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

Proposed Amended Rule 1121 – Reduction of NOx Emissions From Small Natural Gas-Fired Water Heaters

Working Group Meeting #6

August 15, 2024

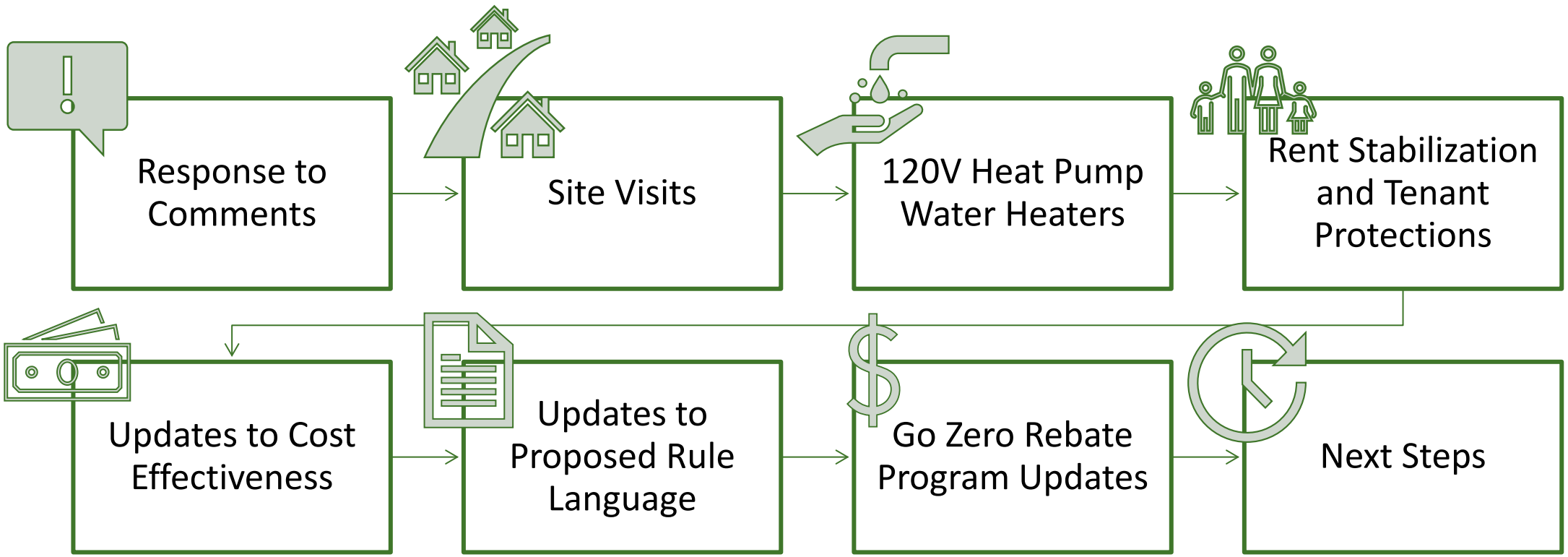
2:00 PM – 4:00 PM (PDT)

Join Zoom Meeting:

https://scaqmd.zoom.us/j/97271436016

Meeting ID: 972 7143 6016

Agenda


Response to Comments
Site Visits
120V Heat Pump Water Heaters
Rent Stabilization and Tenant Protections
Updates to Cost Effectiveness
Updates to Proposed Rule Language
Go Zero Rebate Program Updates
Next Steps

Summary of Working Group Meeting #45

In the previous Working Group Meeting, Staff provided background on:

- Response to Comments
- Site Visits
- 1111 Rule Language Proposals
- 1121 Rule Language Proposals
- Go Zero Rebate Program
- Next Steps

Stakeholder Comments from Working Group Meeting #5

Response to Comment #1

Comment:

- No labeling requirement for the one-year period between PAR 1121 existing and new buildings compliance dates

Response:

- Labeling requirement common for area source rules, especially when some units distributed to the market can only be installed under certain conditions
  - Need to enhance enforcement and compliance
- Previous rules have had labeling requirements for short periods of time
- Staff will work with manufacturers with labeling logistics

Response to Comment #2

Comment:

- Staff should consider changing the emissions limit from 0 ng/J to 0.0 ng/J to mirror BAAQMD Regulation
- Clarify if a unit emitting 0.4 ng/J NOx complies with a 0 ng/J limit by rounding

