Residential Heat Pump Water Heating

Market Characterization Report

January 27, 2026

CalMTA is a program of the California Public Utilities Commission (CPUC) and is administered by Resource Innovations

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List of Abbreviations

Acronym	Definition
ACS	American Community Survey
AWHI	Advanced Water Heating Initiative
AMI	Area Median Income
BayREN	Bay Area Regional Energy Network
BIY	"Buy It Yourself"
BUILD	Building Initiative for Low-Emissions Development
CalMTA	California Market Transformation Administrator
CAISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DIY	"Do It Yourself"
EASE	Efficiency and Sustainable Energy (program)
EIA	Energy Information Administration
ESA	Energy Savings Assistance (program)
ESJ	Environmental and Social Justice
ESMAC	ENERGY STAR Manufacturer Action Council
GGRF	Greenhouse Gas Reduction Fund
GHG	Greenhouse Gas
GPM	Gallons Per Minute
GWP	Global Warming Potential
HCD	(Department of) Housing and Community Development
HEEHRA	Home Electrification and Appliance Rebates
HOMES	Home Investment Partnership Program
HPWH	Heat Pump Water Heater
HVAC	Heating, Ventilation, and Air Conditioning
IRA	Inflation Reduction Act
IOU	Investor-Owned Utility
MAEDbS	Modernized Appliance Efficiency Database System
MCE	MCE Clean Energy (formerly Marin Clean Energy)
MTI	Market Transformation Initiative
NEM	Net Energy Metering
NEEA	Northwest Energy Efficiency Alliance
NOx	Nitrogen oxides
PCE	Peninsula Clean Energy
PG&E	Pacific Gas & Electric
PNNL	Pacific Northwest National Laboratory
RASS	Residential Appliance Saturation Study
POS	Point-of-Sale
POU	Publicly Owned Utilities

RCEA	Redwood Coast Energy Authority
RECS	Residential Energy Consumption Survey
SGIP	Self-Generation Incentive Program
SJV	San Joaquin Valley
SMUD	Sacramento Municipal Utility District
SCE	Southern California Edison
SCP	Sonoma Clean Power
SDG&E	San Diego Gas & Electric
SVCE	Silicon Valley Clean Energy
SVP	Silicon Valley Power
TECH	Technology and Equipment for Clean Heating Initiative
(e)TRM	(electronic)Technical Resource Manual
TOU	Time of Use
UEF	Uniform energy factor

Glossary of key terms

The following provides a reference to understand the use of key terms in this report:

- **Building owners and property managers:** used in sections describing CalMTA survey results to describe all respondents to the building owner and property manager survey; all respondents confirmed that they are responsible for making water heating decisions for residential households in buildings that they own or manage. Only those managing units with separate water heaters were included. Respondents managing properties with central water heating only were excluded.
- **Customer:** used in CalMTA survey results to refer to end-use customers served by installers. However, the term "customer" may also be used in secondary research to describe water heater purchasers who used or did not use professional installers.
- **Decision maker:** used in the context of the CalMTA surveys to describe any residential survey or building owner and property manager survey respondent. Respondents to both surveys were screened to ensure that they are water heater decision makers (residential respondents in their households, and building owner and property manager respondents for households that they own or manage). Therefore, all respondents are confirmed decision makers.
- **Purchaser:** used in the context of the CalMTA surveys to distinguish resident, building owner, and property manager respondents who reported purchasing and installing one or more water heaters in the last three years from those who did not. However, the term "purchaser" is also used in the description of purchasing channels to identify whether a water heater was purchased by the hired installer or the end-use customer.
- **Resident:** used in CalMTA survey results to describe all respondents to the Residential survey.
- **Stakeholder:** used, if describing an interviewed stakeholder, to describe the California stakeholders and subject-matter experts interviewed as part of CalMTA's primary research as described in Section 2.2. These stakeholders represent twenty (20) stakeholder organizations – composed of 17 stakeholders in California and three national – and were interviewed from their roles as program administrators; implementers; experts in market transformation, codes and standards, energy policy, research and development; or experts in workforce education and training.

1 Executive summary

This Market Characterization Report is an output of the Phase II research for the Residential Heat Pump Water Heating (HPWH) Market Transformation Advancement Plan, finalized in September 2024.[1] The plan outlined a high-level research approach that focused on investigating the target market, barriers, and opportunities with the goal of supporting the development of the California Market Transformation Administrator (CalMTA) Residential HPWH Market Transformation Initiative (MTI) Plan.

This report examines the California market for residential HPWHs, with a focus on key barriers to and opportunities for achieving the envisioned impacts of the MTI. This report focuses specifically on residential unitary HPWHs (in which the heat pump is integrated into the water heater tank) and split system HPWHs (in which the heat pump is separate from the tank) that serve only one household.

1.1 Objectives and methods

CalMTA's research objectives for this study include the following:

- Describe the California residential water-heating market
- Understand the existing HPWH program and policy landscape
- Identify key market barriers and opportunities
- Understand completed and ongoing secondary market research, evaluation, and research and development efforts
- Develop supply-side and demand-side market characterizations

1.2 Key findings and conclusions

1.2.1 Conclusion 1. California's water-heating market is large and still dominated by gas, with HPWHs representing very low but growing penetration - particularly in new construction.

Of 11.5 million households with dedicated water heating systems, an estimated 76% (8.7 million households) are served by gas water heaters and 23% (2.6 million households) by electric-resistance water heaters – with the saturation of HPWHs estimated below 2%. An estimated 753,000 non-central water heaters are replaced annually, with HPWHs representing a small but growing segment of those replacements. HPWHs represent an estimated 5% to 6% of overall

[1] CalMTA. (2024). *Residential Heat Pump Water Heating Advancement Plan*. September 17, 2024. Residential Heat Pump Water Heating Advancement Plan - CalMTA

market share, with stronger representation in the new construction market, driven by building code (see Section 4 The estimated 2.6 million households with existing electric-resistance water heaters[2] likely represent the easiest building stock to convert to HPWHs, while the conversion from gas to HPWH will be more challenging.

1.2.2 Conclusion 2. Up-front cost is a top barrier to purchasing HPWHs.

HPWH unit purchase costs typically range from $1,800 to $3,000, putting costs nearly a thousand dollars higher, on average, than other standard alternatives such as natural gas storage water heaters. The total installed cost of a HPWH (without electrical upgrades) was estimated at $6,000 to $7,000 based on interviews with California stakeholders; program data show total average installation costs for incentivized projects of approximately $8,000.[3] This represents a total installed cost without incentives of at least $4,000 higher than alternatives (see Section 6.3, *Pricing and incremental cost*).

Interviewed stakeholders and manufacturers reported that this first cost is a top barrier to HPWH adoption. This was reinforced by resident and installer survey data, with 47% of residential purchasers reporting cost as a top factor in their decision not to install an HPWH. Installers also reported high up-front cost as one of the top three reasons that customers do not choose HPWHs.

While federal standards mandating higher efficiency for electric water heaters in 2029 should increase the volume of HPWHs sold, manufacturers do not expect HPWH unit costs to decrease. They cited several reasons for this, including the high cost of materials in efficient products and appliances, as well as new requirements and specifications that are changing the product landscape so rapidly that some market actors cannot keep up. Findings from stakeholder and manufacturer interviews, along with CalMTA survey data, suggest that natural gas and propane customers (representing an estimated 76% of households) will not shift from gas to HPWH without policy and program support.

CalMTA interviews and survey findings also support existing research that shows the majority of water heater purchases are emergency replacements due to equipment failure. In this situation, decision-making is often reactive, time-sensitive, and led by customers who may not have budgeted for a water heater purchase. Additionally, the average household spends relatively little time thinking about water heating. These factors contribute to a price-sensitive decision-making process.

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[2] CalMTA estimates that 22% of California's 11.5 million households using non-central system water heating are served by electric water heating - up 4% from the 18% estimated by RECS 2020 (see Section 4.2). 1.6% of these are estimated to already be served by HPWHs.

[3] TECH Clean California public data downloaded June 9, 2025. References average single family per-unit project costs of $7,600 in 2024, and $8,200 in 2025 (as of June 2025).

1.2.3 Conclusion 3. Incentives to offset the high cost of HPWHs are widespread but often difficult to navigate, unstable, and insufficiently effective at engaging many customers and installers.

More than 50 energy efficiency and decarbonization programs[4] seek to lower the up-front cost barrier of HPWHs through rebates to customers and installers. However, many customers and installers do not engage with incentives due to shifting program offerings and requirements, and program starts and stops (as brought up frequently by interviewed California stakeholders and manufacturers). CalMTA survey data further indicate that end-use customers and installers have trouble accessing incentives due to complex or burdensome program requirements, with 60% of installers who are aware of incentives reporting that they did not choose a HPWH at least once in the last year due to the administrative burden of incentives.

Interview and survey results collectively indicate that complex incentive applications with varying eligibility and reservation requirements and a lack of availability of expected incentives (when funds are exhausted), have been detrimental to the goal of building contractor engagement. Contractors indicate that they are unwilling to build a business model around incentives that may not be available long term. These factors can act as barriers for smaller installers, and potentially for environmental and social justice (ESJ) community-focused installers,[5] as well as for very large installers with established sales processes.

Many of the interviewed manufacturers and other stakeholders spoke favorably of TECH Clean California (TECH),[6] the state's heat pump and HPWH program, for its substantial HPWH incentives. However, interviews also indicate that regional programs seeking to complement TECH offerings find their programs compromised by TECH program funding interruptions. Stakeholders and manufacturers consistently noted that regions with stable, long-term incentives, such as Sacramento and the Bay Area, have seen greater installer engagement and higher adoption of HPWHs.[7]

While point-of-sale incentives are typically less than $1,000, many midstream incentives offset HPWH costs by several thousand dollars; incentives through TECH have for some customer segments totaled more than $5,000, even before layering with other program offerings. However, high program incentives may contribute to higher installer pricing to the end customer, harming customer perceptions of affordability. While substantial funding has been provided for HPWHs,

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[4] More than 30 are identified as active at the time of this publication. See Appendix D, HPWH incentive programs.
[5] See "ESJ Classification of Installers" in Appendix A, Weighting methodology.
[6] TECH Clean California, discussed further in Section 3.2, is designed to accelerate the adoption of clean space- and water-heating technologies, with goals of creating an equitable pathway to carbon-free homes by 2045 and installing six million heat pumps by 2030 to help meet the state's carbon-neutral objectives.
[7] Note however that the TECH program has documented growth in the rate of incentivized HPWHs in Southern California in 2024 and 2025, supported by higher incentives for Southern California projects.

some at the regional level but more at the statewide level via the TECH program, the long-term forecast for statewide incentive availability is unclear.

1.2.4 Conclusion 4. Uncertainty around HPWH household fit – including whether a home has suitable space, electrical capacity, and ventilation – poses a major barrier to HPWH adoption.

HPWHs have specific requirements for space, electrical capacity, and ventilation that differ from standard water heaters and which could require home modifications or unit relocation, adding cost and complexity that can hinder adoption. Twenty-one percent of recent (within the last three years) water heater purchasers report space constraints affecting the type of water heater they choose, and more typically opt for tankless or standard water heaters instead of HPWHs.[8] Seventeen percent of recent purchasers of dedicated water heaters that did not purchase HPWHs cited incompatibility with their home, a concern echoed by 27% of purchasing building owners and managers.[9] Among those, over half cited electrical limitations as the primary barrier; others pointed to space constraints, ventilation needs, and/or condensate management requirements.

Electrical work – ranging from wiring, smart circuit breakers, circuit pausers or splitters, subpanels, smart panel introduction, or a full panel upgrade – may be required in some households previously served by gas water heaters (the majority of California households). Recently, guidance is shifting from recommendations of full panel upgrades to a focus on less expensive electrical upgrades,[10] where feasible. Research and estimates provided by interviewed stakeholders point to approximately 30% of all California households needing electrical upgrades prior to HPWH installation. Estimates suggest that 22% to 30% of California households may be appropriate for 120-volt HPWHs,[11] which offer opportunities for electrically constrained HPWH installations, but there is currently uncertainty regarding the types of buildings suitable for installation. Form factors that are newer to the market may mitigate issues with fit in certain building types, but awareness building and education is required to support successful deployment.

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[8] CalMTA Residential survey Q. B5. Did any of the following factors influence your decision on the type of water heater you installed? Select all that apply.

[9] CalMTA Residential survey and CalMTA Building Owner and Property Manger survey Q. C5 What factors prevented you from choosing a heat pump water heater? Select all that apply.

[10] This includes subpanels, smart panels, smart circuit breakers, load sharing, or circuit pausers or circuit splitters.

[11] New Building Institute. (2023). Plug-In heat Pump Water Heater Field Study Findings & Market Commercialization Recommendations. July 12, 2023. https://newbuildings.org/resource/plug-in-heat-pump-water-heater-field-study-findings-market-commercialization-recommendations; additional review conducted based on survey data, stakeholder interview feedback and saturation rates of existing water heaters by size found in RECS 2020.

1.2.5 Conclusion 5. Uncertain bill savings and potential increases in electricity cost limit HPWH adoption and benefits for most California households.

Nearly half of interviewed stakeholders identified utility rates and bill impacts as a top adoption barrier, second only to up-front cost; interviewees identified that in most utility territories, an isolated conversion of a gas water heater to a HPWH (without pairing with other measures) can increase household utility bills, and customers are reluctant to adopt a technology that requires a higher up-front investment and may increase energy costs. Bill increases are especially burdensome for ESJ households.

CalMTA residential survey data supports this concern, with 72% of respondents stating that avoiding an increase in utility bills is a highly influential factor in water heater selection.[12] Interviewed stakeholders also noted that potential HPWH adopters are particularly hesitant to fuel switch due to the risk of higher bills – anxiety that is sometimes, but not always, alleviated by tools like bill calculators – given the uncertainty about future rate changes. Customers most often cited lower operating costs (84%) and greater energy savings (82%) as the most important factors for choosing an HPWH.[13]

Surveyed installers cited bill savings as a top reason they recommend HPWHs to their customers,[14] but because this benefit does not apply to all customers – particularly those without existing electric water heating – they also said bill impacts are a primary reason that customers decide not to choose HPWHs. Forty-two percent of installers rated customer concern around bill impacts as often influencing the choice for a different water heater.[15] Bill impacts may influence certain customers to choose HPWHs, yet discourage others, depending on their customer perceptions, existing water-heating equipment, and utility rate options and territory.

1.2.6 Conclusion 6. Familiarity with HPWHs and related programs and policies is uneven across California, and regional disparities in equipment and resource availability may reinforce these gaps.

Interviewed stakeholders and manufacturers, as well as surveyed customers and installers, all identified limited awareness and familiarity with HPWHs as a major barrier to adoption. Although

[12] CalMTA Residential survey Q. C4. Rate how much the following influenced your selection of the water heater that you installed, with 1 being not at all important and 5 being very important.
[13] CalMTA Residential survey Q. H2. Recent purchasers of gas water heaters rated lower operating costs as important even more frequently (87%).
[14] CalMTA Installer survey Q. B5. What selling points do you highlight when discussing heat pump water heaters with customers? Select all that apply.
[15] CalMTA Installer survey Q. B8. Please indicate how frequently each of the following factors contributes to customers' decision to install a water heater that is not a heat pump water heater.

research shows growing awareness,[16] it remains limited, even among those who have recently purchased a water heater.[17] Although CalMTA residential survey results indicate HPWH awareness levels of 50%, installers identified low customer awareness as a key barrier to HPWH installations.

Awareness and familiarity with HPWHs vary by region and by housing segment, suggesting opportunities for targeted engagement to improve adoption.[18,19] In some regions, access to HPWHs through brick-and-mortar stores is limited, and installer engagement is also limited – by factors such as cost concerns, unpredictable program resources, and program requirements for grid connectivity.[20] These disparities in availability and program visibility across regions also likely contribute to overall lower awareness.

Program administrators and surveyed contractors suggested that making it easier for contractors to access training and hands-on experience would build comfort and familiarity with HPWH technology and serve as a tool to increase adoption. Based on survey findings that nearly half of water heater purchases are led by end use customers taking either a Do-it-Yourself (DIY) and Buy-it-Yourself (BIY) approach,[21] awareness building at the customer level (potentially through engagement of market actors such as retailers) will also be critical to increase HPWH adoption.

2 Methodology

CalMTA reviewed the substantial body of existing research on residential HPWHs to inform the planning and implementation of interviews and surveys that CalMTA determined necessary to

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[16] Thirty percent of California homeowner survey respondents were aware of HPWH according to a 2022 survey, while CalMTA surveys indicate awareness levels of 50% among residents, and 83% among building owners and property managers.

[17] Opinion Dynamics. (2022). *Technology and Equipment for Clean Heating (TECH) Initiative: Baseline Market Assessment*. July 15, 2022. https://opiniondynamics.com/wp-content/uploads/2024/12/TECH_Baseline_Market_Assessment_Final_Report_8AHwAxk.pdf.

[18] CalMTA residential survey results find that respondents from San Francisco County report awareness levels of 74%, while Ventura County awareness is reported at 19%.

[19] Familiarity is also lower among mobile home households, where (pending clarification from the state) HPWHs with external equipment may not be permitted.

[20] Less urban areas in Northern California, and the Sierra were identified as areas with low retail and wholesale visibility and availability. CalMTA stakeholder interviews, December 2024-February 2025. More than a third of residential survey respondents in inland zip codes in PG&E territory, and in coastal zip codes in SCE territory reported seeing no HPWHs in smaller retail stores where they shopped for water heaters.

[21] "DIY" has been defined as customers that purchase but do not hire an installer for installation (either self-installing or engaging a friend or family member for installation), while "BIY" is defined as the end customer being the purchaser of the water heater, but then hiring a professional for that unit's installation. Survey findings are detailed in the DIY and BIY Rates and Motivations section of this report.

complete its research objectives. The research conducted is described in the following sections and summarized in Table 1.

Table 1. Research activities

Research Activity	Research Description	Research Description
Review of HPWH literature	230 distinct documents or files reviewed	Section 2.1
Review of water heater stock analyses		
Review of market share and market analyses support data		
Review of ESJ support data		
In-depth interviews with key California stakeholders and subject-matter experts	20 interviews conducted	Section 2.2
In-depth interviews with key manufacturers	6 interviews conducted	Section 2.3
Survey of California residents (household water heater decision makers)	856 respondents surveyed	Section 2.4
Survey of building owners and property managers (water heater decision makers only)	162 respondents surveyed	Section 2.5
Survey of installers of water heaters in California residences	149 respondents surveyed	Section 2.6

2.1 Secondary research and literature review

CalMTA completed a literature review of published research and analyzed available secondary data. Specifically, CalMTA referred to the Energy Information Agency's (EIA) 2020 Residential Energy Consumption Survey (RECS 2020),22 published in 2023, as a reference on appliance saturation levels, behaviors, and other insights relevant to the MTI among California households. Additionally, CalMTA reviewed publicly available technical and market research reports, including California regulatory filings, dockets, and the California Electronic Technical Resource Manual (eTRM), research and reports hosted by CalNEXT and TECH Clean California, and those identified through stakeholder interviews. The study included reviews of content on key industry websites, such as the American Council for an Energy-Efficient Economy, general internet research, and tools like Google Scholar, Semantic Scholar, and Science.gov. EIA's RECS 2020 collected data on household energy characteristics from 1,152 respondents in California (and 18,496 nationally) using web and paper-based surveys. CalMTA also cross-referenced the EIA RECS data with insights from the 2019 California Residential Appliance Saturation Study (RASS)23 and adjusted

[22] U.S. Energy Information Administration. Accessed April 1, 2025. "Residential Survey Energy Consumption (RECS) 2020." https://www.eia.gov/consumption/residential/

[23] Data from the 2019 Residential Appliance Saturation Study (RASS) was accessed through direct correspondence with California Energy Commission staff, July 2, 2024.

numbers to align with recently released occupied household data from the 2023 American Community Survey one-year estimates.

In total, CalMTA reviewed 230 reports, studies, articles, and regulatory documents (not counting program handbooks) related to residential HPWH adoption as part of the literature review process.

2.2 California stakeholders and subject-matter expert interviews

CalMTA identified and interviewed key stakeholders and subject-matter experts to address research objectives and inform the market characterization of residential HPWHs. Key stakeholders and subject-matter experts represented several technical, operational, and community-based perspectives, including developers, administrators, and implementers of Californian HPWH programs; leaders in research and development, standards development, and pilot initiatives; and community organizations and pilot participants. CalMTA also invited subject-matter experts and stakeholders working on HPWHs outside of California to participate. CalMTA identified appropriate interviewees using internet research and existing CalMTA relationships and tracked outreach efforts using the CalMTA Salesforce platform.

The research team contacted 31 stakeholders with the goal of completing 20 interviews representing a balanced distribution of responses across regions and stakeholder types. Findings from these interviews are identified as being from "interviewed stakeholders" throughout this report. Table 2 and Table 3 present the distribution of stakeholder interviews targeted and carried out by region and stakeholder type.

Table 2. Interviewed stakeholders by region

	Northern CA	Southern CA	Coastal CA	Inland CA	Statewide	National	Total
Contacted	7	4	6	2	16	3	31
Interviewed	7	2	6	1	8	3	20

Table 3. Interviewed stakeholders by type

	Program Administrator or Implementer	MT, Codes and Standards, and Policy	Research and Development	Workforce Education and Training	Total
Contacted	18	18	7	6	31
Interviewed	14	11	4	3	20

CalMTA developed the stakeholder interview guide to address the research questions of this MTI, which is included in Appendix C, Research instruments.

2.3 Manufacturer interviews

CalMTA conducted manufacturer interviews to address research objectives and inform the market characterization of residential HPWHs. The research team identified residential HPWH manufacturers across multiple categories, including both established and emerging manufacturers, as well as those marketing a variety of HPWH product types, such as 240-volt vs. 120-volt models, and unitary vs. split system configurations. This document summarizes the aggregated findings from seven interview sessions with 10 people across six manufacturers, with each interview dedicated to a single organization. CalMTA conducted interviews with participants representing various company departments, such as product development, sales, marketing, public relations, and legal.

CalMTA developed a manufacturer interview guide to address the research questions for this MTI. See Appendix C, Research instruments for this guide.

2.4 Residential survey

CalMTA conducted a survey of California residents responsible for household water heating decisions to establish baseline data on water heater saturation by fuel type, location, and age, as well as to assess trends in customer awareness and attitudes. To ensure inclusion of Spanish-speaking populations, the survey was professionally translated into Spanish. The survey explored respondents' awareness of HPWHs, their willingness to consider HPWHs for future purchases, perceived barriers to adoption, and factors that could support uptake. The survey asked respondents who reported purchasing a water heater in the last three years additional questions to understand purchasing motivations and behavior.[24] The survey sample included both homeowners and renters living in single-family, multifamily, and mobile homes.

2.4.1 Sampling plan and resulting respondents

CalMTA purchased an online panel through Qualtrics, a panel aggregator, and used a quota-based sampling approach to ensure representation across climate region, electric utility, housing type, and alignment with ESJ criteria.[25] The team used these quotas to ensure a robust response from key segments and set a target of 800 completed surveys. The team also tracked rates of DIY installations but did not apply quotas to this group. The sampling plan aimed to produce results with 90% confidence at ±10% precision at the stratum level.

After a two-week fielding period, CalMTA relaxed the quotas to improve study efficiency and timeliness. After reviewing the data, the team removed two responses due to poor response

[24] This report refers to respondents to the CalMTA residential survey as residents; the purchasing subset of this survey is referred to as "purchasers." As described above, all respondents to the residential survey represent decision makers in their own household. Note that "purchasers" are also a subset of the respondents to the building owner/property manager survey discussed in the next section.

[25] This is further detailed in Appendix A, Weighting methodology.

quality, resulting in a final total of 856 completed surveys. Of these, 346 respondents reported water heater purchases and answered questions regarding their purchase, and 415 respondents reported awareness of HPWHs and answered additional questions related to their perception of HPWHs. A total of 20 respondents completed the survey in Spanish.[26] See Appendix A, Weighting methodology, for details of these subsample respondents.

2.4.2 Strata definitions

To identify respondents who met ESJ criteria, CalMTA assessed zip codes using CalEnviroScreen data and cross-checked self-reported income and county information to determine whether respondents were at or below 80% of the area median income.[27] This study categorized housing types as follows: single-family homes included both detached and attached units; multifamily homes included condominiums and apartment buildings with two or more units; and mobile homes included manufactured housing. Geographic distinctions between coastal and inland areas aligned with the respondent's zip code and its alignment with California Energy Commission (CEC) Building Climate Zones, as detailed in Appendix B, Zip code and climate zone mapping.

2.4.3 Weighting approach

CalMTA applied a raking methodology that involved weighting the survey results to reflect the statewide population, with adjustments made to reflect the survey's focus on households with dedicated water heaters (vs central systems serving multiple households). See Appendix A, Weighting methodology, for detailed information on the selected approach.

2.5 Building owner and property manager survey

The building owner and property manager survey was designed to capture insights from individuals responsible for water heating decision-making in Californian residential households that they own or manage, with specific attention to ensuring representation across key geographic, demographic, and housing segments, and of households in ESJ communities. The following subsections detail the sampling plan and the methodology used to align with estimates of occupied rental housing served by per-household water heating in California.

