BAY AREA AIR QUALITY MANAGEMENT DISTRICT

# STAFF REPORT

# PROPOSED AMENDMENTS TO BUILDING APPLIANCE RULES – REGULATION 9, RULE 6: NITROGEN OXIDES EMISSIONS FROM NATURAL GAS-FIRED BOILERS AND WATER HEATERS

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# I. EXECUTIVE SUMMARY

The Bay Area Air Quality Management District ("Air District") is proposing amendments to Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters ("Rule 9-6"). These amendments build upon the Rule 9-6 amendments adopted by the Board of Directors in March 2023 and are intended to support successful implementation of the rule's long-term emissions-reduction objectives while addressing implementation barriers identified through subsequent implementation planning and stakeholder engagement efforts.

Natural gas-fired water heaters and furnaces are a significant source of nitrogen oxide (NOx) emissions from buildings in the Bay Area. NOx contributes to the formation of ozone and fine particulate matter (PM2.5), air pollutants that are associated with adverse respiratory and cardiovascular health effects and disproportionately impact communities already burdened by air pollution. To address these emissions and advance regional air-quality goals, the Air District adopted amendments to Rules 9-4 and 9-6 in 2023 establishing future zero-NOx standards for covered furnaces and water heaters.

Since adoption of the 2023 amendments, Air District staff has conducted extensive implementation-review activities, including operation of the Building Appliances Implementation Working Group (IWG), contractor and distributor outreach, market assessments, affordability analyses, and presentations to the Board of Directors and Stationary Source Committee. These efforts culminated in the December 2024 report, *Informational Update Regarding Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters less than 75,000 BTU/hr*, and subsequent policy-development efforts during 2025 and 2026.

The implementation review found that many concerns identified during the 2023 rulemaking have improved substantially. Compliant heat-pump water-heater technologies are now commercially established and increasingly available through multiple manufacturers and distributors. Contractor familiarity with compliant technologies has grown, supply-chain constraints have diminished, and statewide and local incentive programs have expanded. Implementation planning also identified new technologies and strategies, including low-voltage heat-pump water heaters, split-system configurations, smart electrical panels, circuit-sharing technologies, and load-management systems that can reduce installation barriers in many circumstances.

At the same time, implementation planning demonstrated that several challenges remain. In particular, affordability concerns, installation constraints, electrical-infrastructure limitations, multifamily housing considerations, affordable-housing impacts, and emergency replacement situations continue to present barriers for certain consumers, property owners, and businesses. As a result, the Air District's implementation review concluded that the primary implementation questions associated with Rule 9-6 have shifted from technology availability toward affordability, accessibility, and equitable deployment.

## *Implementation Review Findings*

The implementation-review process generally found that Rule 9-6 remains technically achievable and that compliant technologies are increasingly available throughout the market. However, implementation planning also demonstrated that compliance costs and installation

challenges are not distributed evenly across all customers.

The proposed flexibility amendments are therefore intended to address implementation challenges associated with:

- Affordability;
- Electrical-service limitations;
- Installation-space constraints;
- Multifamily housing systems;
- Affordable housing projects;
- Emergency replacement situations; and Certain commercial applications with unique hot-water demands.

The proposed amendments are intended to address those implementation issues while preserving the long-term emissions-reduction framework adopted by the Board in 2023 and the associated health benefits.

## *Key Proposed Amendments*

The proposal includes four principal categories of amendments.

Revised Compliance Dates

The proposed amendments revise the implementation schedule for Rule 9-6's zero-NOx requirements. Covered water heaters and boilers with heat input ratings less than or equal to 75,000 BTU per hour would be subject to the zero-NOx standard beginning January 1, 2028, rather than January 1, 2027. Covered water heaters and boilers with heat input ratings greater than 75,000 BTU per hour and less than or equal to 2,000,000 BTU per hour would be subject to the zero-NOx standard beginning January 1, 2033, rather than January 1, 2031.

These revisions are intended to improve affordability outcomes, support equitable implementation, allow additional preparation time for consumers and contractors, and facilitate implementation of the exemption framework established by the proposed amendments.

Exemption Framework

A central element of the proposal is the creation of a structured exemption framework intended to provide targeted flexibility in situations where compliance may present significant economic, structural, electrical, operational, or timing-related challenges.

The exemption framework includes pathways for:

- Low-income qualified property owners;
- Housing cost-burdened property owners;
- Certain high-hot-water-demand businesses
- Space-constrained installations;
- Electrical-constrained installations;
- Hydronic water-heater applications;
- Multifamily housing;

- Deed-restricted affordable housing;
- Temporary emergency replacement loaners; and
- Certain wholesale transactions.

The exemptions are intended to be simple, predictable, and consumer-friendly. In most cases, eligibility is established through self-attestation and limited supporting documentation rather than extensive discretionary review. The Air District intends for the exemption process to avoid unnecessary delays in equipment purchase or installation, particularly in emergency replacement situations.

Administrative and Implementation Provisions

The amendments establish new exemption-certificate procedures, notice requirements, reporting provisions, and recordkeeping obligations intended to support implementation of the exemption framework.

New provisions include:

- Exemption certificate administration;
- Contractor reporting requirements for temporary loaner equipment;
- Point-of-sale notices for exempt equipment;
- Enhanced seller recordkeeping; and
- Enhanced contractor recordkeeping.

The amendments also simplify certain certification and interim-reporting provisions adopted as part of the 2023 rulemaking.

Clarifying Amendments

The proposal includes several technical and administrative revisions intended to improve clarity, consistency, and enforceability of Rule 9-6. New definitions are added for terms associated with the exemption framework and implementation process, including Distributor, Exemption Certificate, Hydronic Water Heater, Licensed Contractor, Low-Income Program, Mobile Home, and Retailer.

The amendments are expected to improve implementation outcomes while preserving the long-term public-health and air-quality objectives of Rule 9-6.

## *Emissions, Economic and Environmental Analyses*

The proposed Rule 9-6 amendments are not expected to result in significant socioeconomic impacts for Bay Area households or the regional economy. The combination of relatively modest household compliance costs in percentage terms, anticipated utility savings, and targeted exemptions for low-income households substantially reduce economic burdens under Rule 9-6 as compared to the current zero-NOx requirements as adopted in 2023 while supporting the District's air quality, public health, and emissions reduction objectives.

The proposed exemptions and delays, as described in Section VI of this report, are expected to result in delayed emissions reductions, similar to those analyzed in the 2023 EIR.

There may also be continuing forgone emissions reductions as compared to the initial 2023 amendments and analysis due to the low-income exemption in the proposed amendments but

as stated above, these changes do not impact the environment as they do not reverse environmental benefits that have already occurred, nor do they eliminate emissions reductions that have already been achieved as the compliance dates as amended in 2023 have not yet occurred. The proposed amendments with the exemptions and delayed compliance dates continue to result in a less than significant (beneficial) impact to regional air quality. Should the Air District Board of Directors direct Staff to delay compliance dates in the proposed rule amendments until January 1, 2029, the analysis of this Addendum and the 2023 EIR remains intact, inclusive of the proposed exemptions.

## *Recommendation*

Based on information gathered through implementation planning, market assessments, stakeholder outreach, public engagement, and technical analysis, Air District staff concludes that the proposed amendments will facilitate successful and equitable implementation of Rule 9-6 while preserving the Board's long-term emissions-reduction objectives.

Accordingly, staff recommends that the Board of Directors adopt the proposed amendments to Rule 9-6 and approve the associated implementation framework, including revised compliance dates, exemption provisions, and administrative requirements.

# II. BACKGROUND

## *Rule 9-6 and the 2023 Zero-NOx Standards*

Regulation 9, Rule 6 (Rule 9-6) establishes nitrogen oxide (NOx) emission standards for natural gas-fired water heaters and small boilers used in residential, multifamily, institutional, and commercial applications throughout the Bay Area. NOx is a criteria air pollutant that contributes to the formation of ozone and fine particulate matter (PM2.5), both of which adversely affect public health and regional air quality.

In March 2023, the Board of Directors adopted amendments to Rule 9-6 establishing future zero-NOx standards for covered water-heating equipment. The amendments created a long-term regulatory framework under which newly manufactured residential water heaters would be required to meet a zero-NOx standard beginning January 1, 2027, with larger commercial and multifamily equipment subject to a zero-NOx standard beginning January 1, 2031. The full 2023 amendments implementation schedule is shown in the table below.

*Table 1. Current Compliance Schedule for Rules 9-4 and 9-6[1]*

| | |
|---|---|
| **January 1, 2027** | Water heaters less than 75,001 BTU/hr[2] (typically residential tank water heaters) |
| **January 1, 2029** | Residential and commercial furnaces |
| **January 1, 2031** | Water heaters between 75,001 and 2 million BTU/hr (typically commercial and multifamily as well as tankless units) |

***(The above only applies to appliances manufactured after the noted date)***

The 2023 amendments reflected the Board's determination that additional reductions in emissions from water-heating equipment would provide important air-quality and public-health benefits. By phasing out polluting gas furnaces and water heaters starting in 2027, Rules 9-4 and 9-6, as amended in 2023, were projected to result in the health benefits summarized in the table below.[3]

At the time of adoption, the Board recognized that technology development, market conditions, installation practices, infrastructure readiness, and consumer costs would continue to evolve before the future compliance dates. Staff was therefore directed to continue monitoring implementation conditions and engaging stakeholders regarding issues that could affect successful implementation of the rule.

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[1] Please note that the above table shows compliance dates currently in effect based on active regulations. The draft amendments accompanying this regulatory overview introduce delayed compliance dates of January 1, 2028 and January 1, 2033 for small and large water heaters, respectively. More information on this can be found in the "Proposed Rule Amendents" section of this document. The compliance date for furnaces is currently being evaluated as part of the Implementation Working Group process and more a full report from that process is forthcoming in Fall 2026.

[2] BTU/hr means British thermal unit per hour

[3] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20230307_fsr_rules0904and0906-pdf.pdf?rev=100de6caff2342e6b095b59acf2321d0

*Table 1. Health Benefits from 2023 Amendments to Rules 9-4 & 9-6*

| **Major health benefits from Rules 9-4 and 9-6** | |
|---|---|
| These appliance rules help improve regional air quality by reducing pollution from furnaces and water heaters. | 🏠⚙️➡️🌤️ **Cleaner outdoor air** Less NOx & $PM_{2.5}$ from venting |
| Lower pollution means lower exposure to fine particles ($PM_{2.5}$) | 🗺️ **Cleaner Bay Area Communities** Biggest $PM_{2.5}$ reductions in communities of color & overburdened neighborhoods |
| Reducing $PM_{2.5}$ and NOx exposure can prevent dozens of early deaths every year in the Bay Area. | ❤️‍🩹 🫁 **Up to 85 early deaths avoided** each year from cleaner air |
| Health improvements from cleaner air avert unnecessary costs from health impacts. | 🏥 💵 **Up to $890M** Annual health benefits saved in avoided illnesses, hospital visits, and early deaths[4] |
| Climate co-benefits resulting from electrification of appliances | Based on current technology, zero-NOx appliances are electric, and their use would result in a **reduction of greenhouse gas emissions** |

## *Post-Adoption Implementation Review*

Following adoption of the 2023 amendments, the Air District initiated a multi-year implementation review to evaluate implementation readiness, identify potential barriers to compliance, and inform future rule administration.

A central component of this effort was the Building Appliances Implementation Working Group (IWG), which included representatives from manufacturers, distributors, contractors, labor organizations, utilities, local governments, housing stakeholders, community-based organizations, environmental organizations, and technical experts. Between 2023 and 2024, the Air District convened more than twenty meetings involving technical discussions, implementation planning, and community and stakeholder engagement.

The implementation review examined a broad range of topics, including technology availability, workforce capacity, permitting practices, electrical infrastructure considerations, affordability, multifamily housing applications, emergency replacement situations, and customer access issues.

[4] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20221220_sr_appe_rg09040906-pdf.pdf?rev=d4b056153496491fad817c6d4a87df78&sc_lang=en

To support this effort, the Air District commissioned and evaluated technical analyses addressing installation costs, market and sales trends, workforce readiness, permitting requirements, electrical infrastructure considerations, renter impacts, and other implementation issues. Staff also conducted outreach with contractors, distributors, manufacturers, housing organizations, and members of the public. Information collected through these activities provided a more comprehensive understanding of implementation conditions than was available during the 2023 rulemaking.

Findings of the Implementation Review

The implementation review found increased availability of compliant technologies, expanded manufacturer participation, improved contractor familiarity, and reduced supply-chain constraints compared to conditions evaluated during development of the 2023 amendments. Additional incentive programs, workforce-training efforts, and implementation resources also became available during this period.

Collectively, these findings indicate improved market readiness for implementation of the zero-NOx standards adopted in 2023.

At the same time, the review identified several continuing implementation challenges that could affect compliance for certain customers and installation types:

- Affordability and customer access;
- Electrical-service limitations;
- Space-constrained installations;
- Multifamily and centralized hot-water systems;
- Emergency replacement situations;
- Housing providers serving lower-income residents; and
- Certain commercial uses with unusually high hot-water demand.

A central conclusion of the review was that, although concerns regarding technology availability and market readiness were reduced relative to those expressed during the 2023 rulemaking process, implementation challenges remain for some customers and building types. These findings became the primary basis for development of the amendments proposed in this rulemaking.