Response:

- The proposed rules do not intend to allow units with emissions to comply by rounding
- Staff will change the emissions limit from 0 ng/J to 0.0 ng/J
  - Units with any emission (e.g., 0.04 ng/J) is not considered to meet 0.0 ng/J

Response to Comment #3

Comment:

- Apartment buildings often have confined spaces, where heat pump water heater installation would be infeasible

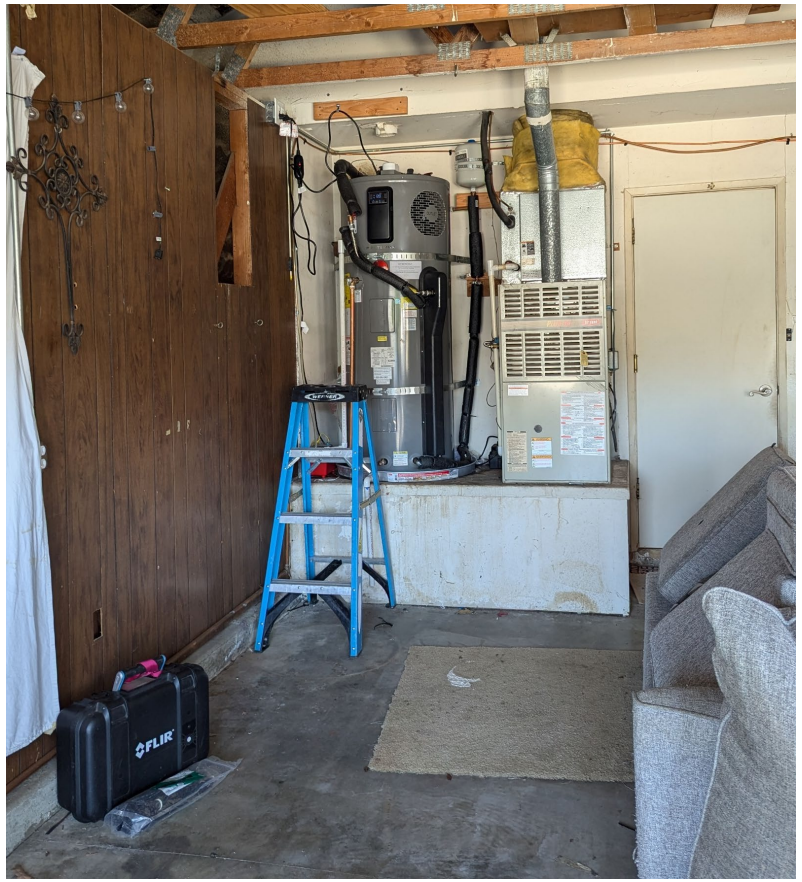
Response:

- During previous site visits to apartment buildings, staff identified feasible solutions for implementing zero emission technologies
  - Open to visit more apartment buildings for the assessment
- Several installation configurations presented in the following slides can help remedy issue of confined spaces

Site Visits

Site Visit to Residence

- Staff visited a single-family home with two to three occupants with a 120V heat pump water heater (HPWH) funded by Southern California Edison
- Installed in 2022 in garage, where previous water heater was located
  - 40-gallon gas fired water heater sized up to 65-gallon 120V HPWH
  - 2-3 hours to install the unit and additional hours to set up water and electricity consumption monitoring
- Installation considerations:
  - Available 120V outlet
  - Room volume
  - Direction of air flow
  - Positioning of condensate line



Site Visit to Multifamily Buildings

- Staff visited two multifamily buildings
  - 1 – 2 bedrooms
- 50-gallon water heater used for both domestic hot water and space heating
- Most of the water heaters are located outside of the residence in a closet
- Installation considerations:
  - Closet space may be restrictive for air flow
    - Louvered door and ducting may be required to install HPWH
    - 120V HPWH may be able to fit in closet
  - May consider heat pump HVAC, instead of hot water, to provide space heating
  - Plumbing of condensate line

Site Visit Key Takeaways

- 120V HPWH is a feasible solution gaining more market interest
- Several factors to consider with installation of 120V HPWHs
  - Costs and ease of installation dependent on location
- Educating users on HPWH maintenance useful to maximize performance
  - Inlet filter requires cleaning for optimized air flow and heat transfer
- Other considerations when using a 120V HPWH:
  - Smart connectivity with app to set water heater to run during off-peak hours
  - Installation smart mixing valve for more deliverable hot water
  - Avoid clustered showers to ensure hot water supply