2.5.1 Sampling plan and resulting respondents

CalMTA purchased an online panel through Qualtrics, a panel aggregator, and used a quota-based sampling approach to ensure representation across climate region, electric utility, housing type, and ESJ category. The survey targeted a total of 92 completed surveys. To identify respondents meeting ESJ criteria, CalMTA assessed zip codes using CalEnviroScreen data and cross-checked self-reported zip codes and ownership and management of affordable housing

[26] See Appendix A, Weighting methodology, for data sources.
[27] ESJ criteria are further detailed in Appendix A, Weighting methodology.

units.28 CalMTA designed the sampling plan to produce results with 85% confidence ±15% precision at the stratum level. See Appendix A, Weighting methodology, for details on the respondent sample. The final sample totaled 162 completed surveys, after removal of two responses due to poor response quality. A total of 16 respondents completed the survey in Spanish.

2.5.2 Weighting approach

CalMTA weighted the building owner and property manager survey results to reflect the population of rental dwellings in California using the population proportions of housing types and investor-owned utility (IOU) customer bases as weighting variables. See Appendix A, Weighting methodology, for detailed information on the selected approach.

2.6 Installer survey

2.6.1 Sampling plan and resulting respondents

CalMTA sourced an online panel through Qualtrics, a panel aggregator, and employed a quota-based sampling approach to ensure representation across key installer types (e.g., dual trades contractors, plumbers, and general contractors), climate regions, electric utilities, and ESJ categories. The team identified ESJ respondents by cross-referencing zip codes with CalEnviroScreen data and confirming where respondents most frequently install water heaters. These quotas ensured secure, robust responses from priority segments, and targeted 136 completed surveys. The team designed the sampling plan to yield stratum-level estimates with 85% confidence and ±15% precision. See Appendix A, Weighting methodology, for details on the respondent sample.

The team recruited participants through the Qualtrics panel network, completing surveys via Computer-Assisted Telephone Interviewing. CalMTA fielded the installer survey in April 2025;[29] the team removed 41 low-quality responses, which resulted in a final sample of 149.

2.6.2 Weighting approach

See Appendix A, Weighting methodology, for detailed information on the selected approach.

3 Policies and programs

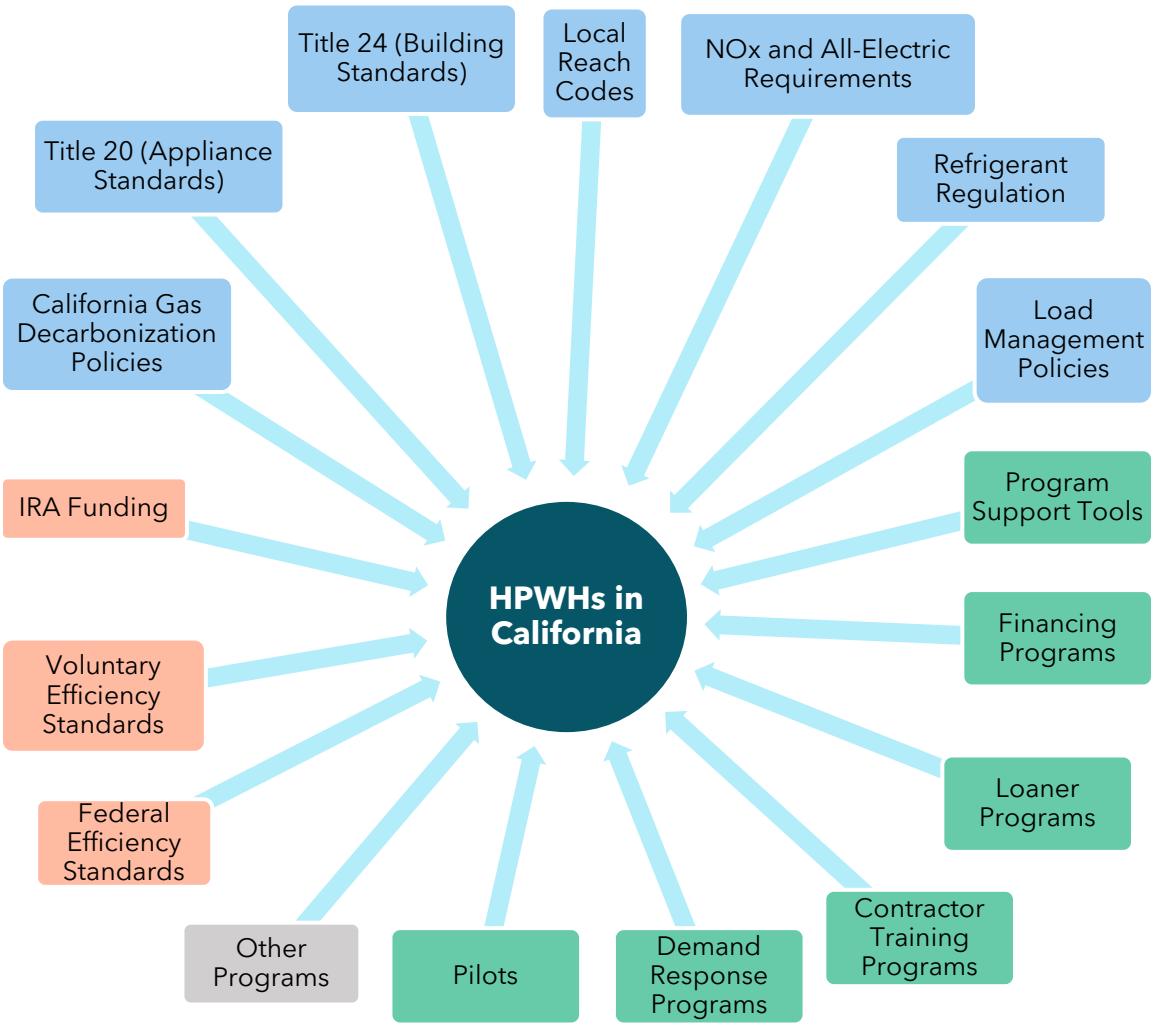
CalMTA conducted a review of major policy and program activities at the federal, state, and regional levels relevant to understanding drivers and potential levers that influence HPWH market adoption in California. This section starts with findings from review of key federal, state, and

[28] ESJ criteria are further detailed in Appendix A, Weighting methodology.

[29] Fielding overlapped with a pause in TECH Clean California HPWH incentives, which may have affected responses in TECH-qualifying regions (see Section 3.3, California program landscape).

regional policies that impact HPWH adoption, and then provides an overview of incentives and other programs influencing HPWH adoption in California (highlighted in Figure 1).

Figure 1. Policies and programs influencing HPWH adoption



3.1 National policy and regulatory landscape

This section reviews key national policies that impact HPWH adoption.

3.1.1 Federal appliance efficiency standards

In April 2024, the U.S. Department of Energy (DOE) finalized new standards that will effectively phase out most electric-resistance water heaters in 2029.[30,31] and which are driving manufacturers to further develop HPWHs as replacements. Interviewed stakeholders and manufacturers emphasized the extensive impact that the DOE standards will have on HPWH adoption. In anticipation, one stakeholder stressed the need for preparing the market to ensure a "soft landing," including sufficient supply and adequate numbers of HPWH contractors and installers. Multiple interviewed manufacturers indicated the expectation that the national HPWH market share would increase to 35% to 40% as a result of these standards (though they did not provide a timeline for this increase), [32] with more products developed to build out customer offerings.[33]

3.1.2 Voluntary efficiency standards

The following voluntary efficiency standards guide HPWH adoption.

ENERGY STAR

The ENERGY STAR® Version 5.0 Water Heaters Final Specification (effective as of April 5, 2023) sets voluntary energy efficiency requirements for multiple types of HPWHs and gas water heaters at the federal level.34 While the current federal administration has created uncertainty regarding the future of ENERGY STAR, its specifications continue to guide California policies and program eligibility.[35,36,37] Figure 2 summarizes the electric water heater certification criteria.

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[30] Federal Register. (2024). "Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters." 10 CFR Parts 429 and 430 EERE 2017-BT-STD-0019] RIN 1904-AD91. May 6, 2024. https://www.federalregister.gov/documents/2024/05/06/2024-09209/energy-conservation-program-energy-conservation-standards-for-consumer-water-heaters

[31] Final rule on energy conservation standards for consumer water heaters as it relates to electric non-heat pump water heaters is so far unaffected by regulatory developments of the new federal administration. As noted by a California Energy Commission analyst in a July 2025 TECH stakeholder meeting, funding for California Energy Commission's HEEHRA rebates has not been changed as part of any legislation passed by Congress this year nor has DOE indicated any change. TECH Clean California 14th Stakeholder meeting, July 23, 2025.

[32] Current national market share is estimated at 4% (discussed in Section 4.3).

[33] With California's distinctly lower electric water heating, and the prevalence of like-for-like replacements, the impact on California market share would be expected to be lower. See 2020 RECS estimated rates of 19% electric water heating in California, vs 46% electric water heating nationally.

[34] ENERGY STAR. Accessed April 1, 2025. "Residential Water Heaters Partner Page." https://www.energystar.gov/products/res_water_heaters_partners

[35] Utility Dive. (2025). *Trump administration plans to end popular ENERGY STAR program.* May 7, 2025. https://www.utilitydive.com/news/trump-administration-epa-energy-star-program/747351/

[36] Door and Window Market. (2025). *Energy Star Wins Key Budget Support but Final Fate Still Uncertain*. Aug. 13, 2025. https://www.dwmmag.com/2025/08/13/energy-star-wins-key-budget-support-but-final-fate-still-uncertain/.

[37] See Appendix D, HPWH incentive programs, for programs (including Modesto Irrigation District, City of Healdsburg, City of Redding, LADWP, and federally-funded HOMES P4P) noting water heaters must be ENERGY STAR-certified to qualify for incentives.

Figure 2. Criteria for ENERGY STAR-certified electric water heaters

Criteria		ENERGY STAR Requirements
Uniform Energy Factor	Integrated HPWH	UEF ≥ 3.30
	Integrated HPWH, 120 Volt / 15 Amp Circuit	UEF ≥ 2.20
	Split-system HPWH	UEF ≥ 2.20
First-Hour Rating		FHR ≥ 45 gallons per hour
Warranty		Warranty ≥ 6 years on sealed system
Safety		UL 174 and UL 1995 or UL 60335-2-40
Lower Compressor Cut-Off Temperature (Reporting Requirement Only)		Report ambient temperature below which the compressor cuts off and electric resistance only operation begins
Upper Compressor Cut-Off Temperature (Optional Reporting Only)		Partners may report the ambient temperature above which the compressor cuts off and electric resistance only operation begins

Source: ENERGY STAR Residential Water Heaters Partner website

ENERGY STAR's list of certified water heaters includes more than 500 HPWHs (more than half of the water heaters listed).[38] Of the 20 manufacturers listed in the ENERGY STAR data that offer HPWHs, 13 offer *only* HPWHs. 120-volt HPWHs and split-system HPWHs are offered by only a few manufacturers (Table 4).

Table 4. Summary of ENERGY STAR-certified HPWHs

	HPWH				Gas or Propane	Solar/ Elec. Backup	Total	% HPWH
	240V	120V	Split System	ALL HPWH				
Model Count	485	63	10	558	498	30	1,086	51.4%
Manufacturers Offering	17	2	3	20	16	12	41	48.8%

Source: ENERGY STAR website, accessed May 2025. Note "Total" Manufacturers Offering represents total manufacturers offering any kind of water heater; manufacturers may offer multiple types of water heater and therefore manufacturers will not sum across columns.

Rheem Manufacturing Company, Inc., currently has the largest share of ENERGY STAR-qualified HPWHs (317 models), followed by A.O. Smith Corporation (120 models). Per the ENERGY STAR criteria, all qualified HPWHs are designed with a maximum current rating of 24 amps at an input

[38] Note that the identification of 20 manufacturers reflects distinct ENERGY STAR Partners in the data, in which a single Partner manufacturer may be responsible for multiple brands (e.g., Partner Rheem has brands identified as both Rheem and Ruud). ENERGY STAR. Accessed May 2025. "ENERGY STAR Certified Heat Pump Water Heaters." https://www.energystar.gov/productfinder/product/certified-heat-pump-water-heaters/results.

voltage of 250 volts or less. This includes all ancillary equipment, such as fans, storage tanks, pumps, or controls necessary for the device to perform its function.[39]

NEEA advanced water heating specification

The Northwest Energy Efficiency Alliance (NEEA)'s Advanced Water Heating Specification (AWHS) covers characteristics specified by ENERGY STAR, as well as additional characteristics related to customer comfort and system performance; the AWHS also establishes tiered ratings for residential and other HPWHs. As specified in the most recent version of the AWHS (version 8.1), all residential HPWHs meeting the AWHS must also be ENERGY STAR-certified.[40]

3.1.3 Inflation Reduction Act

Allocation of Inflation Reduction Act (IRA) funding to California, administered by the CEC, includes $291 million for HOMES and $290 million for HEEHRA; HEEHRA Phase I funding for multifamily is currently being made available to Californians through the TECH program (discussed further in Section 3.2), Phase II funding is in planning stages and may or may not include HPWH incentives, and HOMES funding is planned for integration into the CEC Equitable Building Decarbonization program, and a new pay for performance program (not yet available).[41,42,43] Changes in the federal administration have led to questions by market actors regarding the future availability of IRA funding; however, the CEC noted in July 2025 that funding for the Commission's HEEHRA rebates has not changed as part of any legislation passed by Congress this year, and DOE has not indicated any change. [44]

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[39] ENERGY STAR. Accessed April 1, 2025. "Water Heater Key Product Criteria." https://www.energystar.gov/products/water_heaters/residential_water_heaters_key_product_criteria

[40] NEEA. Advanced Water Heating Specification Version 8.1. Effective Date: July 15, 2024. https://neea.org/wp-content/uploads/2025/03/Advanced-Water-Heating-Specification.pdf.

[41] The High-Efficiency Electric Home Rebate Act (HEEHRA) program helps low- to moderate-income households "go electric" through rebates for ENERGY STAR appliances. The Home Efficiency Rebates (HOMES) program provides incentives for whole-home retrofits that achieve at least 20% energy savings.

[42] California Energy Commission. (2024). *Home Electrification and Appliance Rebates Program Phase: 1 Community Benefits Plan.* July 22, 2024. https://efiling.energy.ca.gov/GetDocument.aspx?tn=257986&DocumentContentId=93918

[43] California Energy Commission. (2025). *Notice of Solicitation Concept Workshop for Home Efficiency Rebates (HOMES) Pay-for-Performance (P4P) Program.* July 28, 2025. https://efiling.energy.ca.gov/GetDocument.aspx?DocumentContentId=101825&tn=265049&utm_medium=email&utm_source=govdelivery.

[44] HEEHRA Phase II is expected to make $152 million available for a combination of HVAC heat pumps, HPWHs, and other measures. Phase II is still under development, and the start date is not known. Updates are shared by the California Energy Commission in the TECH 14th Stakeholder Meeting, July 23, 2025. https://techcleanca.com/documents/5622/TECH_14th_Quarterly_Stakeholder_Meeting.pdf.

3.2 California policy and regulatory landscape

3.2.1 State decarbonization goals and policies

California has now codified a goal of carbon neutrality by 2045 and at least an 85% reduction in anthropogenic greenhouse gas (GHG) emissions below 1990 levels by 2045 through Executive Order B-55-18[45] and the California Climate Crisis Act (AB 1279),[46] with the 2022 CARB Scoping Plan serving as the economy-wide roadmap for achieving those targets. Grounded in the CEC's 2021 Integrated Energy Policy Report (IEPR) and Governor Newsom's July 22, 2022 directive to CARB, CARB's 2022 Scoping Plan calls for 3 million climate-ready/electric-ready homes by 2030, 7 million by 2035, and 6 million heat pumps installed statewide by 2030.[47]

CPUC's Building Decarbonization Rulemaking (R.19-01-011) and Long-Term Gas Planning Rulemaking (R.24-09-012), together with SB 1221 (Min, 2024), operationalize this strategy on the ground as they deploy programs such as TECH and BUILD to accelerate residential HPWH adoption, reform rates and line-extension subsidies so they no longer lock in new gas loads, and create a framework for neighborhood-scale, zero-emission alternatives to gas pipeline investments in "priority neighborhood decarbonization zones." In this way, HPWH deployment is not a standalone efficiency initiative but a key implementation pathway for meeting the state's statutory 2030 and 2045 decarbonization goals, aligning customer-level water-heating choices with long-term gas system contraction, carbon-neutrality, and equity objectives.

One interviewed stakeholder noted that the removal of gas line subsidies for mixed-fuel developments is leading to greater adoption of HPWHs in new construction.

3.2.2 California appliance standards (Title 20)

Title 20 is the statewide appliance standard that sets minimum efficiency and certification requirements for a broad set of products, including water heaters and heat pumps, and requires them to be listed in the CEC's Modernized Appliance Efficiency Database System (MAEDbS). Water heater units are regulated under California's Title 20 Appliance Efficiency Regulations, Section 1605.1(f). The standard points to federal efficiency standards and test methods for "consumer water heaters" and "residential-duty commercial water heaters" and requires them to

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[45] Executive Order B-55-18 (Brown, 2018) establishes California's goal to achieve statewide carbon neutrality as soon as possible, and no later than 2045, and to maintain net negative greenhouse gas emissions thereafter, directing state agencies to align their climate strategies with this objective.

[46] California Climate Crisis Act (AB 1279, Muratsuchi, 2022) codifies state policy to achieve net-zero greenhouse gas emissions as soon as possible, but no later than 2045; to achieve and maintain net-negative emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are at least 85% below 1990 levels, directing CARB to reflect these goals in updates to the Scoping Plan and related implementation measures.

[47] CEC, Final 2021 IEPR, Vol. I: Building Decarbonization (CEC-100-2021-001-V1, 2022), p. 12.; Gavin Newsom, Governor's Letter to CARB (July 22, 2022), p. 2 ("Clean and Healthy Homes"). CARB, 2022 Scoping Plan for Achieving Carbon Neutrality (Dec. 2022), pp. 75–76, 214.

be rated in terms of Uniform Energy Factor (UEF). Title 20 establishes a process by which sales-chain market actors are responsible for ensuring water heaters sold in California are listed in MAEDbS (or subject to a $2,500 per-unit fine).[48] In doing so, they establish the legal performance floor and ensure only compliant products are sold in California. Title 20 also provides the standardized test methods and metrics that Title 24, CPUC programs, and market transformation initiatives rely on, including the MAEDbS as a central database.

3.2.3 California building code (Title 24)

Water heater installation is regulated under California's Title 24 Part 6 (California's Building Energy Efficiency Standards). Starting with its 2022 standards that took effect in January 2023, Title 24 has required that single-family new-construction water heating systems using per-unit gas or propane water heaters must meet electric-ready requirements, including provision of electric capacity and condensate drainage infrastructure, as well as designating a space measuring at least 2.5 feet by 2.5 feet wide and 7 feet tall suitable for the future installation of an HPWH.[49] The 2025 Standards that go into effect January 2026 expand the prescriptive requirement and are intended to support wider adoption of heat pumps in the new construction market by expanding the 2022 single heat pump baseline to dual, which means heat pumps for both space and water heating.[50] The 2025 standards align with NEEA's AWHS and will require either solar water heating or HPWHs as the only options for single-family prescriptive code compliance.[51,52] The performance path will set an energy budget (baseline) using HPWH, so even if gas water heaters are installed as a choice they will require compliance with all the electric-ready requirements in the proximity of the install that remove barriers for future change outs related to electrical upgrades for HPWHs.

During interviews, two established manufacturers and several stakeholders indicated that Title 24's recent allowances and incentives for fuel substitution were contributing to the increase in HPWH saturation in California.

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[48] https://www.energy.ca.gov/rules-and-regulations/appliance-efficiency-regulations-title-20/appliance-regulations-certification.

[49] See Title 24 Section 150.0(n)1, accessible in the 2022 Energy Code Ace Reference. https://energycodeace.com/content/section-1500-mandatory-features-and-devices-single-family-r.

[50] https://www.energy.ca.gov/sites/default/files/2024-09/2025_California_Energy_Code_Fact_Sheet_ada.pdf

[51] CEC Commissioner McAllister stated that the newly adopted state code will "provide a clear path to builders to build to dual heat pump baseline" and will help market adoption. AWHI All Stakeholders Meeting, September 5, 2024.

[52] For single-family new construction, their 2025 proposal makes heat pump space heaters and HPWHs or solar water heating systems the primary prescriptive pathway in all climate zones instead of excluding certain climate zones.
California Energy Codes and Standards. August 2024. "Reach Code News Brief: August 2024." https://localenergycodes.com/content/august-2024?utm_source=chatgpt.com

3.2.4 Reach codes by local jurisdictions

Many local California governments have adopted or are considering adopting reach codes that go beyond the requirements of Title 24 by eliminating gas in new construction. Tracking of local policies by the Building Decarbonization Coalition currently indicates that mulitple local jurisdictions in California have ordinances that limit gas appliances, and another 18 have policies encouraging decarbonization.[53] The future of some of these local codes is uncertain after a federal court overturned the City of Berkeley's restriction on natural gas in 2023.[54] Several interviewed manufacturers reported that they closely track similar reach codes and judicial proceedings to inform their markets.

3.2.5 All-electric and zero nitrogen oxides policies influencing HPWHs

CARBS's zero-emission standards for new space and water heaters are in alignment with the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) as they would reduce building-related GHG emissions. As of August 2025, multiple regions in California have enacted or are considering enacting policies regulating the sales of water heaters that emit nitrogen oxides. The BAAQMD implemented a rule regulating the sale of gas water heaters beginning in 2027. The SCAQMD also considered a rule to require zero-emission residential water heaters,[55] though its rule was voted down in June 2025. At the state level, CARB has begun a rulemaking process to explore a requirement for all new space and water heating sold into both new and existing homes to have zero emissions starting in 2030.[56] The definition of zero emissions is anticipated to include heat pump and electric-resistance water heating and would disqualify gas or propane water heating from new construction and retrofits.

CalMTA's interviews with stakeholders (including program administrators) and secondary research both indicate that programs are seeking to align their programming and incentive offerings to support compliance with the BAAQMD rule.[57] BayREN credits the policies and federal

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[53] Building Decarbonization Coalition. "Zero Emission Building Ordinance Tracker v2." Accessed November 24, 2025. https://buildingdecarb.org/zeb-ordinances.

[54] Grist. (2023). *The First Natural-Gas Ban in the US Just Got Shot Down*. April 18, 2023. Berkeley, California's natural gas ban just got shot down | Grist.

[55] South Coast AQMD. (2024). "Go Zero Pilot Incentive Program Q&A." August 28, 2024. https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1111-and-1121/bidders-conference-slides.pdf?sfvrsn=86c28761_8.

[56] CARB would not restrict the use or repair of existing non-zero-emission space or water heaters, nor require their replacement before 2030. Instead, under the proposed zero-emission standard, any new or replacement space or water heater — whether for new construction or to replace in existing buildings after 2030 — must be zero-emission units. https://ww2.arb.ca.gov/our-work/programs/building-decarbonization/zero-emission-space-and-water-heater-standards/faq

[57] Programs such as MCE Clean Energy's Emergency Loaner Program use program materials to educate customers on this rule and promote HPWH adoption. MCE. September 23, 2024. *MCE Launches Emergency Water Heater Loaner Program*. https://mcecleanenergy.org/wp-content/uploads/2024/09/MCE-Launches-Emergency-Water-Heater-Loaner-Program.pdf

incentives with doubling the number of calls to their adviser hotline, suggesting that these policies are impacting customer and contractor decision-making.[58]

3.2.6 Refrigerant regulation

SB 1206 (2022) seeks to increase adoption of low and ultra-low global warming potential (GWP) alternative refrigerants (refrigerants with GWP <150 and <10, respectively) by limiting the use of refrigerants with GWP >750 effective January 1, 2025, regulating the distribution of R410A and hydrofluorocarbon blends like R407A and R407C starting in 2030, and completely disallowing the sale of any refrigerants with GWP >750 (such as R448A, R449A, and R134a) by 2033.[59] The CPUC Decision 19-01-011 states that decarbonization incentive programs TECH and BUILD will no longer provide incentives for HPWHs with GWP exceeding 750 starting in 2027.[60] Benefits of low GWP water heaters have been noted to include improved performance and water storage temperature capabilities and lowered risk of GHG emissions through the elimination of refrigerant leakages.[61]

Further developments in the market are required to support the adoption of low GWP HPWHs. Currently, more than 95% (553) of the 558 HPWHs certified by ENERGY STAR use R134A – which is scheduled for limited distribution by 2033 – while fewer than 2% use a low GWP refrigerant.[62,63] In December 2023, the CPUC noted that there were no HPWH models satisfying their grid

[58] North Bay Business Journal. (2023). *Demand for Heat Pumps in Bay Area Rises Amid Bans on Gas Appliances.* April 17, 2023. https://www.northbaybusinessjournal.com/article/article/demand-for-heat-pumps-in-bay-area-rises-amid-bans-on-gas-appliances/.