### *December 2024 Implementation Report*

On December 4, 2024, staff presented an informational update to the Board of Directors summarizing the results of the implementation review and evaluating readiness for the first Rule 9-6 compliance date.

The report concluded that substantial progress had occurred in product availability, workforce readiness, permitting resources, and market development since adoption of the 2023 amendments. The report also identified areas where additional implementation flexibility may be appropriate to address affordability concerns and installation barriers while maintaining the long-term emissions-reduction framework adopted by the Board.

Following discussion of the report, staff continued evaluating potential amendments focused on implementation practicality, affordability, and customer access.

### *Development of the Proposed Amendments*

Building upon the findings of the implementation review, staff initiated development of amendments intended to preserve the Board's long-term emissions-reduction objectives while addressing implementation barriers identified through the review process.

In October 2025, staff released a public concepts paper evaluating potential amendments related to affordability, installation constraints, and customer access. Staff subsequently presented implementation findings and regulatory concepts to the Stationary Source Committee, the Board of Directors, stakeholder groups, and members of the public throughout 2025 and 2026. The proposed amendments are the result of that implementation review and stakeholder-engagement process.

The overarching goal of this rule amendment effort for Rule 9-6 is to support equity and affordability for residents while continuing to achieve the air quality benefits associated with the replacement of polluting equipment over time.

Staff have received several recurring questions regarding the applicability and implementation of Rule 9-6 during stakeholder engagement. In some cases, the interpretations stem from misunderstandings about when or how the rule applies. Table 3 below highlights several common misconceptions and provides clarification of the actual requirements of the currently adopted Rules 9-4 and 9-6, prior to any potential changes discussed elsewhere in this document.

*Table 3. Simplified Myths Vs. Facts for the Currently Adopted Rule 9-6*

| Myths | Facts |
|---|---|
| *Mandatory replacements of all equipment starting in 2027* | **Existing water heaters can remain in operation until they burn out or need replacement** |
| *Point-of-purchase requirement* | **The rule is triggered when equipment is replaced (purchased), not when a property is sold** |
| *Applicability based on building type or installation date* | **Requirements are based on the appliances size and date of manufacture** |
| *This rule is an electrification or decarbonization mandate* | **The rule reduces regional NOx emissions caused by natural gas combustion and the associated $PM_{2.5}$ formation to improve air quality and public health. Additionally the rule applies only to natural gas-fired equipment, not propane or other fuels** |
| *This rule applies to stoves, ovens and dryers* | **The rule does not apply to stoves, ovens, nor dryers.** |
| *This rule applies to appliances used in mobile homes* | **The zero-NOx requirements of the rule do not apply to mobile home water heaters and the standards for these will remain unchanged. There is not expected to be a disruption in availability of equipment for mobile homes.** |

## *Regulatory and Market Developments*

The implementation review occurred during a period of significant regulatory and market activity related to building-appliance emissions and electrification.

At the state level, the California Air Resources Board (CARB) has continued development of statewide clean space and water heater standards intended to reduce greenhouse-gas emissions from buildings. CARB has indicated that any future statewide standards are intended to operate alongside local air district regulations addressing NOx emissions and submitted a letter in support of the draft amendments to Rule 9-6 that were released in July 2026 noting that they were complementary to potential state action.

At the regional level, the South Coast Air Quality Management District (SCAQMD) has conducted extensive rule-development efforts addressing emissions from residential and commercial space- and water-heating equipment. Between 2023 and 2025, SCAQMD evaluated proposed amendments to Rule 1111 (natural-gas-fired furnaces) and Rule 1121 (residential-type natural-gas-fired water heaters). The proposed amendments would have established a regulatory framework intended to accelerate deployment of zero-emission technologies through manufacturer sales requirements and related implementation measures. Following an extensive rule-development process that included working-group meetings, public workshops, technical analyses, socioeconomic review, and public hearings, the SCAQMD Governing Board chose not to adopt the proposed amendments. As a result, the previously amended versions of Rule 1111 and Rule 1121 remain in effect with no zero-NOx requirements.

SCAQMD separately pursued amendments to Rule 1146.2, which introduce zero-NOx requirements for large water heaters, small boilers, process heaters, and certain pool heaters. On June 7, 2024, the SCAQMD Governing Board adopted amendments establishing a phased transition toward zero-NOx equipment for covered sources, with compliance dates beginning in 2026 and extending through 2033 depending on equipment type and application. The amendments include compliance flexibility provisions and exemptions for certain circumstances and are expected by SCAQMD to achieve significant reductions in NOx emissions.

The Air District monitored these efforts throughout the implementation-review process and considered relevant information developed through those proceedings. Staff also observed continuing efforts by local governments, utilities, manufacturers, distributors, contractors, and workforce-development organizations to support deployment of heat pump technologies and other low-emission equipment.

The amendments proposed in this Staff Report do not change the Air District's long-term objective of reducing NOx emissions from water-heating equipment. Instead, they are intended to improve implementation based on information collected since the Board's 2023 action.

Specifically, the amendments are intended to:

- Update compliance timelines where appropriate;
- Establish targeted exemptions for qualifying circumstances;
- Create an exemption-certificate process;
- Clarify implementation responsibilities and administrative procedures;
- Improve notice and recordkeeping provisions; and
- Incorporate lessons learned through implementation planning and stakeholder engagement.

Accordingly, the amendments are intended to support both the long-term air-quality objectives of Rule 9-6 and practical implementation for affected households, businesses, and property owners.

# III. PROPOSED RULE AMENDMENTS

The Air District is proposing amendments to Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters ("Rule 9-6"). The proposed amendments maintain the long-term objective of reducing NOx emissions from water-heating equipment while incorporating implementation lessons learned following adoption of the 2023 amendments. The key proposed amendments are summarized below.

## *Rule Applicability*

The proposed amendments revise the applicability provisions of Rule 9-6 to clarify that the rule applies to any person who sells, offers for sale, or installs covered natural gas-fired water heaters and boilers within the Air District, indicating that all sales of covered natural gas-fired equipment in the Air District must comply with the provisions of the rule. The applicability section also clarifies that persons subject to the rule must comply with the new monitoring, reporting, and recordkeeping requirements contained in Section 9-6-500.

## *Exemptions*

One of the most significant changes proposed in this amendment package is the creation of a structured exemption framework. The framework is intended to address situations where compliance may present significant affordability, electrical, structural, operational, or timing-related challenges while maintaining the long-term emissions-reduction goals of Rule 9-6.

Low-Income Exemption (Section 9-6-111)

A natural gas-fired water heater that does not meet the zero-NOx requirements may be installed in the following situations, but only if the purchaser obtains an Exemption Certificate before installation. The low-income exemption is available to all property owners who qualify at the time of application for an exemption certificate, regardless of previous exemptions claimed.

- **Low-income property owners:** Property owners whose income is at or below 80% of Area Median Income or can demonstrate low-income status through participation in a qualifying low-income assistance program may install a non-compliant water heater.

  Proposed amendments to Rule 9-6 define qualifying low-income programs for this exemption which include Covered California, Medi-Cal, food assistance programs, energy rate assistance programs and supplemental security income (SSI). This exemption is intended to provide relief from potentially higher incremental costs of installation for low-income property owners. This provision has been updated from the draft amendments released in July 2026 to expand applicability to 80% of AMI, determined by household size and county, in order to address concerns about costs of compliance. Area median income limits are set by the United States Department of Housing and Urban Development (HUD) on an annual basis.[5]. HUD develops AMI income limits based on data from the American Community Survey and other sources.

- **Housing cost-burdened property owners:** Property owners whose annual mortgage and property tax payments are at least 28% of their annual household gross income may install a non-compliant water heater. Property owners will self-attest to their status as housing cost-burdened. This exemption is intended to provide relief for property owners

[5] https://www.huduser.gov/datasets/il/il2026, https://www.huduser.gov/portal/datasets/il.html

who spend a large portion of their income on housing cost and may not be able to afford the incremental cost of installing a zero-NOx water heater.

One-Time Limited Exemptions for Qualifying Projects (Section 9-6-112)

This exemption establishes limited, one-time exemptions that allow replacement of an existing natural gas water heater with another natural gas unit when site conditions make compliance difficult. An exemption certificate must be obtained before installation. Exemptions are available only for existing buildings and are limited to a single use per property address, regardless of ownership changes or prior exemptions. The one-time nature of these exemptions reflects the expectation that the replacement equipment installed under the exemption will remain in service for an average of 13 years, providing additional time for technological improvements, infrastructure investments, building modifications, and market development that are expected to reduce or eliminate the barriers that originally justified the exemption. This approach is intended to provide flexibility for current implementation challenges and a planning horizon for homeowners while maintaining the long-term objective of emission reductions and regional air quality improvements. Air District staff or the Board of Directors may re-evaluate the need for continuation of these exemption types in the future. New construction projects are not eligible for these exemptions. Qualifying circumstances include:

- **Ventilation Space Constraints:** Existing water heaters located in enclosed spaces smaller than 700 cubic feet that cannot be modified to provide the ventilation required for compliant equipment.

- **Ceiling Height Constraints:** Existing water heaters located in garages with ceiling heights below 7.2 feet or other indoor spaces with ceiling heights below 6 feet, where installation of compliant equipment may not be feasible.

  The exemption process is intended to address physical site constraints while maintaining the overall transition to compliant water-heating technologies.

- **Electrical Constraints:** A licensed contractor must certify that significant electrical constraints exist in an existing building including:
  - Existing knob-and-tube wiring where installation of a compliant electric water heater would require more than 50 feet of conduit between the water heater and the electrical panel or subpanel.
  - Electrical service capacity of less than 100 amps for most buildings, or less than 60 amps per dwelling unit in multifamily residential buildings with five or more dwelling units.
  - The need for a new 240-volt electrical connection requiring more than 50 feet of conduit.
  - Electrical panels that lack available circuit breaker space or expansion slots.

Time-Limited Exemptions for Water Heaters Larger than 30 gallons and 75,000 BTU/hour or less (Section 9-6-113)

This exemption allows the installation of natural gas-fired water heaters that do not meet the zero-NOx requirements in certain scenarios, provided an exemption certificate is obtained before installation. These exemptions are intended to provide additional time for installations where electrification may present greater technical, operational, or financial challenges, particularly in multi-family scenarios. Eligible installations would be limited to water heaters manufactured before January 1, 2033. These time-limited exemptions apply to:

- **Hydronic Heating Systems:** Natural gas storage tank water heaters used in hydronic heating applications.[6]
- **Multifamily Residential Buildings:** Buildings with five or more dwelling units.
- **Deed-Restricted Affordable Housing:** Properties subject to federal, state, or local affordability restrictions.
- **Nonprofit Mutual Housing Cooperatives:** Housing properties owned and operated by qualifying nonprofit cooperative housing organizations where residents buy shares in that corporation rather than owning their specific apartment or house directly.
- **Businesses with Specialized Hot Water Needs**: Restaurants, food service establishments, laundries, dry cleaners, healthcare facilities, and assisted living facilities that can demonstrate a need for high-temperature hot water (160°F or greater) for a specific installation.

These exemptions are designed as transitional measures to support housing providers, multifamily property owners, and businesses with specialized hot water demands while replacement technologies and supporting infrastructure continue to develop. All installations would require documentation and approval through the exemption certificate process prior to installation. The continued applicability and need for these exemptions may be re-evaluated by Air District Staff in the years leading up to the 2033 implementation date at which point further amendments may be evaluated to ensure equitable and practical implementation of the rule.

Contractor Temporary Replacement (Section 9-6-114)

Licensed contractors may install a temporary natural gas replacement water heater when an existing unit fails and immediate installation of compliant equipment is not feasible. The temporary unit must either be removed within 12 months or replaced with, or approved under, a qualifying exemption pathway. Contractors must comply with all reporting requirements associated with the temporary installation.

Limited Exemption for Wholesale Sales (Section 9-6-115)

In order to allow for the continued retail availability of water heaters that do not meet the zero-NOx requirements for the above exempt scenarios, this section allows for continued wholesale distribution of these units.

Exemption for Natural-Gas Fired Mobile Home Water Heaters (Section 9-6-116)

In order to provide clarity for mobile home residents and stakeholders, this section was added to clarify that mobile home water heaters are exempt from the requirements of Sections 9-6-301 and 9-6-303 and the zero-NOx standards. Mobile home water heaters continue to be applicable to Section 9-6-304 for which the standard remains 40 ng/J (originally adopted in 2007).

There is no formal compliance mechanism or exemption waiver process required for mobile home owners purchasing non-zero-NOx water heaters as mobile home water heaters are typically sold as a separate equipment class (“mobile home water heaters”) that are subject to

[6] The compliance date for hydronic heating systems is proposed to be moved to January 1, 2033, out from January 1, 2031 as drafted in July 2026, in an effort to reduce confusion surrounding multiple compliance dates and align compliance dates for technologies that are frequently found in multifamily housing scenarios to allow for continued holistic implementation review. Air District Staff acknowledges comments received from hydronic heating system manufacturers requesting to align this date with compliance dates for Rule 9-4 for furnaces due to the dual nature of hydronic systems. Air District Staff recommends that stakeholders remain engaged in the implementation review process for Rule 9-4 and potential future amendments to ensure alignment with compliance dates across uses of the technology.

the emissions standards of 9-6-304. The exemption form may include an additional pathway for those that require larger equipment, which will continue to be explored through the implementation process. Supply chains are expected to continue supplying equipment to distributors and big box stores as equipment class of mobile home water heaters is exempt. Additionally, sales will continue for a large number of units otherwise exempt as described throughout this report, so staff does not anticipate any issues for mobile home owners to access appropriate equipment for purchase as needed and allowed under the proposed and existing rule.