120V Heat Pump Water Heaters

Heat Pump Water Heater Technologies

- Commercially available heat pump water heaters (HPWH) date back to 1980's
  - Early models were expensive and less reliable compared to gas-fired counterpart
- In 2010, the U.S. Department of Energy (DOE) mandated all electric water heaters installed on or after April 16, 2015, must have energy factors around 2 or more
  - Discouraged installation of inefficient electric resistance water heaters due to high energy demand
  - Encouraged development of efficient HPWH
- DOE published updated standards on May 6, 2024, requiring electric storage water heaters to comply with uniform energy factor (UEF) of at least 2.3 starting May 6, 2029
- Initially, many residential HPWHs were designed for 240V electrical systems
  - May necessitate upgrading the home's electrical system, higher upfront costs
  - Larger footprint than gas-fired counterpart, as larger HPWH tank size is required

Available 120V Heat Pump Water Heaters

- 120V heat pump water heaters (HPWH) were introduced to the market in 2022
- Currently, there are two manufacturers with 120V HPWHs commercially available: Rheem & AO Smith
  - Sizes range from 40 – 80 gallons with ~3-4UEF
- More manufacturers are expected to commercialize 120V HPWHs
- 120V HPWHs offer a convenient solution to replace a natural gas water heater:
  - Can be installed without electrical panel upgrade (plug-in)
  - Several installation configurations to accommodate range of installation spaces
  - 50-65 gallon HPWHs have the capacity for households up to 4 members

Manufacturer Presentation on 120V Heat Pump Water Heaters

120V Heat Pump Water Heater Summary

- 120V plug-in HPWHs can be a feasible replacement for natural gas-fired water heaters for most households
  - According to 2020 Census, the average household size and average family size in California are 2.87 and 3.43, respectively
  - 120V units can serve households up to 4 members
- Replacing a natural gas-fired water heater will likely require a HPWH with a larger tank size in order to match the first hour rating
- Various solutions available for space requirement
  - The smallest space requirement for a HPWH is 450ft^3 without venting modifications
  - With venting modifications such as louvered door, smaller spaces can be used
  - No minimum space requirement when using inlet or/and outlet duct

Rent Stabilization and Tenant Protections

Concerns with Adoption of Zero Emission Technology

- Costs to install and operate zero emission technologies can result in pass-through costs absorbed by tenants
  - Pass-through costs are fees in addition to base rent, including utilities, property improvements, or renovations
- Other agencies have discussed concern and solutions regarding rental units
- According to the US Census, the percentage of renter-occupied households range from 30%-55% in the South Coast AQMD jurisdiction

State Laws for Rent Stabilization and Tenant Protection

Costa–Hawkins Rental Housing Act, effective January 1, 1996

- Prohibits rent control over certain kinds of residential units (e.g., single-family dwellings and condominiums, and newly constructed apartment units)

AB 1482 – California Tenant Protection Act of 2019, effective January 1, 2020

- Limit annual rent increase to no more than 5% + local inflation, or 10%, whichever is lower
- Applies to apartments and other multifamily (two units or more) buildings constructed more than 15 years ago
  - Does not apply to housing regulated by local rent control ordinances

