace~~	~~0~~	~~New~~	~~January 1, 2026~~
		~~Existing~~	~~January 1, 2029~~
Mobile Home Furnace	0	New	January 1, ~~2026~~2027
		~~Existing~~	~~January 1, 2030~~
Wall Furnace and Floor Furnace	0	New	January 1, ~~2026~~2027
		Existing	January 1, 2029

[1] Includes Condensing, Non-Condensing, and Weatherized Furnaces.

Mobile Home Furnace Alternative Compliance for 14 ng/J NOx Limit

- Mobile home mitigation fee alternative compliance option for $150 per unit
  - Ends on September 30, 2025, in current rule
- Revised the fee to align with mitigation fee rate for other furnaces under the new manufacturer alternative compliance target
  - Effective on October 1, 2025

(1) Mitigation Fee Alternative Compliance Option for Mobile Home Furnaces

A manufacturer of Mobile Home Furnaces may elect to pay a per unit mitigation fee for selling or enabling distributors, retailers, Resellers, or Installers to sell Mobile Home Furnaces certified to emit 40 ng/J or less of NOx in lieu of complying with the 14 ng/J NOx emission limit in Table 1, provided the manufacturer complies with the following requirements:

(A) Pays a per unit mitigation fee of:

(i) Until September 30, 2025, $150 for each Mobile Home Furnace distributed or sold into or within the South Coast AQMD; and

(ii) On and after October 1, 2025, $100 for each Mobile Home Furnace distributed or sold into or within the South Coast AQMD;

(B) Submits an alternative compliance plan, no later than August 1st, for each 12-month time period that begins on October 1 during which the manufacturer elects to pay the mitigation fee in lieu of meeting the NOx emission limit that includes:

(i) A letter with the name of the manufacturer requesting the Mobile Home mitigation fee compliance option signed by a Responsible Official and the 12-month alternate compliance period that the mitigation fees cover;

ZEM Alternative Compliance Option

- Establishes zero-NOx emission manufacturer alternative compliance option
  - Manufacturer submits an alternative compliance plan by November 1, 2026, to enroll in this option
  - Comply with the specified sales targets
  - Pay mitigation fee for each NOx-emitting unit
  - Submit report and payment 90 days after each compliance year

(2) Zero-Emission Manufacturer (ZEM) Alternative Compliance Option

Any manufacturer of Furnaces subject to this rule may elect to comply with the ZEM Alternative Compliance Option in lieu of complying with paragraph (d)(2) provided:

(A) The manufacturer submits an alternative compliance plan, no later than November 1, 2026, that includes:

(i) A letter with the name of the manufacturer requesting the ZEM alternative compliance option signed by a Responsible Official;

(ii) A complete South Coast AQMD Form 400A with company name, indicating the application is for a compliance plan (section 7 of form), indicating the request is for the "Rule 1111 ZEM alternative compliance option" (section 9 of form), and signature of the Responsible Official; and

(iii) Payment for the alternate compliance plan filing fee pursuant to Rule 306– Plan Fees.

(B) The manufacturer sells, or enables distributors, retailers, Resellers, or Installers to sell, Zero-NOx Emission Units into or within the South Coast AQMD at a percentage greater than or equal to the Zero-NOx Emission Unit Sales Target specified in Table 3;

(C) The Furnaces sold under this alternative compliance option are certified to emit 14 ng/J or less of NOx;

(D) The manufacturer pays $100 mitigation fee for each Furnace sold; and

(E) The manufacturer submits a report and mitigation fee payment pursuant to paragraph (g)(2) no later than 90 days after the end of each calendar year utilizing this alternative compliance option.

ZEM Alternative Compliance Option - Cont.

- Table 3 for ZEM alternative compliance option targets and mitigation fee schedule
  - $100 for each furnace
  - Higher fee for each furnace over furnace sales target

Table 3 – ZEM Alternative Compliance Option Targets and Mitigation Fee Schedule

Compliance phase	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**
Calendar Years	**2027 - 2028**	**2029 - 2032**	**2033-2035**	**2036 and after**
Zero-NOx Emission Unit Sales Target[1]	30 percent	50 percent	75 percent	90 percent
Furnace Sales Target	70 percent	50 percent	25 percent	10 percent
Mitigation Fee for Furnaces Sold Over Target ($ per Furnace)	$500	$600	$700	$800

[1] Sales target represents the percent of Zero-NOx Emission Units a manufacturer sells in a calendar year into or within the South Coast AQMD compared to the total number of furnaces and Zero-NOx Emission Units sales in a calendar year into or within the South Coast AQMD.

ZEM Alternative Compliance Option - Cont.

- Establishes a mechanism to incentivize manufacturers to sell more zero-NOx emission units
  - Higher fee for each furnace over furnace sales target
  - Discounted mitigation fee determined by the equation for zero-NOx emission units sold greater than their target

(3) ZEM Alternative Compliance Option Sales Target Deviation

Any manufacturer of Furnaces subject to this rule that elects to comply with the ZEM Alternative Compliance Option pursuant to paragraph (f)(2) that deviates from the applicable Sales Targets in Table 3 shall:

(A) If the annual percentage of Furnaces sold is greater than the applicable calendar year Furnace Sales Target specified in Table 3, pay the mitigation fee specified in Table 3 for each Furnace sold above the sales target; or

(B) If the annual percentage of Zero-NOx Emission Units sold is greater than the applicable calendar year Zero-NOx Emission Unit Sales Target specified in Table 3, apply a discount to their annual mitigation fee required pursuant to subparagraph (f)(2)(D) according to the following equation:

$$Discounted\ Mitigation\ Fee = F - F \times \frac{(P-T)}{(100-T)}$$

Where:

F = Annual Mitigation Fee

P = Reported Percent Zero-NOx Emission Units

T = Sales Target

Considerations for ZEM Sales Targets

Determining sales targets will be complicated for some zero-emission systems

- Minisplit heat pumps and electric resistance wall or floor furnaces are non-ducted units, non-centralized systems
- Larger homes may have multiple units installed to replace one NOx-emitting furnace

Staff is considering mechanisms to address this potential discrepancy

Informative Materials for Mobile Home Furnaces

- Existing labeling requirements for mobile home furnaces under mitigation fee alternative compliance option
  - Relied on informative materials to display the labeling language
  - Adjusted the language to reflect the fee revision

(g) Labeling, Reporting, and Recordkeeping

(1) Labeling Requirements for Mobile Home Furnace

(A) For any Mobile Home Furnace that is for distribution or sale inside of the South Coast AQMD that is using an alternative compliance plan in lieu of meeting the 14 ng/J certification limit, a manufacturer shall distribute or publish Informative Materials that clearly display the following language: "If installed in South Coast AQMD only: This furnace does not meet the South Coast AQMD Rule 1111 NOx emission limit (14 ng/J), and thus is subject to a mitigation fee of $150 before September 30, 2025, and $100 thereafter."

(B) For the purposes of subparagraph (g)(1)(A), "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.

(C) A manufacturer may use alternative language in lieu of subparagraph (g)(1)(A), provided the alternative language is:

(i) Similar to the language in subparagraph (g)(1)(A); and

(ii) Submitted to the Executive Officer no later than [90 days after Date of Rule Adoption].

(D) The manufacturer shall use the language in subparagraph (g)(1)(A) if the alternative language is not approved.

Reporting and Recordkeeping for ZEM Alternative Compliance Option

- Establishes reporting and recordkeeping requirements for manufacturers utilizing ZEM alternative compliance option
- Specifies recordkeeping requirements
  - Information shall be maintained for at least five years and made available upon request

(2) Reporting, and Recordkeeping for ZEM Alternative Compliance Option

The manufacturer of a Furnace supplied or offered for use within the South Coast AQMD in accordance with the ZEM alternative compliance option in paragraph (g)(2) shall:

(A) Submit to the Executive Officer a report, signed by the Responsible Official for the manufacturer pursuant to the schedule in paragraph (g)(2)(E), that includes:

(i) Each model number and the quantity of Zero-NOx Emission Units distributed or sold into or within South Coast AQMD for the applicable calendar year; and

(ii) Each model number and the quantity of Furnaces distributed or sold into or within South Coast AQMD for the applicable calendar year;

(B) Maintain records for at least five years, including, but not limited to, the following information and make them available to the Executive Officer upon request:

(i) Model number and serial number of each Zero-NOx Emission Unit;

(ii) Model number and serial number of each Furnace;

(iii) Date and number of Furnaces and Zero-Emission Units sold to a distributor; and

(iv) The distributor's name, address, and phone number.

Exemption

- Specifies the exemption from zero-NOx emission limits under paragraph (d)(2), for:
  - Mobile home furnaces for installation in existing buildings;
  - Mobile home furnace installations in new and existing buildings in master metered mobile home parks
  - New buildings with building permit issued prior to the date of rule adoption

(2) Paragraph (d)(2) shall not apply to the following:

(A) Mobile Home Furnaces for installation in Existing Buildings;

(B) Mobile Home Furnaces for installation or use in New Buildings or Existing Buildings located in master-metered Mobile Home parks, which are Mobile Home parks that take electricity through a master meter and then distribute it to park residents through their own system; and

(C) Furnaces that will be installed or used in New Buildings with building permit issued prior to [Date of Adoption] by the appropriate enforcement agency.

PAR 1121
Third Preliminary Draft Rule

Definitions

- Added two definitions that will be used in the new manufacturer alternative compliance option
  - Responsible Official
  - Zero-NOx Emission Unit

(16) 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.

(19) ZERO-NOx EMISSION UNITS means an appliance that provides water heating with heating capacity equivalent to Water Heaters subjected to this rule and emits no more than zero nanograms of NOx per joule of Heat Output (ng/J).

Table 1 Emission Requirements

- Table 1 limits are applicable prior to Table 2 zero-NOx emission limit compliance date
  - Not proposing zero-NOx emission limit for mobile home water heaters in existing buildings, which will remain subject to Table 1

(1) No person shall manufacture, supply, sell, resell, offer for sale, import, or Install, for use in the South Coast AQMD, any following Water Heater, unless the Water Heater is certified pursuant to subdivision (e) and does not exceed the applicable Table 1 NOx limit, expressed by nanograms of NOx per joule of Heat Output (ng/J) or ppmv:

(A) Any Water Heater prior to the applicable Table 2 compliance date, except for Mobile Home Water Heaters for Existing Buildings; and

(B) Any Mobile Home Water Heater for Existing Buildings.

Table 1 – NOx Emission Limits

Equipment	NOx Emission Limits	
	ng/J	ppmv
Water Heater[1]	10	15
Mobile Home Water Heater	40	55

[1] Excluding Mobile Home Water Heater

Zero-NOx Emission Requirements Table 2

- Removed Mobile Home Water Heater Zero-NOx emission requirement for existing buildings
  - Continue to comply with 40 ng/J, or 55 ppmv NOx emission limit
- Changed Zero-NOx emission requirement for new buildings
  - From January 1, 2026, to January 1, 2027

Table 2 – Zero-Emission Limits and Compliance Schedule

Equipment Category	NOx limit (ng/J)	Building Type	Compliance Date
Water Heater[1]	0~~.0~~	New	January 1, ~~2026~~2027
	0~~.0~~	Existing	January 1, ~~2027~~2029
Mobile Home Water Heater	0~~.0~~	New	January 1, ~~2026~~2027
	0~~.0~~	~~Existing~~	~~January 1, 2030~~

