UPDATED REGULATORY OVERVIEW: RULE 9-6 DRAFT FLEXIBILITY AMENDMENTS

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Bay Area Air District

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Executive Summary

In March 2023, the Bay Area Air District Board of Directors adopted amendments to Regulation 9, Rule 6 ("Rule 9-6") that established a zero nitrogen oxides (NOx) standard for all sales and installations of covered water heaters beginning with those manufactured after January 1, 2027. These amendments did not include any flexibilities or exemptions for any potential extenuating circumstances. Over the past two years, Air District Staff have collaborated with stakeholders to develop and refine potential amendments to introduce flexibility into the zero NOx standard, with the intention of easing requirements and potential cost impacts and provide options for an easier transition.

The Air District convened an external Implementation Working Group (IWG) comprised of over 40 members representing a variety of stakeholder segments to identify and compile potential solutions to identify implementation barriers. The IWG's focus areas included technology readiness, costs, permitting, workforce, grid capacity, and equitable access to incentives and financing. Over 20 IWG meetings were held between May 2023 and August 2024 that informed staff's December 2024 Board update and subsequent October 2025 preliminary concepts paper for flexibility and affordability amendments.

This Updated Regulatory Overview is being released in tandem with draft amendments to Rule 9-6 for public review and comment in advance of a final rule proposal and anticipated hearing of the Air District Board of Directors in November 2026.

The draft amendments include delayed implementation dates for zero NOx standards for water heaters as follows:

January 1, 2028	Water heaters less than 75,001 BTU/hr[1] (typically residential tank water heaters)
January 1, 2033	Water heaters between 75,001 and 2 million BTU/hr (typically commercial and multifamily as well as tankless units)

The draft amendments included in these draft amendments include additional exemptions from the zero NOx standard for:

- Challenging installations due to space constraints (one-time exemption)
- Existing electrical system or panel upgrades (one-time exemption)
- Low-income qualified property owners

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

- Water heaters with a capacity of less than 30 gallons
- Hydronic water heating systems (delay until 2031)
- Multifamily and deed-restricted affordable housing installations (delay until 2033)
- Businesses with high-heat demand (Examples: restaurants, healthcare, dry cleaners, etc.)
- Temporary emergency gas water heater installed by licensed contractors

The draft amendments also include additional registration, reporting and recordkeeping requirements to ensure compliance with the zero NOx standards and associated exemption provisions.

Staff estimate that the average incremental cost to install a heat pump water heater for a "standard" project is approximately $3,500. Of this, the incremental retail cost of a heat pump water heater as compared to a new natural-gas fired unit ranges from $600 - $1,600. The remaining cost difference is due to additional labor to install the unit.

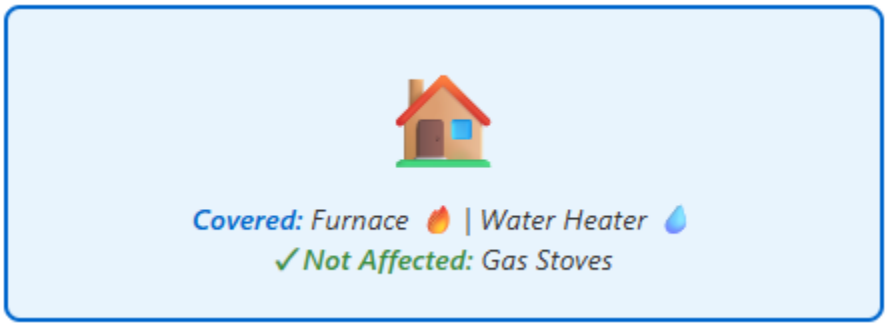
Income-based eligibility exemptions for low-income or housing cost burdened property owners would account for approximately 18 percent of installations. Project or building constraints, such as space or electrical limitations, account for another 20 percent of installations.

Staff plans to provide a mobile-friendly website for property owners to request and immediately receive exemptions. The goal is to make that process as fast and seamless as possible while ensuring that rule requirements are met.

Introduction: Rules 9-4 & 9-6

The Bay Area Air District has two adopted building appliance rules that address pollution from gas fueled equipment in buildings.[2]

- Regulation 9, Rule 4: Nitrogen Oxides from Fan Type Residential Central Furnaces, which regulates small residential and commercial furnaces that heat indoor air
- Regulation 9, Rule 6: Nitrogen Oxides from Natural Gas-Fired Boilers and Water Heaters regulates natural gas water heaters and small boilers that are used to heat water
- These rules **do not** apply to gas stoves, laundry drying, or any other appliance that may use natural gas.



Rules 9-4 and 9-6 were first ***adopted more than 30 years ago*** to reduce nitrogen oxides (NOx) emissions from these everyday appliances, because NOx contributes to the formation smog and fine particles (i.e. particulate matter, or PM) that result in harmful health effects.

In March 2023, the Board adopted amendments to Rules 9-4 and 9-6 that tighten ***"point-of-purchase"*** emission standards for small furnaces and water heaters, including new zero NOx standards that start to phase in between 2027 and 2031 depending on the size and type of equipment. These updated standards apply to the new replacement appliances that would be installed when an existing appliance reaches the end of its life ("burn out") and needs to be replaced, and to new equipment manufactured after the future compliance dates.

[2] https://www.baaqmd.gov/en/rules-and-compliance/rule-development/building-appliances

Clarifying Common Misconceptions

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 1** 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 1. 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 btu rating 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**
This rule applies to stoves, ovens and dryers	**The rule does not apply to stoves, ovens, nor dryers.**

Health Benefits from Implementing Rules 9-4 & 9-6 Amendments

By phasing out polluting gas furnaces and water heaters starting in 2027, Rules 9-4 and 9-6 will help clean up the air we all breathe, prevent dozens of early deaths every year, and save

the region hundreds of millions of dollars in health costs. A summary of the health benefits is shown in the table below.[3]

Table 2. Health Benefits from Rule 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**

[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

[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

Background

Current Status and Compliance Timeline

For the past 30 years, the Air District has been updating these rules to reflect newer, cleaner technologies and to help meet the region's clean air goals. In March 2023, the Board adopted amendments to Rules 9-4 and 9-6 that tighten ***"point-of-purchase"*** emission standards for small furnaces and water heaters, including new zero NOx standards that start to phase in between 2027 and 2031 depending on the size and type of equipment. These updated standards apply to the new replacement appliances that would be installed when an existing appliance reaches the end of its life ("burn out") and needs to be replaced, and to new equipment manufactured after the future compliance dates. The current compliance schedule for zero NOx equipment is shown below.

Table 3. Current Compliance Schedule for Rules 9-4 and 9-6[5]

January 1, 2027	Water heaters less than 75,001 BTU/hr[6] (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)

Together, Rules 9-4 and 9-6 are a key part of the Air District's broader strategy to reduce air pollution from stationary sources, including buildings. The staff's technical analysis for these rules clearly show that emissions from gas furnaces and water heaters affect both local and regional air quality, contribute to ozone and secondary particulate matter formation, and exacerbate health and equity concerns in the Bay Area.