[59] Natural Refrigerants News and Marketplace. (2022). *California to Prohibit Sale of High-GWP hydrofluorocarbons from 2033.* October 6, 2022. https://naturalrefrigerants.com/california-to-prohibit-sale-of-high-gwp-hfcs-from-2033/.

[60] CPUC Rulemaking 19-01-011. "Prohibition on High GWP Refrigerants in Appliances Incentivized by Building Decarbonization Progrms." Adopted Feb. 14, 2025. https://efiling.energy.ca.gov/GetDocument.aspx?tn=262498&DocumentContentId=99028.

[61] CalNEXT Energizing California's Future. (2024). *2024 Water Heating Technology Priority Map.* July 26, 2024. https://calnext.com/wp-content/uploads/2024/09/2024-Water-Heating-TPM-September-1-2024.pdf.

[62] ENERGY STAR. Accessed April 1, 2025. "ENERGY STAR Certified Heat Pump Water Heaters." https://www.energystar.gov/productfinder/product/certified-heat-pump-water-heaters/results, May 2025

[63] Khanoiker, A., et al. "Heat Pump Water Heaters - New Developments for Retrofits and Multi- Family." YouTube. https://www.youtube.com/watch?v=OhMc140r7BM; Two manufacturers have been identified as producing HPWHs with low- or medium-GWP refrigerants (Nyle's 120-volt uses R513A and Sanden/Eco2 uses CO2).

connectivity goals that also used low GWP refrigerant.[64,65] Some programs offer additional incentives for installation of low GWP HPWH models. [66]

To track refrigerants, CARB's Refrigerant Management Program places reporting requirements on contractors and wholesalers that work with refrigerants of different GWP. Distributors and other wholesalers must keep records of refrigerant transactions and file annual reports.[67]

3.2.7 Policies supporting HPWH load management

Several load-management and demand response policies are collaboratively led by the CPUC, CEC, and California Independent System Operators (CAISO). The CPUC has conducted studies and explored pilots and other activities to support demand flexibility in its rulemaking R.22-07-005. In September 2025, the CPUC issued an Order Instituting Rulemaking to Enhance Demand Response (R.25-09-004) to further support process updates critical for improving demand response resources.[68]

The CEC's Joint Appendix JA13 qualifies certain HPWHs as "HPWH demand management systems" and enables qualification for the HPWH demand flexibility compliance credit available in the performance path specified in Title 24.[69] Some programs, such as Building Initiative for Low-Emissions Development (BUILD), offer additional incentives for JA-13-compliant HPWH installation.[70] Program administrators and manufacturers have proposed greater flexibility around communication standards, with manufacturer Bradford White recommending delay of certain

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[64] CalNext. (2024). *2024 Water Heating Technology Priority Map*. July 26, 2024. https://calnext.com/wp-content/uploads/2024/09/2024-Water-Heating-TPM-September-1-2024.pdf.

[65] CPUC D.23-12-004. (2023). Decision Expanding Eligibility for Heat Pump Water Heater Program. December 12, 2023. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M521/K892/521892890.PDF.

[66] SGIP HPWH has offered a low GWP kicker incentive of $1,500 for all project types where HPWHs use a refrigerant with a GWP of 150 or less. Energy Solutions. Accessed January 15, 2025. *Self-Generation Incentive Program Heat Pump Water Heater Program*. https://techcleanca.com/documents/1520/Final_SGIP_HPWH_Handbook.pdf

[67] California Air Resources Board. (2024). "Updates to the Refrigerant Management Program's Refrigeration and Reporting Tool." YouTube. December 12, 2024. https://www.youtube.com/watch?v=zQ6OrVdTs4E.

[68] CPUC, (2025). "ORDER INSTITUTING RULEMAKING TO ENHANCE DEMAND RESPONSE IN CALIFORNIA." September 29, 2025. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M582/K072/582072320.PDF.

[69] Appendix JA13 Qualification Requirements for Heat Pump Water Heater Demand Management Systems Energy Code Ace, Accessed September 2025. https://energycodeace.com/content/appendix-ja13-qualification-requirements-for-heat-pump-water.

[70] Opinion Dynamics. (2025). *Building Initiative for Low-Emissions Development (BUILD) Program.* February 5, 2025. https://www.calmac.org/%5C/publications/BUILD_Time_1_Market_Study_Report_FINAL.pdf.

communication requirements (specifically, EcoPort or CTA-2045-compliant components) until the water heating connectivity standard AHRI 1430 is published.[71]

The CEC is in the process of developing Flexible Demand Appliance Standards in accordance with SB 49 (2019) to support statewide movement toward 100% clean energy supply.[72] While no standard applicable to HPWHs is currently in place, a 2023 study identifies that informing HPWH operation with price signals could provide customer savings of 15% if using TOU price response, and 29% if using real-time price response. A recent study projects over 30 million appliances will be compliant with Flexible Demand Appliance Standards in California by 2035.[73]

3.3 California program landscape

A multitude of programs promote the adoption of HPWHs in California (Figure 3). This section provides a high-level overview of program support for the installation of HPWHs in California, including the following:

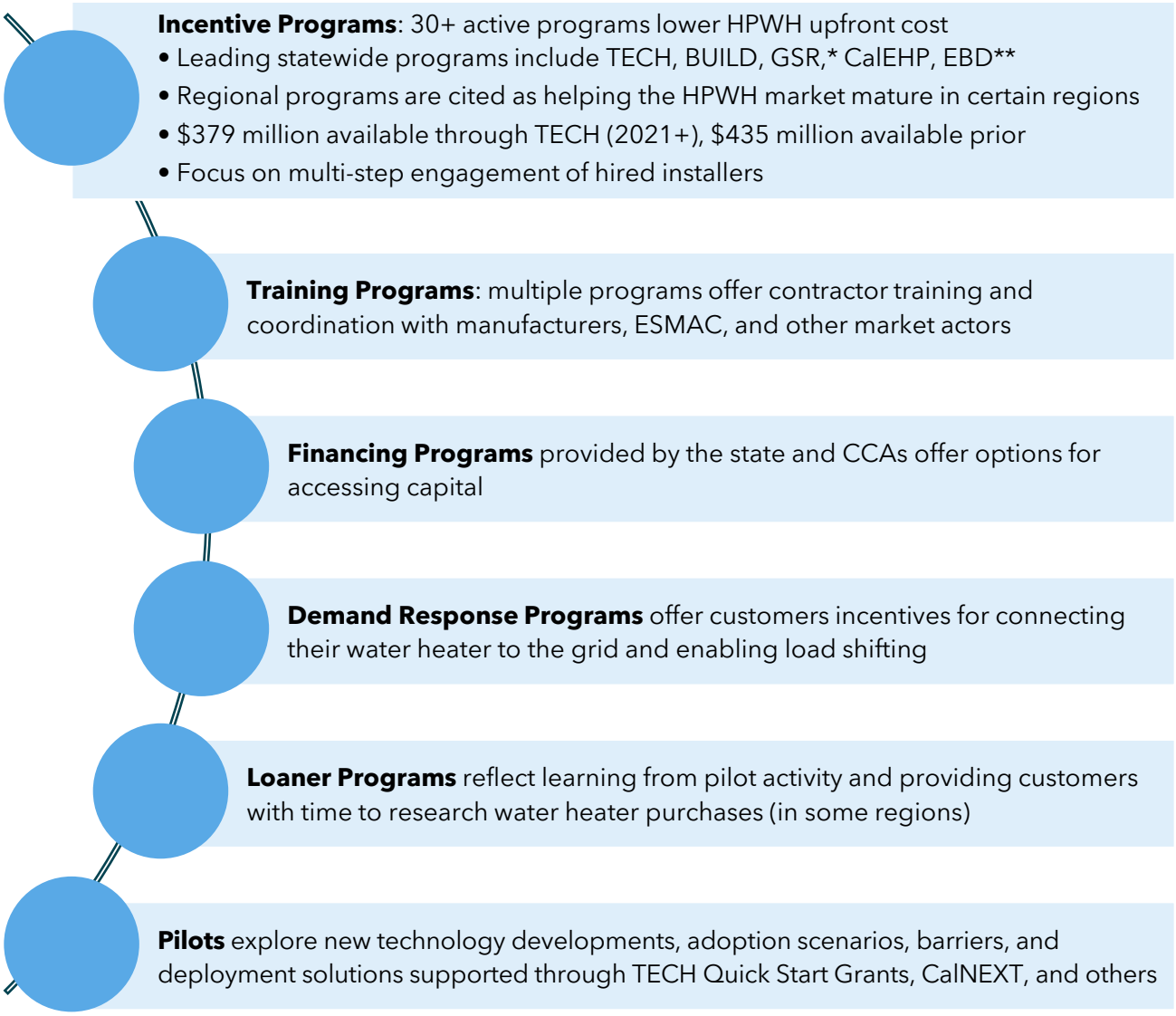
- A sense of scale through a review of key **program funding**.
- A summary of **incentive programs** that support reducing the cost of HPWH installation.
- A review of available **financing programs**, water heater **loaner programs**, and contractor **training programs**.
- A **summary of key pilots** that seek to further HPWH adoption.

[71] Bradford White has noted that the appliance requirements proposed in the CPUC's staff proposal, which include JA-13 compliance, and identification by NEEA as having a CTA-2045 Compliant Communication Port, were too prescriptive, CPUC. April 7, 2022. *Decision Establishing Heat Pump Water Heater Program Requirements*. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M467/K581/467581288.PDF. Bradford White further notes that AHRI 1430 was developed collectively by both water heater manufacturers themselves and the Air Conditioning Heating and Refrigeration Institute (AHRI) in July 2024 comments responding to a CEC Request for Information regarding expansion of flexible demand. https://efiling.energy.ca.gov/GetDocument.aspx?tn=257588&DocumentContentId=93474.

[72] Senate Bill 49 (2019, Skinner) authorizes the CEC to adopt standards for appliances to facilitate the deployment of flexible demand technologies. California Energy Commission https://www.energy.ca.gov/proceedings/active-proceedings/flexible-demand-appliances.

[73] A 2024 study further reviews how price signals could be provided through California's Market Influenced Demand Automation Server (MIDAS). *Expanding Flexible Demand through Public Broadcast of Greenhouse Gas Emissions and Electricity Prices*. California Energy Commission Consultant Report, May 2024. https://efiling.energy.ca.gov/GetDocument.aspx?tn=256582&DocumentContentId=92391.

Figure 3. California program landscape



*Note Golden State Rebates incentives have been discontinued for HPWHs as of October 2025.
**Note Equitable Building Decarbonization program funding for HPWHs is not yet available as of October 2025.

3.3.1 California HPWH program funding and key programs overview

CalMTA reviewed the total funding provided for California HPWH installations. In 2020, the CPUC identified $435 million across 13 programs supported with CPUC funds (though these funds were not exclusive to HPWHs).[74] Since 2020, additional funding has been allocated:

- More than $379 million has been made available to HPWHs through the TECH Clean California program.[75]
- The Equitable Building Decarbonization (EBD) program plans to launch with $567 million for statewide direct install projects,[76] including HPWHs.
- California's Electric Homes Program (CalEHP) has allocated $75 million for all-electric new construction.[77]
- Numerous regional programs provide further funds.

Launched in 2021, TECH has been one of the state's leading programs supporting HPWH adoption. TECH is a statewide program that provides incentives to enrolled contractors to support decarbonization and heat pump adoption (including HPWHs) in existing buildings. TECH also provides contactor training and pilot grants to advance heat pump adoption. CalMTA tracks more than $379 million supporting HPWHs through TECH via multiple funding sources and on multiple timelines, summarized below in Table 5.[78]

Table 5. Summary of HPWH-relevant TECH funding (as of September 2025)

Year Available	Amount	Description	Eligibility/Measures
2021	$116,000,000	Launch of TECH program	HVAC heat pumps and HPWHs, funding from gas IOU ratepayers distributed proportionally by IOU territory
2022	$44,700,000	Launch of TECH SGIP HPWH	SGIP funds are dedicated to HPWHs; SGIP HPWH requires that contractors ensure customers enroll in a demand

[74] California Public Utilities Commission (CPUC). (2020). Fact Sheet: Heat Pump Water Heater Incentive Programs. May 1, 2020. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/cpuc-hpwh-and-electrification-fact-sheet_q22020.pdf.

[75] This includes funds provided through SGIP HPWH.

[76] Includes funds through IRA HOMES. Center for Sustainable Energy. Accessed March 1, 2025. Central California's Equitable Building Decarbonization Program. https://energycenter.org/program/central-californias-equitable-building-decarbonization-program.

[77] California Energy Commission. (2025). California Electric Homes Program – CalEHP. Accessed September 24, 2025. https://www.energy.ca.gov/programs-and-topics/programs/california-electric-homes-program-calehp.

[78] Note this table does not summarize sources of funding for TECH that do not support HPWHs, including $25 million in GGRF funds for single family HVAC heat pumps, and TECH funds from HEEHRA Phase I for single-family projects are restricted to HVAC heat pumps.

Year Available	Amount	Description	Eligibility/Measures
			response program and be on a TOU rate.[a,b]
2023	$40,000,000	Additional funding for SGIP HPWH TECH allocated by CPUC (2022)[c]	Dedicated for HPWHs; intended to provide funding through 2025.
2023	$50,000,000	Allocated by CPUC Decision 23-02-005[d]	Funds allocated from the state's 2022/2023 fiscal year budget for both HVAC HPs and HPWHs; no geographic limitations.
2024	$35,000,000	TECH HEEHRA Phase I Multifamily	HPWHs, HVAC HPs, and other measures; accepting applications since October 2024.[e]
2025	$10,000,000	GGRF-funded TECH Single Family[f]	HVAC HPs and HPWHs; contractors no longer required to confirm TOU rate enrollment before incentive payment.[g]
2025 (Anticipated)	$44,000,000	GGRF-funded TECH Multifamily	TBD – estimated end date December 2026.[g]
2025-2026 (Anticipated)	$40,000,000	Aliso Canyon Disaster Area, CPUC Decision 25-06-034[h]	Multiple measures anticipated, TBD. Funds to be available from the Aliso Canyon Recovery Account[i] through 2027 for specific communities in Southern California.

a: CPUC. "Self-Generation Incentive Program (SGIP) Heat Pump Water Heater (HPWH) Staff Proposal Appendix A, Summary of Recommendations." https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/utilities_and_industries/energy/energy_programs/demand_side_management/sgip-hpwh-appendix-a_final.pdf.
b: BayRen (2023). "TECH and SGIP HPHW Load Shifting." September 20, 2023. https://www.bayren.org/sites/default/files/documents/2023/BayREN-Q3-2023-Forum_Home-Scale-Resilience_Kehmeier.pdf.
c: CPUC. "CPUC Provides Additional Incentives and Framework For Electric Heat Pump Water Heater Program." https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M466/K477/466477873.PDF.
d: CPUC. "Decision Adopting New Funding Pursuan to Assembly Bill 179 for the Technology and Equipment for Clean Heating Intiiative." https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M501/K931/501931113.PDF.
e: https://techcleanca.com/about/news/now-accepting-applications-for-multifamily-heehra-rebates/. Update confirming applications are still open was provided in the TECH 14th Stakeholder Meeting, July 23, 2025. https://techcleanca.com/documents/5622/TECH_14th_Quarterly_Stakeholder_Meeting.pdf.
f: GGRF refers to the Greenhouse Gas Reduction Fund.
g: TECH Clean California 14th Stakeholder Meeting, July 23, 2025. https://techcleanca.com/documents/5622/TECH_14th_Quarterly_Stakeholder_Meeting.pdf.
h: CPUC Decision 25-06-034 (Order Institutionalizing Rulemaking Regarding Building Decarbonization) provides the following detailed priority schedule: "Until June 30, 2027, one hundred percent of funds shall be allocated exclusively to the San Fernando Valley area while prioritizing the City of Los Angeles communities identified in AB 157 (Porter Ranch, Granada Hills, Northridge, Chatsworth, North Hills, Canoga Park, Reseda, Winnetka, West Hills, Van Nuys, and Lake Balboa [communities collectively known as the Aliso Canyon Disaster Area]." After June 30, 2027, "any remaining funds shall be made available to other customers within the Southern Gas Company service territory." https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M569/K067/569067338.docx.
i: For more information on the Aliso Canyon Recovery Account see https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-issues-presiding-officer-decision-adopting-settlement-penalizing-socalgas-for-aliso-2023.

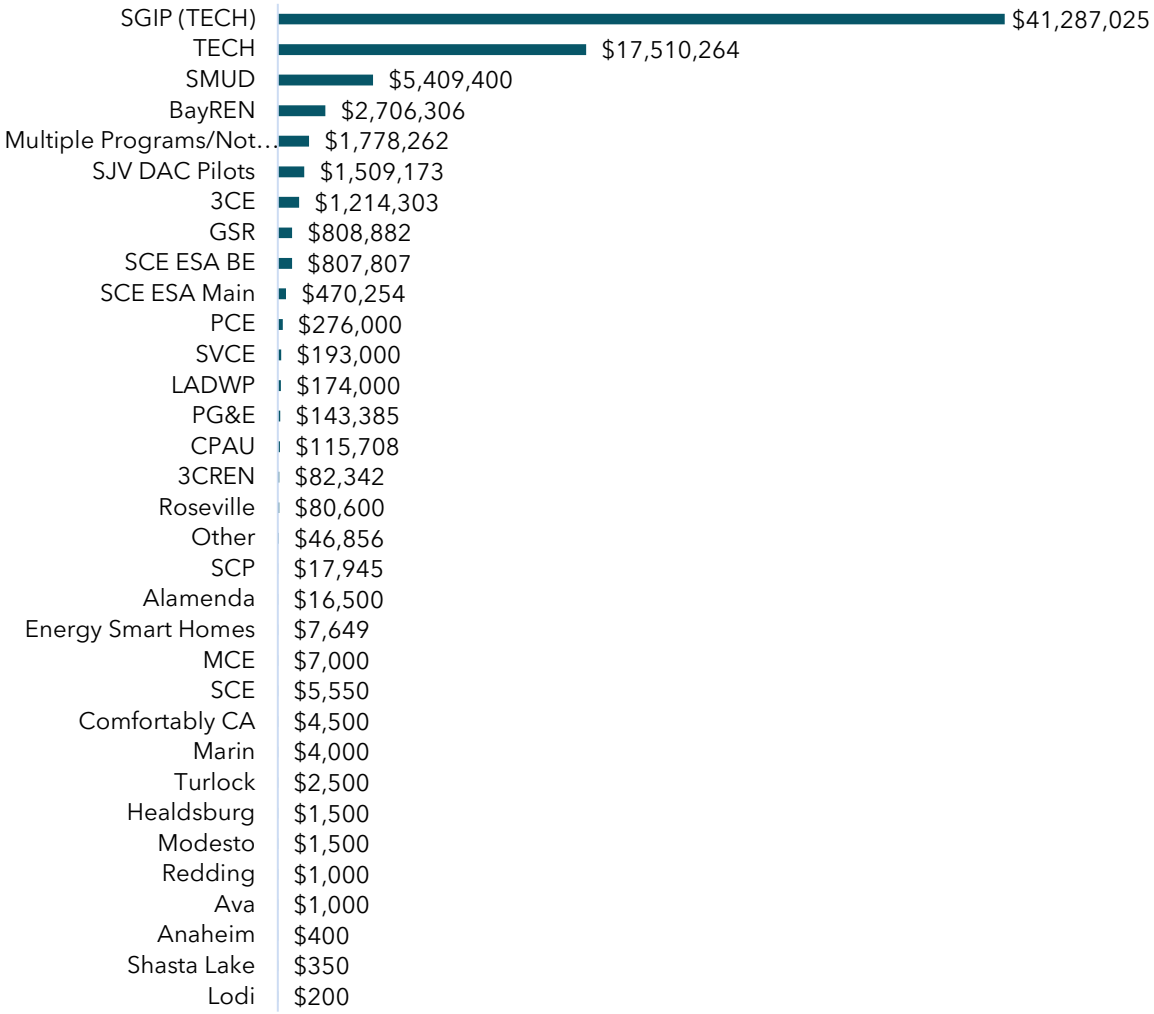
Analysis of data available from the statewide program TECH (which represents a large share of funding directed to HPWHs) shows that as of June 2025, TECH has paid out $58.8 million in

incentives for the installation of 15,336 HPWHs. TECH data also show that these incentives were combined with resources from approximately 30 other programs, which contributed additional incentives of $15.9 million. This resulted in a total of $74.7 million in incentives paid out for 15,336 HPWHs, with an average incentive of $4,870 per HPWH unit installed. Documented total project costs amount to $139 million. Within the TECH single family program, project costs per HPWH unit installed average approximately $8,000.[79] Figure 4 shows a breakdown of incentives provided by program.[80]

[79] TECH Clean California Download Data, accessed June 9, 2025. https://techcleanca.com/heat-pump-data/. Reflects costs and total HPWH counts across low-income direct install, multifamily and single-family programs. Average project cost reflects single-family projects in 2024 and 2025 due to different data formats for the multifamily and low-income direct install program.

[80] TECH Clean California. Download Data, accessed June 9, 2025. https://techcleanca.com/heat-pump-data/. Reflects incentive dollars across low-income direct install, multifamily and single-family programs.

Figure 4. Incentives for HPWHs documented in TECH Clean California data



Source: TECH Clean California Data, May 2025 (Accessed June 9, 2025) HPWH Incentive Programs

More than 50 programs have been identified as making incentives available to support lowering the up-front cost HPWHs, and are summarized in Appendix D, HPWH incentive programs.[81] Of these, 39 are active (as of September 2025). Select programs are summarized below:

Statewide offerings. Statewide programs incentivizing HPWHs include TECH (for retrofits only), Golden State Rebates (point-of-sale; not currently active), EnergySmart Homes (new construction only), BUILD (new construction only) and the Equitable Building Decarbonization program (soon-to-launch). While these programs are communicated as statewide, Golden State Rebates and

[81] Not counting demand response programs, or HPWH emergency loaner programs (covered in separate summaries).

EnergySmart Homes are IOU programs. As such, these programs are restricted to IOU customers (including customers who are also Community Choice Aggregation [CCA] customers). TECH availability may vary depending on its funding source; for example, certain cycles of TECH funding have budgets restricted to certain IOU territories and may or may not be available to publicly owned utilities (POUs).

Incentives for statewide programs vary. TECH's incentives for HPWHs are among the highest across all programs at $3,100 for non-income qualified customers, and at times exceeding $5,000 for low-income customers, while Golden State Rebate has offered rebates of $500 to $900 for HPWHs.

Leading regional programs. Leading active regional programs include the Sacramento Municipal Utility District (SMUD)'s HPWH rebates ($2,500), programs run by CCAs Peninsula Clean Energy (PCE) HPWH rebates ($2,500) and Tri-County Regional Energy Network (3C-REN) rebates ($1,000). CalMTA has identified that 10 smaller cities and municipal utilities also run programs providing rebates.

HPWH program promotion and "incentive finders"

The incentive programs described above and further detailed in Appendix D, HPWH incentive programs, are promoted through a number of "incentive finder" online tools. For example, the statewide outreach and education campaign *The Switch Is On* promotes HPWHs and provides a database of rebates available across California, accessible by entering a zip code. As of June 2024, the campaign peaked at 307,261 unique users in the third quarter of 2022 and ranged from 21,186 to 83,782 unique users per quarter in 2023.[82,83] Many program administrators also cross-promote programs and work across programs to support their customers. Table 6 provides examples of cross-program collaboration.

Table 6. Incentive program collaboration examples

Promotion Type	Description
Cross Promotion	MCE Clean Energy offers a rebate finder specific to zip code, homeowner vs. renter, household size, and income, with further filtering by project type.[84] Redwood City promotes Peninsula Clean Energy (PCE) and BayREN incentives. Rebates offered through BayREN and SMUD, along with five

[82] The Switch Is On. Accessed December 6, 2025. "TECH Clean California single-family heat pump HVAC and heat pump water heater incentives are now available." https://switchison.org/.
[83] Opinion Dynamics. (2024). *TECH Clean California: Key Performance Indicator Assessment.* July 18, 2024.https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.
[84] MCE. Accessed December 6, 2025. "Find Incentives to Reduce Carbon Emissions." https://incentives.mcecleanenergy.org/.

Promotion Type	Description
	additional rebates, are accessible through the TECH Clean California rebate processing system.[85] PG&E hosts a page for its multifamily customers that displays all relevant incentives in its service territory.[86]
Design of Incentive Levels to Assume (or Require) Layering	Many program administrators collaborate to offer deeper and non-duplicative incentives: Sonoma Clean Power (SCP) advertises BayREN multifamily incentives along with complementary incentives to support electrical upgrades of $750 per in-unit upgrade and $5,000 per central building panel upgrade.[87] Interviewed stakeholders pointed to layering regional SMUD, Tri-County Regional Energy Network, and BayREN incentives with TECH incentives,[88] and also layering low-income specific incentives through the Low-Income Weatherization Program or ESA with TECH incentives.[89] BayREN's new Efficiency and Sustainable Energy program (EASE) direct install program requires projects to layer funding from sources (IRA, TECH, and Golden State Rebates), which the program lead manages on behalf of customers. One interviewed stakeholder emphasized that this enables the inclusion of community-requested services – such as weatherization, technical assistance, and wraparound support – within the program offerings.
Data Sharing	A 2024 evaluation found that numerous program administrators have signed a memorandum of understanding with TECH for data sharing (six program administrators) and incentive layering (seven program administrators). As of 2023, all noted program administrators were in PG&E territory, which may reflect an opportunity for greater cross-collaboration with southern California programs.[90]

[85] CalNext. (2024). *Emergency Replacement Heat Pump Water Heater Market Study*. June 26, 2024. https://calnext.com/wp-content/uploads/2024/07/ET23SWE0020_Emergency-Replacement-HPWH-Market-Study_Final-Report.pdf.