1 Excluding Mobile Home Water Heater

ZEM Alternative Compliance Option

- Establishes zero-emission manufacturer alternative compliance option
  - Manufacturers submit an alternative compliance plan by November 1, 2026, to enroll in this option
  - Comply with the specified sales targets
  - Pay mitigation fee for each NOx-emitting unit
  - Submit report and payment 90 days after each compliance year

(f) Alternative Compliance Options

(1) Zero-Emission Manufacturer (ZEM) Alternative Compliance Option

Any manufacturer of Water Heaters subject to this rule may elect to comply with the ZEM Alternative Compliance Option in lieu of complying with paragraph (d)(2) provided:

(A) The manufacturer submits an alternative compliance plan, no later than November 1, 2026, that includes:

(i) A letter with the name of the manufacturer requesting the ZEM alternative compliance option signed by a Responsible Official;

(ii) A complete South Coast AQMD Form 400A with company name, indicating the application is for a compliance plan (section 7 of form), indicating the request is for the "Rule 1121 ZEM alternative compliance option" (section 9 of form), and signature of the Responsible Official; and

(iii) Payment for the alternate compliance plan filing fee pursuant to Rule 306– Plan Fees.

(B) The manufacturer sells, or enables distributors, retailers, Resellers, or Installers to sell, Zero-NOx Emission Units into or within the South Coast AQMD at a percentage greater than or equal to the sales target specified in Table 3;

(C) The Water Heaters sold under this alternative compliance option are certified to emit 10 ng/J (or 15 ppmv) or less of NOx;

(D) The manufacturer pays $50 mitigation fee for each Water Heater sold; and

(E) The manufacturer submits a report and mitigation fee payment pursuant to paragraph (f)(1) no later than 90 days after the end of each calendar year utilizing this alternative compliance option.

ZEM Alternative Compliance Option - Cont.

- Table 3 for ZEM alternative compliance option sales targets and mitigation fee schedule
  - $50 for each water heater
  - Higher fee for each water heater over water heater sales target

Table 3 – ZEM Alternative Compliance Option Targets and Mitigation Fee Schedule

Compliance phase	Phase 1	Phase 2	Phase 3	Phase 4
Calendar Years	2027 - 2028	2029 - 2032	2033-2035	2036 and after
Zero-NOx Emission Unit Sales Target[1]	30 percent	50 percent	75 percent	90 percent
Water Heater Sales Target	70 percent	50 percent	25 percent	10 percent
Mitigation Fee for Water Heaters Sold Over Target ($ per Water Heater)	$500	$600	$700	$800

[1] Sales target represents the percent of Zero-NOx Emission Units a manufacturer sells in a calendar year into or within the South Coast AQMD compared to the total number of Water Heaters and Zero-NOx Emission Units sales in a calendar year into or within the South Coast AQMD.

ZEM Alternative Compliance Option - Cont.

- Establishes a mechanism to incentivize manufacturers to sell more zero-NOx emission units
  - Higher fee for each water heater over water heater sales target
  - Discounted mitigation fee determined by the equation for zero-NOx emission units sold greater than their target

(2) ZEM Alternative Compliance Option Sales Target Deviation

Any manufacturer of Water Heaters subject to this rule that elects to comply with the ZEM Alternative Compliance Option pursuant to paragraph (f)(1) that deviates from the applicable Sales Target in Table 3 shall:

(A) If the annual percentage of Water Heaters sold is greater than the applicable calendar year Water Heater Sales Target specified in Table 3, pay the mitigation fee specified in Table 3 for each Water Heater sold above the sales target; or

(B) If the annual percentage of Zero-NOx Emission Units sold is greater than the applicable calendar year Zero-NOx Emission Unit Sales Target specified in Table 3, apply a discount to their annual mitigation fee required pursuant to subparagraph (f)(1)(D) according to the following equation:

$$Discounted\ Mitigation\ Fee = F - F \times \frac{(P - T)}{(100 - T)}$$

Where:

F = Annual Mitigation Fee

P = Reported Percent Zero-NOx Emission Units

T = Sales Target

Informative Materials for Mobile Home Water Heaters

- Mirror Rule 1111 “informative materials” requirements for NOx-emitting mobile home water heaters
  - On and after January 1, 2027, zero-emission limit will apply to new mobile homes but not existing mobile homes

(1) Labeling Requirements for Mobile Home Water Heaters

(A) For any Mobile Home Water Heater certified to meet the applicable Table 1 NOx emission limit that is for distribution or sale inside of the South Coast AQMD, a manufacturer shall distribute or publish Informative Materials that clearly display the following language: “If installed in South Coast AQMD only: This water heater is only allowed to be installed and used for mobile homes before January 1, 2027; and is only allowed to be installed and used for existing mobile homes on and after January 1, 2027.”

(B) For the purposes of subparagraph (g)(1)(A), “Informative Materials” shall mean the following:

(i) The consumer brochure for the Water Heater;

(ii) The technical specification sheet for the Water Heater; and

(iii) The manufacturer’s website that promotes, discusses, or lists the Water Heater.

(C) A manufacturer may use alternative language in lieu of subparagraph (g)(1)(A), provided the alternative language is:

(i) Similar to the language in subparagraph (g)(1)(A); and

(ii) Submitted to the Executive Officer no later than 90 days after [Date of Rule Adoption].

(D) The manufacturer shall use the language in subparagraph (g)(1)(A) if the alternative language is not approved.