SB 567 – Termination of tenancy, effective April 1, 2024

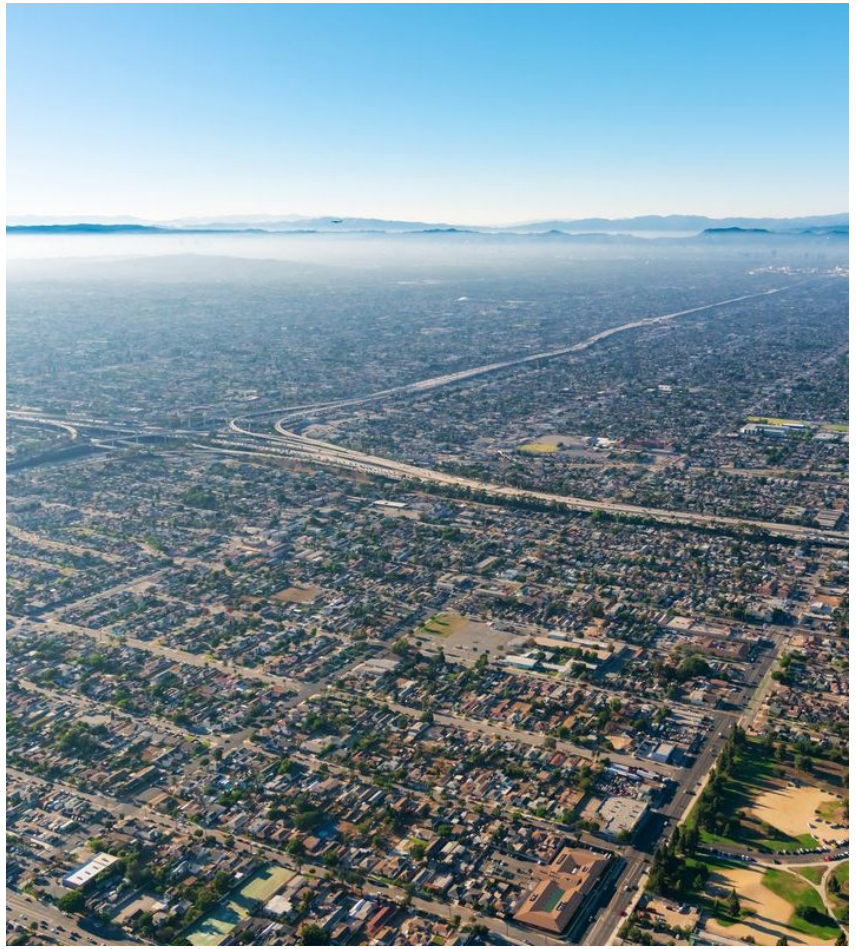
- Requires owner who displaces a tenant to substantially remodel to provide tenant with written notice with information regarding description of remodel, expected completion date, and copy of permits required to remodel

State Laws for Rental Stabilization and Tenant Protection: Challenges

- Allows landlord to evict tenants to renovate a unit/building for substantial remodels
  - Substantial remodels – any modification that requires a permit or abatement of hazardous materials that cannot be safely accomplished within 30 days
  - Cost of obtaining permits may not deter landlords and costs can be recovered by eviction and relisting with increased rent
- Owners can reset rents to market rate at vacancy, then resume conforming to annual cap of 5% + inflation

Local Regulations for Rental Stabilization and Tenant Protection

- According to Tenants Together, 39 out of 482 cities in California have “strong” tenant protections
  - At least 13 cities in our jurisdiction have rent control (at least 11 cities in Los Angeles County)
    - Maximum allowable increase generally ranges from 2.54% to 5%
    - For the most part, cities in Orange, San Bernardino, and Riverside counties don’t have local rent control ordinances
      - Rent control in Santa Ana (Orange) and Palm Springs (Riverside)
    - Some cities might have rent control, but no rent board, while other cities have both
- Cities without more stringent rent controls are subject to State Laws for rental stabilization and tenant protection



Effect on Building Appliance Rules

Using building appliance upgrades as justification for substantial remodels

- Utility upgrades could potentially trigger no-fault cause eviction
- No-fault causes include:
  - Intent to demolish or substantially remodel the property
  - Compliance with a local ordinance or order issued by a governmental agency

Most local and state laws do not directly protect tenants from pass-through expenses

- Base cost of rent is controlled
- Allowance of pass-through costs (i.e. costs in addition to base rent) differ city-to-city

Slide Revised

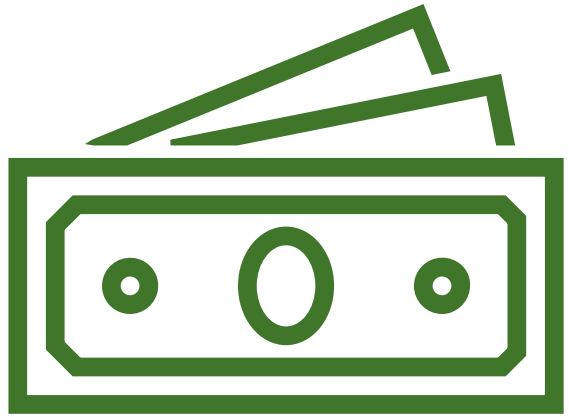
Mitigate Impact of Building Appliance Rules on Rental Property – ~~State~~ Recommendations to State