The 2023 amendments to Rules 9-4 and 9-6 included a provision to report back to the Board of Directors two years prior to each implementation date on the current state of available technologies, costs and other potential implementation challenges. The Board of

[5] 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 "Overview of Draft Amendments" 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.

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

Directors directed staff to include a provision in the 2023 amendments to establish an Implementation Working Group, consisting of a wide spectrum of stakeholders, and called for the corresponding report to inform any further changes to the rules.

Table 4 below summarizes the Board's actions over time, showing what has happened so far and where the rule currently stands. This timeline provides context for how Rule 9-6 has progressed from adoption to subsequent discussions regarding updates and flexibility.

Table 4. Post-Adoption Timeline of Regulatory Events for Rules 9-4 & 9-6

Date	What happened?	Brief description
March 15, 2023	The Board of Directors adopted amendments to 9-4 & 9-6. The Board also directed staff to come back with a Rule 9-6 implementation report in 2024.	The Board held a public hearing and adopted the proposed amendments to Rules 9-4 and 9-6, and certified the CEQA Environmental Impact Report, formally approving the new zero NOx standards and related requirements.
June 21, 2023	The Board heard details on SIP submittal of Rules 9-4 & 9-6	The Board of Directors held a public hearing and directed staff to submit the current versions of Rules 9-4 and 9-6 to U.S. EPA and the California Air Resources Board for inclusion in the State Implementation Plan (SIP). That process is currently on hold while the Air District develops its attainment plan for the new $PM_{2.5}$ air quality standard.
December 4, 2024	The Board received information on staff's research on Rule 9-6 implementation per the 2023 direction.	Staff presented informational updates on implementation readiness of the zero NOx requirements for residential water heaters under Rule 9-6, summarizing the Implementation

Date	What happened?	Brief description
		Working Group findings and professional research in a Rule 9-6 Implementation Report.[7]
October 2025	Public Release of Rule 9-6 Concepts Paper (flexibility options)	Staff released the **Rule 9-6 Concepts Paper**, outlining potential flexibility concepts for amending Rule 9-6. The flexibility amendments are a result of findings from the 2024 implementation report that recognized constraints for seamless adoption of Rule 9-6.[8]
December 10, 2025	The Stationary Source Committee received information from staff on potential flexibility amendments based on affordability and availability issues for Rule 9-6.	Staff presented informational updates on flexibility amendments to Rule 9-6 which would address issues that would make the rule more practical to implement. Staff's discussion highlighted the concept paper and the public comments received on the concept paper. ***The Committee directed staff to come back with information on possible exemptions for low-income property owners.***
February 11, 2026	Per direction from the 12/10/2025 Stationary Source Committee meeting, staff presented specifics on options for defining and qualifying low-income affordability	Staff presented to the Stationary Source Committee on: 1. Who qualifies as "low-income" – presenting two options including different income limits as well as considerations for housing cost burden

[7] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20241127_board-report-dec-2024-pdf.pdf?rev=f9b89cc7ceb54588b5c505d6f20635e3&sc_lang=en

[8] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/rule-09_06-concepts-paper_final-v1-pdf.pdf?rev=9eac6fc7a84e4b259fd2017c838de68c&sc_lang=en

Date	What happened?	Brief description
		2. How much does it cost to help low-income households switch to cleaner water heaters ***The Committee directed staff to return in May 2026 with a full set of final options so the full Board can give clear directions on how to proceed with the rule.***
May 6 & 13, 2026	Staff presented the initial Regulatory Overview and flexibility concepts for Board of Directors discussion and direction	Staff presented on flexibility concepts including exemptions for space and electrical constraints, low income and housing cost burdened property owners, as well as delays for hydronic and small units and reporting requirements. ***The Board of Directors directed staff to continue in developing flexibility amendments and to release draft language for public review and comment.***

Implementation Working Group

As part of the 2023 zero NOx amendments, the Board required that two years prior to each compliance date, staff must provide updates to the Board regarding implementation challenges, especially focused on concerns raised by stakeholders during rulemaking—such as costs, workforce, market development, and equity issues in terms of incentives and tenant impacts. With this direction, staff coordinated and led a multi-stakeholder Implementation Working Group (IWG) focusing primarily on the Rule 9-6 amendments (IWG Phase 1), holding **21 meetings** from May 2023 through August 2024[9] to provide input on those topics relevant to January 2027 implementation for small water heaters less than 75,000 BTU/hr. Members included industry representatives, union representatives, industry associations, local governments, utilities, community choice aggregators and subject matter expert organizations, among others.

[9] https://www.baaqmd.gov/community-health/building-appliances-rule-implementation/building-appliances-implementation-working-group

The IWG was comprised of various subcommittees. The Technical Subcommittee compiled and reviewed the most up-to-date technical information relevant to implementing Rule 9-6 to present to the Working Group, such as market availability and projected cost of compliant appliances, and potential financial incentives for consumers. The Technical Subcommittee also provides recommendations for the Working Group and/or Steering Committee to consider.

IWG Phase 1 Findings

Overall, staff found that even in just a short two-year timeframe (2023-2024), several significant challenges brought up during the 2022 rulemaking process had been mitigated or were found not to be major barriers to Rule 9-6 implementation (e.g., water heater impacts to the grid and reliability, market readiness including post-Covid supply chain, workforce availability, and local jurisdictional permit streamlining). However, some challenges remain, and staff's overall recommendation highlighted the need for future flexibility and amending the 100 percent sales requirement. To review all findings, please see the IWG Phase 1 Staff Report *Informational Update Regarding Regulation 9, Rule 6* ,[10] which was presented to the Board of Directors in December 2024.

The following table provides a brief overview of the milestone deliverables prepared for the Building Appliances Implementation Working Group. Each technical report addresses a distinct implementation issue and helped inform the Air District's analysis of Rule 9-6 implementation.

Table 5. Technical Research on Implementation Issues

Technical Report	Brief Description
Installation Costs for Zero NOx Space and Water Heating Appliances	Updates the estimated installation costs of zero NOx heating appliances and how incentives affect household bills and upfront costs.
Workforce Challenges for Zero NOx Requirements	Reviews contractor availability, training needs, and workforce readiness for heat pump adoption.

[10] https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20241127_board-report-dec-2024-pdf.pdf?rev=f9b89cc7ceb54588b5c505d6f20635e3

Technical Report	Brief Description
Challenging Use Cases and Emerging Solutions for Zero NOx Appliances	Identifies difficult retrofit situations and summarizes practical solutions for constrained sites.
Renter Protections Policy Landscape Summary	Reviews renter-protection policies and suggests ways to reduce possible negative impacts on tenants.
Market and Sales Trends for Zero NOx Appliances	Summarizes market conditions, sales trends, and contractor input on the current and future heat pump market.
Permitting Requirements for Zero NOx Appliances	Describes permitting barriers, requirements, and best practices for installing zero NOx appliances.
Grid Reliability and Interconnection Challenges	Examines concerns about electric grid reliability, service upgrades, outages, and appliance-level performance.
Lived Experience Interviews Summary	Summarizes renter interviews on housing insecurity, displacement, energy burden, and other quality-of-life impacts.