Reporting and Recordkeeping for ZEM Alternative Compliance Option

- Specifies reporting requirements for manufacturers utilizing ZEM alternative compliance option
- Specifies recordkeeping requirements
  - Information shall be maintained for at least five years and made available upon request

(2) Reporting, and Recordkeeping Requirements for ZEM Alternative Compliance Option

The manufacturer of a Water Heater supplied or offered for use within the South Coast AQMD in accordance with the ZEM alternative compliance option in paragraph (f)(1) shall:

(A) Submit to the Executive Officer a report, signed by the Responsible Official for the manufacturer pursuant to the schedule in paragraph (f)(1)(E), that includes:

(i) Each model number and the quantity of Zero-NOx Emission Units distributed or sold into or within South Coast AQMD for the applicable calendar year; and

(ii) Each model number and the quantity of Water Heaters distributed or sold into or within South Coast AQMD for the applicable calendar year;

(B) Maintain records for at least five years, including the following information and any other information for compliance demonstration, and make them available to the Executive Officer upon request:

(i) Model number and serial number of each Zero-NOx Emission Unit;

(ii) Model number and serial number of each Water Heater;

(iii) Date and number of Water Heater and Zero-Emission Units sold to a distributor; and

(iv) The distributor's name, address, and phone number.

Exemption

- Specifies the exemption from zero-NOx emission limits under paragraph (d)(2), for:
  - Mobile home water heaters for installation in existing buildings;
  - Mobile home water heater installations in new and existing buildings in master metered mobile home parks
  - New buildings with building permit issued prior to the date of rule adoption

(3) Paragraph (d)(2) shall not apply to the following Water Heaters:

(A) Mobile Home Water Heaters for installation in Existing Buildings;

(B) Mobile Home Water Heaters for installation or use in master-metered Mobile Home parks, which are Mobile Home parks that take electricity through a master meter and then distribute it to park residents through their own system; and

(C) Water Heaters that will be installed or used in New Buildings with building permits issued prior to [Date of Adoption] by the appropriate enforcement agency.

Updates to Cost Assumptions

Cost-Effectiveness Assessment

- Staff considers upfront “project costs” and lifetime operational costs
  - Customers will have choice to transition to zero-emission units upon unit replacement, so costs considered are incremental costs

Upfront project cost

Unit, installation, panel upsizing, and other electrical work

Fuel switching cost difference

Difference between the gas and electricity utility rate and appliance efficiency

- Electricity rates are higher than natural gas, but heat pumps are 3 – 5 times more efficient than conventional units which can result in lifetime cost savings

Summary of Updated Costs

Staff updated cost assessment to reflect most recent available cost data (i.e., 2024-dollars)

Staff updated:

- Project costs
- Utility rates based on updated projection
- Annual fuel use for fuel switch cost
  - Staff looked at lifetime operational costs based on different climate zones
    - South Coast AQMD is a diverse region
    - Installation and utility costs can vary for mountain, inland, city, and coastal installations

Updated Space and Water Heating Project Costs

Updated Zero-NOx Emission Appliance Project Costs

Staff uses the TECH Clean California real-world project cost for heat pump installations

- Cost data available in publicly searchable database by county
- Previous cost estimates relied on data from 2021 – June 2024
- Updated to only consider 2024 costs
  - Include comparison of full dataset to 2024 data
- Updated to weighed cost by population of each county (vs. region average previously)

Staff uses median project costs for cost-effectiveness assessment

- More representative of costs than average
- Less sensitive to outliers

Evaluation of TECH Data for Single-Family Space Heating

Space Heating (PAR 1111)

TECH Single Family HP HVAC Installations: 2021-2024	
Number of Installations	10,223
Percentage Needing Electrical Service Upgrade	3.8%
Percentage Installed in Disadvantaged Community	15.1%
Project Cost Average ($)	20,000
Project Cost Median ($)	18,000

TECH Single Family HP HVAC Installations: 2024	
Number of Installations	3,074
Percentage Needing Electrical Service Upgrade	3.7%
Percentage Installed in Disadvantaged Community	13.6%
Project Cost Average ($)	21,100
Project Cost Median ($)	19,000
Project Cost Weighted by County Population ($)	19,000

- Median costs for 2024 similar to past data
  - Update will not have a significant impact on cost-effectiveness assessment

Multifamily Space Heating TECH Data

Space Heating (PAR 1111)

Installations in 2022-2024	
Total Number of Properties	964
Total Number of Units Installed	1,211
Percentage Installed in Disadvantaged Community	32.5%
Cost per Unit Average ($)	6,200
Cost per Unit Median ($)	6,000

Installations in 2023-2024	
Total Number of Properties	839
Total Number of Units Installed	1,060
Percentage Installed in Disadvantaged Community	25.0%
Cost per Unit Average ($)	6,300
Cost per Unit Median ($)	6,000
Project Cost Weighted by County Population ($)	5,900

- Staff used data from 2023-2024 since there is no 2024 data for some counties
- Median costs same as past data

Single-Family and Multifamily* Water Heating

Water Heating (PAR 1121)

Installations from 2021-2024	
Number of Installations	1,644
Percentage Needing Panel Upgrades	15.4%
Percentage Installed in Disadvantaged Community	38.3%
Project Cost Average ($)	6,500
Project Cost Median ($)	5,800

Installations in 2024	
Number of Installations	1,212
Percentage Needing Panel Upgrades	15.8%
Percentage Installed in Disadvantaged Community	46.7%
Project Cost Average ($)	6,800
Project Cost Median ($)	6,900
Project Cost Weighted by County Population ($)	5,400

- Significant increase in the number of units installed
  - Median costs for 2024 higher than past data
    - Increase may be influenced by significant increase in incentive funds
  - Update will increase cost-effectiveness assessment

* Due to insufficient sample size in tech data for multifamily water heating, staff relied on single-family cost

Updated NOx-Emitting Appliance Project Costs

Staff uses the E3 “Residential Building Electrification in California” for the NOx-emitting appliance cost

Same source as previous cost-effectiveness calculation

- Adjusted from 2019 to 2024 for inflation

Cost is weighted to housing type (new construction, 90’s construction, etc.) based on Census data