[86] Including PG&E Energy Savings Assistance (ESA), Energy-Smart Homes, SGIP, On-Bill Financing, Solar on Multifamily Affordable Housing, the California Electric Homes Program, the Building Initiative for Low-Emissions Development, (or better known as BUILD), the Low Income Weatherization Program, Bay Area Multifamily Building Enhancements (BAMBE), and GoGreen Financing. PG&E. Accessed March 1, 2025. "Programs. Browse Available Programs." https://pgemultifamily.com/programs/. Note programs listed are not necessarily restricted to multifamily.

[87] Sonoma Clean Power. Accessed March 1, 2025. "Multifamily Building Improvements." https://sonomacleanpower.org/multifamily-building-improvements.

[88] Note BayREN has worked on alleviating challenges in HPWH incentive identification for years; see May 2021 newsletter discussing its regional HPWH incentive guide: BayRen. May 2021. *Key Program Learnings: Heat Pump Water Heater Contractor Incentive Program – One Year In*. https://www.bayren.org/sites/default/files/2022-02/hpwh_learnings_may_2021_bayren_1.pdf.

[89] One interviewed stakeholder noted that the ESA Whole-Home pilot programs do not allow layering with other program incentives so that they can more reliably analyze pilot outcomes independently.

[90] Opinion Dynamics. (2024). *TECH Clean California: Key Performance Indicator Assessment.* July 18, 2024. https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.

3.3.2 HPWH financing programs

Some incentive programs co-market financing options as a way to reduce remaining up-front costs to the customer and allow the customer to pay the remaining project costs over time:[91]

- The **California Alternative Energy Finance's GoGreen Home** financing program offer financing to single-family and multifamily owners and renters of up to $75,000 and $5 million, respectively, by providing partner finance companies with a credit enhancement in the form of a loss reserve.[92] The program allows for payments to be made directly to the financing company, or through the customer's utility bill using on-bill repayment. GoGreen Homes financing has supported 204 projects that installed HPWHs as of July 2025.[93]
- CCAs may also provide financing. **Peninsula Clean Energy's Zero Percent Loans** program advertises zero interest loans of up to $10,000 for all-electric home conversion.[94]

  While several IOUs offer on-bill financing for non-residential projects, IOU offerings do not currently cover residential HPWHs.

3.3.3 Loaner programs supporting HPWHs

Based on recent findings that show that loaner equipment can successfully lessen the time constraint customers cite as a common barrier to considering HPWHs,[95] water heater emergency replacement loaner programs to support HPWHs have been growing in select program administrator territories. These programs are operated by a mix of utilities, other program administrators, cities, and nonprofits. Table 7 provides examples of HPWH loaner programs, many of which launched in Fall 2024.

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[91] CPUC. (2023). "Decision on Clean Energy Financing Proposals." August 10, 2023. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M517/K717/517717993.PDF
TECH Clean California. Accessed January 15, 2025. "Inclusive Utility Investment Pilot." https://techcleanca.com/pilots/tariffed-on-bill-pilot/.
California's market includes more than 4 million low-income households and more than 5.8 million households in rental housing, including 2 million moderate- and above-moderate-income renter households, meaning that approximately 6 million households lack ready access to private capital for upgrading their homes.

[92] https://www.gogreenfinancing.com/about-us/.

[93] California Alternative Energy and Advanced Transportation Financing Authority. (2025). "GoGreen Home Energy Financing Program: Monthly Data Summary through June 30, 2025." https://www.treasurer.ca.gov/caeatfa/cheef/monthlyreel/2025/06.pdf.

[94] Peninsula Clean Energy. 0% financing through PCE. https://www.peninsulacleanenergy.com/residential/financing/.

[95] See Appendix H, Pilots supporting HPWH deployment in California.

Table 7. HPWH emergency replacement loaner programs

Name	Program Administrator	Loaner Type	Available To	Description
Emergency Water Heater Loaner Program[a]	MCE Clean Energy	Gas or electric	Contractors	$1,500 per-unit contractor incentive for the installation of HPWHs after providing an emergency loaner. Must be an active TECH contractor.
HPWH Emergency Replacement Pilot Program[b]	City of Palo Alto Utilities	Gas or 120-volt electric	Contractors	Permanent installation of a 120-volt plug-in HPWH if the site is suitable, or a temporary gas water heater to enable permanent installation of an HPWH later.
Gas Water Heater Loaner Incentive Offering[c]	Tri-County Regional Energy Network	Gas	Contractors	Provision of a loaner gas water heater to contractors or aggregators of Tri-County Regional Energy Network's Single-Family Hard to Reach program, plus $1,000 paid up front to offset labor costs

a:https://mcecleanenergy.org/wp-content/uploads/2024/09/MCE-Launches-Emergency-Water-Heater-Loaner-Program.pdf; https://mcecleanenergy.org/heat-pump-water-heater-incentive/.
b: https://procurement.opengov.com/portal/palo-alto-ca/projects/83035/document.
c: https://cedars.cpuc.ca.gov/documents/download/3226/mainchange_summary%7Cmain%7Credline)/.

3.3.4 Contractor training programs

Many administrators structure their HPWH programs with midstream initiatives that provide incentives directly to contractors or require installation by contractors who are either trained in HPWH installation or participate in a program administrator contractor network, or both. Some program administrators may require contractors to be in their contractor network (e.g., SMUD), while others may allow contractors to be in a central contractor network, such as TECH (e.g., MCE HPWH incentives). Not all incentive programs have requirements that installation contractors be part of a network or show proof of HPWH training (e.g., PCE).[96] Table 8 lists programs offering contractor HPWH training.

Table 8. Contractor training programs

Name	Program Administrator	Eligibility	Description	Incentives To Participate
TECH Contractor Trainings	TECH	Possess a valid CSLB license (B, C-36, C-20, C-20+C10, or C-36+C10)[a]	Technical and sales training from certified instructors and manufacturers and in collaboration with ENERGY STAR	Access to TECH incentives

[96] Peninsula Clean Energy. Accessed February 15, 2025. "How to Take Advantage of Exclusive PCE Rebates." https://www.peninsulacleanenergy.com/residential/rebates-offers/appliance-rebate-application-form/#apply.

Name	Program Administrator	Eligibility	Description	Incentives To Participate
			Manufacturer Action Council (ESMAC).	
FutureFit Fundamentals Contractor Training[b]	SVCE	Reside in, or license held, or union membership held, in the county: C-46, C-10, C-36 or C-20 license	Courses covering fuel switching, the latest products, and product benefits	$500 FutureFit Fundamentals stipend for course completion; up to $5,000 for completing installation
E-Contractor Program[c]	SoCalREN	Licensed contractors	Support with business development, certifications, marketing, bid/RFP review, and referrals to resources and project opportunities	One-on-one technical assistance, access to projects through SoCalREN programs
Contractor Demand Building Program[d]	SCE	Licensed contractors or installers/technicians represented by a licensed contractor. Must complete an on-demand video to enroll in one-day in-person training	Expert-led class teaches proper installation techniques for optimal performance and customer satisfaction.	Participants receive a 65-gallon HPWH upon training completion
PG&E Energy Center Courses	PG&E	Open to all	Online classes on HPWHs and electrification[e]	

a: Some trainings may also be available to administrative staff and managers. Eight trainings were held as online webinars at 7.00a.m. PST January to April 2025 as detailed in a TECH "Introduction to Heat Pump Water Heater Education" flyer. TECH Clean California & ESMAC. Accessed January 14, 2025. Introduction to Heat Pump Water Heater Education. https://techcleanca.com/documents/5513/ESMAC_Evergreen_Training_v241218.pdf.
b: Silicon Valley Clean Energy. Accessed December 1, 2024. "Get paid $500 for Online Training and up to $5,000 a year for promoting electric appliances." .
c: SoCal REN. Accessed December 15, 2024. "WET Contractor Program." https://socalren.org/SoCal wet/contractor-program.
d: Southern California Edison. Accessed December 10, 2025. "Contractor Demand Building." https://www.sce.com/business/contractor-demand-building-program.
e: PG&E. Accessed February 1, 2025. "Training and Courses."https://pge.docebosaas.com/learn/courses/3137/heat-pump-water-heater-installation-decision-guidance-and-load-shifting.

Contractors that enroll in TECH must complete TECH training. A July 2024 evaluation tracks the project volume of 798 contractors that enrolled in the program between April 2023 and February 2024 ("TECH 2.0") and found that 409 (51%) of them had submitted at least one HVAC or HPWH

project) during that period.[97] TECH also engages with community-based organizations (CBOs) to recruit disadvantaged workers and help them enroll as TECH contractors. As of 2023,[98] TECH had engaged 63 CBOs to assist with disadvantaged worker recruitment and has been working to expand contractor training. TECH has also tested use of a disadvantaged community and rural-hard-to-reach-focused hotline.[99] Multiple interviewed stakeholders, including manufacturers, mentioned TECH trainings as successful resources, and noted positive collaboration on ESMAC and TECH trainings. Two stakeholders and one manufacturer also positively noted TECH's engagement in colleges and trade schools.

3.3.5 Demand response programs

Demand response programs (Table 9) offer benefits to customers who connect their HPWH to the grid and allow for either program-controlled or customer-controlled load shifting in response to either TOU pricing or a demand response event determined by the program administrator. Certain incentive programs may require grid connection and enrollment in a demand response program (e.g., required by SGIP HPWH-funded TECH).

Table 9. HPWH demand response programs

Program Name (Admin)	Status	Incentive ($)	Eligibility
WatterSaver (PG&E)[a]	Active	$50 enrollment bonus (gift card) plus a $5 gift card credit per month of participation.	Any PG&E customer or CCA customer in PG&E service territory with a Wi-Fi-enabled water heater can enroll (if the customer does not have one, heaters can be retrofitted to be eligible).
SmartShift Rewards Hot Water (SCE)[b]	Active	$50 enrollment bonus plus $5 per month for participation; $10 per month for equity-eligible customers (low-income, disadvantaged communities, and public housing).	All SCE customers (including CCA customers) who are on or enroll in a TOU rate. Control devices provided at no cost if needed. Short-term opt-outs are allowed if active ≥14 days per month.[c]
PowerMinder (SMUD)[d]	Closed/ No Longer Active	One-time enrollment incentive of $150 plus $2 per month for continual participation.	Specifically for HPWHs. Owner-occupants or landlord-owners of single-family homes up to 4 units (no apartments) who receive SMUD electric service
GridSavvy (SCP)[e]	Active	$25 enrollment incentive, plus $5 per month bill credit for	Not specifically for HPWHs. Must be an active SCP customer, have a

[97] Opinion Dynamics. (2024). *Op cit.*, July 18, 2024. https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.
[98] *Ibid*.
[99] TECH Clean California. (2024). *12th Quarterly Stakeholder Meeting*. October 9, 2024. https://techcleanca.com/documents/5440/TECH_12th_Quarterly_Stakeholder_Meeting.pdf.

Program Name (Admin)	Status	Incentive ($)	Eligibility
		allowing SCP to remotely control connected devices, including HPWHs. $2 for every kilowatt-hour (kWh) saved during peak events	SmartMeter, and not be enrolled in any conflicting utility or third-party demand response programs outside of the GridSavvy Rewards program.
Power Saver Rewards (SDG&E)[f]	Active	$1 for every kWh saved during the FlexAlert hours, called or other grid emergency event (event-based program).	Not specifically for HPWHs. All SDG&E customers

a: https://www.watter-saver.com/
b: https://energized.edison.com/stories/save-money-with-smart-water-heater-rewards
c: https://energized.edison.com/stories/save-money-with-smart-water-heater-rewards.
d: https://www.smud.org/Corporate/Landing-Pages/PowerMinder/PowerMinder-FAQs ; https://www.smud.org/-/media/Documents/Rebates-and-Savings-Tips/PowerMinder-Agreement.ashx
e: https://sonomacleanpower.org/gridsavvy-rewards; https://sonomacleanpower.org/uploads/documents/GridSavvy-Rewards-Alerts-FAQs-Final-2023.pdf
f: https://www.sdge.com/residential/savings-center/energy-saving-programs/reduce-your-use/power-saver-program

3.3.6 Relevant pilots

CalMTA examined 11 California-based pilots supporting residential HPWH adoption (summarized in Appendix H) supported by programs including TECH,[100] CalNEXT, and the Low-Income Weatherization Program. Pilots examined by CalMTA address a range of topics, from supporting contractor engagement on load shifting and streamlining permitting, to testing deployment of specific HPWH models for specific customer segments, to piloting use of loaner water heaters.

3.4 Other programs

CalMTA also notes the following key programs supporting HPWH adoption operating in territories outside of California:

- The **Advanced Water Heating Initiative (AWHI)** conducts research, supports pilots, facilitates working groups and holds an annual HPWH Day to support HPWH adoption.[101]
- **NEEA** authors the AWHS (discussed earlier in this section), maintains a residential HPWH Qualified Products List (QPL), conducts HPWH trainings and other awareness activities, and has undertaken substantial market research on HPWH adoption in the Pacific Northwest.

[100] TECH offers Quick Start Grants to support pilots that test approaches to overcoming market barriers to HVAC heat pump and HPWH adoption. https://techcleanca.com/quick-start-grants/.
[101] Advanced Water Heating Initiative. *Our Work*. Accessed November 2025. https://www.advancedwaterheatinginitiative.org/our-work-1.

NEEA makes its findings on unit performance, installation experiences, and other market transformation challenges and opportunities available to the public.[102]

- **Programs supporting HPWH adoption in the Northeast**, including Efficiency Maine's program[103] and Efficiency Vermont[104] have tested innovative approaches to HPWH deployment, including bulk purchases to support low-income adoption, and commitment to trained contractor networks.

4 Market size and composition

4.1 Market overview

California's population of 39.4 million occupies an estimated 13.7 million households. This report focuses on the estimated 11.5 million households served by a dedicated water heater (84% of all households in the state) and excludes households served by central water heating.[105]

Households with dedicated water heaters include 8.84 million single-family households, 2.19 million multifamily households, and 0.41 million mobile homes (Figure 5).

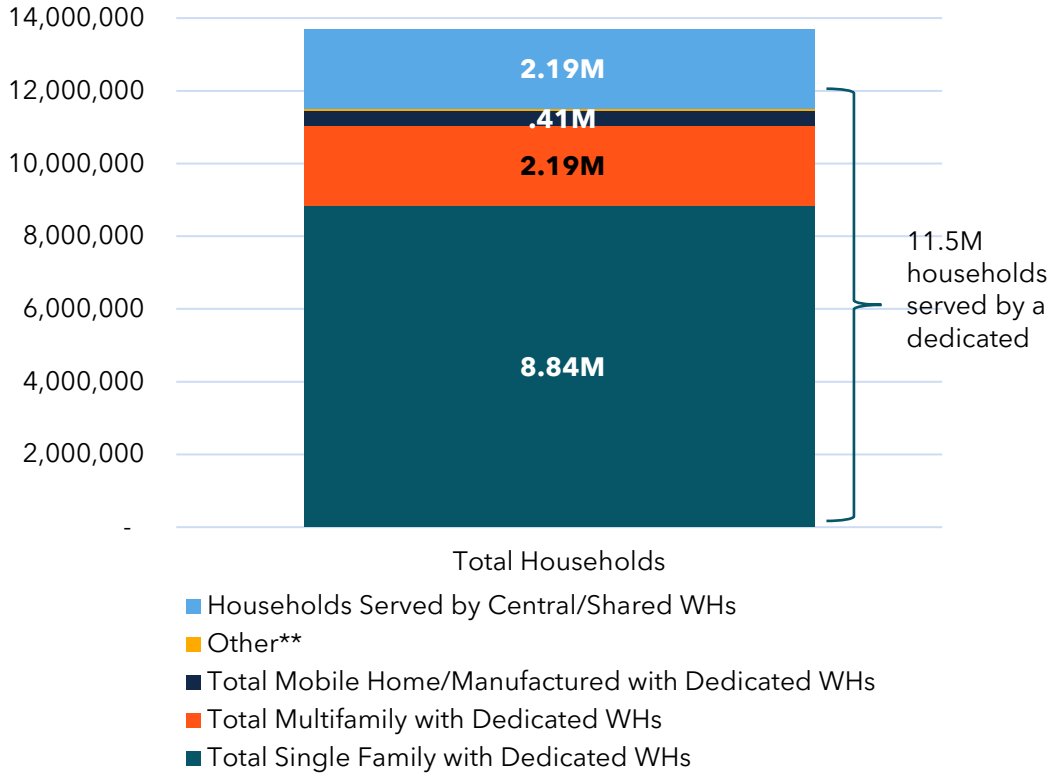
[102] NEEA. *Water Heating*. Accessed November 2025. https://neea.org/market-transformation-portfolio/water-heating/.

[103] Efficiency Maine Trust Heat Pump Water Heater Initiatives Impact Evaluation, Program Years 2015-2017. https://www.efficiencymaine.com/docs/WHEC_EMT_HPWH_Impact_Evaluation_Full_Report_with_Appendices_12_11_2019.pdf.

[104] Efficiency Vermont. *Rebates: Heat Pump Water Heaters*. https://www.efficiencyvermont.com/rebates/list/heat-pump-water-heaters.

[105] Households served by a larger, centralized water heating system are not expected to adopt HPWHs of 120 gallons or less. While the prevalence of central water heating systems is not well documented, research indicates these systems serve approximately 50% of multifamily households. Sources include: CalMTA stakeholder interviews, Dec 2024-Feb 2025; *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy; New Buildings Institute's Central Heat Pump Water Heater Market Research (2023-2025) https://static1.squarespace.com/static/605d0aa46f4b6f47e0ab88af/t/68266ae73e7ed6516015a59f/1747348205401/NBI_MAGIC_MarketResearch_202505.pdf (estimating 47% in-unit and 53% central systems).

Figure 5. California households with dedicated water heaters



Source: 2023 American Community Survey (ACS 2023) occupied households by segment, with adjustments to remove households assumed to have central water heating.

4.2 Market saturation by water heating technology

CalMTA examined existing research on saturation of different water heater types in California, with attention to the percentage of electric versus gas water heating and the existing saturation of HPWHs. CalMTA also estimated water heater saturation based on the residential survey conducted for this study.

Gas versus electric water heater saturation

Analysis of California's 2019 RASS indicates natural gas and electric water heater saturation rates of 84% and 11%, respectively,[106] while the 2020 Residential Energy Consumption Survey (RECS)

[106] CalMTA reviewed RASS 2019 and excluded household reporting point of service water heating. Note that the percentages of 84% and 11% for natural gas and electric water heating exclude "Not Applicable" and No Answer responses; if these responses are included, the survey indicates natural gas rates of 63% and electric rates of 9%.

indicates natural gas and electric rates of 78% and 19%, respectively.[107] Secondary research indicates that rates of gas water heating have been in decline over the past decade.[108,109,110] The CalMTA residential survey results, which focus on households served by a dedicated water heater, suggest a shift in saturation rates of gas versus electric water heaters since the 2020 RECS. Table 10 summarizes different reference points on gas and electric water heating saturations (albeit with variations in populations covered and data gathering approaches, with implications for results[111] in different years in California.

[107] 2020 RECS – which cannot isolate for dedicated/per-household water heating – further estimated that 87% of single-family households, 66% of multifamily households, and 97% of mobile homes use gas (including propane) water heating. Given RECS estimates that 0% of mobile homes are served by electric water heating, which is known to be incorrect, CalMTA has also referenced the 2019 RASS, which estimated mobile home saturation of 83% gas water heating and 6% electric water heating.

[108] For example, see the 2015 Codes and Standards Enhancement Initiative (CASE) citing that 90% of California households are served by gas water heating. *Hoeschele et al. (2012). "Water Heating Design Guide." Prepared for California Energy Commission by Davis Energy Group and Gas Technology Institute.*
Codes and Standard Enhancement Initiative. February 2015. *Residential Instantaneous Water Heaters.* https://efiling.energy.ca.gov/GetDocument.aspx?tn=74627&DocumentContentId=16036.

[109] Opinion Dynamics. (2024). *California Water Heating Market Study.* March 29, 2024. https://pda.energydataweb.com/api/view/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

[110] Gas storage water heating sales declined in 2024 by 2.7% from 2023 sales; electric storage water heating sales (including HPWHs and non-HPWHs) in 2024 increased by 3.1%. Air Conditioning, Heating and Refrigeration Institute (AHRI). Accessed July 1, 2025. "Residential Automatic Storage Water Heaters Historical Data." https://www.ahrinet.org/analytics/statistics/historical-data/residential-automatic-storage-water-heaters-historical-data.

[111] Neither 2019 RASS nor 2020 RECS isolate for dedicated/per-household water heating, while the 2025 CalMTA survey does. 2019 RASS and 2025 report primary water heater type, while 2020 RECS reports fuel source only. The RECS and RASS surveys are not directly comparable due to differences in question framing and answer structures. Specifically, RECS asks respondents about the fuel source used for water heating, while RASS asks about the type of water heating system. Consequently, the response options differ in scope and interpretation. For instance, RASS allows for hybrid system responses such as "solar with electric backup," whereas the RECS fuel source question requires a discrete choice between options such as solar or electric. The CalMTA residential survey aligns more closely in structure with RASS, as it asks about water heater type rather than fuel source. However, like RECS, it requires respondents to select a single, discrete option and does not accommodate hybrid water heating systems. Given these differences, the instruments are not directly comparable. Nonetheless, reported findings can still offer contextual insights.

Table 10. Summary of water heating fuel type research findings

Source	Year	All Segments		Single Family		Multifamily	
		Gas/ Propane	Electric	Gas/ Propane	Electric	Gas/ Propane	Electric
RASS[a]	2019	88%	11%	91%	8%	74%	25%
RECS[b]	2020	81%	19%	87%	13%	66%	34%
TECH BMA[c]	2022	n/a	n/a	72%	23%	n/a	n/a
CalMTA Survey[d]	2025	63%	36%	64%	35%	57%	42%[112]

a: Represents RASS total reporting, excluding NAs and no answer respondents (23% of all respondents) and those reporting households served by point-of-service, or appliance-level, water heating only (less than 0.3% of respondents) to be comparable to RECS
b: RECS 2020, no records excluded (RECS 2020 results for water heating fuel type do not contain NAs).
c: TECH Baseline Market Assessment (see Figure 20 summarizing single family household survey respondents, n=500). Opinion Dynamics. July 15, 2022. *Technology and Equipment for Clean Heating (TECH) Initiative*. https://techcleanca.com/documents/3697/TECH_Baseline_Market_Assessment_Final_Report_8AHwAxk.pdf
d: CalMTA Residential Survey, n=828 (surveying residents that are the water heater decisionmaker for their own homes). Excluded respondents answering, "I don't know" (n=28).

The data in Table 10 support the downward trend in gas saturations indicated by other research. The results of the 2025 CalMTA Survey indicate a 17-percentage-point increase in the proportion of households with electric water heaters since RECS 2020 (a shift from 19% to 36%) – a higher increase than seems feasible over a 6-year period; however, the CalMTA survey proportion of single-family homeowners with electric water heaters (35%) is 12 percentage points higher than the 23% proportion found in TECH's 2022 Baseline Market Assessment.[113]

In an effort to further understand actual changes in saturation of electric water heating in residential homes in recent years, CalMTA conducted additional review of electric water heating in new construction and electric water heating replacements in existing homes.

Increased electric water heater installations - new construction

CalMTA collected data on residential construction starts and electric line extension requests to estimate the share and number of electric water heaters installed in new homes. CalMTA estimates that 248,174 per-household electric water heaters have been added through new construction since RECS 2020 (Table 11).[114]

[113] CalMTA water heating fuel type for homeowners versus renters is presented in Table 36, Appendix F.
[114] EIA collected the 2020 RECS characteristics data in late 2020 and early 2021.