- ~~CARB~~Strategic Actions for a Just Economy (SAJE) recommendations to CARB for state and local policy goals:
  - Prohibit evictions for home modifications that objectively improve quality of housing or help advance climate goals, such as replacing appliances
  - Amend AB 1482 to adjust rent caps
    - Close the substantial remodel loophole and remove no-fault evictions
  - Amend California Health and Safety code to state heating and cooling must operate with electric (after 2030)
  - Financial assistance to small landlords in exchange for stronger rent protections (e.g. Equitable Building Decarbonization Program)
  - City-level policy
    - Penalties for illegal construction
    - Adopt proactive inspection programs
    - Verify appliance compliance via habitability inspections

Mitigate Impact of Building Appliance Rules on Rental Property – Other Agency Recommendations

- Support updates to AB 1482 to explicitly limit pass-throughs for decarbonization and zero NOx retrofits
  - Clarify if upgrading to zero NOx appliances triggers “substantial repair” clauses in laws
- Local agencies (i.e. “rent boards”) should consider policies to prohibit or limit pass-through costs for zero-NOx upgrades, especially for low-income tenants
- Expand education on renter protection laws and provide low-cost/free legal support
- Local governments should clarify that end-of-life equipment replacements for services already provided (i.e. heat and hot water) qualify as regular operations & maintenance costs, not capital improvements
- Perform a risk assessment (data-based estimate of the likelihood that impact will occur) to better inform policy and incentive program changes in the long term

Updates to PAR 1111 Cost-Effectiveness



PAR 1111 Cost-Effectiveness Update

- Staff previous assumed a lifetime of 15 years for PAR 1111 cost-effectiveness analysis
- More appropriate to update to change cost-effectiveness over a 25-year equipment lifetime
  - Average lifespan of a typical gas furnace is around 15-30 years
  - Previous rulemakings for Rule 1111 assumed a 25-year lifetime
  - Bay Area AQMD assumed to an average lifespan of 18 years for space heating equipment
  - California Public Utilities Commission (CPUC) is proposing to increase the estimated useful lifetime for appliances, including gas furnaces and heat pumps
  - This update has lowered the cost effectiveness for each categories

PAR 1111 Single Family Cost-Effectiveness

- Cost-effectiveness updated assuming an equipment lifetime of 25 years (vs. 15 years)
- Replacement in homes without AC still above $349,000 threshold
- Replacement in home with furnace and AC cost effective
- Overall weighted average cost effective
  - Based on 87% of homes in the AQMD have AC and 4% requiring a panel upgrade

Replacement	Cost-Effectiveness ($/Ton) No Panel Upgrade	Cost-Effectiveness ($/Ton) with Panel Upgrade	Cost-Effectiveness ($/Ton) Weighted Average
Furnace	~~$1,495,000~~ $897,000	~~$1,652,000~~ $991,000	~~$1,502,000~~ $901,000
Furnace and AC	~~($344,000)~~ ($277,000)	~~($187,000)~~ ($183,000)	~~($338,000)~~ ($273,000)
Weighted Average	~~($105,000)~~ ($124,500)	~~$52,000~~ ($30,000)	~~($98,000)~~ ($120,000)

PAR 1111 Multifamily Cost-Effectiveness

- Cost-effectiveness updated assuming an equipment lifetime of 25 years (vs. 15 years)
- All cases more cost effective

Replacement	Cost-Effectiveness ($/Ton) No Panel Upgrade	Cost-Effectiveness ($/Ton) with Panel Upgrade	Cost-Effectiveness ($/Ton) Weighted Average
Furnace	~~($885,000)~~ ($1,400,000)	~~($562,000)~~ ($1,076,000)	~~($871,000)~~ ($1,385,000)
Furnace and AC	~~($3,383,000)~~ ($3,897,000)	~~($3,060,000)~~ ($3,574,000)	~~($3,369,000)~~ ($3,883,000)
Weighted Average	~~($3,058,000)~~ ($3,573,000)	~~($2,735,000)~~ ($3,250,000)	~~($3,044,000)~~ ($3,559,000)

PAR 1111 Commercial Cost-Effectiveness

- Cost-effectiveness updated assuming an equipment lifetime of 25 years (vs. 15 years)
- All sizes of small commercial furnaces more cost effective