- Previously used region-wide housing type weighed cost
- The update refined the cost by further weighing the cost by population of each county

Updated NOx-Emitting Space Heating Project Costs

- Comparing previous costs (2023) and updated costs (2024)
  - Slight change of NOx-emitting appliance project costs

E3 NOx-Emitting Space Heating Appliance Costs ($): 2023	
Single-Family HVAC	18,800
Multifamily HVAC	12,400
Single Family Furnace Only	10,000
Multifamily Furnace Only	6,600

E3 NOx-Emitting Space Heating Appliance Costs ($): 2024	
Single-Family	20,000
Multifamily	12,000
Single Family Furnace Only	11,000
Multifamily Furnace Only	7,300

Updated NOx-Emitting Appliance Project Costs

- Comparing previous costs (2023) and updated costs (2024)
  - Slight change of NOx-emitting appliance project costs

E3 NOx-Emitting Water Heating Appliance Costs ($): 2023	
Single-Family	3,000
Multifamily	2,700

E3 NOx-Emitting Water Heating Appliance Costs ($): 2024	
Single-Family	3,300
Multifamily	3,300

Project Cost Summary

Revised

Appliance Type	Property Type	Installation Type	Zero-NOx Emission Unit Costs ($)	NOx-Emitting Unit Cost ($)	Additional Project Cost for Choosing Zero-NOx Emission Unit ($)
Space Heating (Rule 1111)	Single-Family	Furnace + AC to Heat Pump	19,000	20,000	-1,000
		Furnace to Heat Pump	19,000	11,000	~~10,000~~ 8,000
	Multifamily (Cost per unit)	Furnace + AC to Heat Pump	5,900	12,000	-6,100
		Furnace to Heat Pump	5,900	7,300	-1,400
Water Heating (Rule 1121)	Single-Family	Water Heater	5,400	3,300	2,100
	Multifamily	Water Heater	5,400	3,300	2,100

Conclusion on Cost Updates

2024 data showed some increases to the project costs

Space heating costs have been consistent

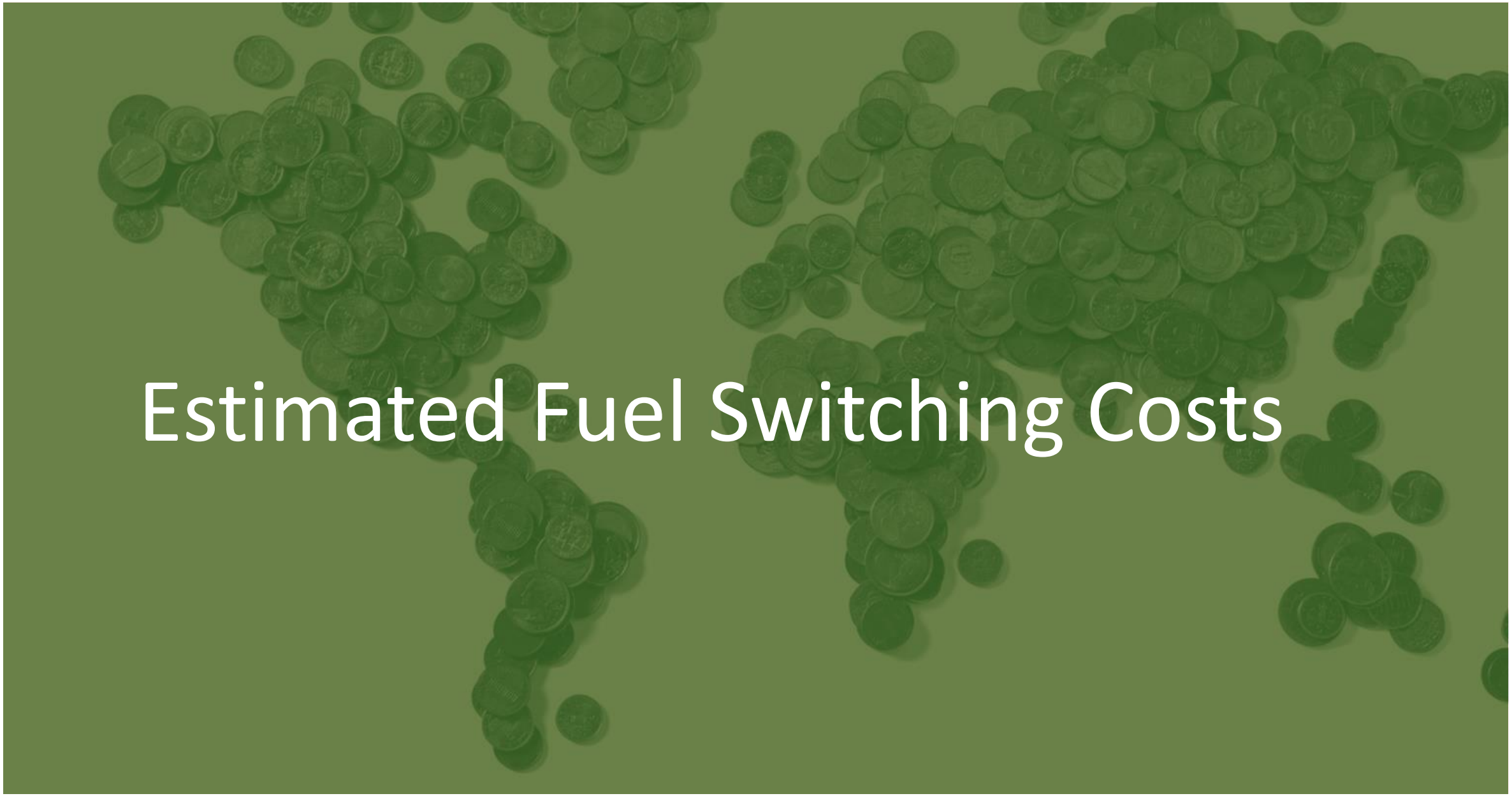
Technology is more mature

Increases were more dramatic for water heating

New plug-in 120V units have significantly lower cost

Higher incentives may drive up project costs

Offset homeowner costs



Estimated Fuel Switching Costs

Utility Rate Forecast

- Staff relies on the California Energy Commission's Integrated Energy Progress Report (IEPR) to estimate future utility costs (i.e., gas and electricity rates)
  - Cost of operating zero-NOx emitting appliance
    - Typically, an electric heat pump
  - Cost of operating NOx-emitting appliance
    - Typically, a natural gas furnace
  - Used residential rate for single-family home and multifamily homes