### *Definitions*

To support administration of the new exemption framework, the amendments add several new definitions.

New definitions include:

- **Hydronic Water Heater** - A water heater that heats potable water directly within the appliance and is designed to provide space heating either directly or indirectly through distributing heated fluid to either a fan coil or similar appliance.
- **Licensed Contractor** - A plumber, electrician, heating ventilation & air conditioning (HVAC) contractor, or general contractor licensed through the California Contractors State License Board.
- **Low-Income Program** - Any of the following programs, or other program designated by the Air Pollution Control Officer (APCO) as a "Low Income Program" eligible for an exemption under Section 9-6-111.4: Covered California Silver 94, Covered California Silver 87, Covered California Silver 73, Medi-Cal for Adults, Medi-Cal for Pregnant Individuals, Bureau of Indian Affairs General Assistance, CalFresh/SNAP (Food Stamps), CalWorks (TANF) or Tribal TANF, California Alternate Rates for Energy (CARE) , Family Electric Rate Assistance Program (FERA), Free or Reduced National School Lunch Program (NSLP), Head Start Income Eligible (Tribal Only), Women, Infants and Children (WIC), Supplemental Security Income (SSI), Low Income Home Energy Assistance Program (LIHEAP)
- **Mobile Home -** Any home that is a "manufactured home" or "mobile home" as defined in California Health and Safety Code (H&SC) Sections 18007 and 18008. Mobile home does not include a commercial modular, as defined in H&SC Section 18001.8; factory-built housing, as defined in H&SC Section 19971; a manufactured home, as defined in H&SC Section 18007; or a multifamily manufactured home, as defined in H&SC Section 18008.7.
- **Wholesale Sale –** A sale of goods for resale or commercial distribution, rather than for the purchaser's end use, which are not subject to sales tax at the time of the sale.

Additionally, definitions were renumbered throughout the rule to allow for alphabetic listing. These definitions are intended to improve implementation clarity and ensure consistent application of the exemption provisions.

### *Standards*

The proposed amendments retain the zero-NOx performance standard while revising implementation dates.

<u>NOx Standards for Natural Gas-Fired Storage Water Heaters with a Rated Heat Input Capacity of 75,000 BTU/hr or less (Section 9-6-301)</u>

Water heaters manufactured after January 1, 2028 must meet the zero-NOx standard to be sold or installed in the Bay Area. This deadline has been extended one year to ensure appropriate rollout of the exemption process, and to provide more time for outreach to the public. There are a few exceptions to the January 1, 2028 deadline as follows:

- Units less than 30 gallons are subject to the 10 ng/J[7] standard set forth in Section 301.4. Continued sales are allowed as there are currently no 30-gallon or smaller zero-NOx water heaters available in the US market. Editorial changes have been made to Sections 301.3 and 301.4 for consistency in applying this standard.
    - The continued applicability and need for this exception for small equipment may be re-evaluated by Air District Staff as the market continues to develop, at which point further amendments may be evaluated to facilitate continued emissions reductions
- The zero-NOx standard does not apply to exempt projects as limited and described above in the exemptions section (Sections 111 through 114).

NOx Standards for Natural Gas-Fired Boilers and Water Heaters with a Rated Heat Input Capacity of greater than 75,000 BTU/hr to 2,000,000 BTU/hr (Section 9-6-303)

Water heaters manufactured after January 1, 2033 must meet the zero-NOx standard to be sold, purchased, or installed in the Bay Area. The proposed compliance-date revisions do not necessarily reflect a lack of available technology for all exempt categories such as multifamily buildings. Rather, they are intended to provide additional time for:

- Consumer planning;
- Contractor preparation;
- Administration of the exemption program;
- Development of reporting systems;
- Improvement of equitable access to compliant technologies; and
- Expansion of incentive and financing opportunities such as the Equitable Building Decarbonization Program

The zero-NOx standard does not apply to exempt projects as limited and described above in the exemptions section (Sections 111 through 114). This deadline and additional exemptions will be re-evaluated as a report to the Board of Directors by January 1, 2031 as required by Section 9-6-404.

Additionally, editorial changes to this section were made to clarify the applicability of the standard to units greater than 75,000 BTU/hr (as opposed to 75,001 BTU/hr).

### *Administrative Requirements*

Equipment Certification (Section 9-6-402)

The proposal renames and simplifies the existing compliance-statement provisions by establishing an Equipment Certification structure tied directly to the certification requirements in Section 9-6-302.

Identification (Section 9-6-403)

The amendments revise product-identification requirements to clarify that no person may sell,

[7] Nanograms of nitrogen oxides (measured as $NO_2$) per joule of heat output.

offer for sale, purchase, or install covered equipment unless the equipment can be identified through model number, certification status, and date of manufacture.

Interim Reporting (Section 9-6-404)

Following completion of the first implementation review cycle, the interim-report requirement for small water heaters is removed.

The remaining interim-report requirement would apply only to larger equipment regulated under Section 9-6-303.5 and would occur approximately two years before the January 1, 2033 compliance date.

Exemption Certificate Requirements for Non-Compliant NOx-Emitting Equipment (Section 9-6-405)

This section was added to set forth exemption certificate requirements. Applicants seeking an exemption must submit:

- Verified address for the dwelling unit where the NOx-emitting equipment will be installed;
- Applicant name and contact information; and
- Additional documentation establishing eligibility of an exemption

This section also states that the APCO would issue an exemption certificate authorizing installation of one qualifying non-compliant water heater per approved exemption upon receipt of the required information.

Reporting Requirements for Temporary Emergency Replacement Loaners (Section 9-6-406)

This section was added to set forth requirements for licensed contractors utilizing the temporary loaner exemption under Section 9-6-114.2. Licensed contractors utilizing temporary replacement loaners must report:

- Serial numbers of units;
- Installation locations;
- Exemption-certificate information;
- and must notify the Air District when loaner equipment is removed, sold, or disposed of.

Noticing Requirements for NOx Emitting Equipment Offered for Sale (Section 9-6-407)

This section was added to set forth requirements for sellers of NOx emitting equipment. After January 1, 2028, sellers offering non-compliant water heaters must clearly display a notice stating that the equipment may only be purchased and installed with a valid Exemption Certificate. The notice must also provide information on how to access Air District compliance guidance and the exemption registration process. Prior to the compliance date, the Air District will work with relevant stakeholders to provide sample language for noticing as well as guidance for providing notice through online retailers. If a unit is to be sold or delivered within the Bay Area Air District, online retailers must comply with this requirement as well as with exemption and other recordkeeping requirements.

### *Monitoring and Records*

Recordkeeping Requirements for Water Heater Sellers (Section 9-6-501)

This new section adds requirements for water heater sellers to maintain records of any NOx

emitting water heater 75,000 BTU/hr or less and related exemption certificates beginning January 1, 2028 for five years. Records must include the following verifiable information:

- Date of the sale or purchase
- Name, business name, and address of the purchaser and seller
- Location of the sale, purchase, delivery and/or installation (as applicable)
- Serial number of the water heater
- Whether the sale/purchase is covered by an Exemption Certificate number and supporting records for the exemption, if applicable

Air District Staff intend for the information that is collected through the recordkeeping process to be evaluated on an aggregate basis to ensure compliance with the requirements of the rule. Information such as the name and address of the purchase of equipment is required to ensure compliance with the requirements of one-time exemptions and other rule provisions. Air District staff will publish implementation guidance prior to the proposed compliance date of January 1, 2028 regarding recordkeeping and reporting requirements. For example, the retention of an exemption certificate which can be linked to the address of the purchaser may suffice to fulfill the requirements for the purchaser of Section 9-6-501.2 in certain circumstances.

Implementation guidance will also include information about automated pathways or regular intervals at which records may be submitted to the Air District however this section does not require regular reporting. The Air District, as part of regular course of action, may send inspectors to review records. This also allows businesses to choose to keep the records onsite as opposed to submitting them to the Air District for storage. That being said, any records submitted to or reviewed by the Air District under Section 501 will be treated as confidential business information and handled in accordance with relevant privacy requirements.

Section 9-6-502 Contractor Recordkeeping

Additionally a new section was added for contractor recordkeeping in which, beginning January 1, 2028, licensed contractors must maintain records documenting purchase dates, installation dates, installation locations and exemption-certificate information for all NOx-emitting water heaters purchased, sold or installed. Records must be maintained for five years and provided to the APCO upon request. Contractors who both purchase and install equipment must satisfy both seller and contractor recordkeeping requirements.

Air District Staff intends to utilize the recordkeeping provisions of this rule to monitor overall compliance with the requirements of the rule and investigate repeated or intentional circumvention of the rule requirements. The recordkeeping requirements are necessary to ensure the ability of the Air District to validate the use of Exemption Certificates and that the program is functioning as intended. Air District Staff intends to continue working with stakeholders to determine the most efficient method for review of records or potential optional reporting for sellers with the intention to maximize program compliance while minimizing disruptions to regular business.

# IV. Exemption Framework and Implementation Process

## *Purpose of the Exemption Framework*

The proposed amendments establish a structured exemption framework intended to address circumstances where immediate compliance with the Rule 9-6 zero-NOx requirements may create substantial affordability, infrastructure, operational, or installation challenges. The framework is designed to provide targeted flexibility while preserving the long-term emissions-reduction objectives established by the Air District Board of Directors in 2023.

The proposed exemptions are intended to address situations identified through the Air District's post-adoption implementation review process, including affordability concerns among low-income and housing cost-burdened households, electrical infrastructure limitations, constrained installation conditions, multifamily and affordable-housing applications, emergency replacement scenarios, and certain commercial applications with unusually high hot-water demand.

## *Guiding Principles*

The proposed exemption framework is designed around three implementation principles:

- **Simple**: Eligibility requirements are intended to be clearly defined, straightforward and based primarily on self-attestation and limited supporting documentation.
- **Timely**: Consumers should not experience delays in restoring hot water service or replacing failed equipment.
- **Targeted**: Exemptions are intended to address specific affordability, infrastructure, and installation barriers identified through the implementation review process.

The proposed exemption framework is designed to function as an administrative certification process rather than a traditional permitting program. The Air District's role is to verify eligibility under clearly defined exemption categories and maintain records supporting implementation of the rule. The process is not intended to require extensive case-by-case review, discretionary approvals, or prolonged waiting periods before equipment can be purchased or installed.
For most exemption categories, eligibility is established through applicant self-attestation combined with limited supporting documentation. This approach minimizes administrative burden while allowing the Air District to maintain sufficient records for enforcement and program-evaluation purposes. It also helps ensure that implementation of Rule 9-6 does not interfere with time-sensitive appliance replacement decisions, particularly when property owners are responding to unexpected equipment failures.

## *How the Exemption Process Works*

In most cases, exemption eligibility is expected to be established through objective criteria and applicant self-attestation. The exemption process is intended to operate concurrently with normal appliance replacement activities and is designed to not delay purchases, installations, or restoration of hot-water service.

Step 1: Determine Eligibility

The applicant determines whether the proposed project qualifies under one of the exemption categories established in Sections 9-6-111 through 9-6-114.
Potential exemption categories include:

- Low-income qualified property owners;
- Housing cost-burdened property owners;
- Certain high-hot-water-demand businesses;
- Space-constrained installations;

- Electrical-constrained installations;
- Multifamily and affordable-housing installations;
- Hydronic water-heater applications;
- Temporary emergency replacement loaners; and
- Qualifying wholesale transactions.

Step 2: Submit Application and Documentation

The applicant submits an exemption application to the Air District. The application would generally include:

- Installation address;
- Applicant contact information;
- Identification of the requested exemption category;
- Documentation demonstrating eligibility;
- Equipment information, where applicable; and
- Any required certifications or attestations.

***Examples of Supporting Documentation***

- Income Eligibility: Documentation sufficient to demonstrate that household income is at or below 80 percent of the Area Median Income (AMI), subject to the documentation requirements established for the program.
- Housing Cost Burden: A signed self-certification demonstrating that housing-related costs consume a significant portion of gross household income, consistent with program requirements.
- Space Constraint: Information reasonably demonstrating that site conditions satisfy applicable program criteria. Documentation may include photographs, measurements, contractor information, plans, or other supporting materials.
- Electrical Constraints: Information reasonably demonstrating eligibility under the program's electrical-constraint criteria. Documentation may include contractor assessments, equipment information, photographs, or other supporting materials.

Step 3: Administrative Review and Certificate Issuance

If the required eligibility information and supporting documentation are provided, the Air District issues an exemption certificate authorizing installation of qualifying equipment under the applicable exemption category.

For exemption categories that are limited to a single use per address, the Air District would maintain records to ensure that future applications can be evaluated against prior approvals.

During the initial implementation phase, documentation requirements will be limited to those reasonably necessary to establish eligibility and administer the program and exemptions are planned to be issued on an immediate basis following submission of the exemption certificate request if all fields are completed. Following an overall review of program performance and administration, the APCO, in consultation with the Board of Directors, may consider whether additional documentation or exemption application review requirements are appropriate. Any potential changes to this process would be discussed in a public meeting of the Air District Board of Directors and follow the appropriate public process for adoption of such a policy.

Step 4: Equipment Purchase and Installation

After issuance of an exemption certificate, the applicant may purchase and install the authorized non-compliant equipment in accordance with the applicable exemption provisions.