Table 11. Water heater additions and estimated electric market share in new construction, 2021-2024

New construction	Single-Family units[a]	Multifamily units[a]	Mobile Home/ Manufactured units[b]	Total Estimated New Construction with Dedicated WHs[c]	Average % Electric WH[d]	Estimated electric non-central water heaters[e]
2024	61,229	39,156	2,813	83,620	85%	71,077
2023	56,655,	53,052	2,951	86,132	80%	68,906
2022	56,655,	53,052	4,022	87,203	70%	61,042
2021	64,500	52,800	3,344	94,244	50%	47,122
Total (2021-2024)						**248,147**

a: Units reported in the First Tuesday Journal. April 14, 2025. California Residential Construction Starts. https://journal.firsttuesday.us/the-rising-trend-in-california-construction-starts/17939/; April 12, 2024 (https://journal.firsttuesday.us/the-department-of-housing-and-community-development-hcd-focuses-on-new-construction-for-californias-economically-vulnerable-residents/94063/); and https://journal.firsttuesday.us/wp-content/uploads/03-2022-MSU.pdf. Note 2022 unit counts are assumed to be the same as 2023 due to a lack of data on 2022 single family vs multifamily breakdown, but the article noting that 2023 numbers are similar to 2022.
b: See Annual Totals of Shipments to States: 1994-2023. United States Census. Accessed September 30, 2025. "MHS Latest Data." https://www.census.gov/data/tables/time-series/econ/mhs/latest-data.html.
c: Sum of 100% of single family starts and mobile home shipments, and 50% multifamily starts (removing 50% assuming central water heater usage).
d: Public data on water heater types used in new construction are limited; however, for the purpose of projecting new construction's impact on water heater saturation, CalMTA estimates the rate of electric water heating in new construction using multiple sources, including: LinkedIn post discussion led by Sean Armstrong on all-electric new construction March 2025, referencing CPUC data; See also CPUC's *Building Decarbonization* webpage, which notes 72.45% of residential new construction line extension requests made in 2023 by builders were for all-electric buildings (as well as 61.72% pf all projects energized) in PG&E territory; in SDG&E territory, 87.65% of residential line extension requests in 2023 were all-electric and 36.26% of projects energized). https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization. Note rates of electric water heating would exceed rates of all-electric buildings. HPWH adoption in new construction has been identified in secondary research and CalMTA interviews as a market segment with fewer barriers to HPWH; retrofits of existing equipment and space are not necessary, and Title 24 building standards support HPWHs through the prescriptive compliance path.
e: Percent electric multiplied by total new construction with dedicated water heaters.

Increased electric water heater installations - replacement and retrofits

CalMTA examined how changes in the replacement market have affected water heater type saturation since RECS 2020. CalMTA survey findings indicate that electric water heater replacements outpace removals by 9.6%.[115] Application of this percentage to the total annual sales of per-household water heaters in the retrofit market (669,342 units, described further in Section 4.3) results in an estimated net increase of 257,372 electric water heaters since RECS 2020 (or 64,343 annually).

[115] Survey results indicate that the share of electric units removed (33.0% of removals) is outpaced by those purchased (42.6% of purchases) over the past three years by 9.6% (or 42.6% minus 33.0%). CalMTA Residential Survey Q. B3: "What type of water heater did this unit replace??" (n=346). and the Residential Survey Q. A16: "What type of water heater did you purchase?" (n=346).

Net additions of electric water heaters – new construction and retrofit

Adjustment of RECS 2020 results by 505,519 water heaters in the analysis above (248,147 net additions in newly constructed homes, plus 257,372 net additions in existing homes) corresponds to a 4.4% shift in the share of natural gas to electric water heating. Based on the above analysis, CalMTA estimates that 76% of California households (8.7 million households) use natural gas or propane water heaters, and approximately 23% of households (2.6 million households) use electric water heaters.[116]

HPWH saturation

RASS 2019 indicated 56,536 HPWHs installed, representing an estimated saturation of HPWHs in California households with dedicated water heaters of 0.6%.[117] Given the level of HPWH market and programmatic activity during the six years since the gathering of data for RASS, CalMTA sought to update this estimate using additional data sources. Results of the CalMTA residential survey suggest a HPWH saturation rate of 3.5% among households with dedicated water heaters in 2025.[118] However, CalMTA concluded that that saturation rate is too high, because it implies an additional 350,000 HPWHs have been installed since 2019, which amounts to approximately half of the national sales tracked by ENERGYSTAR since 2019.[119]

To revise the estimate of HPWHs installed in residences, CalMTA conducted additional analysis of data on the rates of HPWH incentives distributed, estimates of HPWHs in new construction vs. retrofit installations, and the HPWH market share analysis (described below in Section 4.3) to calculate estimated changes in saturation (Table 12). CalMTA estimates that HPWH saturation is approximately 182,890 units, or 1.6% of the 11.5 million households with non-central water heating.[120,121]

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[116] Calculated the 76% gas saturation estimate from RECS gas and propane estimates (77.87% and 2.99%, respectively), adjusted down by 4.4% (estimated change since RECS 2020). Similarly, the 23% electric saturation is calculated by adjusting RECS electric estimate (18.79%) up by 4.4%.

[117] 2019 estimates from RASS. 0.6% represents the HPWHs divided by the total population represented by those responding to the question (aka, not reporting N/A).

[118] Analyzed with 1% margin of error, 90% confidence interval. See also Appendix F, Reported existing water heaters, residential survey.

[119] Assumes sales numbers for 2024 (not yet available) are similar to those in 2023.

[120] CHEERS permitting data from 2022 shows HPWHs accounting for 16% of water heaters in California's new construction single-family homes. CEC. (2024). *2025 Multifamily Individual Heat Pump Water Heater Baseline Report*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=255318-2&DocumentContentId=91005.

[121] CalMTA also referenced the finding from the 2024 California Water Heating Market Study that approximately 62% of HPWH installations occurred in retrofits and 38% in new construction (Opinion Dynamics, *op cit*. March 29, 2024).

Table 12. HPWH saturation analysis

	HPWH Market Share (% of 753,000 units annually)[a]	HPWH Market Share (Units Annually)	Estimated Saturation (Units)	Estimated Saturation (% of 11.5 million installed units)
2019			56,536	
2020	1.5%	11,110	67,648	0.6%
2021	1.8%	13,351	81,000	0.7%
2022	2.7%	20,189	101,193	0.9%
2023	5.1%	38,702	139,902	1.2%
2024	5.7%	43,002	182,911	1.6%

a: HPWH 2024 market share estimate (% and units) reflects analysis in Section 4.3. A projection of % market share back to 2020 was estimated roughly using analysis of the year-over-year rate of change prevalence of incentivized HPWHs and national shipment data.

4.3 Water heater and HPWH sales

National market share

While HPWHs still represent a small share of the overall water heater market,[122] sales are growing nationally. Using data on ENERGY STAR–certified HPWH shipments as a proxy,[123] national 2023 sales of HPWHs are estimated at 190,000,[124] or 4% of the market (up from 3% in 2022 and 1% in 2021).[125] Using these data, HPWH sales are estimated to have doubled over the last five years, with an increase of 35% from 2022 to 2023 (following a previous increase of 26% from 2021 to

[122] U.S. International Trade Commission. (2022). *Residential Heat Pump (Hybrid) Water Heater Market, Production, and Trade.* February 2022. https://www.usitc.gov/publications/332/executive_briefings/ebot_residential_heat_pump_hybrid_water_heaters.pdf.
NEEA. (2018). *Northwest Hat Pump Water Heater Initiative Market Progress Evaluation*. September 27, 2018. https://neea.org/wp-content/uploads/2025/03/HPWH_MPER4_FINAL.pdf
Grand View Research. Accessed February 4, 2025. "Heat Pump Water Heater Market Size, Share & Trends Analysis Report By Technology (Air to Water, Water Source, Geothermal), By Capacity (Up to 10 kW, 10-20 kW), By Application, By Operation Type, By Tank Type, By Region, And Segment Forecasts, 2025 – 2030." Heat Pump Water Heater Market Size | Industry Report, 2030.

[123] Use of these data as a proxy is documented in other market research; however, the team flags that numerous HPWHs on the market are not certified with the voluntary ENERGY STAR standard, including from manufacturers such as A.O. Smith, Ariston, and Stiebel Eltron.

[124] ENERGY STAR. Accessed February 15, 2025. "Unit Shipment and Sales Data Archives." https://www.energystar.gov/partner-resources/products_partner_resources/brand-owner/unit-shipment-data/archives.

[125] 2023 data is the most recent data available as of August 2025. ENERGY STAR Unit Shipment and Market Penetration Report Calendar Year 2023 Summary. https://www.energystar.gov/sites/default/files/2024-09/2023%20Unit%20Shipment%20Data%20Summary%20Report_508.pdf.

2022).[126] Interviews with stakeholders and manufacturers similarly provided national estimates of market share ranging from 2.5% to 5%.[127]

California HPWH market share

According to the CEC, approximately 800,000 water heaters are sold in California annually;[128] CalMTA estimates that 753,052 of these are dedicated, non-central water heaters.[129] Based on data for new construction starts and mobile home shipments in California, new construction represents 83,620 units per year.[130] The remaining 669,432 units are expected to represent retrofit and replacement water heaters for existing buildings (Figure 6).

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[126] ENERGY STAR-tracked shipments of HPWHs were reported to be 190,000 in 2023, 141,000 in 2022, 112,000 in 2021, 104,000 in 2020, and 84,000 in 2019. https://www.energystar.gov/sites/default/files/2024-09/2023%20Unit%20Shipment%20Data%20Summary%20Report_508.pdf; https://www.energystar.gov/sites/default/files/2022%20Unit%20Shipment%20Data%20Summary%20Report.pdf; https://www.energystar.gov/sites/default/files/asset/document/2021%20Unit%20Shipment%20Data%20Summary%20Report_0.pdf; https://www.energystar.gov/sites/default/files/asset/document/2020%20USD%20Summary%20Report_Lighting%20%20EVSE%20Update_0.pdf; https://www.energystar.gov/sites/default/files/asset/document/2019%20Unit%20Shipment%20Data%20Summary%20Report_0.pdf.

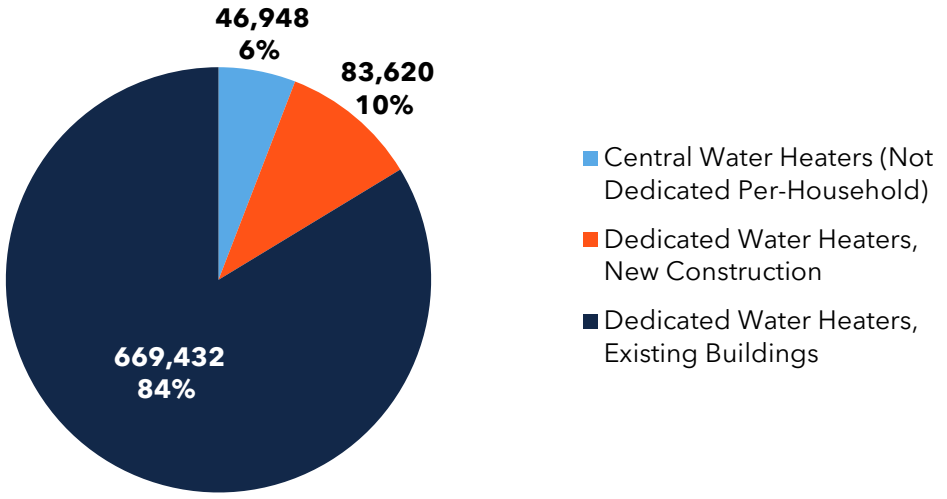
[127] One stakeholder estimated that the market share nationally for HPWH was about 3% to 4%, and probably as high as 12% in the Pacific Northwest. Manufacturers gave similar estimates regarding the current market share with one estimating 2% to 3% and another placing it in the 2.5% to 5% range.

[128] California Heat Pump Partnership Blueprint. (2025). Scaling California's Heat Pump Market: The Path to Six Million. March 2025. https://heatpumppartnership.org/wp-content/uploads/2025/03/CAHPP-Blueprint-Final.pdf.

[129] CalMTA estimated central water heater sales using ACS 2023 to estimate that approximately 700,000 central water heaters, replaced at a replacement rate of 15 years, currently serve multifamily buildings (with one central water heater serving every three multifamily units in multifamily buildings of 2 to 4 units and one central water heater serving every ten multifamily units in buildings with 5 or more units.

[130] See data indicating 61,229 single family housing starts in California in 2024, 39,156 multifamily unit starts (CalMTA assumes 50% are units with dedicated water heaters), and 2,813 mobile home shipments. First Tuesday Journal, Sept. 26, 2025. https://journal.firsttuesday.us/the-rising-trend-in-california-construction-starts/17939/; See also Annual Totals of Shipments to States: 1994-2023. United States Census. Accessed September 30, 2025. "MHS Latest Data." https://www.census.gov/data/tables/time-series/econ/mhs/latest-data.html.

Figure 6. California water heaters: 800,000 in annual sales



CalMTA conducted additional analysis using a variety of sources to estimate the number of HPWHs and non-HPWH electric water heaters installed in new and existing residential homes (Table 13). Table 14 and Figure 7 summarize market share of HPWH and other non-HPWH electric water heaters, by new construction versus retrofit.

The estimated market share of HPWHs in new construction is 21%, while the estimated market share of HPWHs in retrofit installations is 4%. An estimated 85% of water heaters installed in newly constructed homes in 2024 were electric (HPWH and non-HPWH, combined). Despite the relatively small number of in-unit water heater installations in newly constructed homes (11% of total), note that new construction accounts for 41% of HPWH installations. Appendix G provides details on the data sources, assumptions, analysis, and points of reference CalMTA used to arrive at these estimates.

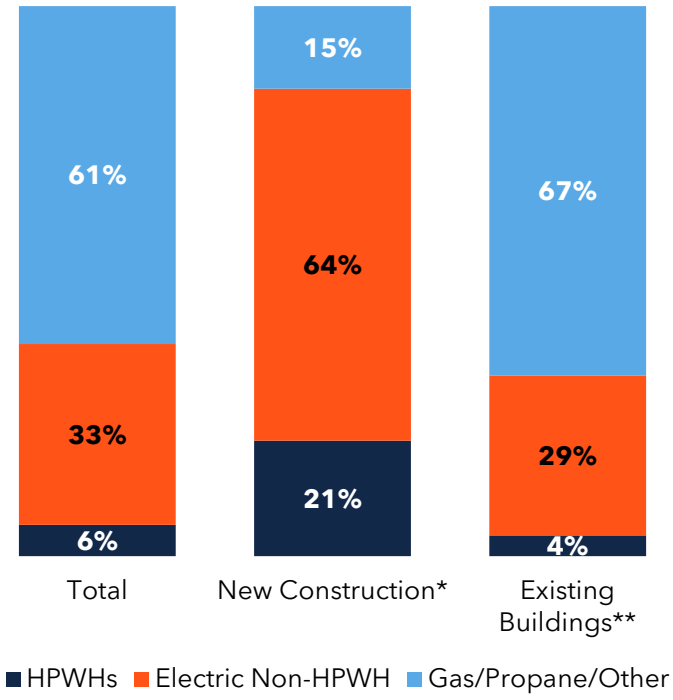
Table 13. Summary of estimated 2024 in-unit water heater installations - units

	New Construction	Retrofit	Total
Total Electric	71,077	219,523	290,600
HPWH	17,574	25,429	43,002
Non-HPWH	53,503	194,094	247,598
Natural Gas, Propane, Other	12,543	449,909	462,452
Total	**83,620**	**669,432**	**753,052**

Table 14. Summary of estimated 2024 in-unit water heater installations – market share

	Total	New Construction	Retrofit
Total Electric	39%	85%	33%
HPWH	6%	21%	4%
Non-HPWH	33%	64%	29%
Natural Gas, Propane, Other	61%	15%	67%
Total	100%	100%	100%

Figure 7. Estimated 2024 in-unit water heater installations – market share



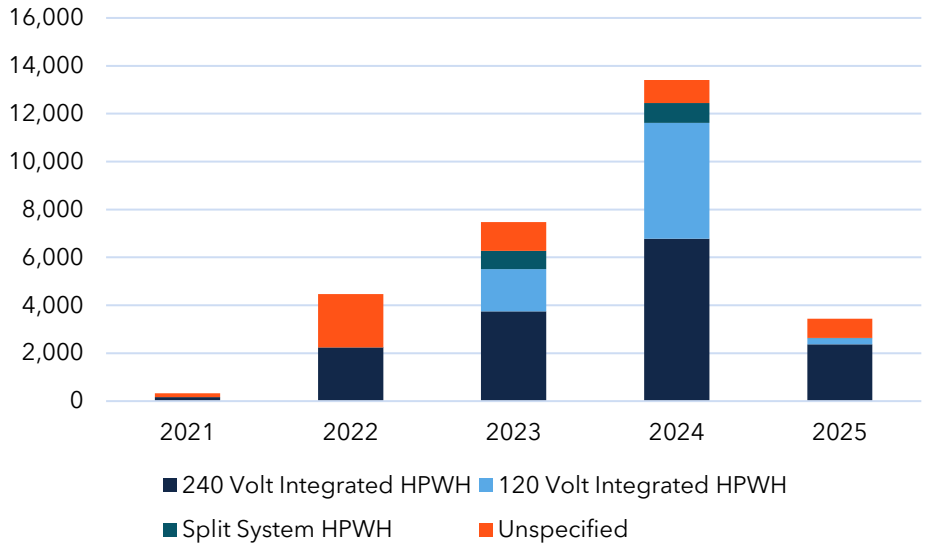
Sources: RECS 2020; 2025 CalMTA Residential and Installer Surveys; 2022 and 2023 ENERGY STAR shipment data

HPWHs in program data

CalMTA reviewed program data to see how many HPWHs were incentivized in California through energy efficiency and decarbonization programs. CalMTA used public data shared by the TECH program (Figure 8), which provides data on HPWH projects incentivized through TECH (available for all TECH program years, 2021-2025), and from the CEDARS database (Figure 9), which provides data on projects funded through the energy efficiency component of the public goods charge on utility bills. Because CEDARS does not include municipal utility programs, CalMTA also reviewed SMUD's data on incentivized HPWHs (given SMUD's position as a large municipal utility with a well-established HPWH incentive program).

Data from CEDARS and TECH show that the rate of incentivized HPWH installations in California has grown rapidly over recent years. TECH data accessed in June 2025 shows that 15,366 HPWHs were installed in existing residential households since the program's inception,[131] with 85% installed in single-family households and 11% installed in multifamily households.[132]

Figure 8. Total incentivized HPWHs through TECH

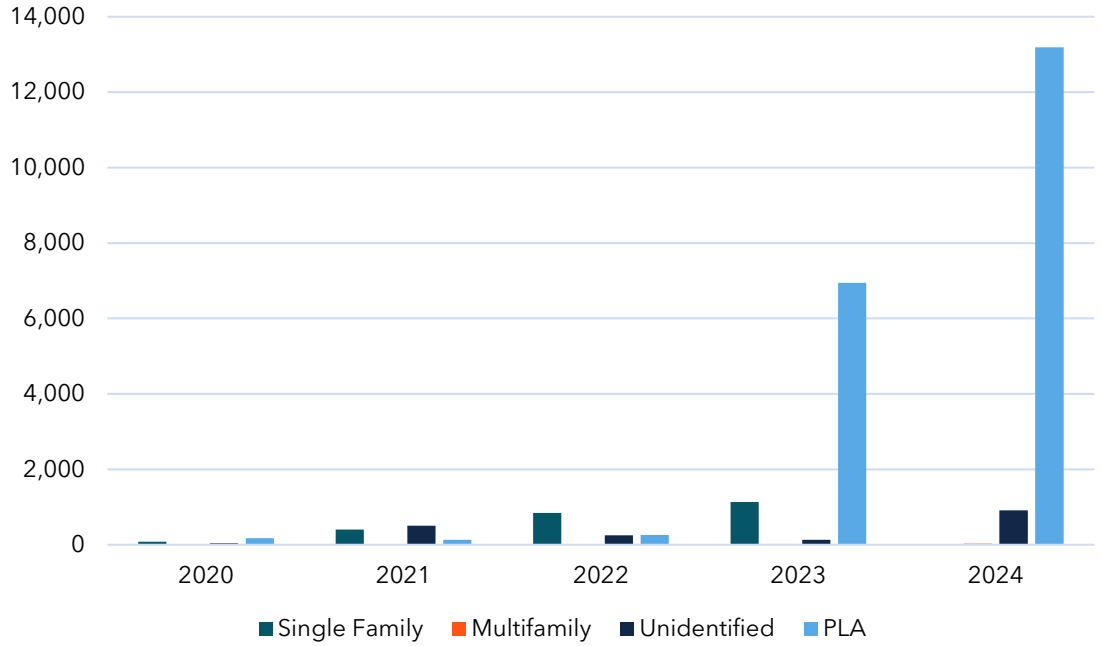


Source: TECH Clean California Working Dataset, 5-26-2025 (Downloaded June 9, 2025).

[131] Note that due to the ability to layer incentives, installs from these programs cannot be added together as an estimate of total incentivized installations.

[132] Represents analysis of data from TECH Clean California downloaded June 9, 2025. Note, total HPWHs identified by year (15,301) differs from overall shared total of 15,366 due to lack of available data on installation completion for some units.

Figure 9. Total incentivized HPWHs available in CEDARS

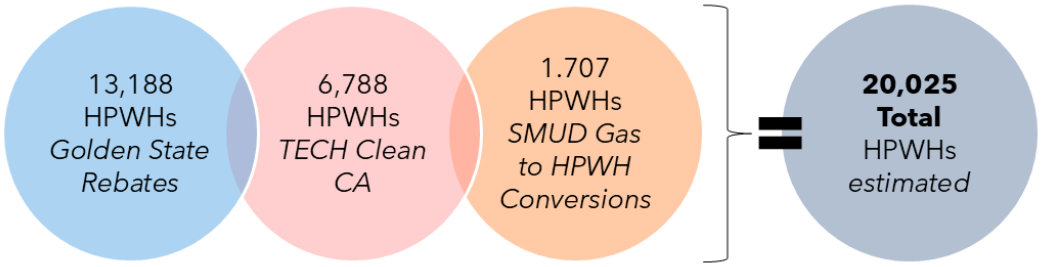


Source: CEDARS data downloaded 2/5/2025. Plug Load Appliance (PLA) rebates are currently branded as the Golden State Rebate program.

CalMTA estimates that at least 20,025 HPWHs received TECH, SMUD, or ratepayer-funded energy-efficiency program incentives in 2024.[133] Figure 10 shows total known incentives for HPWH retrofits.

[133] Represents 13,188 per-household (non-central) HPWHs incentivized through PLA/Golden State Rebates in 2024, plus 6,778 per-household (non-central) HPWHs incentivized through TECH in 2024, minus 651 HPWHs counted between the two programs (based on TECH data tracking of second incentives). CalMTA then added 1,704 incentives as tracked by SMUD's gas to HPWH conversion program in 2024, minus 707 TECH non-central HPWH projects identifying use of SMUD incentives in 2024. See *Emission and zero-carbon program information*, Sacramento Municipal Utility District (SMUD), Access Date September 9, 2025, https://www.smud.org/Corporate/Environmental-Leadership/2030-Clean-Energy-Vision/Emission-and-zero-carbon-program-information.

Figure 10. Estimate of incentivized HPWHs, retrofit programs (2024 data)



Source: Analysis of TECH Clean California data, CEDARS data, and SMUD data – note an estimated overlap of GSR and TECH of 651 HPWHs in 2024 counts, and an estimated overlap of SMUD and TECH of 997 HPWHs in 2024 counts.

CEDARS data for 2024 also list 909 HPWHs incentivized through new construction programs. Incentives for retrofit and new construction HPWHs are summarized with total estimated HPWH sales in Table 15.

Table 15. 2024 total estimated HPWH sales – incentivized vs. non-incentivized

	Retrofit	New Construction	Total
Total HPWHs Sold Annually[a]	25,429	17,574	43,002
Incentivized Units[b]	20,025	909	20,934
Non-Incentivized Units	5,404	16,665	22,068

a: Note totals may not sum due to rounding.
b: New construction reflects known incentives found in CEDARS data only.

Market share projections

Nationally, the HPWH market is expected to grow at a compound annual rate of 14.9% from 2025 to 2030.[134] Interviewed stakeholders anticipate growth in the HPWH market nationally and in California, driven by consumer trends and policy shifts. The DOE's new federal efficiency standard for residential water heaters (set to take effect in 2029) is anticipated to essentially eliminate electric-resistance options for residential water heating, thereby requiring HPWH installations in both electric water heater replacement and new construction. Partnerships such as the California Heat Pump Partnership and funding associated with California's statewide goal of installing 6 million heat pumps by 2030 also support heat pump deployment for space and water heating in California households.[135] One manufacturer interviewed by CalMTA commented that the increasing number of incentives available would positively impact the market share in the state,

[134] Grand View Research, *op. cit.* Accessed February 4, 2025. Heat Pump Water Heater Market Size | Industry Report, 2030.
[135] United States Department of Energy. April 30, 2024. *DOE Finalizes Efficiency Standards for Water Heaters to Save Americans Over $7 Billion on Household Utility Bills Annually.* DOE Finalizes Efficiency Standards for Water Heaters to Save Americans Over $7 Billion on Household Utility Bills Annually | Department of Energy.

but also noted that California is still dominated by natural gas and propane-heated equipment, which could temper projections.

5 Demand-side characteristics

CalMTA analyzed the demand side of the market to assess the baseline saturation rates and characteristics of the existing housing stock, map the experience of customers and professional installers as they move through a water heater purchase, and identify associated demand-side barriers and opportunities to support HPWH adoption.

5.1 Water heater characteristics

This section summarizes considerations affecting HPWH adoption in different residential segments, as well as characteristics of existing buildings and water heaters that impact adoption.