2025 Integrated Energy Policy Report

Updated Utility Rate Forecast

Prior assessment relied on 2023 forecast for electricity and natural gas rates

Forecast shows natural gas prices increasing at a higher rate than electricity prices

As demand for natural gas decreases, rates expected to increase as fewer consumers left to pay to maintain aging gas infrastructure

December 2024, IEPR updated their electricity rate forecast

Estimated both residential and commercial electricity rates will increase by ~$0.03 per kWh from prior forecast

Climate Zone Fuel Use Assessment

Climate Zone	County Fuel Use
6	Los Angeles and Orange
8	
9	
10	Riverside and San Bernardino
16	

- The South Coast AQMD region ranges from coast to mountains covering five climate zones
  - Different weather patterns by various climate zones could cause distinction of fuel use
  - Income and economy difference may also mean varied equipment installation costs
- Prior analysis assumed same fuel use costs across the region
- To understand the fuel switching costs for regions within the South Coast AQMD, staff evaluated fuel use by climate zone for space heating
  - Water heating cost not impacted by climate zone so cost by climate zone not available

Fuel Use and Fuel Switching Costs

$$Fuel\ Switching\ Cost = (\text{annual electricity use} * \text{average electricity rate over unit lifetime}) - (\text{annual gas use} * \text{average gas rate over unit lifetime})$$

- California Energy Commission Residential Appliance Saturation Study (RASS) used for fuel use for heat pumps and natural gas-fired units
- Fuel use for zones 6, 8, 9, 10, and 16 were used and averaged based on counties represented by the climate zones
  - Fuel use for other climate zones in the South Coast AQMD, such as climate zone 15, not available

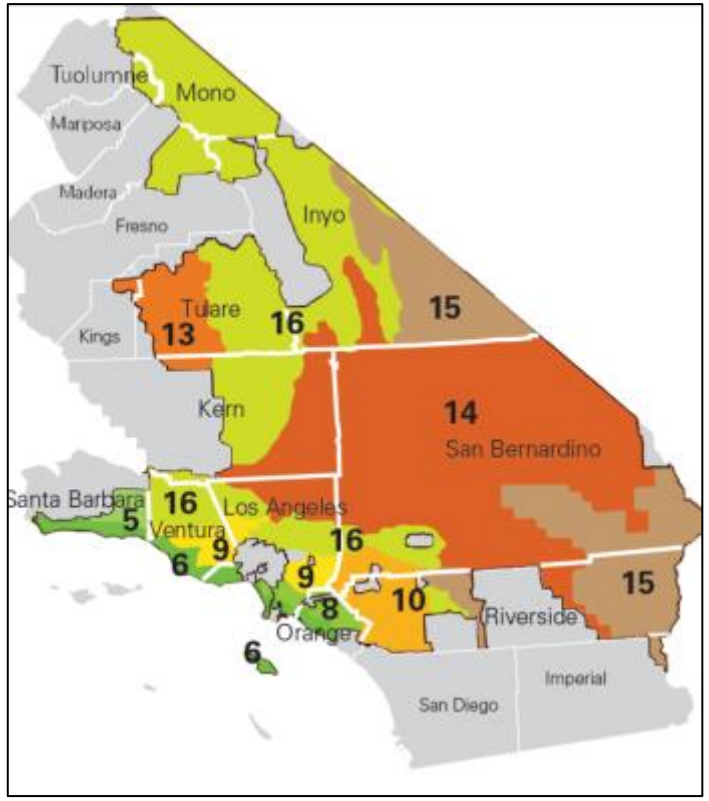


Image Source: Redwood Energy

Updates to Fuel Switching Costs

Rule	Housing Type	Installation Type	Replacement	Previous Cost ($)	Updated Cost ($)
Space Heating (Rule 1111)	Single-Family	Furnace	Heat Pump	-$1,900	-$750
	Multifamily	Furnace	Heat Pump	$200	-$200
Water Heating (Rule 1121)	Single-Family	Water Heater	Heat Pump	-$1,400	-$1,100
	Multifamily	Water Heater	Heat Pump	-$1,400	-$1,100

- As mentioned in previous slides, RASS data by climate zones used for annual fuel use for:
  - Zero-NOx emission units (e.g., heat pumps); and
  - Natural gas-fired units
- Updated fuel switching costs equate to less savings, except for multifamily
  - All scenarios show fuel switching cost savings
  - Utilities bills will be lower

Conclusion on Fuel Switching Cost Update

Climate zone assessment shows more nuanced fuel switching impacts

Fuel switching assessment shows cost savings to operate a heat pump versus NOx-emitting furnace

High efficiency of the heat pump offsets the higher cost of electricity

Updated Cost-Effectiveness Assessment

Updated Cost-Effectiveness Screening Threshold

BARCT assessment requires proposed NOx limits to be technically feasible and cost effective

2022 Air Quality Management Plan established a cost-effectiveness screening threshold using a health benefit-cost approach