Overview of Draft Rule Amendments

In October 2025, staff released a Concepts Paper outlining potential future amendments to Rule 9-6 directly addressing the challenges identified in the implementation working group report described above. In July 2026, accompanying this report, staff released draft rule amendments for public review and comment. The draft rule amendments are summarized below.

General Provisions and Exemptions

Sections 9-6-100 through 9-6-114

1) **Section 111: Limited Exemptions for Qualifying Projects:**

   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.

   - **Low-income property owners:** Property owners who participate in a qualifying low-income assistance program may install a non-compliant water heater. Draft 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.
   - **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 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.
   - **Certain businesses:** Restaurants, food service businesses, laundries, dry cleaners, healthcare facilities, and assisted living facilities may install a non-compliant natural gas water heater. These businesses have been identified to have specialized high hot water heat demands whose needs may not be met by the technical capabilities of zero NOx water heaters that are currently available on the market.

- **Space constraints (one-time only):** A one-time non-compliant replacement is allowed if the existing water heater is in an enclosed space smaller than 700 cubic feet that cannot be modified to provide required ventilation, or in a garage with a ceiling lower than 7.2 feet or another indoor space with a ceiling lower than 6 feet. This exemption is intended to provide relief from additional potential costs associated with water heater relocation and major construction due to existing space constraints within the home.

The "one-time" exemptions for ventilation constraints and low ceiling height can only be used once at a given property. After a non-compliant water heater has been installed under either of those exemptions, that address cannot use either one-time exemption again, although it may still qualify for one of the other exemptions.

2) **Section 112: Time-Limited Exemptions for Water Heaters Larger than 30 gallons and Less than 75,000 BTU/Hour:**

This section provides a temporary exemption for certain natural gas-fired water heaters (over 30 gallons and under 75,000 BTU/hour) that do not meet the zero NOx requirements if an Exemption Certificate is obtained before installation. This exemption is only available for qualifying equipment types or properties and water heaters manufactured before the applicable deadlines. The exemption applies to:

- **Hydronic heating systems:** Non-zero NOx water heaters manufactured before January 1, 2031. Though there are currently a limited number of hydronic heat pump water heaters on the market, the product carries a significant price premium. In order to ensure minimal impacts and to allow for new technology to develop in this category, the draft amendments delay this project category to a 2031 compliance date
- **Multifamily and affordable housing:** Non-zero NOx water heaters manufactured before January 1, 2033 may be purchased, sold, or installed in residential buildings with five or more dwelling units or in properties covered by qualifying federal, state, or local affordable housing programs. This additional time recognizes that these properties often require longer planning horizons to coordinate cost-effective equipment replacements, particularly for deed-restricted affordable housing with long-term budgeting and regulatory requirements.

3) **Section 113: Limited Exemptions for Licensed Contractor Installations:**

A licensed contractor may install a water heater that does not meet the zero NOx requirements if they obtain an Exemption Certificate before installation. This exemption is intended to prevent costly or time-sensitive installation challenges where replacing or upgrading building systems to support a compliant water heater may not be immediately feasible.

- **Electrical constraints (one-time only):** Applies to buildings where installing a compliant water heater is expected to be particularly expensive due to conditions such as knob-and-tube wiring requiring more than 50 feet of conduit, an electrical panel below 100 amps (or below 60 amps for multifamily buildings with five or more units), the need for a new 240V connection requiring more than 50 feet of wiring/conduit, or a panel with no available breaker space or expansion capacity.

- **Temporary replacements:** Allows a non-compliant water heater to be installed temporarily while awaiting permanent replacement with a compliant unit. The temporary unit must be removed within 12 months and required reporting must be completed.

4) **Section 114: Limited Exemption for Wholesale Sales:** 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.

To support the exemption process, Staff plan to develop a web application accessible from the Air District's home webpage for anyone seeking an Exemption Certificate for any of the exemption options listed above. The portal would be mobile friendly and would require some documentation and attestation prior to purchase and installation.

When applying for an exemption, staff intend to provide educational resources embedded into the web portal to notify property owners and contractors of incentives that may be available to them based on their location and income level. It is staff's intention to provide residents information to make an informed decision about whether they would like to continue to pursue an exemption to Rule 9-6 or to purchase and install a zero NOx appliance with the help of incentives or other financing.

The certification process as part of the registration portal could be designed to require that contractors must make property owners aware of their zero NOx options, right-sizing (120-

volt plug-in HPWHs; circuit-sharing; skinny breakers, etc.), benefits, as well as the incentive programs available to them.

Definitions

Sections 9-6-200 through 9-6-221: Definitions are added and updated to improve clarity throughout the rule. New definitions included in these draft amendments include: Distributor, Exemption Certificate, Hydronic Water Heater, Licensed Contractor, Low-Income Program, Mobile Home and Retailer. Staff welcomes public comment on these definitions to ensure understanding of rule applicability.

Emissions Standards

Sections 9-6-300 through 9-6-305

1) **Section 301: NOx Standards for Water Heaters Less than 75,000 BTU/hr:** Water heaters manufactured after January 1, 2028 must meet the zero NOx standard to be sold, purchased, 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:
    a. Units less than 30 gallons are subject to the 10 ng/J[11] 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.
    b. The zero NOx standard does not apply to exempt projects as limited and described above in the exemptions section (Sections 111 through 114).

2) **Section 303: NOx Standards for Water Heaters greater than 75,000 BTU/hr to 2,000,000 BTU/hr:** Water heaters manufactured after January 1, 2033 must meet the zero NOx standard to be sold, purchased, or installed in the Bay Area. This deadline has been extended two years to allow time for new multifamily incentive programs such as the Equitable Building Decarbonization Program to collect additional cost data for evaluation.

    The zero NOx standard does not apply to exempt projects as limited and described above in the exemptions section (Sections 111 through 114). This

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

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

Sections 9-6-400 through 9-6-406: The draft amendments include new administrative requirements to facilitate the Exemption Certification process. New requirements include:

- **Section 405: Exemption Certificate requirements:** Anyone purchasing or installing a non-compliant NOx-emitting water heater under an approved exemption must first register with the Air District, certify that the information provided is accurate, and obtain an Exemption Certificate. The application must include the installation address, registrant contact information, and some documentation showing that the exemption requirements are met.
- **Section 406: Emergency replacement loaner reporting:** Licensed contractors using the temporary replacement exemption must report each unit's serial number, Exemption Certificate number, and installation address to the Air District by January 31 each year. Reports must also identify any units that were sold or disposed of and provide details on the transfer or disposal.
- **Section 407: Sales notice requirements:** 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.

Additionally, Section 402 (Interim Report) was updated to remove the interim reporting requirement for water heaters less than 75,000 BTU/hr. This report was given to the Air District Board of Directors in December 2024 and has informed the draft amendments summarized here. Interim reporting is still required two years prior to the January 1, 2033 deadline for larger water heaters.