5.1.1 HPWHs in multifamily buildings

Residences in multifamily buildings more commonly have lower hot water demands than single-family residences and are typically better suited to smaller capacity units. These residences frequently locate water heaters in an exterior closet, typically around 3 feet by 4 feet, or in a smaller mechanical closet within the apartment.[136] Figure 13 shows that in TECH installations, water heaters in multifamily buildings are most commonly sized between 40 to 50 gallons (while those in single-family buildings are typically between 60 to 70 gallons). About half of low-income residents in California live in multifamily properties, and the majority of these residents are renters.[137]

Research found that program influence was greater in the multifamily water-heating market than in the single-family market. While single-family purchases are often reactive and triggered by equipment failure, purchases for multifamily buildings are more likely to be proactive, planned replacements. Multifamily building owners and managers will often replace multiple units at once as part of larger retrofit projects; thus, when the time comes to replace water heating units, the project is planned and decision makers likely have the time to seek out incentive programs to mitigate costs. Access to on-staff maintenance is also likely to support greater incentive program use.[138]

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[136] CalMTA stakeholder interviews conducted December 2024 to February 2025.

[137] The California Housing Partnership notes that the total California renter population is 5.9 million, 3.1 million of which is low-income. California Affordable Housing Needs Report 2024. https://chpc.net/wp-content/uploads/2024/03/California-Affordable-Housing-Needs-Report-2024-1.pdf.

[138] Stakeholder interviews; also CPUC. (2021). *Impact Evaluation of Water Heating Measures – Residential Sector – PY 2019. EM&V Group A*. https://www.calmac.org/publications/CPUC_Group_A_Report_Water_Heating_PY_2019_Final_CALMAC.pdf.

5.1.2 Mobile homes

California has more than 405,686 occupied mobile homes.[139] Most mobile homes are equipped with either small (30 gallons or less) or medium (31 to 50 gallons) water heaters.[140] Although most mobile home residents own their homes, many do not own the land their home sits on (which can affect mobile home occupants' ability to install water heaters that include an exterior footprint). Mobile home residents also face higher average energy burdens than residents in single-family detached homes, with nearly 40% of residents spending at least 30% of their income on housing costs.[141] Master metering in mobile home parks also creates a complicated split incentive issue. The IOU Mobile Home Utility Conversion program seeks to address this disparity, but has a long wait list of mobile home parks seeking support to convert to individually metered lots.[142]

HCD authority and mobile home water heating installations

California's Department of Housing and Community Development (HCD), the primary state agency that enforces the HUD Code, is also tasked with enforcing building standards for all mobile and manufactured homes and manufactured home parks. Local governments can request permission from HCD to assume regulatory authority over mobile home parks in their jurisdiction, and approximately 900 parks in California fall under local government control.[143] However, in multiple interviews that covered the topic of opportunities and barriers to mobile home HPWH adoption, stakeholders said the need for HCD approval was a barrier to adoption in most mobile home parks.

Most mobile homes constructed in recent years include 30-amp to 50-amp service (relying on gas for water and space heating); conversions through the Mobile Home Utility Conversion program typically increase service to 100 amps, which may still not be sufficient for 240-volt HPWHs.[144] Mobile homes on lower amperage are generally wired with low-load aluminum wiring and require rewiring before HPWH installation, which typically must be inspected by HCD, an agency with limited resources.[145] A CalNEXT study is in progress (estimated completion late 2026) to

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[139] ACS. (2023). Occupied household units.

[140] CalNext. (2023). *Mobile and Manufactured Housing Market Characterization Report.* December 8, 2023. https://calnext.com/wp-content/uploads/2023/12/ET23SWE0017_Mobile-and-Manufactured-Housing-Market-Characterization-Study_Final-Report.pdf.

[141] *Ibid*.

[142] *Ibid*.

[143] CPUC. (2023). *R.18-04-018 Phase 2B Staff Proposal.* July 25, 2023. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M515/K355/515355350.PDF.

[144] Note that 2023 CPUC staff proposal recommended the program adopt an infrastructure standard that can accommodate 200-amp service. CPUC. July 25, 2023. R.18-04-018 Phase 2B Staff Proposal. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M515/K355/515355350.PDF.

[145] McCann, R. (2019). Electrification of Converted MHPs." Presented at CPUC Workshop in R.18-04-018. March 20, 2019. https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/safety/mobile_home_parks/mhp-electrification-wma-.pdf.

explore the use of intelligent power management technologies such as smart electrical panels and smart circuit breakers, to control electrical loads in manufactured housing and support electrification of different end uses, including water heating. The report specifies that the project will work with HCD to gain approval for the installation of these technologies in mobile home parks where 100-amp service has been upgraded through the Mobile Home Utility Conversion Program.[146]

5.1.3 Water heater location in the home

CalMTA assessed available data on the location of existing water heaters serving California households to better understand potential barriers and opportunities for HPWH installations. HPWHs are larger than standard water heating units, require additional ventilation and condensate management, and perform better in warmer temperatures;[147] installations that involve relocating the water heater are likely to face additional cost and complexity. HPWHs may also have louder operation than standard water heaters, which may affect the desired location if installed inside the home.[148]

RECS 2020 data, calibrated to reflect population counts by housing segment from ACS 2023 population data, indicate that more than a quarter of California residential water heaters are located outside the home and are therefore likely impacted by changes in outdoor temperature. Households in colder climates are less likely to have their water heater located outside and more frequently have their water heater in the main living space.[149] In contrast, the majority of mobile homes (80%) have water heaters located outside.[150]

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[146] See *Electric Infrastructure Upgrades Alternatives Study for Manufactured Housing* (ET24SWE0047) in CalNEXT Approved Projects list. CalNext. Accessed September 2025. "Approved Projects." https://calnext.com/approved-projects/.

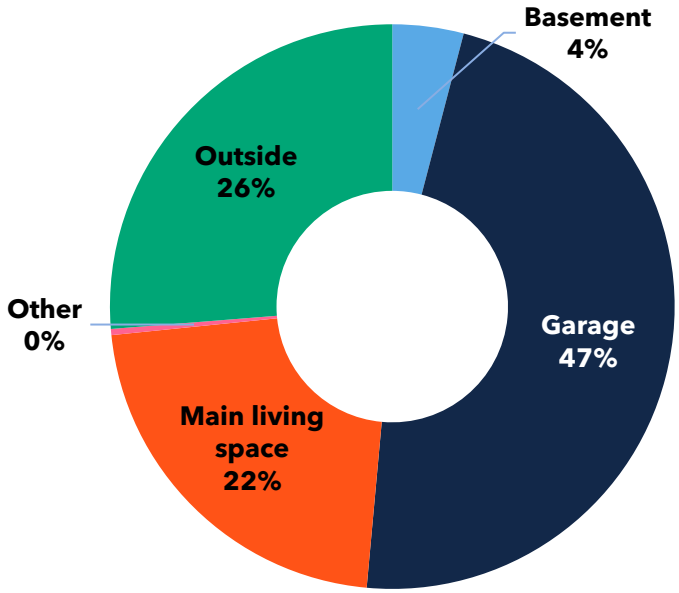
[147] This is especially true for 120-volt HPWHs; two interviewed stakeholders suggested that exterior installs of 120-volt may work in San Diego but not in other regions in California. One stakeholder provided specific guidance that if the ambient temperature is not kept above 50 degrees F, a 120-volt unit would not make sufficient hot water.

[148] It is possible that noise and vibration may be mitigated with proper installation, but its impact has still been flagged in secondary research and by interviewed stakeholders and manufacturers (Section 7.1, Market barriers).

[149] Analysis uses RECS 2020 regional identifiers of Cold, Hot-Dry, Marine, Mixed-Dry. Cold climate households have 59% water heaters located in the main living space (compared to 15%, 14%, and 34% in Hot-Dry, Marine, and Mixed-Dry, respectively) and only 14% outside (compared to 19%, 14%, and 25% in other climates, respectively).

[150] RECS 2020 indicates 23% of single family attached dwellings have water heaters outside, and 25% of single family detached have water heaters outside. Multifamily breakdowns are not available (reported as Not Applicable).

Figure 11. Water heater location, California households



Source: Analysis of RECS 2020, calibrated to ACS 2023, California microdata

CalMTA reviewed the location of known installed HPWHs for indication of location as a barrier. CalMTA survey results suggest that HPWHs are installed in interior closets in nearly half of all installations,[151] but note that this finding is based on a small sample size and on self-reported water heater types. TECH evaluations indicate incentivized projects are most regularly located in garages (70% to 75%).[152,153,154,155] These data points together suggest that HPWH installations in interior closets may be less frequent than indicated by the survey.

[151] Results indicate 47% of residents who have installed HPWHs have their water heater installed in an interior closet inside the home; CalMTA Residential Survey Q. B1: "Where is your water heater located?" (n=856) and Residential Survey Q. A14: "What type of water heater do you currently have installed in your home?" (those having currently installed HPWHs, n=50).

[152] It should be noted that TECH installations summarize installations in buildings in which HPWHs have been able to be installed and are not considered representative of overall California building stock.

[153] A March 2025 TECH report found that 90% of TECH customers installed HPWHs in unconditioned spaces, with 70% occurring in garages. Opinion Dynamics. (2025). *TECH Clean California: Insights into Customer Experience and Satisfaction.* March 27, 2025. https://www.calmac.org/publications/TECH_Updated_Customer_Experience_and_Satisfaction_Report_3.31.2025_Clean_UPDATED.pdf.

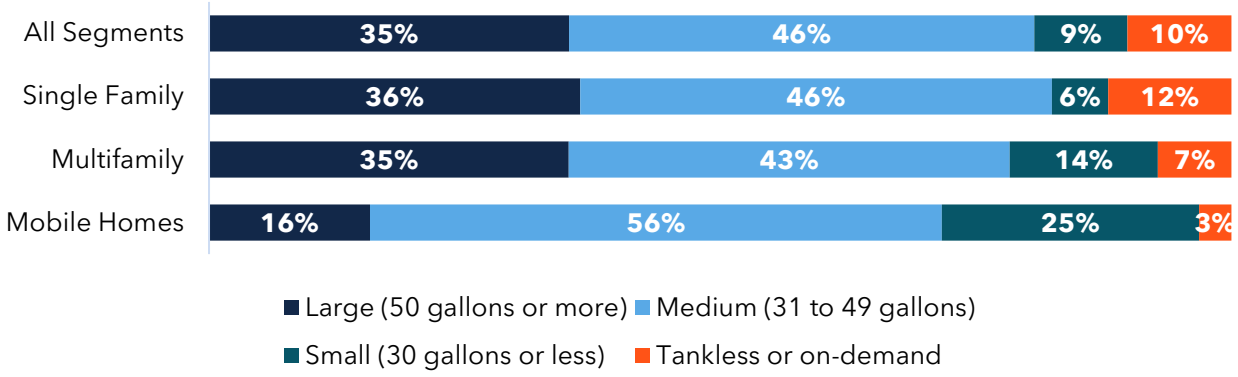
[154] Opinion Dynamics. (2025). *Process Evaluation of the TECH Clean California Initiative.* May 2, 2025. https://pda.energydataweb.com/api/view/4185/TECH%20Process%20Evaluation%20Draft%20Report.pdf.

[155] In contrast, CalMTA survey results indicate that 30% of single-family HPWH installations (n=29, including those receiving and those not receiving TECH incentives) and 26% of overall HPWH installations (n=50) report having their water heater in the garage (CalMTA Residential Survey, QB1).

5.1.4 Water heater saturation by tank capacity

Water heater tank size is measured in gallons. Typically, larger tanks serve households with higher water heating capacity needs, but tank size needs also vary by technology; a 45-gallon natural gas water heater may provide more hot water than a standard electric water heater of the same size.[156] RECS 2020 shows existing California water heater sizes (Figure 12) to be similar to those nationally, with more than half of all water heaters having a tank capacity of less than 50 gallons.[157]

Figure 12. Water heaters by size, California



Source: Analysis of RECS 2020 (California microdata), calibrated to ACS 2023.

An installer replacing a standard gas or electric water heater with a HPWH may be advised to upsize a HPWH by one or two sizes to meet the same capacity; upsizing is common practice per manufacturer and stakeholder interviews, existing studies, and review of TECH data (below).[158,159]

Figure 13 shows an analysis of HPWHs installed and reported in TECH public data; the majority of HPWHs installed through its multifamily program are 50 gallons or less. The majority of HPWHs installed in TECH-incentivized single-family homes in recent years are between 60 and 70 gallons.

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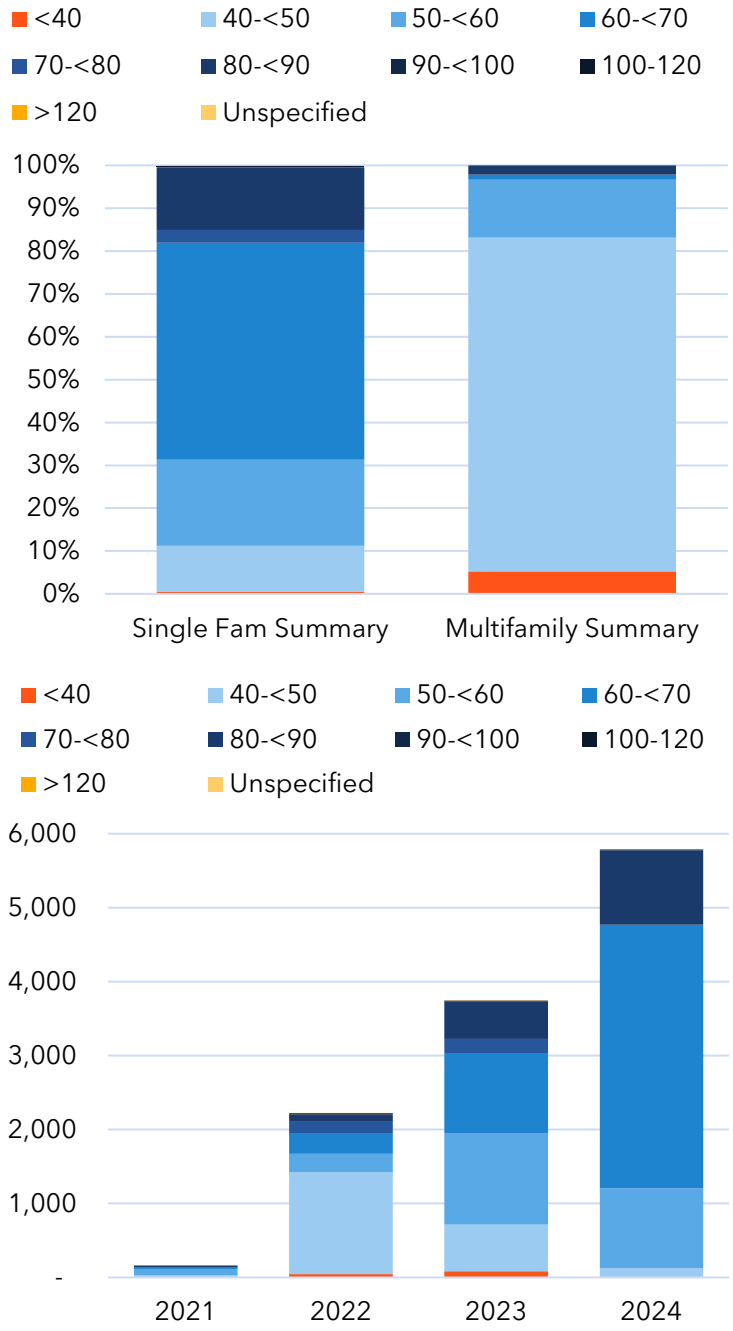
[156] https://1stchoiceplumbingheatingandairconditioning.com/gas-vs-electric-water-heaters-a-comparison-guide/ and https://www.hotwater.com/info-center/gas-vs-electric-water-heater.html.

[157] U.S. Energy Information Administration RECS. March 2023. "Water Heating in Homes in the South and West Regions, 2020." https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%208.8.pdf.

[158] Per CalMTA manufacturer interviews, January-March 2025; also Matt Risinger, 2024 Heat Pump Water Heater Buyers Guide. https://www.youtube.com/watch?v=YT0zTRD7N2s.

[159] See also a CalNEXT study which describes that most contractors are upsizing tanks when moving from gas or electric-resistance water heaters to HPWHs. Residential Water Heater Sizing Measure Package Support, CalNEXT Final Report ET22SWE0036, 2023. https://calnext.com/wp-content/uploads/2023/02/ET22SWE0036_Residential-Water-Heater-Sizing-Measure-Package-Support_Final-Report.pdf.

Figure 13. Rated storage volume of HPWH installations through the TECH program by household type and year



Source: TECH Clean California public data exported June 9, 2025. https://techcleanca.com/heat-pump-data/download-data/.

5.1.5 Water heater age and replacement rate

A 2024 analysis of RECS data estimated the average age of water heaters in single-family residences in California at 8.3 years and found that approximately 37% of existing water heaters are more than 10 years old and nearing the end of their useful life.[160,161] National data suggest that 8% of water heaters are replaced each year.[162]

5.1.6 Electrical capacity

Residents with existing natural gas or propane water heating seeking to convert to 240-volt electric water heating may require electrical work or optimization, such as subpanels, smart panels, smart circuit breakers, load sharing, and circuit pausers or circuit splitters.

The number of homes with electrical constraints has been reviewed in several recent studies that have considered total household amperage and estimated remaining electrical capacity to calculate the frequency with which panel upgrades or panel optimization may be required to accommodate 240-volt appliances.[163] The CPUC Fuel Substitution Infrastructure Market Study estimates that 27% to 41% of residential units are likely to require a panel upgrade for electrification and an additional 19% to 27% of residential units are likely to require panel optimization services for electrification.[164] A 2024 market study from Guidehouse isolates California water heating electrification needs and estimates that approximately 14% of single-family homes and 13% of multifamily units would require electrical panel upgrades and that panel optimization would be necessary for 30% of single-family homes and 41% of multifamily

[160] CalNEXT, *op cit.,* June 26, 2024. https://calnext.com/wp-content/uploads/2024/07/ET23SWE0020_Emergency-Replacement-HPWH-Market-Study_Final-Report.pdf.

[161] Research indicates reported water heater useful life ranges between 10 and 20 years. In its recent residential water heater rulemaking, DOE used an average lifetime of 15 years for all storage water heaters (see DOE Final Rule May 6, 2024: https://www.regulations.gov/document/EERE-2017-BT-STD-0019-1426).

[162] U.S. Department of Energy. (2009). *Water Heater Market Profile.* https://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/water_heaters/Water_Heater_Market_Profile_Sept2009.pdf.

[163] See Appendix E, Electrical capacity, for a list of studies.

[164] CPUC. (2024). *Fuel Substitution Infrastructure Market Study*. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/cpuc_fsinframs_stakeholderpresentation_20240305.pptx.

buildings.[165] A review of TECH Clean California data shows that 6% of TECH Multifamily projects and 25% of TECH single-family projects involve some kind of electrical upgrade.[166,167]

Recent studies, a CPUC staff proposal,[168] and interviewed stakeholders all recommend adopting low-cost adjustments, such as circuit pausers and circuit splitters, where feasible.[169] Additionally, if suitable for a building's needs, 120-volt HPWHs can in some cases be considered as an alternative to electrical upgrades (120-volt HPWH application and 120-volt HPWH application and).

5.2 Water heater purchase experience: customers

This section presents findings on the experience of customers as they initiate and move through a water heater purchase, using analysis of the CalMTA residential survey and building owner and property manager survey, both fielded in spring 2025. Subsections detail general awareness, perceptions, and purchase behavior and experience sentiment pertaining to water heaters. Findings are supplemented with secondary research and an assessment of the effectiveness of related market support.

5.2.1 Residential awareness of and attitudes toward HPWHs

The findings below highlight key insights into awareness levels, perceptions, and purchasing behavior related to HPWHs across California's diverse housing and decision-making segments.

Awareness of HPWHs

Fifty percent of residential decision makers are aware of HPWHs (Figure 14). HPWH awareness was relatively even across single-family households (50%) and multifamily respondents (51%), but lower among mobile home residents (39%). HPWH awareness was higher among residents in

[165] Guidehouse. (2024). *Fuel Substitution Behind the Meter Infrastructure Market Study*. May 17, 2024. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/fs-infra-ms_overall-report_20240606.pdf.

[166] It should be noted that analysis of TECH project data represents an analysis of a specific segment of the market; namely, a segment that has sought an HPWH installation and for which HPWH installation has been found feasible and desirable by the customer and contractor.

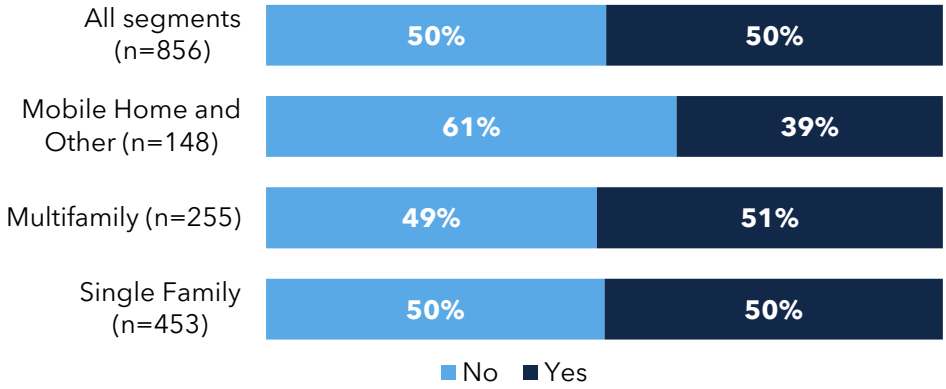
[167] TECH Clean California, Data Download of 5-26-2025 data (accessed 9 June 2025).

[168] R.19-01-011 Phase 4A Staff Proposal. CPUC Energy Division Staff, July 18, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M536/K015/536015666.PDF.

[169] See also Canary Media. December 7, 2023. *Yes, It's Possible to Electrify a Home on Just 100 Amps*. https://www.canarymedia.com/articles/electrification/yes-its-possible-to-electrify-a-home-on-just-100-amps; Canary Media. July 8, 2024. *How to Avoid Panel Upgrades So We Can Electrify More Homes*. https://www.canarymedia.com/articles/electrification/how-to-avoid-panel-upgrades-so-we-can-electrify-more-homes.

non-ESJ communities (58%) compared to those in ESJ communities (44%).[170] Awareness was higher among residents who purchased a water heater in the last three years (63%).

Figure 14. Awareness of HPWHs reported by housing segment



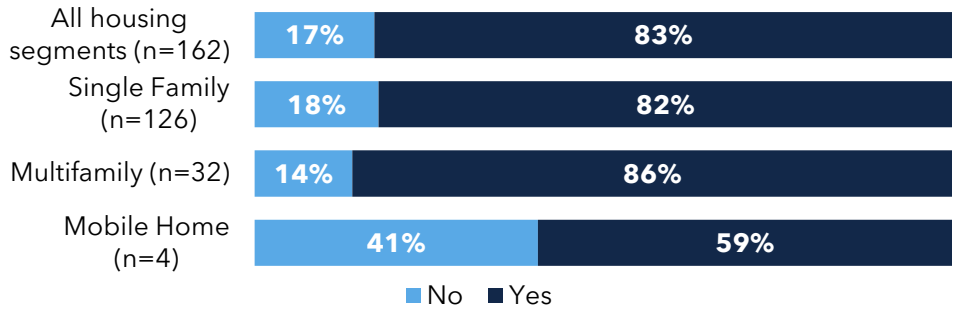
Source: CalMTA Residential Survey Q. A11. "Have you heard of heat pump water heaters (HPWHs)?" (n=856). Note: "Yes" indicates respondents who are aware of HPWHs; "No" indicates respondents who are not aware.

CalMTA also reviewed and found little difference between the levels of awareness of inland residents (47%) and coastal residents (51%); however, survey results show substantial variation in awareness at the county level, suggesting that customers who reside within some utility, REN, or CCA territories may be more primed to consider HPWHs than others.[171]

Figure 15 shows that 83% of building owners and property managers reported awareness of HPWHs. Awareness among mobile home property owners was notably lower, aligning with the residential findings (shown in Figure 14). Building owner and property manager awareness was similar for those who own or manage buildings in ESJ communities (81%) versus non-ESJ communities (84%).[172]

[170] CalMTA Residential Survey Q. A11: "Have you heard of heat pump water heaters (HPWHs)," analyzed by CalMTA Residential Survey ESJ criteria.
[171] For example, results indicate awareness among San Francisco residents (n=48) at 74%, and awareness of San Diego respondents (n=85) at 33%. Awareness in Ventura County (n=21) is estimated at 19%. CalMTA Residential Survey Q. A11. "Have you heard of heat pump water heaters (HPWHs)?" (n=856).
[172] CalMTA Building owner and property manager Survey Q. A10. " Which electric utility serves most or all of your units?"