- Threshold shall be inflation-adjusted based on the year the costs are brought into analysis
  - 2022 AQMP threshold = $325,000 per ton of NOx reductions by 2021 dollars
  - Previous analysis = $349,000 per ton of NOx reductions by 2022 dollars
  - Updated threshold = **$383,000 per ton of NOx** reductions by 2024 dollars

If cost-effectiveness is above the screening threshold, alternative compliance options must be available

Cost-Effectiveness Calculation

$$Cost\ Effectiveness\left(\$/_{tons\ NOx\ reduced}\right) = \frac{Cost\ Difference\ in\ Initial\ Investment\ Cost + (Fuel\ Switching\ Cost\ * PVF)}{Lifetime\ Emission\ Reductions}$$

- Costs calculated using following variables and sources:
  - Upfront Project Costs
  - Annual Fuel Switching Costs
  - Present Value Factor (PVF) = current worth of future sum of money

Present Value Factor (PVF) Equation

$$PVF = \frac{(1+r)^N - 1}{r * (1+r)^N}$$

r = real interest rate (discount rate, 4%)
N = years of equipment life

Updated Cost-Effectiveness Assumptions

Project Cost Assumptions:

- 2024 costs weighted by county
- Proposal considers replacement at the end of unit lifetime
  - Project costs are the difference in cost between NOx emitting and Zero-NOx emitting appliances

Annual Operating Costs are the Fuel Switching Cost:

- Fuel use based on California Energy Commission Residential Appliance Saturation Study
- 2024 IEPR electricity and gas demand
- Weighted by climate zone

Present Value Factor (PVF) = current worth of future sum of money

- Based on equipment lifetime
  - 25 years for space heating
  - 15 years for water heating

Updated Cost-Effectiveness for Space and Water Heating

Space Heating (PAR 1111)

Housing Type	Scenario	Cost-Effectiveness ($/ton NOx)
Single-Family	Heat Pump Replacing Furnace + AC	-592,000
	Heat Pump Replacing Furnace only	1,730,000
Multifamily	Heat Pump Replacing Furnace + AC	-785,000
	Heat Pump Replacing Furnace only	-197,000

Water Heating (PAR 1121)

Housing Type	Scenario	Cost-Effectiveness ($/ton NOx)
Single-Family and Multifamily	Heat Pump Replacing Conventional Tank Type Water Heater	405,000

Conclusion on Cost-Effectiveness

Space Heating (PAR 1111)

- Cost-effectiveness below screening threshold for a heat pump replacing a HVAC system
- High cost-effectiveness for replacing a furnace only with a heat pump
  - Other lower cost zero-emission technologies exist

Water Heating (PAR 1121)

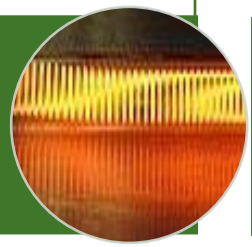
- Based on updated costs, cost-effectiveness just above screening threshold for heat pump replacing NOx-emitting water heater
  - Other lower cost zero-emission technologies exist

Zero-Emission Manufacturer Alternative Compliance Option addresses the cost and concern for consumer choice

- Both zero-NOx emission units and NOx-emitting units will be available
  - Homeowners with high-cost installations can choose to install a NOx-emitting unit

Zero-Emission Space Heating Options

Electric Resistance



- Project costs ~$9,800, about $1,200 cheaper than NOx-emitting unit
- Not preferable in colder climates
  - High cost to operate
- Cost-effective option for where space heating demand is low, e.g., coastal regions

Source: https://www.angi.com/articles/how-much-does-it-cost-install-electric-furnace.htm

Minisplit

- Project cost of $2,000 - $8,800 per single zone unit and a five-zone unit averages $4,800 - $18,000 for large home
- Comprised of indoor and outdoor unit
- Multiple zones allow room level temperature control
- Less expensive to operate than heating/ cooling the entire living space

Source: https://www.bobvila.com/articles/mini-split-installation-cost

Wall and Window Units

- Low-cost alternative that costs ~$500 per unit, versus ~$300 for window AC
- Unit that straddle units developed as a low-cost solution at ~$3,800 per unit
- Wall/window units that can be quickly installed without the need for an installer

Source: https://www.gradientcomfort.com/

Zero-Emission Water Heating Options

Revised

TECH Clean California real-world project cost

240V vs. 120V Installations in the South Coast AQMD in 2024

	240V & 120V	240V	120V
Number of Installations	1,212	1,006	206
Percentage Needing Electrical Upgrades	15.8%	18.6%	2.4%
Percentage Installed in Disadvantaged Community	46.7%	42.7%	66.0%
Project Cost Median ($)	6,900	7,100	3,900

- 120V heat pump water heaters introduced in 2023
  - Designed for existing building retrofits
- 120V heat pump water heaters have lower percentage that need a panel upgrade
  - Plug into a standard wall socket
- Promising solution for retrofits and installation in disadvantaged communities

120V Costs Compared with NOx Emitting Water Heater

	120V Zero Emission Cost($)	NOx Emitting Cost ($)	Project Costs ~~Saving~~ ($)	Lifetime Utility Savings ($)
Water Heater	~~3,300~~ 3,900	~~3,900~~ 3,300	600	1,100

Socioeconomic Impact Assessment

- A Socioeconomic Impact Assessment will be prepared and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing for PAR 1111 and PAR 1121, which is scheduled for May 2, 2025 (subject to change)

- The analysis will consider:
  - Range of probable costs or savings
  - Type of affected industries, including small business
  - Impact on employment and the regional economy

California Environmental Quality Act (CEQA)

Draft Subsequent Environmental Assessment (SEA) for PAR 1111 and PAR 1121:

- Tiers off the Final Program Environmental Impact Report (EIR) for 2022 AQMP
- Released for a 46-day public review and comment period from September 27, 2024 to November 12, 2024
- Analysis based on September 2024 versions of PAR 1111 and PAR 1121
- Potentially significant adverse impacts and mitigation measures identified for:
  - Air Quality during construction
  - Energy due to increased demand for electricity and natural gas
- February 2025 versions of PAR 1111 and PAR 1121 provide more flexibility and result in fewer adverse impacts and fewer NOx emission reductions than what was initially analyzed in the Draft SEA

Staff Conclusions and Takeaways

Zero emission space and water heating appliances are commercially available

Space Heating Costs

- Replacing furnace & air conditioner with heat pump will save on upfront costs and monthly utility bills
- Replacing only a furnace with central heat pump will have higher upfront costs but monthly utility bills will be lower
  - Other zero-emission options can save on upfront costs
  - New rule concept that allows for NOx emitting unit sales addresses high-cost scenarios

Water Heating Costs

- Replacing conventional water heater with heat pump will have higher upfront costs but monthly utility bills will be lower
  - New 120V water heaters can save on upfront costs
  - New rule concept that allows for NOx emitting unit sales addresses high-cost scenarios

Rebates and incentives are available to offset upfront costs

Next Steps

March 2025
Stationary Source Committee

Spring 2025
Launch Go Zero Incentive Program

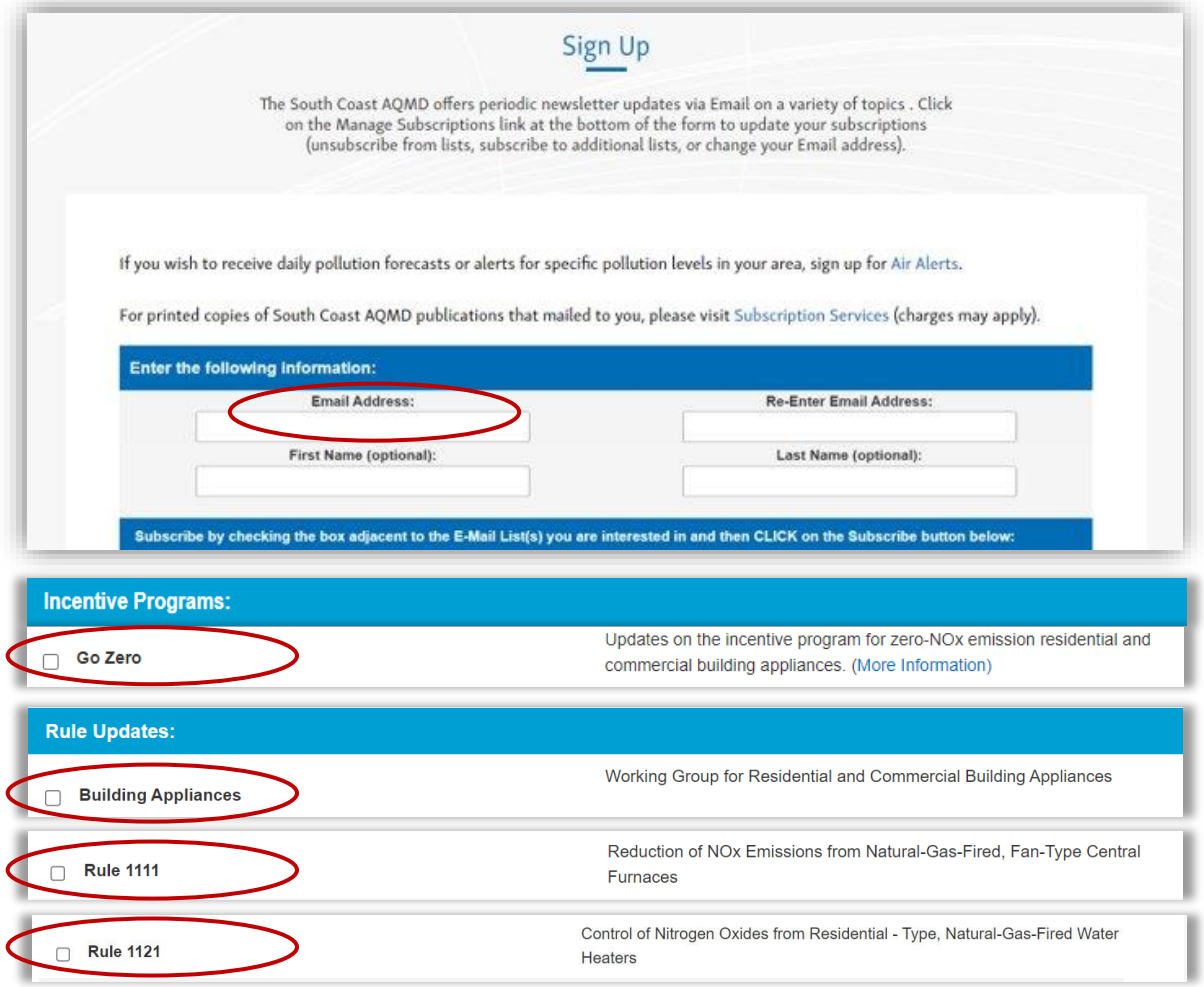
April 1, 2025
Release draft PAR 1111 and PAR 1121 and draft supporting documents

May 2, 2025 (subject to change)
Public Hearing

Sign Up for Notifications

- To receive newsletter updates via email for notifications regarding Go Zero, 1111 and 1121 rule development, or other forthcoming building appliances rules, please subscribe by checking the **Go Zero**, **Rule 1111, Rule 1121,** or **Building Appliances** check boxes located under Rule Updates: http://www.aqmd.gov/sign-up

- Visit our newly redesigned Residential Building Appliance Clearinghouse Webpage: https://www.aqmd.gov/home/rules-compliance/residential-and-commercial-building-appliances



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