Monitoring and Records

Section 9-6-501 and 9-6-502: New recordkeeping requirements are introduced to ensure compliance with the zero NOx and related exemption provisions. Beginning January 1, 2028, sellers must keep records of each sale, including the date, location, price, buyer and

seller information, and exemption certificate number as applicable. Licensed contractors must keep records of each purchase and installation, including the date, location, and any exemption certificate number. If they both purchase and install the water heater, they must keep records for both.

Challenging Installations

Variations across the building stock (i.e. existing space configuration, existing electrical system and panel condition, amount of deferred maintenance) will result in some challenging installation cases for zero NOx water heating. TECH Clean CA[12] program data for heat pump water heater (HPWH) installations in the Bay Area showed costs ranging from $2,900 to $38,800, with the high end of costs representing the most challenging installation cases. It should be noted that this data on costs only includes completed jobs and includes data from years before new and improved products were available on the market. These high-cost edge cases are typically driven by either electrical or space constraints. Specifics around drivers for electrical and space constraints, potential heat pump configurations and available data on projects that face these constraints can be found in Appendix A. The previously described exemptions present in the draft rule amendments are designed to address these situations and allow for relief where needed.

Average Upfront and Operational Costs

For the remaining projects that may not be eligible for one of the potential exemptions, or more "standard" projects or "drop-in" replacements, staff estimate average incremental cost to remain at approximately $3,500. Original IWG research was based on a large dataset of over 4,000 incentive program projects with very little difference between mean versus median costs. These amendments would help to eliminate the high-cost projects or other outliers. Therefore, staff expect average costs to be similar to the IWG estimates.

Retail additional (incremental) cost for the equipment only is as follows for most basic models with 50 gallon tanks:

- **120V:** $1,100-$1,600
- **240V:** $600-$1,300[13]

[12] TECH Clean California is a statewide initiative to accelerate the adoption of heat pumps across California homes, overseen by the CA Public Utilities Commission and the CA Energy Commission. https://techcleanca.com/

[13] Baseline assumes midpoint of $900 MSRP for ultra low NOx natural gas tanked water heaters: Low end: $770 (e.g. Rheem Performance 50 gal. Tall 6-Year 34,000 BTU Ultra Low NOx Natural Gas Tank Water Heater; A.O. Smith Signature 100 50-Gallon Tall 6-year Warranty 50000-BTU Natural Gas Water Heater) ; Higher end: $1100 (e.g. Rheem Performance Platinum 50 Gal. Tall 38,000 BTU Ultra Low NOx Natural Gas Water Heater)
Zero NOx water heater costs:120V: $2,000 - $2,500 (e.g., GE GeoSpring 120V, Rheem 120V); 220V: $1,500 - $2,200 (e.g. A.O. Smith Signature 900, Rheem ProTerra, A.O. Smith HPTS-50 Voltex)
Online retailer websites accessed February and March 2026.

Note that most of the upfront costs for HPWH projects consist of labor and installation, along with permitting costs. HPWHs can require extra labor compared to a like-for-like gas water heater due to:

- new electrical wiring
- condensate management or new drain lines
- potential ventilation measures for water heaters in confined spaces (ducts, louvered doors)
- capping the old water heater gas line; and
- further components such as mixing valves, heat exchangers, and vibration-reducing flexible piping.

These are mostly one-time upgrades that will also support future water heater replacements. The number of higher cost installations that need these upgrades will be significantly reduced through the potential exemptions.

Staff expect that over time, larger pools of contractors and greater experience region-wide will lead to lower labor costs.

Operational costs analyses found that with the switch to HPWHs, households will either see utility bill savings or a very small monthly increase. 95 percent of high-usage customers (5,000 kWh or more annual usage before electrifying) see bill savings or no change in bills after switching to a HPWH. For low-use customers, approximately 35 percent of single-family and 60 percent of multi-family (MF) market-rate customers (those not receiving any low-income program discounts) experience a bill increase of around $2 per month on average.

To understand upfront costs, the Air District analyzed incentive program data from multiple agencies (statewide, regional and local) covering over 4,000 projects installed exclusively in the Bay Area between 2021-2023. The average upfront additional incremental cost to install a zero NOx HPWH compared to a NOx-emitting gas water heater is estimated to fall between $1,840, and $3,496,[14] before rebates**Error! Bookmark not defined.**. This number varies based on the program analyzed and the types of projects and baseline appliance (tanked and tankless vs. tanked only) being replaced.

As noted in the IWG report, actual costs may vary depending on site conditions, equipment size, electrical upgrades, installation complexity, and energy prices. Although upfront costs for certain HPWH configurations can be higher than their gas counterparts, these costs can

[14] Installation Costs for Zero NOx Space and Water Heater Appliances https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/task1_electrificationcosts-pdf.pdf?rev=3cb66a09f3094f94b35fa7fc90cfd4ec

often be offset through various available rebates or incentives, while comparable gas options may not. Zero NOx water heaters are expected to have lower operational energy costs for most customers.[15]

Socioeconomic Impact Evaluation

The California Health and Safety Code requires that whenever an air district intends to propose the adoption, amendment, or repeal of a rule or regulation that will significantly affect air quality or emissions limitations, that agency must actively consider the socioeconomic impact of regulations and make a good faith effort to minimize adverse socioeconomic impacts. A "socioeconomic impact" means the following:

a. The type of industries or business, including small business, affected by the rule or regulation.
b. The impact of the rule or regulation on employment and the economy of the region affected by the adoption of the rule or regulation.
c. The range of probable costs, including costs to industry or business, including small business, of the rule or regulation.
d. The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.
e. The emission reduction potential of the rule or regulation.
f. The necessity of adopting, amending, or repealing the rule or regulation to attain state and federal ambient air standards.

For the 2023 Appliance Rule Amendments for Rules 9-4 and 9-6 for Nitrogen Oxide Emissions from Natural Gas-Fired Water Heaters, Boilers and Furnaces, staff additionally analyzed:[16]

a. The direct impacts of increased compliance costs on residential consumers installing and replacing space and water heaters
b. Potential equity impacts at the household level by different income groups, housing tenure, and poverty level.
c. Monetized health impacts and benefits analysis of residents across the region based on race, including a range of valuations, based on modeled particulate matter exposures across the region and an equity assessment by race.
d. Potential shifts in consumer spending and potential job losses (both direct and indirect/induced)
e. Impacts to electrical grid capacity and reliability and related potential costs of related electric utility infrastructure upgrades

[15] *ibid 15*
[16] 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_appc_rg09040906-pdf.pdf?rev=0680bc8794e74d53909fc180e4936de0&sc_lang=en

f. Air District costs to implement the proposals

The flexibility amendments being discussed at this time are expected to decrease costs as compared to the analysis conducted for the 2023 amendments and therefore does not necessitate conducting a socioeconomic analysis under the California Health and Safety Code. Nevertheless, staff intend to publish an updated analysis outlining expected costs and other relevant items described above for consideration by the Board of Directors and the public. At the July 8th meeting of the Stationary Source Committee of the Air District Board of Directors, the Committee recommended that a newly developed proposed Socioeconomic Impact Analysis Policy be brought to the full Board of Directors for further consideration and potential adoption at its September meeting. Staff currently plans to follow the draft policy as the updated socioeconomic analysis is developed for the draft amendments.