The certificate number would also become part of the recordkeeping requirements established under Rule 9-6.

Step 5: Recordkeeping and Enforcement

The exemption program relies primarily on documentation, reporting, and recordkeeping requirements rather than pre-installation inspections. Beginning on the applicable start date of zero-NOx requirements, sellers and licensed contractors would be required to maintain records associated with exempt transactions for a minimum of five years.These records would support:

- Verification of eligibility;
- Enforcement activities;
- Program evaluation; and
- Future assessment of exemption utilization rates.

The Air District may use this information to evaluate whether additional amendments or implementation adjustments are warranted in the future.

The proposed exemption framework is intended to provide flexibility for qualifying installations while maintaining the long-term emissions-reduction objectives of Rule 9-6. The process is intended to rely on objective eligibility criteria, self-attestation, and protection against unnecessary delays in equipment replacement. By addressing affordability, installation barriers, and emergency replacement challenges, the exemption framework is intended to support equitable and practical implementation of Rule 9-6 throughout the Bay Area and address the concerns of residents regarding affordability and delays of equipment replacement.

# V. TECHNOLOGY EVALUATION

As described above, the proposed Rule 9-6 amendments build upon implementation experience and market developments that have occurred since the Board adopted the 2023 amendments. At the time of the original rulemaking, significant uncertainty existed regarding future technology availability, contractor readiness, market development, supply-chain capacity, and infrastructure requirements associated with compliant technologies. The information in this section is a summary of multiple reports prepared as part of the Implementation Working Group Process including Market and Sales Trends for Zero-NOx Appliances[8], Workforce Challenges for Zero-NOx Requirements[9] and Challenging Use Cases and Emerging Solutions for Zero-NOx Appliances[10]. All consultant work products and other information associated with the Implementation Working Group can be found on the associated Air District webpage.[11]

Since adoption, the Air District has continued to evaluate technology availability and implementation readiness through the Implementation Working Group process, stakeholder engagement activities, contractor outreach, distributor surveys, and market studies. These efforts indicate that substantial progress has occurred in the development, commercialization, and deployment of zero-NOx-compliant water-heating technologies.

As a result, the rationale for the proposed flexibility amendments differs substantially from the rationale underlying the original compliance dates adopted in 2023. The proposed amendments are not driven by concerns that compliant technologies will be unavailable. Rather, they reflect efforts to improve affordability, address installation barriers, and provide equitable access to technologies that are now increasingly available throughout the market.

Other implementation factors relevant to technology deployment, including economic impacts and infrastructure considerations, are discussed further in Section VI and the associated appendices.

## *Evolution of Market Readiness Since 2023*

During development of the 2023 Rule 9-6 amendments, a significant portion of stakeholder discussion focused on whether compliant technologies would be commercially available in sufficient quantities by the proposed compliance dates. Since adoption of those amendments, market conditions have evolved substantially.

Manufacturers have expanded production of heat-pump water-heating equipment, contractor familiarity with installation practices has increased, supply-chain constraints have eased, and state and local incentive programs have expanded. Market assessments commissioned and reviewed by the Air District indicate that compliant technologies are no longer confined to pilot or demonstration-scale deployment and are increasingly becoming part of the mainstream water-heating market.

As a result, the primary implementation questions facing Rule 9-6 have shifted. Whereas the 2023 rulemaking focused heavily on technology availability and market readiness, post-

[8] https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/market-and-sales-trends-for-zero-nox-appliances-clean-pdf.pdf?rev=86e5b084773c4cf0b822ea64efc9778b&sc_lang=en
[9] https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/workforce-summary-memo-pdf.pdf?rev=a8670756237f4fcdbc4e3b8603ff951b&sc_lang=en
[10] https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/challenging-use-cases-and-emerging-solutions-for-zero_nox-appliances-final-08012024-pdf.pdf?rev=ec22a136aca846f49512f5e3f7659997&sc_lang=en
[11] https://www.baaqmd.gov/en/Community-Health/Building-Appliances-Rule-Implementation/Building-Appliances-Implementation-Working-Group

adoption implementation planning has focused increasingly on affordability, installation constraints, customer access, and equitable implementation.

Zero-NOx Natural Gas Systems

At the time of preparation of this Staff Report, Air District staff is not aware of any commercially available natural gas-fired water-heating technologies that can reliably meet the Rule 9-6 zero-NOx performance standard for the full range of covered applications.

However, development efforts continue within the broader water-heating industry. Future innovation may produce technologies capable of satisfying the Rule 9-6 performance requirements using combustion-based approaches. Consistent with the 2023 rulemaking, Rule 9-6 remains technology-neutral and does not prescribe a specific compliance pathway. Any technology capable of meeting the applicable performance standard may be certified for compliance.

For purposes of implementation planning and impact assessment, currently available electric heat-pump water-heating technologies remain the primary commercially available technology capable of consistently satisfying the Rule 9-6 zero-NOx requirements.

Zero-NOx 240-Volt Electric Systems

Heat-pump water heaters operating on 240-volt electrical service are now widely available in residential and commercial markets and represent the most mature category of compliant technology.

Since adoption of the 2023 amendments:

- Product availability has increased significantly.
- Manufacturer participation has expanded.
- Contractor familiarity and installation experience have improved.
- Supply-chain constraints have diminished substantially.

A wide range of residential and commercial heat-pump water-heating systems are now commercially available in capacities suitable for most applications covered by Rule 9-6.

While installation costs remain higher than conventional gas-fired systems in many cases, implementation planning demonstrates that availability of compliant products is no longer the primary implementation concern.

Low-Voltage Heat Pump Water Heater Market Development

One of the most significant developments since adoption of the 2023 amendments has been the maturation of the low-voltage heat-pump water-heater market.

At the time of the original rulemaking, low-voltage heat-pump water heaters were generally considered emerging technologies with limited deployment history. Since then, multiple commercial products have entered the market, demonstration and validation programs have advanced, distribution networks have expanded, and contractors have accumulated substantial installation experience.

The Air District's market assessment found that concerns regarding basic technology availability have diminished substantially since 2023. Manufacturers continue to invest in product development, distributors report improving product availability, and contractors report increasing familiarity with heat-pump water-heater installations.

Distributor and contractor outreach conducted as part of the implementation review also suggests that heat-pump water-heater equipment can generally be obtained within timeframes comparable to those associated with conventional gas-fired equipment. These findings indicate

that supply-chain constraints are no longer a primary implementation barrier.

The market assessment further concluded that low-voltage and alternative installation configurations are playing an increasingly important role in serving retrofit applications where electrical upgrades or installation constraints might otherwise create barriers to compliance.

Taken together, these findings indicate that compliant water-heating technologies have progressed beyond the early commercialization stage. Continued innovation is expected; however, affordability and installation challenges have emerged as more significant barriers than basic technology availability.

### *Contractor Readiness*

Implementation planning and market research indicate that contractor readiness has improved substantially since adoption of the 2023 amendments.

Contractors throughout California have gained increasing experience with heat-pump water-heater installations, including equipment sizing, condensate management, electrical coordination, ventilation considerations, and retrofit applications. In parallel, industry training opportunities and workforce-development initiatives have expanded, helping increase familiarity with emerging technologies and installation practices.

Although workforce development remains an important implementation consideration, information collected through Air District outreach indicates that contractor readiness is improving and is no longer viewed as a primary barrier to implementation.

### *Installation Constraints and Mitigation Strategies*

Implementation planning identified installation constraints as one of the most significant remaining challenges associated with Rule 9-6 implementation.

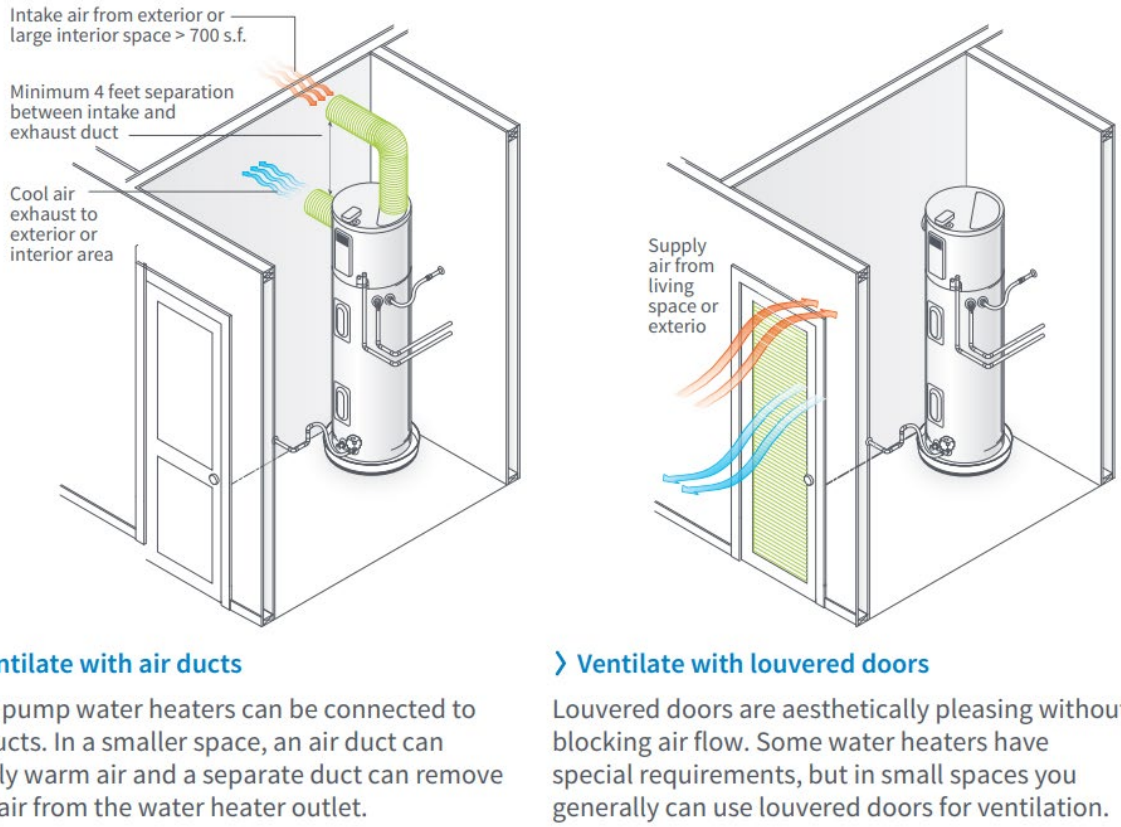
#### Space Constraints

Heat pump water heaters (HPWHs) need adequate ventilation space as well as physical space (because of the integrated compressor unit, they are typically a bit taller than NOx-emitting units). Modifications to address space constraints range in costs.

Ventilation measures (air openings such as louvered doors, see below) were mostly relatively low cost (average=$208 and max=$1,701) according to Palo Alto HPWH program data.[12] Lower costs for these measures are also dependent upon having adequate ventilation space in the adjoining room or access to an outdoor wall. Figure 1 shows standard configurations for these solutions.

[12] Data provided by Palo Alto Utilities staff, September 2024. Note that the Palo Alto program is one of the few programs documenting detailed measures such as ventilation or carpentry measures, with hundreds of projects.

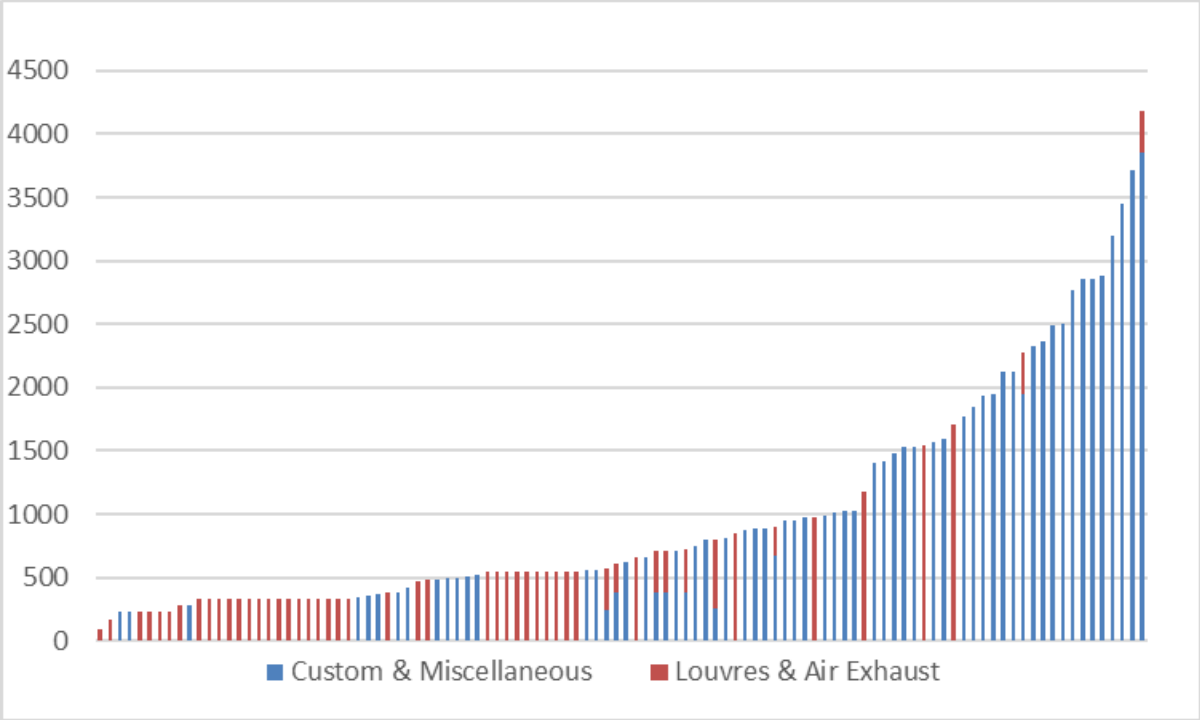
*Figure 1. Ways to circulate more air*[13]




HPWHs, due to their slower recharge times, are typically upsized approximately 10-15 gallons compared to a gas water heater; these larger tanks, in addition to the integrated compressor, can lead to lack of physical space for the new HPWH if the existing location is a utility closet, a basement space with low ceilings, etc. Space reconfiguration or relocating the water heater can cause significant costs (average= $1,287 and max= $4,540), according to Palo Alto HPWH program data, as seen below in Figure 2. Program data as illustrated in the Figure 2 bar chart shows that for individual projects, ventilation measures (red bars) were generally less expensive to add (<$1,000) compared to space reconfiguration and carpentry measures (blue bars). Bars showing both red and blue represent projects and costs that deployed both ventilation measures and space reconfiguration or carpentry measures.