Size (tons)	Cost Difference	Fuel Switching Cost	Cost-Effectiveness ($/ton)
5	$200	~~($24,000)~~($34,000)	~~($91,000)~~($77,000)
6	$1,000	~~($24,000)~~($34,000)	~~($87,500)~~($75,000)
7.5	$750	~~($24,000)~~($34,000)	~~($88,750)~~($75,500)
8.5	$1,250	~~($24,000)~~($34,000)	~~($87,000)~~($74,500)
10	($650)	~~($24,000)~~($34,000)	~~($94,000)~~($79,000)

Summary of PAR 1111 Cost-Effectiveness Updates

- Cost-effectiveness updated for single family, multifamily, and commercial building space heating equipment
  - Over an equipment lifetime of 25 years vs. 15 years in previous analysis
- Lower cost-effectiveness for all cases
  - Replacement of furnaces in homes without AC still above $349,000 threshold, while others are below
- Considering provisions for those existing units with high cost-effectiveness

Updates to Proposed Rule Language

PAR 1111 and PAR 1121 Rule Changes

PAR 1111

- Revised definitions to clarify applicable categories:
  - Types of Residential Fan-Type Furnaces defined
  - Master-metered mobile home park defined
- Clarified which emission limits and compliance dates are to be met for certification
- Propane furnace labeling requirement
  - Accidentally removed in previous draft

PAR 1121

- Revised definitions to clarify applicable categories:
  - Water Heater includes Mobile Home Water Heater
  - Master-metered mobile home park defined
- Clarified which emission limits and compliance dates are to be met for certification
- Removal of obsolete certification requirements

Master-Metered Mobile Home Exemption

- Master-metered mobile homes were presented in WGM #4
- Challenges with master-metered mobile homes:
  - Discouraged to replace appliances since utility billing is distributed based on total utility use of the mobile home park
  - Homes may currently not have sufficient electrical service to install zero-emission appliances
    - Panel upgrades may be required to provide enough electrical service
- Staff is proposing an exemption in PAR 1111 and PAR 1121 for master-metered mobile homes
  - The CPUC Mobile Home Part Utility Conversion Program plans to convert 50% of mobile home park spaces to a direct utility service by 2030
  - When mobile homes are converted, they would no longer be exempt from the rules

Recap for PAR 1111 Zero-Emission Compliance Dates

- No change to the proposed compliance date in Table 2 since WGM #5
- As presented at WGM #5, alternative compliance option for emergency replacement is proposed to:
  - Allow supplier to rent units for up to six months to allow for permitting, electrical upgrades, etc.
- Consider provisions for replacement in homes without AC that has high cost-effectiveness

Table 2 – Zero-Emission Limits and Compliance Schedule

Equipment Category	NOx Emission Limit (ng/J*)	Building Type	Compliance Date
Residential Fan-Type Central Furnace**	0.0	New	January 1, 2026
		Existing	January 1, 2028
Commercial Fan-Type Central Furnace	0.0	New	January 1, 2026
		Existing	January 1, 2028
Mobile Home Furnace	0.0	New	January 1, 2026
		Existing	January 1, 2030
Wall Furnaces, Floor Furnaces, and Others	0.0	New	January 1, 2026
		Existing	January 1, 2028

* Nanograms of NOx per joule (ng/J) of Useful Heat Delivered to the Heated Space

** Includes Condensing, Non-Condensing, and Weatherized Furnaces.

Recap for PAR 1121 Zero-Emission Compliance Dates

- No change to the proposed compliance date since WGM #5
- As presented at WGM #5, proposing alternative compliance option for mobile home water heater emergency replacement
  - Allow supplier to offer rental units for up to six months to allow for permitting, electrical upgrades, etc.