Available Rebates

A variety of rebates currently exist across federal, state, utility, and local programs, though availability can vary depending on funding cycles and program capacity. The low-income exemptions will help those property owners who are unable to afford the switch to compliant equipment, even with available funding.

Updated information on HPWH rebates available by zip code can also be found at incentives.switchison.org. This information will be also be provided to property owners when they apply for the low-income exemption.

An updated snapshot of currently available rebates is included in **Table 6** below.

Table 6. Available HPWH rebates in the Bay Area as of March 2026[17]

Geographic Scope	Program or Funder Name	Incentive amount per HPWH
Statewide	Multifamily HEEHRA[18]	$1,750
City of Alameda	Alameda Municipal Power (AMP)	$1,500
Palo Alto	City of Palo Alto Utilities	$3,500
PCE customers	Peninsula Clean Energy (PCE)	up to $3,000

[17] https://incentives.switchison.org/residents/incentives?state=CA and filter for equipment "Heat Pump Water Heater"

[18] High-Efficiency Electric Home Rebate Act (HEEHRA), now often called Home Electrification and Appliance Rebates (HEAR)

PG&E customers	California Energy Smart Homes	$1,000 for Integrated Heat Pump Space and Water Heating
PG&E customers	Golden State Rebates	$400-$700
Pinole	City of Pinole	up to $3,000
Redwood City	Redwood City	Up to $500
San Francisco	Clean PowerSF Water Heater Upgrade Program	$1,200 - $1,800 in bill credits ($50/month)
SCP customers	Sonoma Clean Power (SCP)	$700
SJCE customers	San Jose Clean Energy (SJCE)	$2,000 to $3,000
SVCE customers	Silicon Valley Clean Energy (SVCE)	up to $2,000

Note that **Table 6** does not include highly targeted funding programs available to limited households, including PG&E's Energy Savings Assistance (ESA) program;[19] the California Energy Commission's Equitable Building Decarbonization (EBD) Program;[20] and upcoming SB 1221 Neighborhood Decarbonization pilots.[21]

[19] https://www.pge.com/en/save-energy-and-money/energy-saving-programs/energy-savings-assistance-program.html
[20] https://www.energy.ca.gov/programs-and-topics/programs/equitable-building-decarbonization-program
[21] https://www.cpuc.ca.gov/industries-and-topics/natural-gas/sb-1221-implementation

Summary of Potential Impacts and Considerations

Grid and Reliability Impacts

Though often cited by the public as a concern, new electrical loads resulting from Rule 9-6 are highly unlikely to cause power outages. The change in electrical load due to the implementation of these rules will be spread over at least 15 years and is included in the State's ongoing planning for future enhancements of the electric grid. There are current and new (SB 410) requirements for utilities and the California Energy Commission (CEC) regarding grid planning for increasing loads, which will include added load from the building appliance rules.

The large majority of power outages are not caused by electrical load or bulk capacity issues but are instead caused by external physical impacts (e.g. downed trees, storms) or public safety power shutoffs (PSPS), which have been significantly reduced since 2019.[22]

For the rare instances of bulk capacity issues (e.g., statewide Flex Alerts), many HPWHs allow users to shift energy usage to off-peak hours (sometimes with the direct support from utilities), essentially using electricity to make and "store" hot water during periods of lower electricity demand and prices. HPWHs are increasingly being used by utilities for demand response to help improve overall grid reliability.

In the event of a power outage, tanked water heaters, including HPWHs, can stay hot for several hours, especially when installed with a cold-water mixing valve. Note that, some new NOx- emitting gas water heaters have dampers and fans (including tankless on-demand, tanked models with power venting) that rely on electricity and cannot operate during power outages.[23]

Potential Renter Impacts

The Air District commissioned research and engaged stakeholders regarding concerns for renter impacts due to Rule 9-6. These analyses confirmed that implementation of the 2023 amended rule language could lead to capital cost pass-throughs, potential rent increases, and temporary evictions for some tenants, though water heaters covered under the 2027

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[22] Rincon and E3. *Grid Reliability and Interconnection Challenges.* https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/grid-impacts-final-pdf.pdf?rev=14a3ea4d46704d19a48cf03e3984c90e&sc_lang=en

[23] https://docs.bradfordwhite.com/Spec_Sheets/1118_0815.pdf https://www.hotwater.com/info-center/water-heater-venting.html#:~:text=Power%20Vent,professional%20plumbing%20contractor%20for%20installation

requirements of Rule 9-6 posed a lower risk than other appliances due to lower costs and construction impacts.

Landlords could use a "substantial repair" clause found in the local and state renter protection laws for "no-fault evictions,"[24] creating potential eviction risk for some high-cost water heater installations. In these cases, "substantial repair" refers to significant construction work that requires the renter to vacate while the work occurs, takes more than 30 days, and requires a permit to complete.

Cities with the highest concentration of renters also have the strongest renter protections. San Jose, San Francisco, Oakland and an additional 13 Bay Area jurisdictions have local renter protection laws that go beyond state law. Each major jurisdiction has its own limits on rent increases and capital improvement pass-through costs, as well as eviction protections. In cities without local rent stabilization, renters rely on state protections. AB 1482 provides statewide rent increase limits and just cause eviction protections but does not specifically address capital improvement pass-throughs. The law expires in 2030.

Workforce Development and Availability

Bay Area workforce research shows positive signs for contractor availability and readiness. Compared to national benchmarking, the Bay Area has equivalent levels of relevant contractors compared to the US average. Based on region-wide surveys, the majority of contractors are available to respond to emergency water heater failures within a couple days. A two-thirds majority of surveyed contractors were already aware of the building appliance rules and at least one category of applicable incentives, though slightly less than half of the surveyed contractors participated in incentive programs.

Further education for many installers is needed, however. Large-scale public awareness campaigns and specific outreach to installers are planned for 2026.

Quantitative Estimates on Number of Exemptions

Total estimates for potential certified exemptions are estimated to be up to 38 percent of residential small water heater unit installs. This varies slightly depending upon how the low-income qualified exemption is defined. See **Table 7** below for a more detailed break out.

[24] No-fault evictions allow landlords to remove tenants who have not violated lease terms, but can occur under strict reasons, such as owner move-in, substantial remodeling, or removing units from the market.

Table 7. Residential Certified Exemptions Expected by Category

Annual Residential Small Gas Water Heater Turnover:		120,000
Exemption type	**Percentage**	**Annual Number**
Very Low Income & Housing Cost Burdened	15.8%	19,000
Project/ building constraints	20% [25]	24,000

The certified exemption estimates do not include continued sales of 30 gallon and below tanked water heaters, which are estimated at 10 percent per year.