[13] https://library.peninsulacleanenergy.com/m/c76176ab7d47195/original/Heat-Pump-Water-Heater-Space-and-Air-Guidance.pdf

*Figure 2. Palo Alto HPWH Program: Additional Space Constraint Costs ($) for Space Reconfiguration, Carpentry, and Ventilation Measures*[14]




HPWH solutions for small spaces are emerging. Split-system HPWHs offer an unattached, outside condenser/heat pump (see Figure 3) but there are fewer and less common market options. While some mitigation strategies have been identified, certain buildings contain space-constrained scenarios that will continue to result in higher cost water-heater installations due to required significant construction such as those located in small enclosed closets, confined utility rooms, mechanical spaces with limited clearance, multifamily equipment rooms. As a result, the proposed amendments to Rule 9-6 are intended to provide flexibility in situations where significant installation barriers remain.

Electrical Constraints

In most homes, some electrical work will be needed to switch to a HPWH from an older gas water heater. This can range from minor work (e.g., simply installing a short length of new electrical conduit or outlet), to major work resulting in significant time and cost (e.g., extensive rewiring, electrical panel upsizing and potential utility service upgrades).

Additional challenges may arise in buildings that contain:

- Undersized electrical-service panels;
- Limited breaker capacity;
- Legacy wiring systems;
- Long conduit requirements; and
- Multifamily electrical-infrastructure constraints.

These conditions can increase installation costs substantially in some cases

[14] Data provided by Palo Alto Utilities staff, September 2024. Note that the Palo Alto program is one of the few programs documenting detailed measures with hundreds of projects.

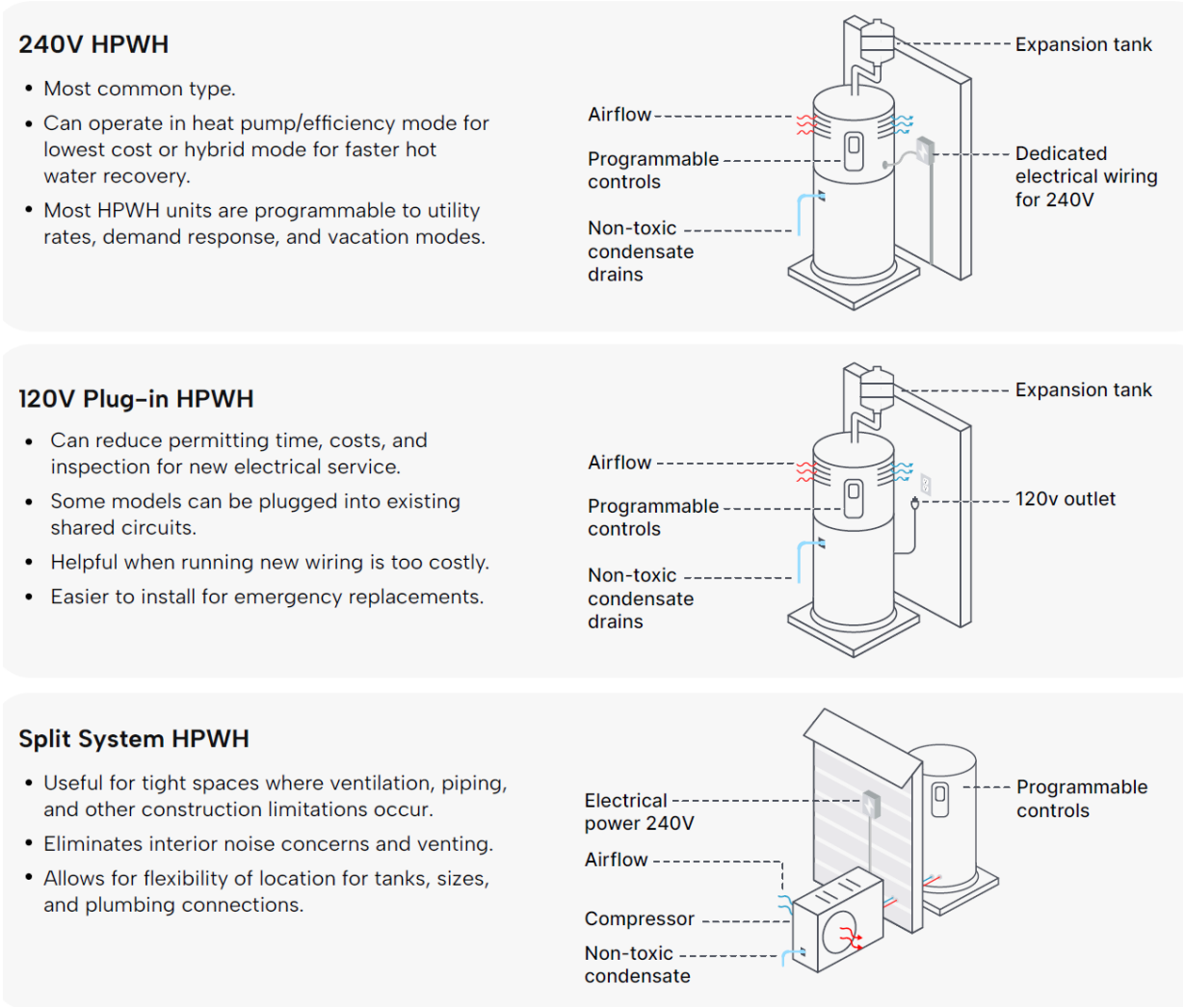
A minimum of 44 percent of single-family homes in the Bay Area is estimated to have electric panels with 200 amps,[15] which is considered to be the modern standard, and could fully electrify without panel upsizing.

32 percent of single-family and 59 percent of multifamily homes in California have panels of intermediate size (100 amps for single-family, 60 amps for multi-family)[16] and will likely require "right-sizing", "watt diet" or panel optimization strategies (low-voltage appliances; circuit pausing/sharing; smart panels) to avoid panel and service upsizing in these homes. Newer 120-volt plug-in HPWHs (see Figure 3) can also help mitigate the need for extensive electrical upgrades, particularly for smaller households with less hot water demand.

For a small portion of homes, extensive electrical work likely cannot be avoided and would be especially costly, encompassing panel upsizing and in some cases, subsequent utility service upsizing. Statewide, 3 percent of single-family homes had panels smaller than 100 amps and 10 percent of multi-family homes had panels smaller than 60 amps (per dwelling unit) which will most likely require upsizing for electrification. In disadvantaged communities (DACs), the number of single-family homes with panels smaller than 100 amps is disproportionately higher at 8 percent.[17]

[15] NREL model, as described in Table 19. https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/task1_electrificationcosts-pdf.pdf?rev=3cb66a09f3094f94b35fa7fc90cfd4ec&sc_lang=en
[16] Fournier, Eric et al. *Quantifying the electric service panel capacities of California's residential buildings.* 2024. https://www.sciencedirect.com/science/article/pii/S0301421524002581
[17] Ibid.

*Figure 3. Heat Pump Water Heater (HPWH) configurations and wiring, siting and installation needs*




Available Mitigation Strategies

The Implementation Working Group process identified a variety of approaches that can reduce installation barriers, including:

- Low-voltage heat-pump water heaters;
- Split-system heat-pump water heaters;
- Smart electrical panels;
- Automatic load-management systems;
- Circuit-sharing technologies; and
- Other panel-optimization strategies.

These technologies and installation approaches can expand the range of buildings capable of accommodating compliant equipment while reducing the need for major electrical-service upgrades. The proposed exemption framework is intended to provide flexibility in situations where significant installation barriers nevertheless remain.

## *Technology Readiness and Market Availability*

The Air District's post-adoption evaluation indicates that technology readiness has progressed substantially since the original rulemaking. Key findings of this study include:

- Heat-pump water-heating technologies are commercially established.
- Multiple manufacturers actively compete within the market.
- Distributor inventory availability has improved.
- Contractor familiarity has increased.
- Low-voltage product offerings have expanded
- Installation-support technologies are becoming more common.
- Incentive availability has grown significantly.

However, implementation planning also demonstrated that technology availability alone does not guarantee practical accessibility for all consumers.

Affordability, installation constraints, emergency replacement situations, multifamily applications, and electrical-infrastructure limitations remain significant barriers in some circumstances. These considerations form the basis for the flexibility amendments proposed in this rulemaking.

### *Summary*

Based on information gathered through implementation planning, stakeholder engagement, market assessments, contractor outreach, distributor surveys, and manufacturer developments since 2023, Air District staff concludes that the primary implementation challenges associated with Rule 9-6 are no longer driven by technology availability. Instead, affordability, installation constraints, electrical infrastructure limitations, and equitable access to compliant technologies represent the most significant remaining implementation barriers addressed by the proposed amendments.

# VI. EMISSIONS AND EMISSION REDUCTIONS

## *2023 Amendments Emissions Context*

The 2023 amendments to Rules 9-4 and 9-6 sought to reduce emissions from natural gas-fired space and water heating equipment in residential and commercial buildings, which represent the largest source of emissions within the building sector. Emission estimates for this sector are based on regional natural gas consumption and appliance usage data.

The building sector is a significant source of air pollution in the Bay Area, with residential and commercial space and water heating accounting for the vast majority of emissions from natural gas use in buildings. These sources are among the largest stationary-source contributors of NOx emissions within the Air District's regulatory authority. As a result, the Air District identified additional regulation of these appliances as an important opportunity to improve air quality and advance objectives established in the 2017 Clean Air Plan, which specifically called for reducing emissions from residential and commercial heating equipment.

The primary focus of amendments to Rules 9-4 and 9-6 is the reduction of NOx emissions. NOx is a key precursor to both ground-level ozone and secondary fine particulate matter, making it an important target for air quality improvement efforts. Secondary particulate matter forms through atmospheric reactions involving NOx and contributes to adverse health effects, including respiratory and cardiovascular illnesses. Reducing NOx emissions is therefore expected to provide significant public health benefits by lowering concentrations of both ozone and fine particulate pollution. NOx exposure itself can also negatively affect respiratory health. Emissions reductions from this sector are also intended to support regional and statewide efforts to attain state and federal air quality standards for ozone and $PM_{2.5}$. Ozone formation increases when NOx and other precursor pollutants react in the atmosphere, particularly during hot and stagnant weather conditions. Because the Bay Area remains in nonattainment for ozone and certain particulate matter standards, reducing NOx emissions from building appliances is expected to contribute to long-term improvements in regional air quality, help protect public health, and support attainment of ambient air quality standards both within the Bay Area and in neighboring downwind regions.

Estimated emissions reductions from the 2023 amendments to Rules 9-4 and 9-6 are shown below as well as the specific reductions associated with water heating equipment, as is relevant to the proposed amendments discussed in this report. As seen below, reductions associated with Rule 9-6 account for approximately 18 percent of reductions initially estimated for the 2023 rule amendments, which were considered as a package.

*Table 4: Cumulative Emission Reductions (tons NOx/year) under 2023 Amendments*

| Year | Projected NOx Reduction Total (tons/yr) | Projected NOx Reduction Rule 9-6 (tons/yr) |
|---|---|---|
| 2030 | 874 | 142 |
| 2035 | 1,835 | 363 |
| 2040 | 2,761 | 548 |
| 2046 | 3,236 | 575 |

### *Impacts of Proposed Amendments – Delayed Compliance Date*

The proposed amendments to Rule 9-6 presented in this report propose delayed compliance dates for water heaters, delaying the zero-NOx requirement for water heaters less than 75,000 BTU/hr from January 1, 2027 to January 1, 2028; and delaying the zero-NOx requirement for water heaters over 75,000 BTU/hr and less than 2 million BTU/hr from January 1, 2031 to January 1, 2033. Another option is to delay the compliance dates for water heaters less than 75,000 BTU/hr from January 1, 2027 to January 1, 2029.

The table below shows the impacts of delayed implementation of the rules to the proposed compliance dates discussed above. as well as how emissions reductions could be delayed should all compliance dates be delayed to 2035 as presented in Alternative 3 to the 2023 Environmental Impact Report and referenced in the Draft Addendum to the Environmental Impact Report published along with this Preliminary Staff Report.