Table 2 – Zero-Emission Limits and Compliance Schedule

Equipment	Building Type	NOx limit (ng/J*)	Compliance Date
Water Heater**	New	0.0	January 1, 2026
	Existing	0.0	January 1, 2027
Mobile Home Water Heater	New	0.0	January 1, 2026
	Existing	0.0	January 1, 2030

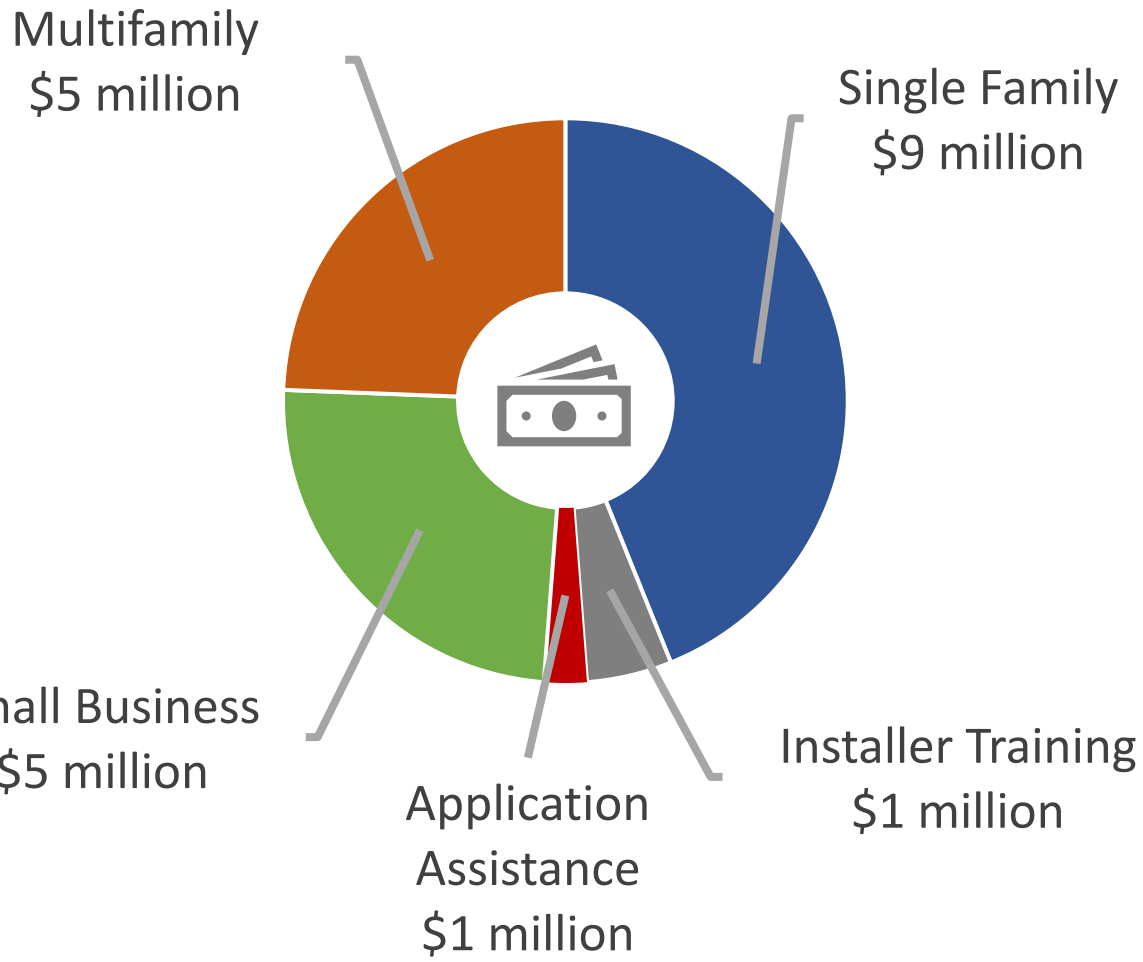
* ng/J of Heat Output.

** Excluding Mobile Home Water Heater

Go Zero Rebate Program Development

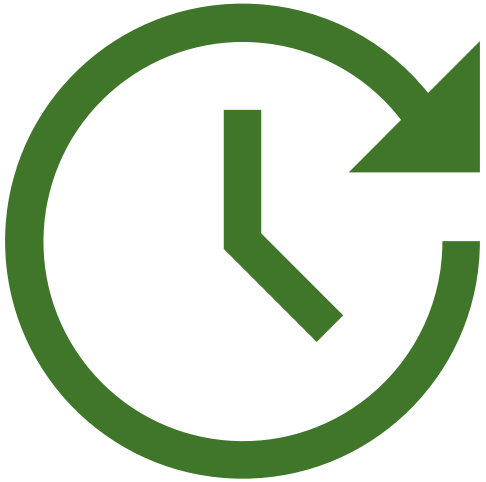
Go Zero Pilot Funding Levels

- Program funding with $21 million, funded by Rule 1111 and Rule 1121 mitigation fees
- 75% of rebate funding to be allocated for overburdened communities (identified by CalEnviroScreen)