Given that the purchase of Emergency Replacement Loaner water heaters will not displace zero NOx water heaters nor be installed permanently, numbers are not quantified below. However, in the nine-county Bay Area, current numbers of licensed contractors who would be eligible to purchase a limited number of NOx emitting water heaters (larger than 35 gallons tanked and less than 75,000 btu/hour) for emergency replacement loaners is listed below:[26]

- B (General Contractor License) 15,967
- C36 (Plumbing) 1,762
- C20 (HVAC) 868

Lastly, 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[27]
- 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[28]
- 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.

[25] Reasonable estimate based on program data and case studies citing prevalence of space and electrical constraints. See **Appendix C**.
[26] https://www.cslb.ca.gov/onlineservices/dataportal/ accessed October 2025.
[27] https://bayren-existing-buildings.mtcanalytics.org/
[28] Ibid.

Health Equity vs. Economic Equity Considerations

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. **Table 8** below summarizes several of the key policy considerations staff evaluated in balancing these health and economic equity objectives.

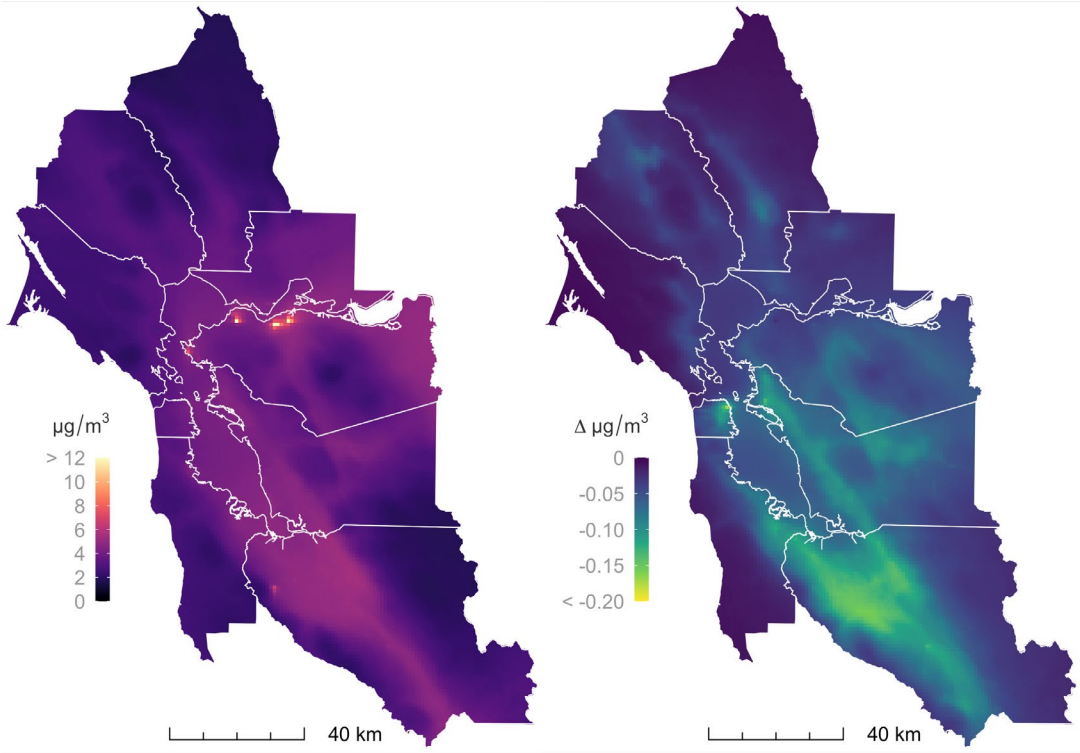
Table 8. Equity Considerations

Health Equity
Reduced indoor and outdoor air pollution exposure
Health-protective technology standards
Protections for renters and occupants
Fewer exemptions to maximize health benefits
Prioritize reductions in overburdened communities
Faster reduction of NOx and $PM_{2.5}$ emissions
Economic Equity
Manage cost impacts for residents and businesses
Phased-in compliance timelines
Protections for landlords and property owners
Targeted exemptions to address barriers
Flexibility pathways for cost or technical constraints
Incentives, rebates, and market support programs

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.[29] 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 at this time 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

[29] 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

summarized above, up to 38 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 existing overburdened communities. Additionally, the 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.

Appendix A

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).

A minimum of 44 percent of single-family homes in the Bay Area is estimated to have electric panels with 200 amps,[30] which is considered to be the modern standard, and could fully electrify without panel upsizing.

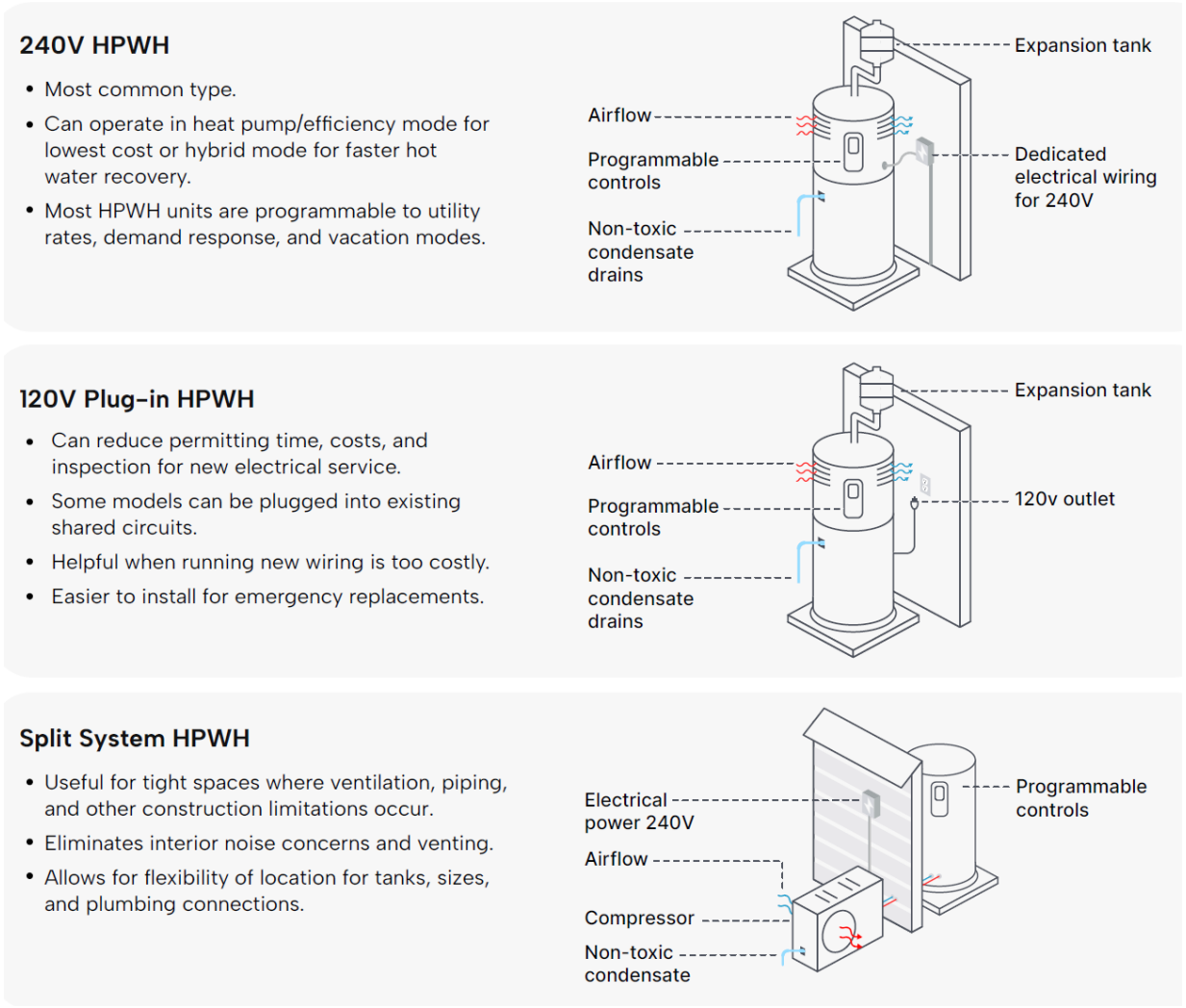
32 percent of single-family and 59 percent of multifamily homes in California have panels of intermediate size (100 amps for single-family, 60 amps for multi-family)[31] and will likely require "right-sizing", "watt diet" or panel optimization strategies (low-voltage appliances; circuit pausing/sharing; smart panels) to avoid panel and service upsizing in these homes. Newer 120-volt plug-in HPWHs (see **Figure 1A**) 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.[32]