*Table 5: Impact of Delayed Compliance Dates*

| Year | 2027 and 2031 zero-NOx compliance dates | 2028 and 2033 zero-NOx compliance dates | 2029 and 2033 zero-NOx compliance dates |
|---|---|---|---|
| | Projected Annual Reduction of NOx (tons/yr) vs. baseline | | |
| 2030 | 142 | 106 | 71 |
| 2035 | 363 | 310 | 274 |
| 2040 | 548 | 531 | 495 |
| 2045 | 575 | 575 | 575 |
| 2047 | 575 | 575 | 575 |

Staff does not recommend extending the compliance date beyond 2029 at this time. Rule 9-4 for furnaces currently has compliance deadlines for 2029. In addition, EPA may designate the Bay Area as nonattainment for the 2024 annual National Ambient Air Quality Standard for $PM_{2.5}$, The Air District is still evaluating the emissions reductions that would be needed to attain by the deadline. Extending the compliance date beyond 2029 creates a risk of confusion with the deadlines for furnaces and may create a need for additional rulemaking on other sources and industries in order to comply with federal health standards for $PM_{2.5}$.

### *Impacts of Proposed Amendments – Exemptions*

The proposed amendments to Rule 9-6 presented in this report provide for flexibility in cases where installation of a zero-NOx water heater has been proven through the Implementation Working Group process to pose a potential obstacle to the property owner, either financially or based on the time and potential loss of hot water service that would be experienced by residents. A summary of the proposed exemptions is presented below including estimates of the percentage of Bay Area households that would fall under each exemption.

*Table 6 – Proposed Exemption Percentages*

| Exemption Category | Proposed Regulatory Change | Percentage of Bay Area Households |
|---|---|---|

| | | |
|---|---|---|
| Low Income (less than 80% AMI) and Housing Cost Burdened | 9-6-111 | 19.8%[18] |
| Project Constraints (Electrical and Space) | 9-6-112 | 20%[19] |
| Continued sales of units 30 gallons and below | 9-6-301.5 | 10%[20] |

Given that the purchase of Emergency Replacement Loaner water heaters will not displace zero-NOx water heaters nor be installed permanently, Staff has not estimated an emissions impact associated with the proposed exemption under Section 9-6-114. For businesses with specialized applications and high hot water demand, many may already be utilizing water heaters above the 75,000 btu/hour threshold based on high hot water needs. However, estimated numbers of these businesses are listed below.

- Food service/restaurant facilities - approximately 2,427 food service buildings[21]
- Healthcare clinics and assisted living facilities - while not separate categories, BayREN buildings inventory estimates "Medical - Hospital & Clinic" and "Medical – Other" at 3,021 buildings in the Bay Area[22]
- Laundry, dry cleaner and laundromat - estimates in the Bay Area are not available.

Overall, staff expect the annual number of exemptions granted to specialized business applications to be low as compared to other exemption pathways as described above.

While the estimates above are conservative and staff anticipates that these scenarios may overlap, the proposed exemptions result in approximately half of the initially estimated emissions reductions associated with Rule 9-6 as adopted in 2023 to be potentially exempt. Given the extensive incentives available, especially for low-income property owners, many property owners may voluntarily switch to cleaner water heaters, even though they would be exempt from the regulatory mandate.

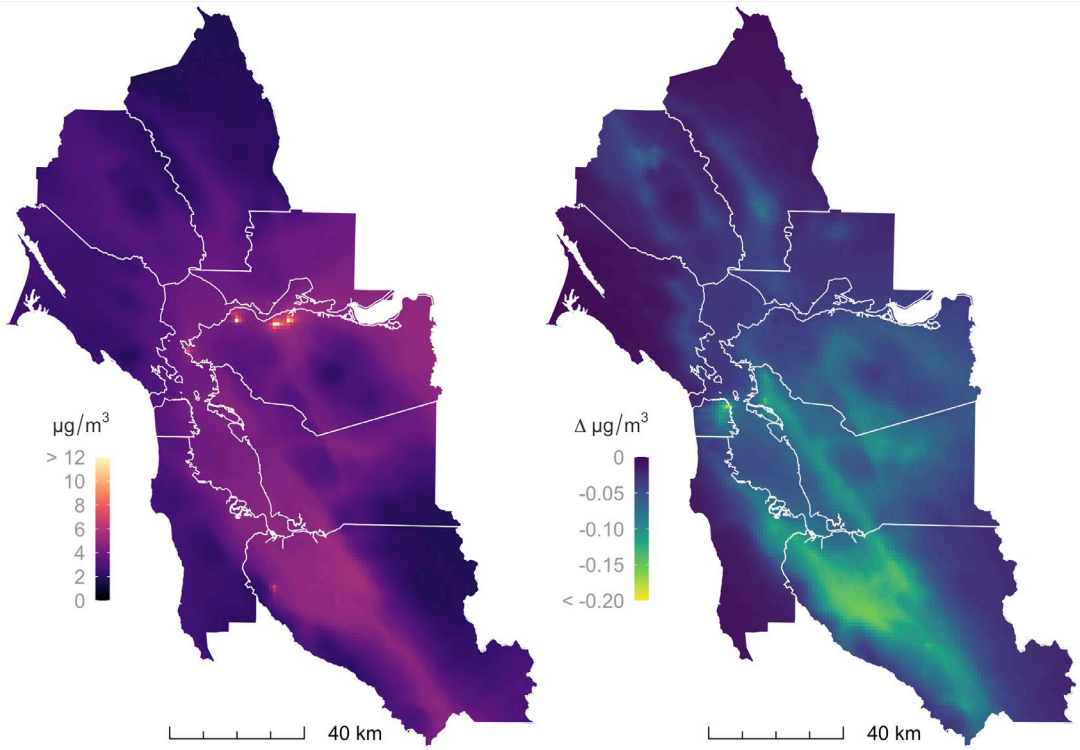
### *Health Modeling Impacts*

Staff considered both health equity and economic equity implications when evaluating future potential amendments to Rule 9-6. From a health equity perspective, the rule is intended to reduce NOx and $PM_{2.5}$ exposure, particularly in communities that have historically experienced higher pollution burdens. At the same time, staff evaluated potential economic impacts on low-income property owners and renters, including whether compliance costs could create financial hardship or housing instability. To address these considerations, the potential rule amendments incorporate targeted exemptions, phased implementation timelines, and other implementation safeguards intended to mitigate potential cost impacts and help preserve access to housing.

[18] American Community Survey Data for 2024; https://www.census.gov/programs-surveys/acs/data.html 564,674 households qualify of 2,845,928 in the Bay Area
[19] Updated Regulatory Overview, July 2026 https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20260713_rule_9_6_regulatory_overview_updated_july_draft_amendment_package-pdf.pdf?rev=f4c5f70f25674a2787eed4d39abc97ab&sc_lang=en
[20] Ibid.
[21] https://bayren-existing-buildings.mtcanalytics.org/
[22] Ibid.

For the zero NOx amendments to Rules 9-4 and 9-6 in 2023, staff evaluated ambient air quality and health impacts from covered appliances. Staff estimated NOx and $PM_{2.5}$ emissions from these sources, as well as their contributions to levels of fine particulate matter exposures.[23] Approximately 60 percent of average $PM_{2.5}$ exposure in the Bay Area associated with the target appliances results from secondary formation driven by NOx emissions. In general, because secondary $PM_{2.5}$ formation requires time and atmospheric transport, exposure to secondary $PM_{2.5}$ occurs at a regional scale rather than near the original emission sources. As a result, certain homes or locations that may forgo local emission reductions due to an exemption would still benefit from region-wide improvements in exposure if the flexibility amendments were implemented. Figure 1, below, depicts the modeled annual average baseline concentrations and reductions of secondary particulate matter attributed to the elimination of emissions associated with appliances impacted by the 2023 zero NOx amendments to Rules 9-4 and 9-6, which accrue on a regional basis.

*Figure 1. Baseline concentrations (left) and reductions (right) for secondary $PM_{2.5}$*




Staff believe that it is too speculative to make assumptions about the locations at which property owners will choose to utilize a certified exemption for project constraints or low-income qualification as there are many factors that would impact this decision. As summarized above, up to 50 percent of small water heaters could be eligible for an exemption or extension of the compliance timeline. However, due to the regional benefit of reduction of secondary fine particulate matter exposure and the focus of Rule 9-6 on the reduction of nitrogen oxides, a precursor for secondary particulate matter, staff does not believe that the flexibility amendments discussed in this document will result in a significantly different disparity in health benefits in

[23] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20221220_sr_appe_rg09040906-pdf.pdf?rev=d4b056153496491fad817c6d4a87df78&sc_lang=en

existing overburdened communities. Additionally, the non-income based exemption pathways are intentionally designed as one-time exemptions so that any disparity does not exist in perpetuity. Staff intend for outreach related materials and the exemption portal to point all projects, including low-income property owners, to available incentives to mitigate any remaining equity concerns.

With regards to renters, under the Air District's flexibility concepts, exemptions would be provided in scenarios requiring significant construction including space and/or electrical constraints. Landlords would *not* be required to install zero NOx water heaters in scenarios that align with "substantial repair" exemptions, thus greatly decreasing "renoviction" risks. Since the remaining projects that would be required will be more standard, average-cost projects, the risk of major pass-through costs will also be reduced as a result.

# VII. ECONOMIC IMPACTS

## *Socioeconomic Impacts*

Eastern Research Group, Inc. (ERG) conducted a socioeconomic analysis of the proposed amendments to 9-6. ERG evaluated the potential impacts of the proposed amendments on Bay Area households, affected populations, and the regional economy. The analysis focused on the incremental costs associated with replacing existing gas-fired water heaters at the end of their equipment life with compliant electric heat pump water heaters. ERG assessed the impacts of these costs on households across income levels and counties.

Across the Bay Area, ERG estimates annualized net compliance costs of approximately $525.5 million for households after accounting for utility bill savings and applicable exemptions. Compared to the current regulatory environment, which accounts for the current zero-NOx requirements outlined in Rule 9-6 as passed in March of 2023 by the Air District Board of Directors, the proposed amendments result in $137.5 million of annual savings across the Bay Area as a result of flexibility measures introduced. Utility savings associated with the transition from gas-fired to electric water heating are estimated to offset approximately $78.7 million of annual compliance costs.

The socioeconomic report estimates that up to 172,800 households per year could be subject to the requirement to replace their water heater in the Bay Area. This number is based on in-scope households required to conduct replacements that are not exempt through the low-income exemptions present in the proposed amendments. This number differs from the approximately 120,000 installations per year that Air District Staff uses elsewhere in this report and other analyses as the lower number accounts for additional households that the Air District expects to be out of scope largely due to existing zero-NOx equipment installation (including equipment installed at properties not serviced by utility natural gas) and other factors to represent what staff believes to be a reasonably likely scenario. Staff may provide updated values for this portion of the socioeconomic analysis as part of the Final Staff Report prior to the Board of Directors hearing on the proposed amendments.

ERG used the IMPLAN regional economic input-output model to evaluate broader regional economic impacts associated with changes in household spending resulting from compliance costs. Comparing the impacts of Rule 9-6 as passed in March of 2023 to those under the proposed amendments results in about 600 fewer jobs lost if the amendments are adopted.

Overall, ERG concludes that the proposed Rule 9-6 amendments are not expected to result in significant socioeconomic impacts for Bay Area households or the regional economy. The combination of relatively modest household compliance costs in percentage terms, anticipated utility savings, and targeted exemptions for low-income households substantially reduce economic burdens under Rule 9-6 while supporting the District's air quality, public health, and emissions reduction objectives.

## *Valuation of Health Impacts*

Air District Staff modeled the health impacts associated with full implementation of Rules 9-4 and 9-6 as adopted by the Board of Directors in 2023. The methodologies and complete results of this analysis can be found in the 2023 Staff Report as well as the related modeling appendices[24]. The results are also summarized in the table below.