Figure 15. Awareness of HPWHs by building owners and property managers

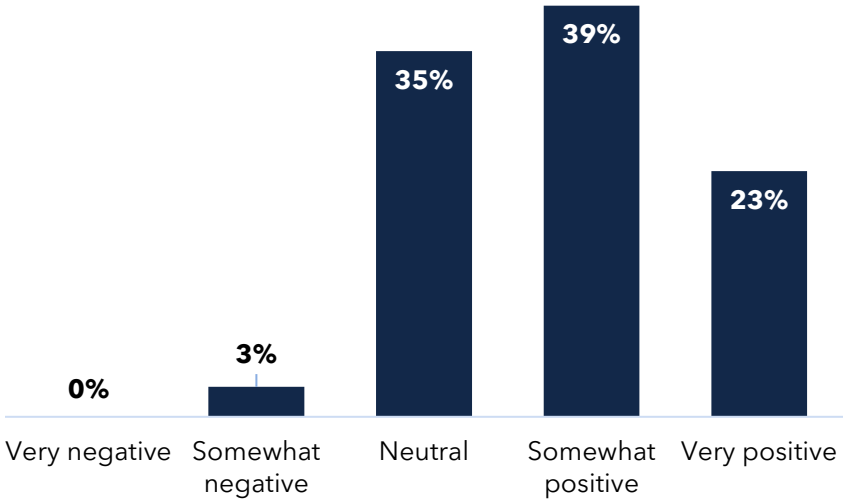


Source: CalMTA Building Owner and Property Manager Survey Q. A11. "Have you heard of heat pump water heaters?" (n=162).
Note: "Yes" indicates respondents who are aware of heat pump water heaters; "No" indicates respondents who are not aware.
Note: This is based on the housing type that the building owners' and property managers either own or manage the most.

Perceptions of HPWHs

A majority of survey respondents who are aware of (and may own) HPWHs (62%) reported they had a *somewhat* positive or *very positive* impression of the technology (Figure 16). However, most of these respondents reported *somewhat* positive or *neutral* perceptions.

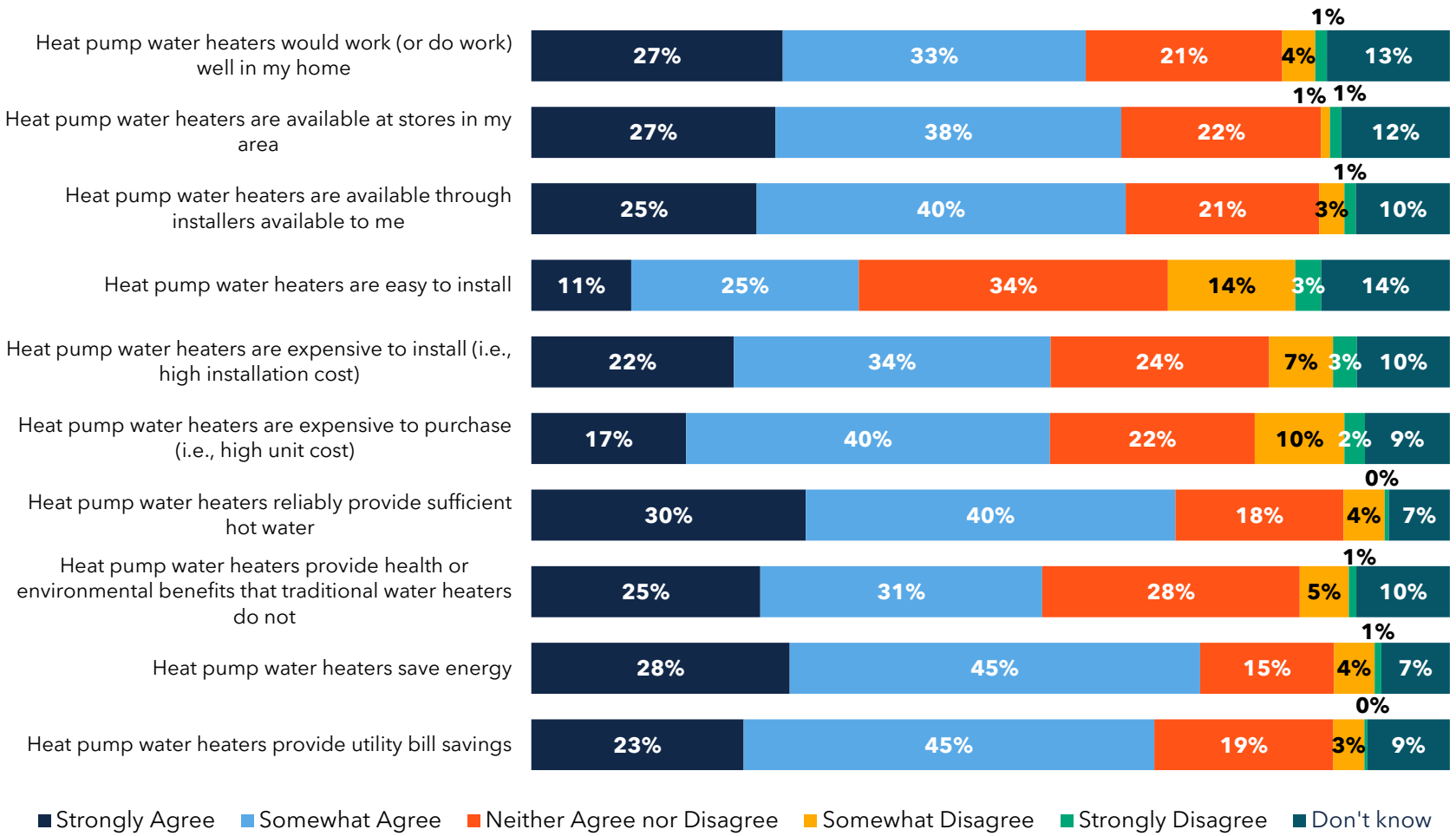
Figure 16. Impressions of HPWHs, California residents



CalMTA Residential Survey Q. C1. "Based on what you have heard, read, or seen about them, and any experience you have with their purchase/install, how would you rate your impression of heat pump water heaters?" (n=416)

Respondents were asked about their level of agreement or disagreement with different statements about HPWHs (Figure 17). Notably, the highest levels of agreement were with statements that HPWHs save energy (73%) and provide sufficient hot water (70%), and the most negative perception was regarding ease of installation – only 36% of respondents agreed that HPWHs are easy to install.

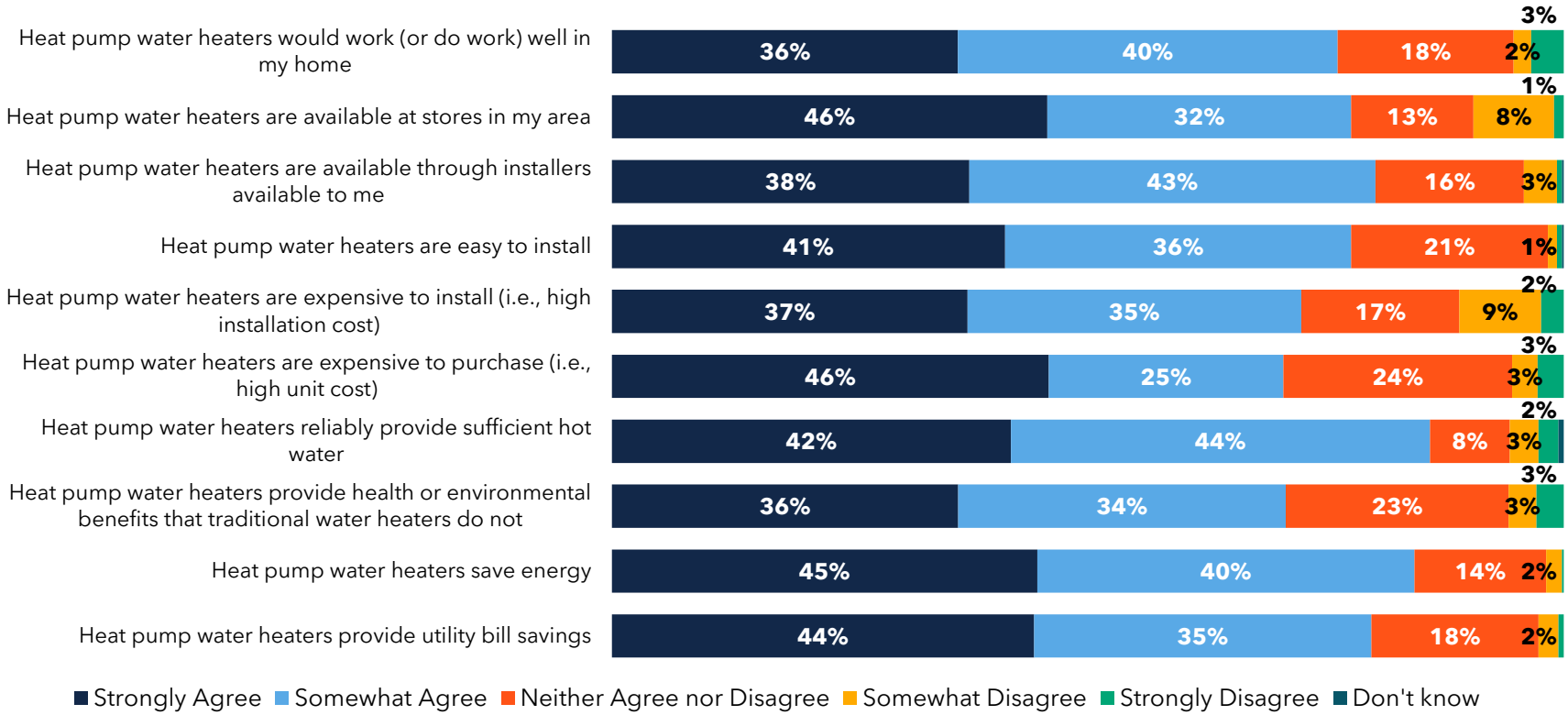
Figure 17. Agreeability sentiment - HPWH-related statements (residents)



Source: CalMTA Residential Survey Q. C2. "Based on what you have [Field-C2_text], how much do you agree or disagree with the following statements about heat pump water heaters?" (n=416)

As shown in Figure 18, most owners and managers who were aware of HPWHs *somewhat or strongly agreed* they could save energy (85%) and utility costs (79%). Respondents also largely agreed that HPWHs reliably provide hot water (86%), are easy to install (77%), and are available through stores (78%) and installers (81%).

Figure 18. Agreeability sentiment - HPWH-related statements (building owners and managers)



Source: CalMTA Building Owner/Property Manager Survey Q. C2 "Based on what you have [experienced/ heard, read, or seen], how much do you agree or disagree with the following statements about heat pump water heaters?" (n=138)

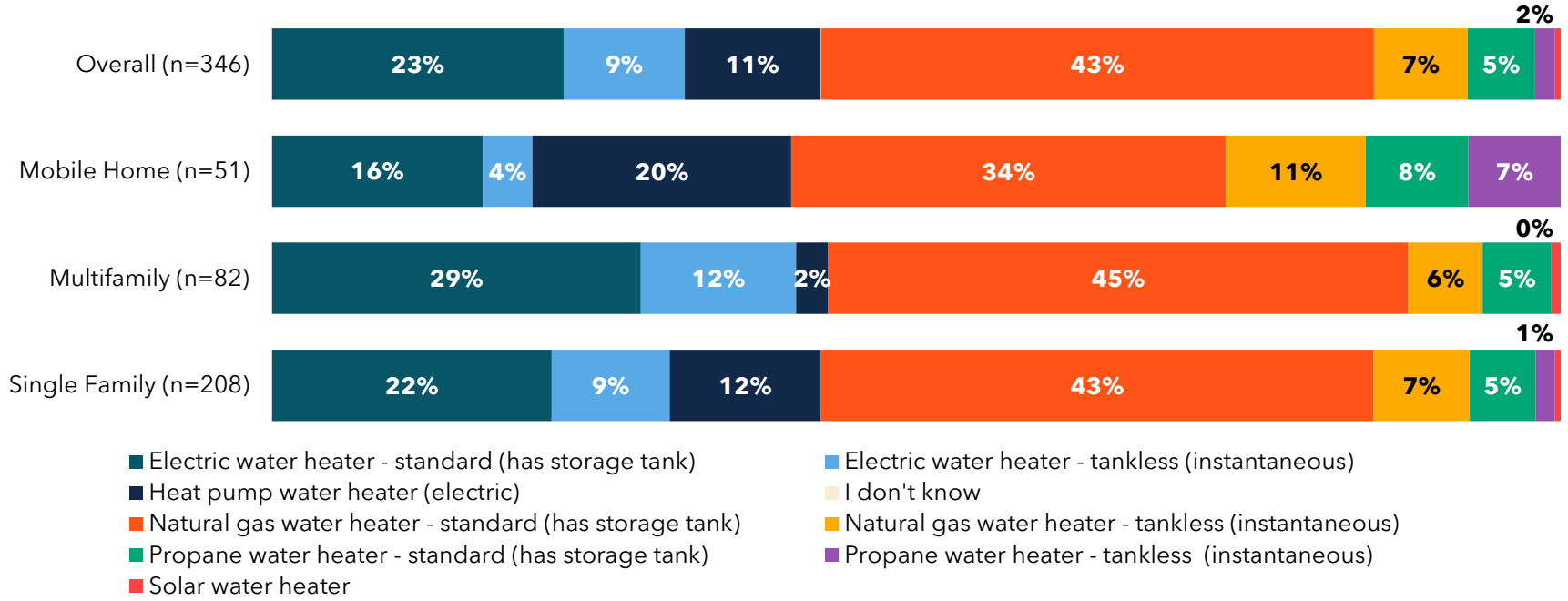
5.2.2 Willingness to purchase and purchasing behavior

This section describes the types of water heaters purchased, the circumstances and motivations behind those purchases, and the key factors that support or hinder adoption of HPWHs. To better understand market dynamics and to fill data gaps, CalMTA examined survey responses from residents, building owners, and property managers who reported purchasing a water heater within the last three years.

Water heater type selection

Figure 19 summarizes the water heater types respondents reported purchasing (n=346), by housing type.

Figure 19. Customer purchase of water heaters in the last three years by type



Source: CalMTA Residential Survey Q. A16.a: "What type of water heater did you purchase?" (n=346) Note: "Other" homes (n=5) are included in the overall category, but not broken out. The residential survey also asked respondents about second water heater purchases (Q. A16b, n=95), which are not included in this summary.

These results indicate that 57% of non-central water heater installations in existing homes over the past three years were natural gas, while recent electric installations (including HPWHs) were 39% (with 6% of those being HPWHs). These findings have a higher rate of electric installations compared to the 2024 California Water Heating Market Study, which – surveying among *homeowners* purchasing in the last *two* years – found natural gas water heaters installed in homes 64% of the time and electric 24% of the time (with 5.4% of those being HPWHs).[173]

Motivation for purchase

Existing research indicates that the majority of water heater installations are emergency replacements, and that emergency replacements are less likely to be HPWHs, largely because customers have little or no time to research the benefits of a new technology or available incentives. Instead, customers prioritize regaining hot water service as quickly and as cost-effectively as possible.[174] CalMTA residential survey results similarly indicate that the majority of customers purchase due to broken or failed water heaters, driving replacement 66% of the time (Figure 20).[175] When isolating for HPWH purchasers, survey results indicate 34% reported purchasing due to water heater failure, 40% purchased as an upgrade (without failure), and 24% purchased for an addition or remodel.[176]

The CalMTA residential survey also examined differences in the time respondents spent choosing a water heater in emergencies vs. non-emergency situations. Thirty-one percent of emergency replacement respondents chose their water heater in less than an hour, compared to 16% of non-emergency purchasers. Only 20% of emergency purchasers spent more than three days choosing a water heater, compared to 44% of non-emergency purchasers.[177]

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[173] Opinion Dynamics, *op cit.* March 29, 2024. https://pda.energydataweb.com/api/downloads/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

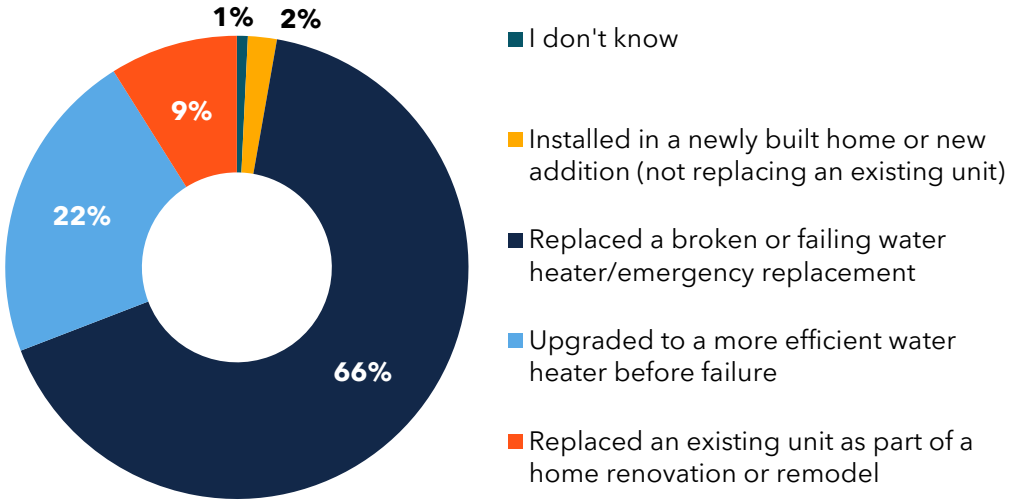
[174] The 2024 CalNEXT Emergency Replacement HPWH Market Study found that 75% of water heater replacements occur in emergency conditions. (CalNext, *op cit.* June 26, 2024.) The 2024 Water Heating Market Study reported that among homeowner-reported water heater *replacements* (excluding new construction/additions), 51% were replaced due to complete failure and another 23% were replaced due to existing equipment not working well. (Opinion Dynamics, *op cit.* March 29, 2024.) The 2024 Study also found that surveyed HPWH installers reported that only 24% of their HPWH installations were emergency installations, with homeowners less likely to request HPWHs and installers less likely to recommend HPWHs in emergency replacements. (Opinion Dynamics, *op cit.* March 29, 2024.)

[175] Figure 20 also notes survey respondents reporting 2% of purchases applying to new construction or additions and not replacing an existing unit; as the survey did not survey builders, this is interpreted to largely represent additions, with separate analysis conducted of the new construction market (see Sections 4.1, 6.1, and 6.2).

[176] CalMTA Residential Survey Q. B4. "Which of the following best describes why you installed your water heater?" (n=346) filtered by looking at respondents who purchased an HPWH (n=39).

[177] CalMTA Residential Survey Q. G7. "Thinking about your most recent water heater purchase, approximately how long did each of the following steps take? If not applicable, please select "not applicable."

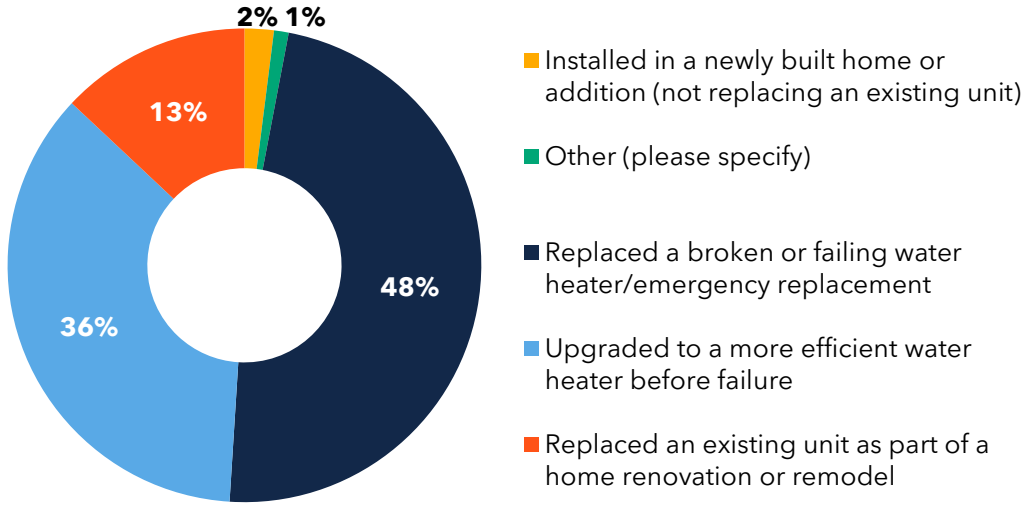
Figure 20. Primary drivers of water heater purchases (residents)



Source: CalMTA Residential Survey Q. B4 "Which of the following best describes why you installed your water heater?" (n=346)

The research team analyzed the motivations behind water heater replacements among residential customers versus building owners and property managers (Figure 21). While emergency replacements were common across both residents and owners and managers, other motivations varied. Residents more often cited broken or failing units, whereas owners and managers were more likely to upgrade proactively or during renovations. These differences reflect interview feedback suggesting that building owners and managers typically have more flexibility and longer planning cycles, creating opportunities to encourage early adoption of high-efficiency units.

Figure 21. Primary drivers of water heater purchases (owners and managers)



Source: CalMTA Building Owner/Property Manager Survey Q. B4. "Which of the following best describes why you have installed per-unit water heaters in the last three years" (n=137)

DIY and BIY rates and motivations

Recent homeowner research has estimated California water heater DIY installation rates (installations in which customers did not hire installers) ranging from 36% to 50%.[178, 179, 180] Interviewed stakeholders reported being aware of these DIY estimates and said they seemed high, but not impossible. Most stakeholders thought that DIYers chose to install their water heaters to reduce the total installation cost. Stakeholders reported uncertainty about the rates of HPWH DIY installs, with most guessing that instances of DIY installations would be lower due to the greater complexity of the equipment. However, one stakeholder suggested that HPWH adopters may represent a technically savvy and enthusiastic market segment, which could drive up DIY rates. To better understand DIY rates and their influence on the choice of water heater installation, CalMTA surveyed purchasers about their installation types and their rationale for DIY installations. CalMTA also sought information on the rate of residents, owners, and managers choosing a BIY approach to water heating, in which the end customer is the purchaser of the water heater but then hires a professional to install their purchased unit.

CalMTA survey results indicate that 15% of recent water heater purchasers completed a DIY installation, with 30% taking a BIY approach.[181] Residents who installed HPWHs did not report any DIY installations (Figure 22) and more than half purchased the unit themselves prior to hiring an installer (note the relatively small sample size of n=39 purchasing an HPWH.)

Building owners and property managers who reported a recent water heater purchase (n=137, all water heater types) reported choosing to DIY water heater installations 35% of the time, and 32% of respondents report most commonly engaging in BIY behavior.

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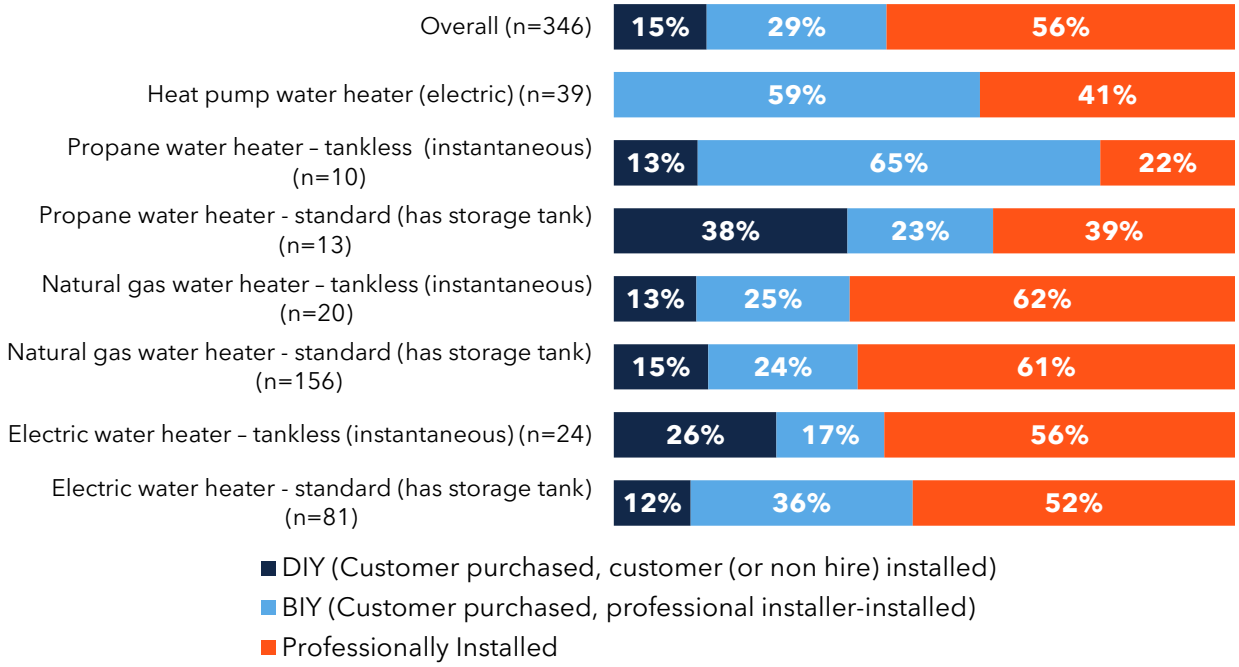
[178] Of the 149 California homeowners who replaced their water heaters in the past two years surveyed in the 2024 *California Water Heating Market Study,* 52% reported not hiring an installer. Opinion Dynamics, *op cit.* March 29, 2024. https://pda.energydataweb.com/api/downloads/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

[179] The 2024 TECH market assessment found that of 500 single-family homeowners surveyed, 36% self-installed or had a friend or family member install. Tech Clean California: Time I Market Assessment Final Report. https://opiniondynamics.com/wp-content/uploads/2024/12/TECH_Time_1_Market_Assessment_Final_Report_4.22.24.pdf.