[30] 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

[31] Fournier, Eric et al. *Quantifying the electric service panel capacities of California's residential buildings*. 2024. https://www.sciencedirect.com/science/article/pii/S0301421524002581

[32] Ibid.

Figure 1A. Heat Pump Water Heater (HPWH) configurations and wiring, siting and installation needs



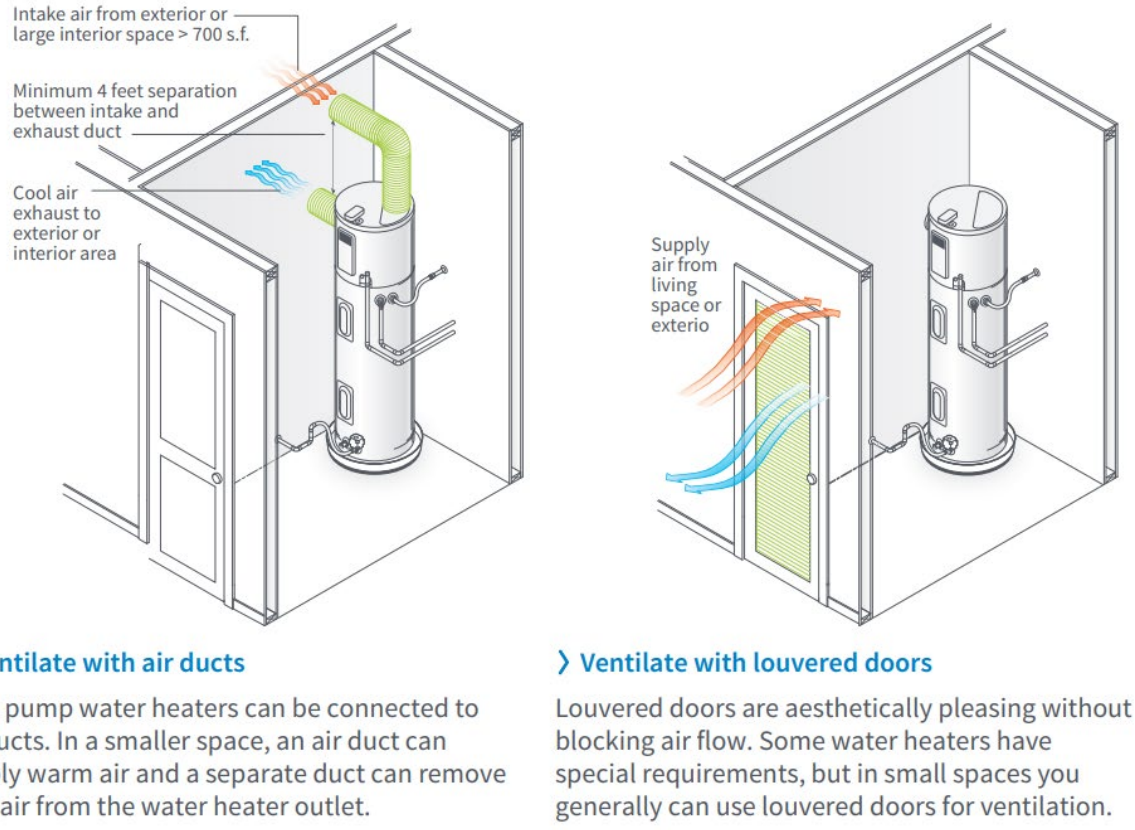
Space Constraints

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 **Figure 2A**) were mostly relatively low cost (average=$208 and max=$1,701) according to Palo Alto HPWH program

data.[33] Lower costs for these measures are also dependent upon having adequate ventilation space in the adjoining room or access to an outdoor wall.

Figure 2A. Ways to circulate more air[34]



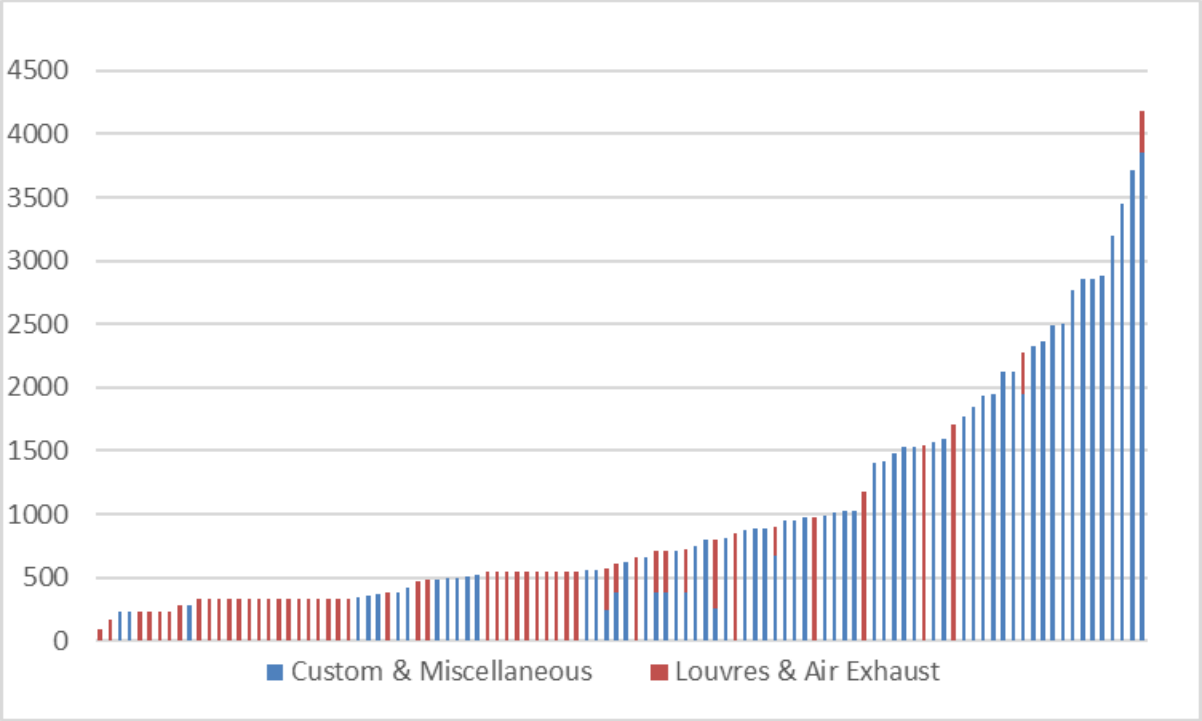
HPWHs, due to their slower recharge times, are typically upsized approximately 10-15 gallons compared to a gas water heater; these larger tanks, in addition to the integrated compressor, can lead to lack of physical space for the new HPWH if the existing location is a utility closet, a basement space 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 3A.** Program data as illustrated in the **Figure 3A** 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