[24] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20221220_sr_appe_rg09040906-

*Table 7 - Valuations of reductions in annual average $PM_{2.5}$ concentrations due to an assumed case that eliminates space and water heating natural gas combustion emissions in the Bay Area*

| Health Impact[a] | Total Valuation in 2020 U.S. Dollars, Million Dollars Per Year | |
|---|---|---|
| | Secondary $PM_{2.5}$ | Total $PM_{2.5}$ |
| **Premature mortality** | | |
| All causes[b] | 230–530 | 380–870 |
| **Chronic/severe illness** | | |
| Non-fatal acute myocardial infarction (heart attack) | 0.23–2.1 | 0.38–3.5 |
| Hospital admission, neurological[c] | 0.11 | 0.19 |
| Incidence, out of hospital cardiac arrest | 0.019 | 0.03 |
| Incidence, stroke | 0.059 | 0.096 |
| Incidence, lung cancer | 0.056 | 0.091 |
| **Hospital admissions[d]** | | |
| Respiratory[e] | 0.028 | 0.045 |
| Cardiovascular[f] | 0.055 | 0.090 |
| **ER visits** | | |
| Respiratory[g] | 0.013 | 0.021 |
| Cardiovascular[h] | 0.0084 | 0.014 |
| **Other effects** | | |
| Restricted activity days | 1.9 | 3.2 |
| Work loss days | 1.1 | 1.8 |
| Hay fever/allergic rhinitis | 0.31 | 0.52 |
| **Asthma-related effects** | | |
| Asthma symptoms/albuterol use | 0.0037 | 0.0059 |
| Onset of asthma | 3.6 | 5.8 |
| **Sum** | | |
| All health impacts included | 240–540 | 400–890 |

[a] Each health impact is associated with one or more unique International Classification of Diseases-9-Clinical Modification (ICD-9-CM) code(s) (Medicode, 1996).
[b] Includes all ICD-9 codes.
[c] First hospital admission (cause-specific, to indicate onset of the chronic disease) for dementia, Alzheimer's disease, or Parkinson's disease (ICD-9 codes 290, 331.0, or 332, respectively), and other neurological morbidities.
[d] Hospital admissions due to acute exposure to air pollution are assumed to pass through the emergency room; however, the calculated value of hospital admissions does not account for the cost incurred in the emergency room visit. This strategy avoids double-counting.
[e] Includes all respiratory diseases (ICD-9 codes 460–519).
[f] Includes cardio-, cerebro-, and peripheral vascular diseases (ICD-9 codes 410, omitting 410.x2; 410–414; 426–427; 428; 429; 430–438; 440–448).
[g] Includes respiratory diseases (ICD-9 codes 480–486, 491, 492, 496, 460–465, 466, 477, 493, 786.07).
[h] Includes all cardiac outcomes (ICD-9 codes 390–549).

pdf.pdf?rev=d4b056153496491fad817c6d4a87df78&sc_lang=en;
https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20221220_sr_appf_rg09040906-pdf.pdf?rev=a6f1c065273243b99cffcf290a08fe74&sc_lang=en

These valuations were determined using EPA's May 2021 version BenMAP-CE paired with three sets of health impact functions deemed appropriate for use in the Bay Area. BenMAP-CE was designed to estimate changes in human health due to changes in air pollution levels and to estimate conventional valuations of these impacts (in 2020 U.S. dollars). The valuation process considers the direct and indirect costs of illnesses as well as the willingness to pay to avoid premature death. Direct costs include actual medical costs and lost worker hours, while indirect costs reflect willingness to pay to avoid pain and suffering.

Staff acknowledge a few key updates to the BenMAP methodologies in the time since the 2022 analysis was completed and that the quantified benefits represented above should be understood as a partial accounting for the assumed case that eliminates space and water heating natural gas combustion emissions in the Bay Area. The January 2026 documentation for updated BenMAP modeling shows that some methods have already evolved and that current defaults would raise at least certain morbidity valuations. However, morbidity endpoints comprised less than 5% of the overall reported valuation. Therefore, this 2026 rule review will retain the 2022 assessment as the documented product of the methods, inputs, software, and evidence available for that analysis. Staff's position is that the assessment was conducted appropriately, and that at the present time, no generalized numeric adjustments, recalculations of health impacts or valuations, or re-expressions of results in later dollar years are needed.

However, as detailed in Section VI of this report, emission reductions associated with water heaters account for approximately 18% of the original emissions reductions estimated for the 2023 amendments, as the majority of emissions reductions are associated with appliance replacements under Rule 9-4. The scaled health valuations associated with Rule 9-6 are summarized below.

*Table 8: Scaled Health Valuation*

| Implementation Scenario | Annual Health Savings |
|---|---|
| Elimination of space and water heating natural gas combustion emissions in the Bay Area | Up to $890 million per year |
| Elimination of water heating natural gas combustion emissions in the Bay Area | Up to $160 million per year |
| Valuation assuming low-income exemption usage, complete implementation expected by 2059[25] | Up to $112 million per year |

## *Air District Impacts*

Staff anticipates that the proposed amendments to Rule 9-6 will require additional staff time and resources. The enforcement of the zero-NOx standard is anticipated to result in increased staffing needs for the Compliance and Enforcement Division as well as the Planning and Climate Protection Division.

While inspections to ensure continued compliance are ongoing, general compliance with the non zero-NOx requirements of Rule 9-6 has been established throughout the region. This is supported by the longevity of the existing requirements as well as similar requirements

[25] Complete implementation by 2059 takes into account proposed 2028 and 2033 implementation dates as well as one-time exemption usage, assuming a 13 year average life span for a water heater

throughout the state. As such, review of certifications has been streamlined and point-of-sale enforcement is not currently resource intensive for the Air District.

In order to support the proposed exemption process and associated enforcement review required to ensure implementation, Staff anticipates that the Air District will require at least 3 full time equivalent employees to be added to the existing Air District structure and budget to ensure compliance. In addition, Staff tasked with implementation will continue to explore the needs associated with specific aspects of implementation including software and technology integration of the exemption process with retailers and customer access points such call center staffing or other customer service response. While not currently estimated, Staff expects additional cost to the Air District associated with complete implementation of the rules and any additional programs proposed will follow the Board of Directors' public process for approval of use of funds.

# VIII. REGULATORY IMPACTS

Section 40727.2 of the California Health and Safety Code requires an air district, when adopting, amending, or repealing a regulation, to identify existing federal, state, and local air-pollution-control requirements applicable to the source category affected by the proposed amendments and to describe any differences between those requirements and the proposed rule.

The amendments proposed in this Staff Report modify the implementation framework associated with Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters ("Rule 9-6"), which was amended by the Air District Board of Directors in March 2023 to establish future zero-NOx performance requirements for covered water-heating equipment.

Unlike the 2023 rulemaking, the current amendments do not establish a new emissions performance standard. Rather, the amendments modify implementation timelines, establish a structured exemption framework, create exemption-certificate procedures, establish new notice and reporting requirements, and update recordkeeping responsibilities associated with Rule 9-6.

## *Existing Regulatory Requirements*

Rule 9-6 currently regulates emissions of nitrogen oxides from covered natural gas-fired water heaters and boilers sold and installed within the Air District. The rule contains emissions standards, certification requirements, testing procedures, and compliance provisions applicable to covered equipment.

The rule does not require removal of existing equipment and applies at the point of sale, installation, and manufacture of covered equipment.

The 2023 amendments established future zero-NOx standards with compliance dates beginning in 2027 for smaller water-heating equipment and 2031 for larger water heaters and boilers.

## *Proposed Regulatory Changes*

The proposed amendments make several changes to the existing regulatory framework:

- Revise compliance dates to January 1, 2028 and January 1, 2033;
- Establish a structured exemption framework;
- Create exemption-certificate procedures;
- Add new definitions necessary to administer the exemption provisions;
- Implement contractor reporting requirements for temporary loaner equipment;
- Establish point-of-sale notification requirements;
- Expand seller and contractor recordkeeping requirements; and
- Simplify certain certification and interim-reporting provisions adopted in 2023.

## *Relationship to State and Regional Efforts*

The Air District continues to coordinate with other agencies evaluating emissions from building appliances.

The California Air Resources Board (CARB) is developing statewide clean space and water heater standards focused primarily on reducing greenhouse-gas emissions from newly sold appliances. CARB has stated that any future statewide requirements are intended to complement rather than replace local air-district regulations addressing emissions of nitrogen oxides. Manufacturers would be required to comply with both applicable state and local

requirements.

The South Coast Air Quality Management District (SCAQMD) has also continued rule-development efforts related to emissions from residential and commercial water-heating and space-heating equipment. In June 2024, SCAQMD adopted amendments to Rule 1146.2. SCAQMD also considered amendments to Rule 1111 and Rule 1121, although those amendments were not adopted by the Governing Board in June 2025.

The Air District's proposed amendments are therefore consistent with broader regulatory efforts occurring throughout California while remaining focused on implementation of Rule 9-6 within the Bay Area.

### *Federal Requirements*

There are currently no federal regulations that establish point-of-sale NOx emission standards equivalent to those contained in Rule 9-6 for the covered categories of residential and commercial water-heating equipment.

The proposed amendments therefore do not duplicate existing federal requirements.

### *Effect on Existing Rule Requirements*

The proposed amendments do not alter the fundamental emissions-reduction framework established by the Board in 2023. The amendments retain the underlying zero-NOx performance requirements while introducing implementation mechanisms intended to address affordability concerns, installation constraints, and equitable deployment of compliant technologies.

Because the amendments primarily affect implementation rather than emissions-performance requirements, they are intended to facilitate successful compliance with Rule 9-6 while preserving the long-term emissions-reduction objectives established by the Board of Directors.

# IX. ENVIRONMENTAL IMPACTS

The California Environmental Quality Act (CEQA) requires public agencies to evaluate the environmental impacts of discretionary actions and determine whether those actions may result in significant environmental effects.

The Air District previously evaluated the environmental impacts associated with the 2023 amendments to Rule 9-6 through preparation and certification of an Environmental Impact Report (EIR).[26] The current amendment package modifies implementation provisions associated with Rule 9-6 but does not alter the long-term emissions-reduction objectives established by the Board of Directors in 2023.

## *Overview of Previously Certified Environmental Review*

The Environmental Impact Report certified in 2023 evaluated the environmental impacts associated with implementation of future zero-NOx standards for covered water-heating equipment. The analysis concluded that the rule would result in beneficial air-quality and greenhouse-gas impacts through reductions in combustion-related emissions from water-heating equipment.

The EIR also identified potentially significant impacts associated with:

- Utility and service systems;
- Energy demand;
- Electrical infrastructure requirements; and
- Operational noise associated with certain heat-pump technologies.

The EIR evaluated several project alternatives, including alternatives with delayed implementation schedules, and concluded that delayed implementation could reduce certain environmental impacts while delaying realization of expected air-quality benefits.

## *Environmental Review for the Proposed Flexibility Amendments*

The proposed amendments do not change the underlying zero-NOx performance standard adopted in 2023. Instead, the amendments revise compliance schedules, establish a targeted exemption framework, create exemption-certificate procedures, and implement other administrative provisions intended to address affordability concerns and installation barriers identified through the implementation-review process.

Compliance with CEQA requirements is complete with the publishing of an addendum to the previously certified EIR completed for this project. The addendum evaluates whether the proposed amendments:

- Create any new significant environmental impacts;
- Result in substantially more severe impacts than those previously analyzed;
- Introduce new information that changes the conclusions of the certified EIR; or
- Require additional environmental review under CEQA.

In particular, the original EIR already evaluated alternative implementation scenarios involving delayed compliance schedules including a delay of all compliance dates to 2035. Because the current amendments primarily revise implementation timing and establish flexibility mechanisms rather than changing the underlying emissions-performance standard, the environmental analysis conducted in 2023, and specifically the 2035 alternatives analysis

[26] Final Environmental Impact Report for Proposed Amendments to Rule 9-4 and Rule 9-6 https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20230307_feir_rules0904and0906-pdf.pdf?rev=7e8845220137443fb2cf6771fed7caf2

remains directly relevant.

### *Basis for the Addendum Approach*

A key consideration supporting the Addendum approach is that the compliance dates established in the 2023 amendments have not yet taken effect.

As a result:

- The January 1, 2027 compliance date has not occurred;
- The January 1, 2031 compliance date has not occurred;
- Emissions reductions anticipated under the original rule have not yet been realized;
- Associated implementation activities have not yet occurred to a meaningful extent; and
- The environmental changes evaluated in the original EIR have not yet been triggered.

Consequently, the proposed amendments do not reverse environmental benefits that have already occurred, nor do they eliminate emissions reductions that have already been achieved.

Instead, the amendments primarily affect the timing and implementation pathway associated with future compliance.

### *Air Quality and Greenhouse Gas Impacts*

The certified 2023 EIR concluded that implementation of Rule 9-6 would produce beneficial air-quality and greenhouse-gas impacts through reductions in combustion-related emissions at both the compliance schedule intended in 2023 as well as with a 2035 compliance date as analyzed in the alternatives analysis.

The proposed amendments retain the underlying zero-NOx performance requirements. However, revised compliance dates and targeted exemptions may affect the timing and magnitude of near-term emissions reductions relative to the implementation scenario evaluated in the original EIR as described in Section VI.

# X. RULE DEVELOPMENT / PUBLIC PARTICIPATION PROCESS

## *Public Participation During Development of the Flexibility Amendments*

The flexibility amendments proposed in this Staff Report are the result of an extensive implementation-review process conducted following adoption of the 2023 Rule 9-6 amendments. Unlike the original rulemaking effort, which focused primarily on technology readiness and future market availability, the subsequent implementation-review process focused on evaluating actual implementation experience, affordability considerations, installation barriers, and equitable access to compliant technologies.

Following adoption of the 2023 amendments, the Air District initiated a multi-year implementation-review effort consisting of Implementation Working Group meetings, market assessments, contractor outreach, distributor outreach, Board updates, Stationary Source Committee discussions, and stakeholder-engagement activities. These efforts were intended to evaluate whether assumptions made during the original rulemaking remained valid as implementation approached and to identify barriers that could affect successful implementation of Rule 9-6.

The Air District's Building Appliances Implementation Working Group (IWG) served as the primary mechanism for gathering technical information, market data, stakeholder feedback, and implementation experience. The IWG included more than 40 invited members representing manufacturers, contractors, labor organizations, utilities, local governments, affordable-housing stakeholders, community organizations, environmental organizations, and technical experts. The IWG was organized around a Technical Subcommittee, Community/Equity Subcommittee, and Steering Committee and was supported by an independent facilitator.

Between May 2023 and August 2024, Air District staff hosted more than twenty IWG meetings, including plenary sessions, Technical Subcommittee meetings, Community/Equity Subcommittee meetings, and Steering Committee meetings. Information generated through these meetings ultimately informed the December 2024 implementation report and development of the flexibility amendments proposed in this Staff Report.