More information at:
https://www.aqmd.gov/home/rules-compliance/residential-and-commercial-building-appliances

Next Steps



Next Steps

August 2, 2024
Released RFP for Go Zero Rebate Program

September 20, 2024
Release PAR 1111 and PAR 1121 preliminary draft rule language and staff report

Fall 2024
PAR 1111 and PAR 1121 Public Workshop

Conduct site visits and hold stakeholder meetings

Anticipated Public Hearing: 4th Quarter 2024

Sign Up for Notifications

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

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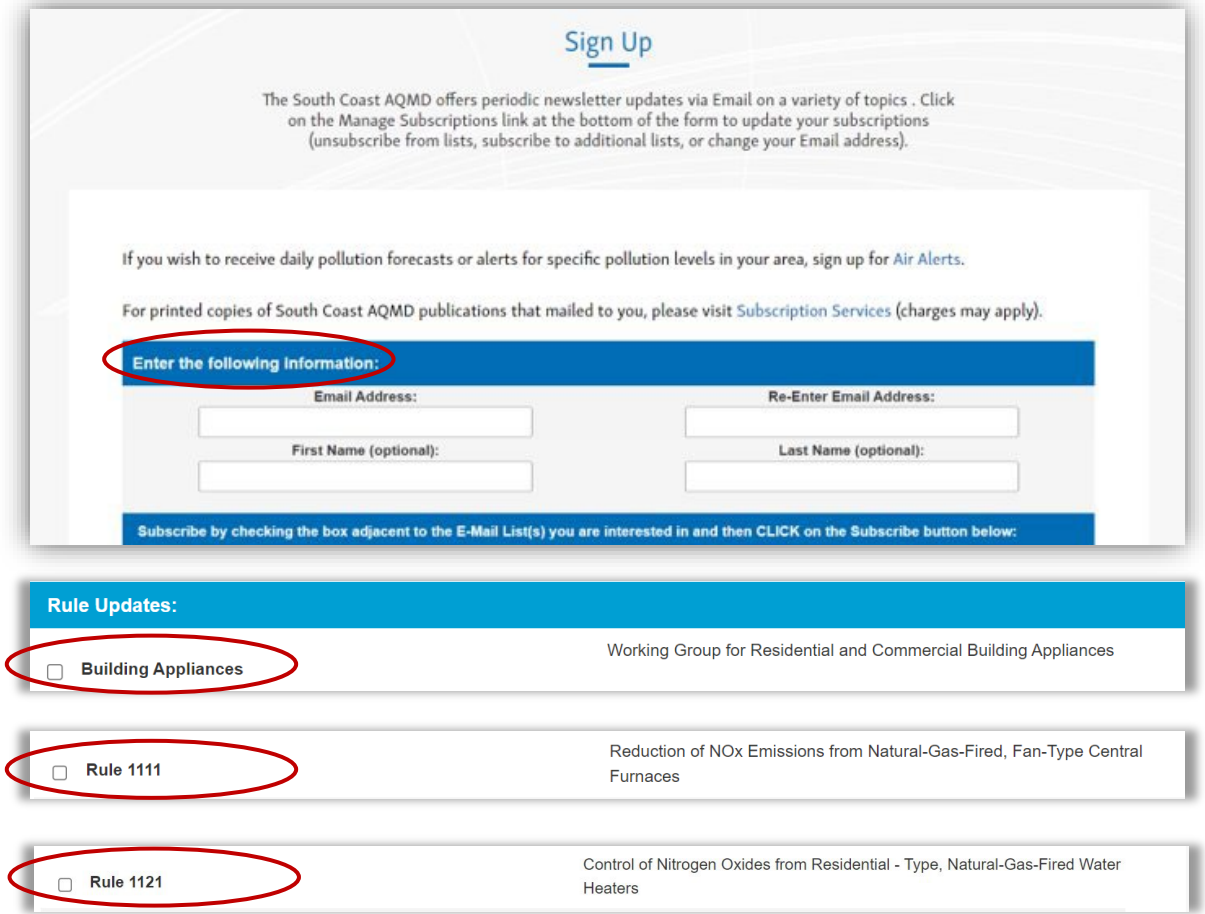

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