[33] 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.

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

represent projects and costs that deployed both ventilation measures and space reconfiguration or carpentry measures.

Figure 3A. Palo Alto HPWH Program: Additional Space Constraint Costs ($) for Space Reconfiguration, Carpentry, and Ventilation Measures[35]



HPWH solutions for small spaces are emerging. Split-system HPWHs offer an unattached, outside condenser/heat pump (see **Figure 1A**) but there are fewer and less common market options.

[35] 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.

Appendix B

References for Income Qualified Calculations

For 2025 values of 250 percent Federal Poverty Guidelines for each household size:
https://aspe.hhs.gov/sites/default/files/documents/dd73d4f00d8a819d10b2fdb70d254f7b/detailed-guidelines-2025.pdf

For 2023 5-year American Community Service Tables:

B25009 - tenure by household size for owner and renter occupied homes - use owner occupied:
https://data.census.gov/table/ACSDT5Y2023.B25009?g=050XX00US06001$1400000,06013$1400000,06041$1400000,06055$1400000,06075$1400000,06081$1400000,06085$1400000,06095$1400000,06097$1400000

B25118 - number of households in different income bins for owner- and renter-occupied homes - used owner-occupied housing units: Tenure by Household Income in the Past 12 Months (in 2023 Inflation-Adjusted Dollars):
https://data.census.gov/table/ACSDT5Y2023.B25118?q=California+Income+and+Poverty&t=Owner/Renter+(Householder)+Characteristics&g=050XX00US06001,06013,06041,06055,06075,06081,06085,06095,06097&y=2023

For Area Median Income (AMI) for each county and household size:
https://www.hcd.ca.gov/sites/default/files/docs/grants-and-funding/income-limits-2023.pdf

Appendix C

Sources for Project Constraint Estimates

Program/ Source	Geographic Scope	Constraint	Prevalence
Palo Alto	Palo Alto	Space, electrical, drainage measures >$1500 per project	15%
TECH / NBI 120V HPWH study	Statewide	Space constraint. (Note: program did not use any space ventilation measures e.g. louvered doors)	28%
UCLA *Quantifying the electric service panel capacities of California's residential buildings.*	Statewide	Electrical	3% SF, 10% MF
BayREN Home Energy Score Audits (included water heater location information)	Santa Clara Co.	Space: interior utility closets (some basements may also be constrained)	4% interior closet, 20% Basement

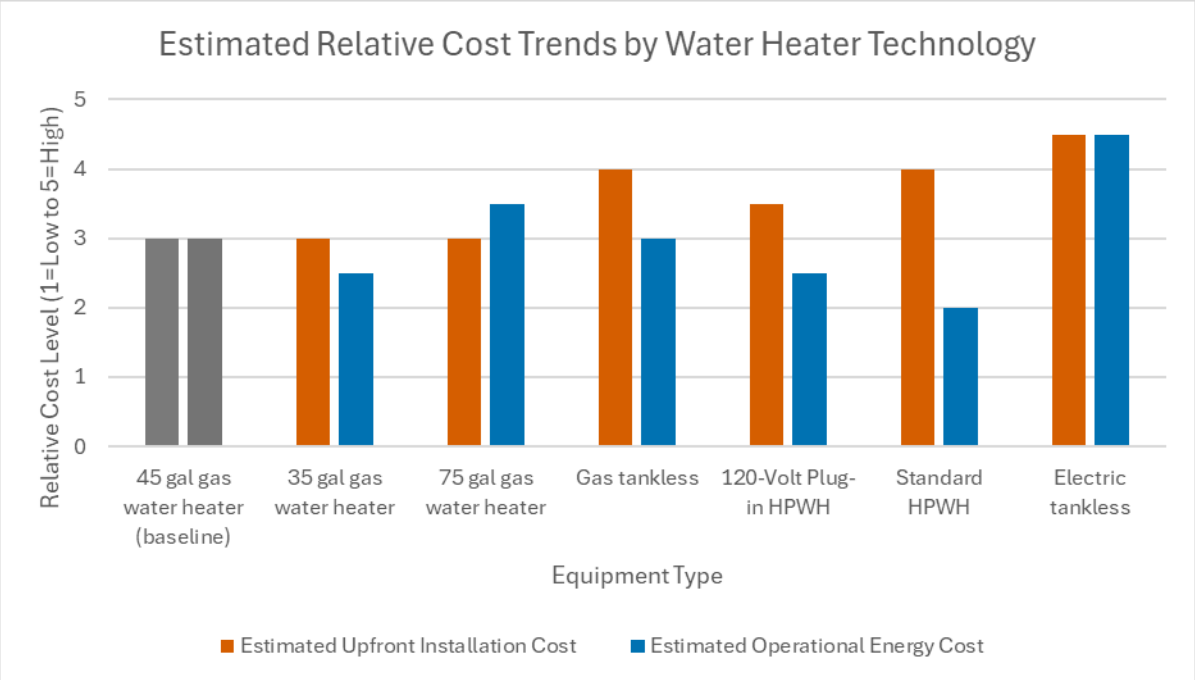
Appendix D

Average Estimated Upfront and Incremental Costs

The costs presented below are general estimations and are not meant to represent exact costs for any specific project or installation. Actual costs will vary based on site conditions, equipment size, and installation requirements.

Unit Type	Upfront Installation Cost	Long-Term Energy Cost
35-gal gas water heat	Moderate	Moderate-low
75-gal gas water heater	Moderate	Moderate-high
Gas tankless	Moderate-high	Moderate
120-volt Plug-in HPWH	Moderate-high	Moderate-low
Standard HPWH	Moderate-high	Low-moderate
Electric tankless	High	High

Figure 4A Illustrative Relative Costs Trends by Water Heater Technology[36]



[36] *Adapted from ibid* 15; *values are illustrative and reflect staff interpretation of available data*