## *Rule Development Milestones*

Major milestones associated with development of the flexibility amendments include:

- **March 15, 2023** – Board adoption of Rule 9-6 amendments.
- **May 2023 – August 2024** – Building Appliances Implementation Working Group process, including more than twenty meetings.
- **December 4 and 11, 2024** – Board consideration of *Informational Update Regarding Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters less than 75,000 BTU/hr*.
- **October 2025** – Release of *Concepts for Rule 9-6 Amendments: Affordability and Availability Considerations for Zero NOx Small Water Heaters* and opening of a 30-day public comment period.
- **December 10, 2025** – Stationary Source Committee discussion of comments received on the Concepts Paper and review of affordability-focused implementation concepts.
- **February 11, 2026** – Stationary Source Committee review of low-income qualification approaches and additional flexibility concepts.

- **May 6 and May 13, 2026** – Board discussion of the Regulatory Overview and flexibility-amendment concepts. The May 13 meeting continued discussion following loss of quorum on May 6.
- **July 14 – August 13, 2026** – Public review period for draft Rule 9-6 amendments, draft regulatory language, and the Updated Regulatory Overview. Written comments were accepted through the Air District's online comment portal.
- **September 2026** – Release of Draft Staff Report and Proposed Rule Language
- **November 2026 (anticipated)** – Board consideration of the proposed Rule 9-6 flexibility amendments

### *Considerations to Ensure Equitable Outcomes*

Throughout the implementation-review process, stakeholders consistently emphasized the importance of balancing public-health and air-quality benefits with affordability and equitable access to compliant technologies. Discussions focused on ensuring that implementation of Rule 9-6 does not disproportionately burden:

- Low-income households;
- Housing cost-burdened property owners;
- Affordable-housing providers;
- Multifamily property owners;
- Customers facing electrical constraints;
- Customers facing space-constrained installations; and
- Businesses that rely heavily on hot-water availability.

The proposed exemption framework, revised compliance dates, and administrative provisions were developed specifically to address these implementation concerns while maintaining the long-term emissions-reduction objectives of Rule 9-6.

### *Overview of Comments Received on Draft Amendments*

The Air District released draft Rule 9-6 flexibility amendments, draft regulatory language, and an Updated Regulatory Overview for public review on July 14, 2026. Written comments were accepted through August 13, 2026.

The public-review process generated substantial participation from community members, environmental organizations, industry representatives, contractors, housing stakeholders, local governments, and other interested parties. A total of 699 comments and submissions were submitted on the draft amendments. In addition, the Air District received a petition submitted through the Sierra Club that included 1,435 signatories supporting retention of the core Rule 9-6 emissions standards while supporting targeted flexibility measures. This resulted in approximately 2,134 expressions of public input associated with the amendment package. The comments broke down as follows:

*Table 9: Draft Amendment Comments Summary*

| Comment Focus | Count of Comments |
|---|---|
| Directly addressed the draft amendments | 235 |
| Primarily commented on the underlying rule or other broader issues | 464 |
| Pettion signatures that Support Rule 9-6 and targeted flexibility to address implementation and affordability concerns | 1,435 |

The 464 comments that did not address the draft amendments mainly expressed concern regarding regulation of natural gas-fired appliances generally or expressed concerns about cost of compliance with the 2023 rule for situations that will be addressed by the exemptions introduced in the draft amendments. Of the 235 individual comments received that directly addressed the draft amendments:

- 135 comments generally supported amendments to Rule 9-6 and provided comments suggesting edits and clarifications, many of which are reflected in the proposed amendments;
- 75 comments supported additional or broader flexibility amendments;
- 25 comments supported narrower exemptions and greater rule stringency than presented in the draft amendments.

Comments received throughout the implementation-review process consistently focused on:

- Affordability and installation costs;
- Consumer choice and regulatory authority concerns;
- Scope and administration of exemptions;
- Multifamily housing and renter impacts;
- Space and structural feasibility;
- Timing of implementation;
- Electrical-service and utility constraints;
- Technology readiness and equipment performance; and
- Emergency replacement challenges.

Supportive commenters generally emphasized:

- Public-health benefits associated with NOx reductions;
- Improved air quality;
- Reduced pollution exposure;
- Climate and electrification benefits; and
- Continued support for Rule 9-6's long-term emissions-reduction objectives.

Many commenters expressed support for targeted implementation flexibility and assistance for lower-income households while cautioning against broad exemptions that could substantially reduce emissions benefits.

Staff Response

The comments received during the implementation-review process reinforced many of the findings developed through the IWG and supporting technical studies. In particular, commenters consistently focused on affordability, installation constraints, emergency replacement situations, and administrative simplicity rather than concerns regarding basic technology availability. The exemption framework, revised compliance dates, emergency-loaner provisions, multifamily housing provisions, contractor-reporting requirements, and streamlined administrative processes proposed in this Staff Report are intended to address many of these concerns while preserving the long-term emissions-reduction framework adopted by the Board in 2023.

### *Planned Continued Outreach*

The *Air District's* communication and outreach effort is being implemented through a phased approac*h* designed to build awareness and support for the transition to zero-NOx appliances. During Phase I, *up until this point*, outreach activities have focused on developing clear, audience-specific messaging, conducting a baseline public awareness survey, and launching

media, contractor, and social media engagement efforts. Following Board action *on the proposed amendments*, Phase II will expand communications through a local advertising campaign and enhanced community outreach, including door-to-door engagement, with clear timelines and calls to action for affected stakeholders. Beginning in 2027 and continuing thereafter *through the implementation dates outlined in the proposed amendments*, Phase III *intends to* maintain ongoing advertising, public relations, stakeholder engagement, and social media outreach to support public awareness and implementation of program requirements.

## *Coordinated Efforts*

### Available Programs, Incentives, and Technical Resources

A growing network of regional agencies, utilities, and local governments is working to support heat pump water heater (HPWH) adoption by providing incentives, technical assistance, streamlined permitting, and customer education. BayREN offers programs and resources for single-family homeowners, multifamily property owners, and small businesses, along with training and technical resources for local building departments. PG&E provides customer-facing tools such as buyer guides, cost and savings calculators, contractor selection resources, and information on avoiding unnecessary electrical panel upgrades. Funding and incentive programs are also available through local load-serving entities and community choice aggregators, although access is dependent on the customers location within the Bay Area.

To improve public access to current information, the Air District continues to encourage organizations offering incentives, rebates, financing, or other assistance to register their programs with The Switch Is On[27], which serves as a centralized resource for Bay Area residents.

### Regional Coordination and Rule 9-6 Implementation Support

Regional coordination efforts are underway to support implementation of Rule 9-6. The San Francisco Environment Department is leading a collaboration among cities, counties, utilities, nonprofit organizations, and technical experts to reduce barriers to HPWH adoption. Key focus areas include lowering equipment, labor, permitting, and inspection costs; addressing common electrical and space constraints; expanding homeowner technical and financial assistance; and sharing successful local practices.

Current activities include development of a regional electrification campaign, standardized outreach materials, coordinated communications, and expanded engagement with homeowners and property managers. These efforts are intended to increase awareness of available resources and support broader HPWH adoption throughout the Bay Area. The Air District will continue to coordinate with local jurisdictions and working groups to assist in smooth implementation of the proposed rule amendments.`

### Legislative Updates

Senate Bill 222 (Wiener) is set to streamline permitting and inspections for residential heat pump water heaters and heat pump HVAC systems by requiring electronic permitting, allowing asynchronous inspections, and establishing online instant permits for simple replacement projects. The bill also limits local requirements that create barriers to heat pump installations and establish permit fee caps for qualifying projects. SB 222 was signed into law in September 2026. The bill is expected to reduce installation costs, simplify the permitting process, and accelerate adoption of heat pump technologies statewide.

[27] https://www.switchison.org/

Local Permitting and Incentive Best Practices

Several jurisdictions and load-serving entities have already implemented programs that align with the goals of Rule 9-6 and SB 222. Examples include instant or same-day permitting programs in Palo Alto, San José, and San Francisco; simplified permitting pathways in Santa Clara; permit fee rebates; alternative electrical load calculation methods that can help avoid panel upgrades; and incentive programs such as smart panel rebates.

These local efforts demonstrate how streamlined permitting, technical assistance, and financial incentives can reduce project costs, improve the customer experience, and support increased adoption of heat pump water heaters.

# XI. CONCLUSION/RECOMMENDATIONS

Pursuant to California Health and Safety Code Section 40727, before adopting, amending, or repealing a rule, the Board of Directors must make findings of necessity, authority, clarity, consistency, non-duplication, and reference. The following discussion addresses each of these findings for the proposed amendments to Rule 9-6.

## *Necessity*

California Health and Safety Code Section 40727(b)(1) provides that a regulation must be necessary, meaning that a need exists for the regulation or amendment as demonstrated by the rulemaking record.

The Bay Area continues to face significant air-quality challenges associated with emissions of nitrogen oxides (NOx), including impacts related to ozone formation and secondary particulate matter. Rule 9-6 remains an important component of the Air District's strategy for reducing emissions from residential, multifamily, institutional, and commercial water-heating equipment.

The proposed amendments are necessary to support successful implementation of the Rule 9-6 zero-NOx standards adopted by the Board in 2023. Information gathered through the Air District's implementation review process, the Implementation Working Group, market assessments, contractor outreach, affordability analyses, socioeconomic research, and stakeholder engagement demonstrated that the principal implementation challenges associated with Rule 9-6 are now concentrated around affordability, installation constraints, electrical limitations, multifamily housing considerations, affordable-housing impacts, and emergency replacement situations.

The amendments address these issues through revised compliance timelines, a structured exemption framework, streamlined administrative procedures, and targeted implementation flexibility while preserving the long-term emissions-reduction objectives established by the Board. The amendments are therefore necessary to promote practical, equitable, and successful implementation of Rule 9-6 throughout the Air District.

## *Authority*

California Health and Safety Code Section 40727(b)(2) defines authority as the legal basis permitting an air district to adopt, amend, or repeal a regulation.

The Air District has authority to adopt these amendments pursuant to California Health and Safety Code Sections 40000, 40001, 40702, and 40725 through 40728.5.

## *Clarity*

California Health and Safety Code Section 40727(b)(3) requires that regulations be written so their meaning can be easily understood by affected persons.

The proposed amendments improve clarity by:

- Updating compliance schedules;
- Adding clearly defined exemption categories;
- Establishing exemption-certificate procedures;
- Clarifying contractor, retailer, distributor, purchaser, and installer responsibilities;
- Adding notice and reporting requirements;
- Expanding recordkeeping provisions; and
- Adding new definitions necessary to support implementation of the rule.

The amendments are intended to provide clear and predictable implementation pathways for equipment owners, contractors, retailers, distributors, manufacturers, and consumers.

### *Consistency*

California Health and Safety Code Section 40727(b)(4) requires that regulations be consistent with applicable state and federal law.

The proposed amendments are consistent with existing Rule 9-6 requirements and do not alter the underlying emissions-performance standards established by the Board in 2023. The amendments are also consistent with the Board's direction to evaluate implementation conditions and develop appropriate implementation-flexibility measures based on information gathered following adoption of the 2023 amendments.

The amendments complement ongoing state and regional efforts to reduce emissions associated with building appliances while continuing to support the Air District's air-quality and public-health objectives.

### *Non-Duplication*

California Health and Safety Code Section 40727(b)(5) requires that regulations not duplicate existing state or federal requirements unless necessary to carry out the responsibilities of the Air District.

The proposed amendments are not duplicative of any existing federal or state regulation. The amendments establish implementation provisions specific to Rule 9-6 and are intended to facilitate administration of the Air District's existing authority to regulate emissions from water-heating equipment sold and installed within its jurisdiction.

### *Reference*

California Health and Safety Code Section 40727(b)(6) requires identification of the statutes, court decisions, or other legal authorities being implemented, interpreted, or made specific by the regulation.

The proposed amendments implement, interpret, and make specific the provisions of California Health and Safety Code Sections 40000, 40001, 40702, and 40725 through 40728.5.

### *Recommendations*

Based on the information presented in this Staff Report, Air District staff concludes that the proposed amendments will facilitate successful implementation of Rule 9-6 while maintaining the long-term emissions-reduction objectives adopted by the Board in 2023.

The implementation review process demonstrated that compliant water-heating technologies are increasingly available and commercially established. However, the review also identified continuing challenges associated with affordability, electrical-service limitations, installation constraints, multifamily housing systems, affordable-housing projects, and emergency replacement situations. The proposed amendments are specifically intended to address those challenges while preserving the long-term public-health and air-quality benefits associated with the Rule 9-6 zero-NOx requirements.

Accordingly, Air District staff recommends that the Board of Directors:

1. Adopt the proposed amendments to Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters;
2. Approve the revised compliance dates for covered Rule 9-6 equipment;
3. Approve the exemption framework and associated administrative requirements, including exemption certificates, notice requirements, reporting provisions, and recordkeeping requirements;

4. Approve the implementation provisions intended to address affordability concerns, installation constraints, multifamily-housing considerations, affordable-housing considerations, and emergency replacement situations;
5. Adopt the applicable CEQA findings and approve the CEQA documentation prepared for the proposed amendments; and
6. Direct staff to continue implementation-support activities, compliance assistance, and future reporting related to Rule 9-6 as appropriate.

The proposed amendments are intended to preserve the long-term public-health and air-quality benefits of Rule 9-6 while improving affordability, implementation practicality, and equitable access to compliance pathways. Staff therefore recommends adoption of the proposed amendments.