[180] As a reference point from another region, NEEA found DIY rates for water heaters at 28% in the Northwest. NEEA, 2018. *Water Heater Market Characterization Report*. https://neea.org/resources/water-heater-market-characterization-report.

[181] Summarizes residents reporting the water heater they purchased in Residential Survey Q. A18a. The residential survey also asked respondents about second water heater purchases (Q A18b, n=95), which are not included in this summary.

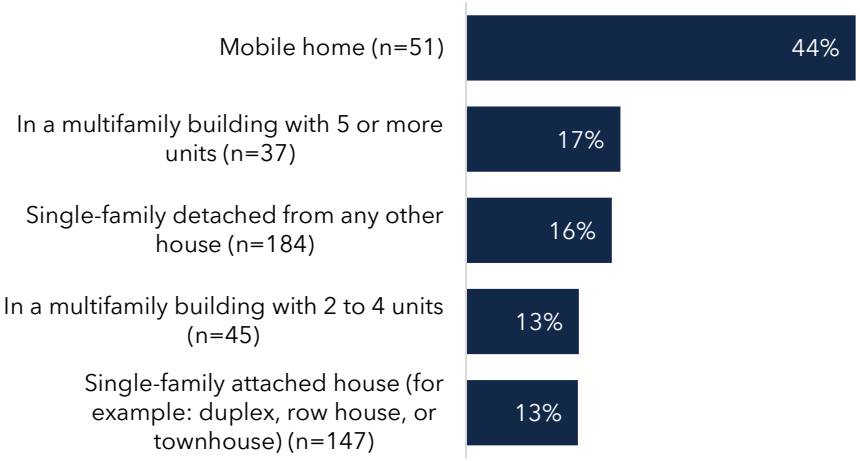
Figure 22. Water heater installation method, by type



Source: DIY rates: CalMTA Residential Survey Q. A18. "How was your water heater installed?" (n=346) QA16_a "What type of water heater did you purchase?" (n=346) BIY rates: CalMTA Residential Survey Q. A16_a "What type of water heater did you purchase?" (n=346) and Q. F2. "At what point in your purchase process was the water heater type selected?" (n=282). Note: "I don't know" (n=1) and "Solar water heater" (n=2) are not shown separately but are included in the overall figure.

DIY installation rates varied by housing type among residents who purchased a water heater in the past three years (see Figure 23). Mobile home residents were the most likely to install units themselves, while DIY installation was least common in single-family attached homes.

Figure 23. Rate of DIY by housing type

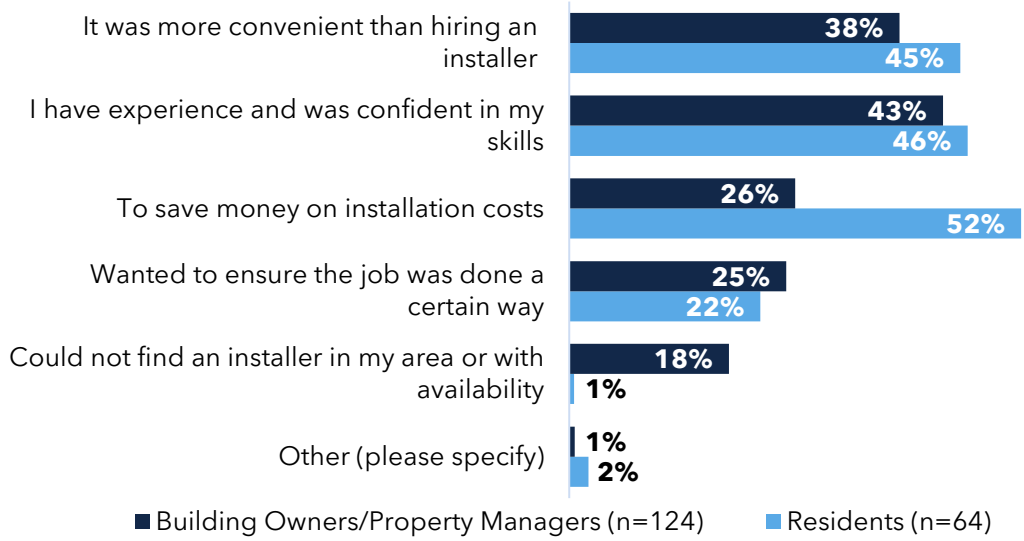


Source: CalMTA Residential Survey Q. A18. "How was your water heater installed?" (n=341), Q. A16_a "What type of water heater did you purchase?" (n=341), and Q. A5. "Which of the following best describes your primary residence?" (n=341).
Note: Responses of "Other (please specify)" were excluded from this chart.

Some residential survey respondents that purchased and installed a water heater themselves (DIY) reported that installers influenced their purchase decision: 7% of DIY respondents reported that an installer recommended the water heater they purchased.

Most customers who chose to install their own water heaters did so to save on installation costs. In contrast, building owners were more often motivated by confidence in their own skills and experience (Figure 24).

Figure 24. Why DIY residents chose to install a water heater themselves



Source: CalMTA Residential Survey Q. F3. "What were your main reasons for choosing DIY installation? Select all that apply." (n=64) and CalMTA Building Owner and Property Manager Survey Q. F3. "What were your main reasons for choosing to install the water heater yourself? Select all that apply" (n=124)

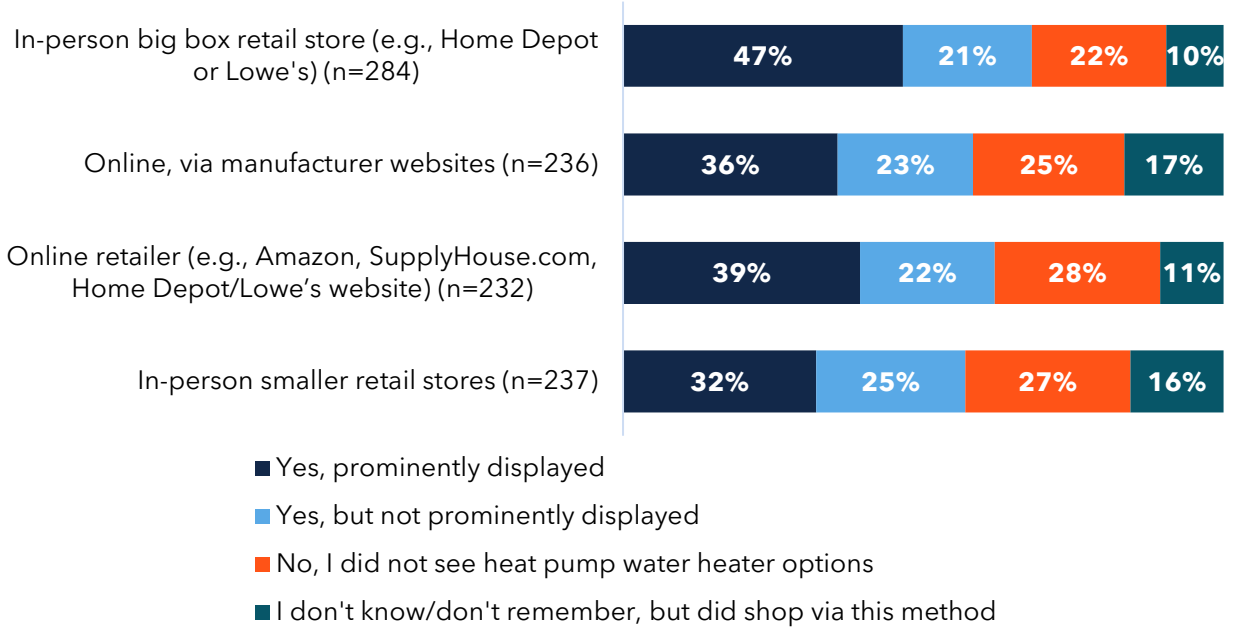
Survey results also examined the frequency of BIY purchasers. Thirty-five percent of customers who hired installers (30% of all purchasers) chose to purchase the water heater themselves prior to hiring an installer to install it.[182]

The survey found that 45% of all purchasers were either DIY (15%) or BIY (30%); this is reviewed in more detail in Section 6.2.

HPWH visibility and availability

Figure 25 and Figure 26 summarize the residential purchasers' experience shopping for water heaters via different shopping venues.[183] Results indicate that HPWHs were visible to residents between 58% to 68% of the time, depending on the shopping venue, with lower reported visibility at smaller, in-person retail.

Figure 25. HPWH availability seen in different locations (reported by residents purchasing water heaters)



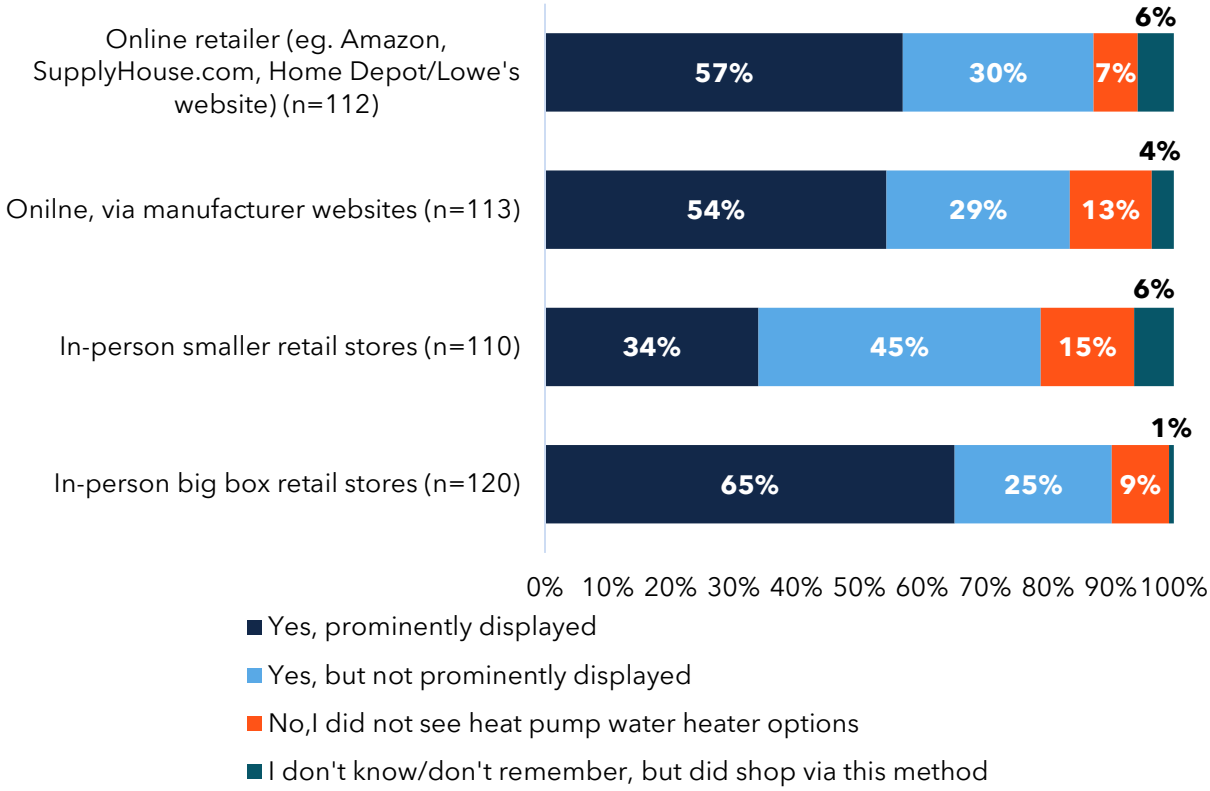
Source: CalMTA Residential Survey Q. B10. "When shopping for a water heater, did you notice heat pump water heater options displayed?" (n=346). Note: Respondents who answered "N/A – I did not shop via this method" were excluded from this analysis. Responses to "Other (please specify)" are not displayed.

[182] CalMTA Residential Survey Q. F2. "At what point in your purchase process was the water heater type selected?" (n=282; question was posed to all non-DIY respondents that purchased a water heater in the last three years. Note total respondents posed this question was n=285, but three respondents left this question blank.

[183] Note the shopping venue is not necessarily the end point at which the purchase is made; see Section 6.2 for purchasing analysis.

In general, building owners and property managers noted a higher rate of availability or display of HPWHs in comparison to residents, including a greater perception of prominent display across channels (Figure 26).

Figure 26. HPWH availability by location, reported by building owners and managers

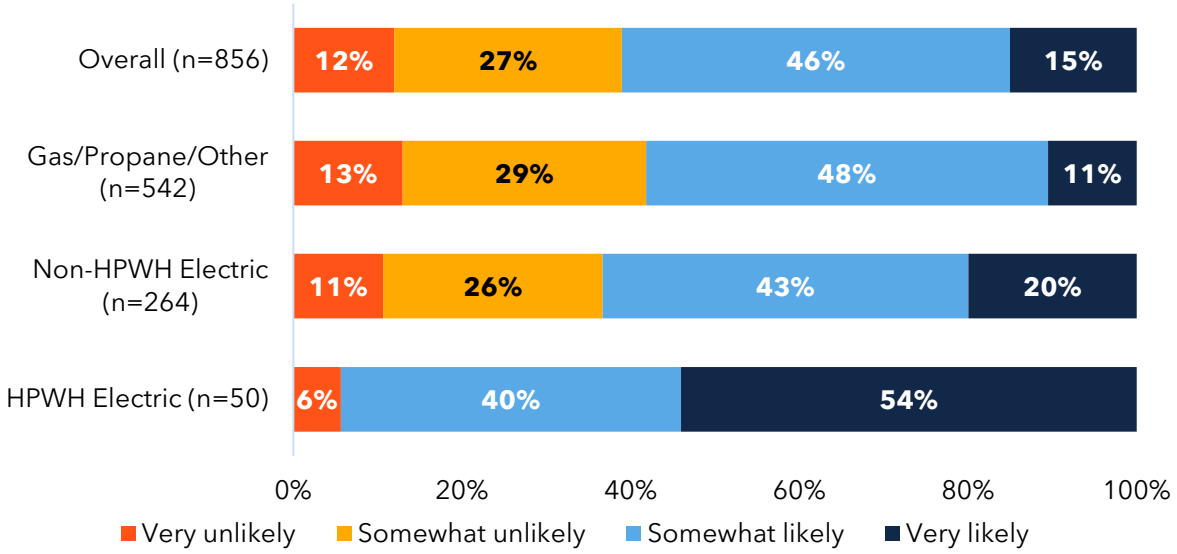


Source: CalMTA Building Owner/Property Manager Survey Q. B9. "When shopping for a water heater, did you notice heat pump water heater options displayed?" (n=121). Note: Respondents who answered "N/A – I did not shop via this method" were excluded from this analysis. Responses to "Other (please specify)" are not displayed.

Likelihood to consider a HPWH

Sixty-one percent of survey respondents reported they would be very or somewhat likely to consider an HPWH for their next water heater purchase, based on their current knowledge, with 46% of respondents saying they were *somewhat likely* and 15% saying they were *very likely* to consider a HPWH. As shown in Figure 27, reported likelihood to consider HPWHs is similar for respondents with standard electric and gas fueled water heaters. In contrast, 94% of respondents who currently have a HPWH reported they would be likely to consider installing another one for their next replacement.

Figure 27. Likelihood to consider installing HPWHs by fuel type

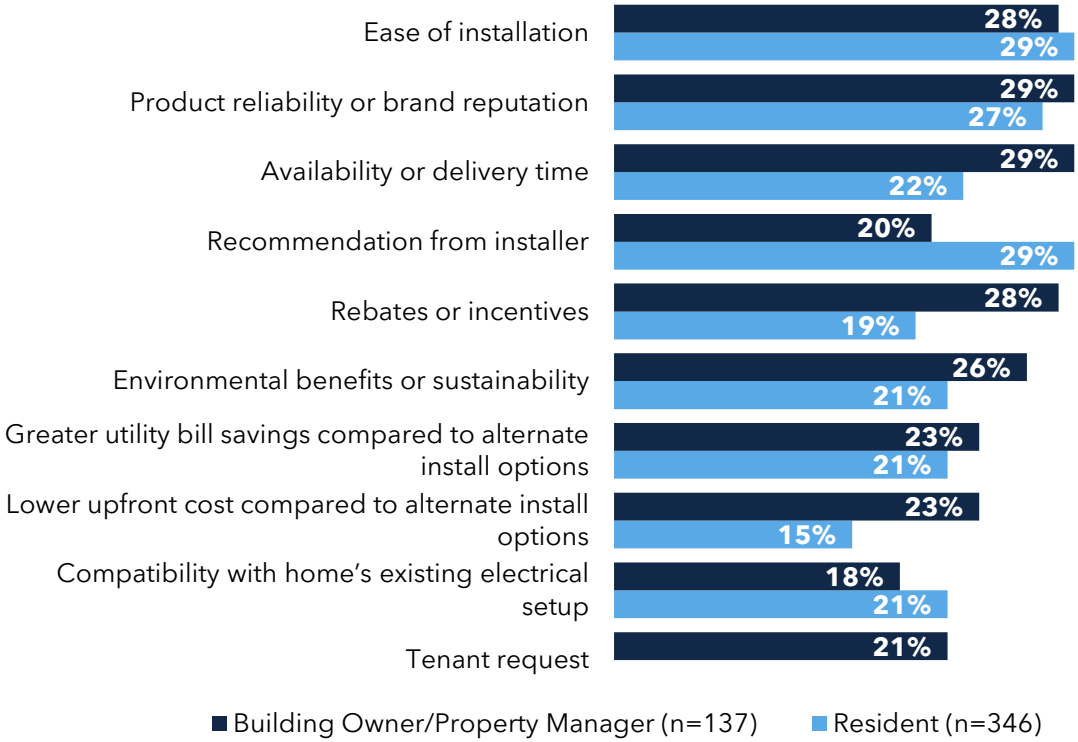


Source: CalMTA Residential Survey Q. H1. "Based on what you know today, how likely are you to consider installing a heat pump water heater for your next water heater replacement?" and Q. A14. "What type of water heater do you currently have installed in your home?" (n=856)

Analysis showed little difference between the likelihoods reported by residents of ESJ communities compared to residents of non-ESJ communities.

Residents and building owners both prioritized ease of installation and product reliability when choosing water heaters (see Figure 28). However, installer recommendations played a larger role in resident decisions, while building owners were more influenced by incentives and sustainability considerations.

Figure 28. Primary factors in water heater selection during purchase



Source: CalMTA Residential Survey Q. B8. "What were the primary factors in your selection of your water heater? Select up to three responses." (n=346); CalMTA Building Owner Property Manager Survey Q. B7. "What were the primary factors in your selection of your water heater? Select up to three responses." (n=137)

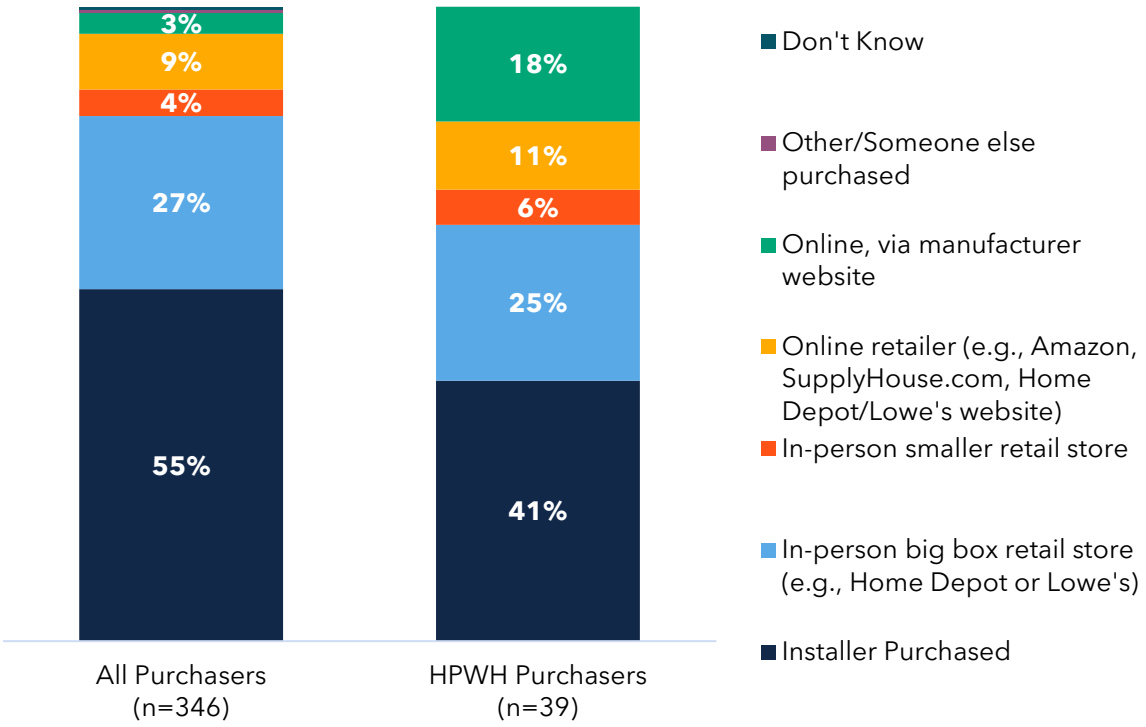
Water heater purchase location

Residential survey respondents – including those purchasing directly as DIYers or BIYers (45% of respondents) and those relying on an installer for both purchase and install (55% of respondents) – reported on their water heater purchase location. Respondents reported their water heaters being purchased at big-box retail most frequently, with online retail and retail/distribution hybrids (such as SupplyHouse.com, and Amazon) reported second-most frequently (Figure 29).

Responses of HPWH purchasers (n=39) indicate less frequent purchases at retail and more frequent purchases online through manufacturer websites. Given that actual purchases directly from manufacturers to end-use customers are extremely unusual, it is interpreted that this represents customers navigating to their purchase location via manufacturer websites.[184]

[184] For example, Rheem's "Find a Pro" and A.O. Smith's "Plumbers Near Me" tools connect water heater shoppers to installers. https://www.rheem.com/find-a-pro/. https://www.hotwater.com/plumbers-near-me.html. SanCO's website similarly links to a "Find a Contractor" tool. https://eco2waterheater.com/where-to-buy-residential/.

Figure 29. Purchase location, reported by residents

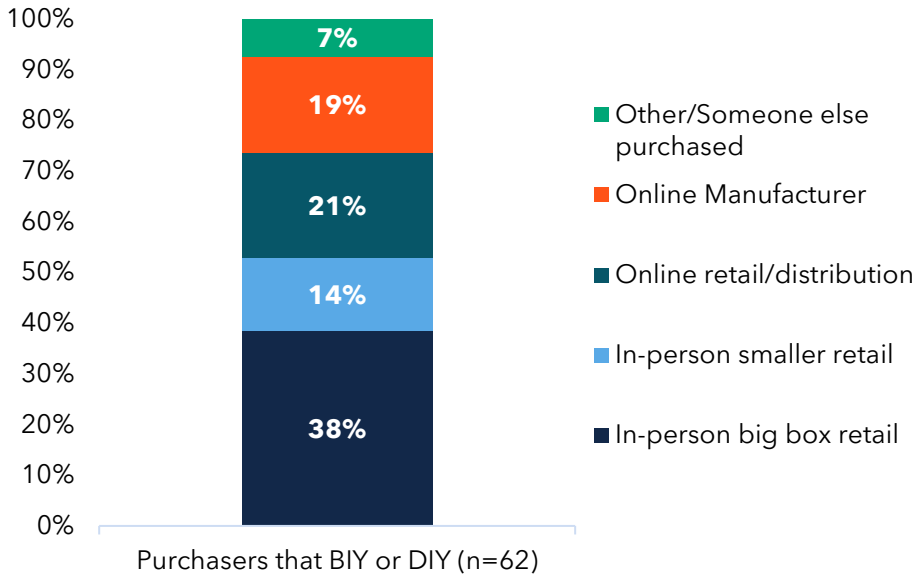


Source: CalMTA Residential Survey, QB9. "Where did you purchase your water heater?" (n=346) and QA16 "What type of water heater did you purchase?" (n=346). Note that the legend reflects the original survey response options. While the response option was labeled "online retailer" examples provided included both retail and distributors.

These purchase channel results, showing 40% of all residents purchasing coming through retail, point to the retail channel being key to HPWH market growth, and support stakeholder and manufacturer feedback recommending support for HPWH adoption through retail sales. When installer purchase channels are combined with results of the residential survey, more than half of all purchases come from retail (see installer purchases in Figure 58 and aggregation in Section 6.2).

A subset of surveyed building owners and managers also reported the purchasing channels they use most frequently for their purchases. Figure 30 shares the purchase channels reported by all DIY and BIY owners and manager respondents that reported their purchase channel. Note that these values cannot be compared with Figure 29 because not all building owner and manager respondents reported purchase channel and the survey did not allow identification of installer-led purchases. Survey results also did not allow for the isolation of HPWH purchasing channels.

Figure 30. Purchasing channels, reported by owner and managers that DIY or BIY

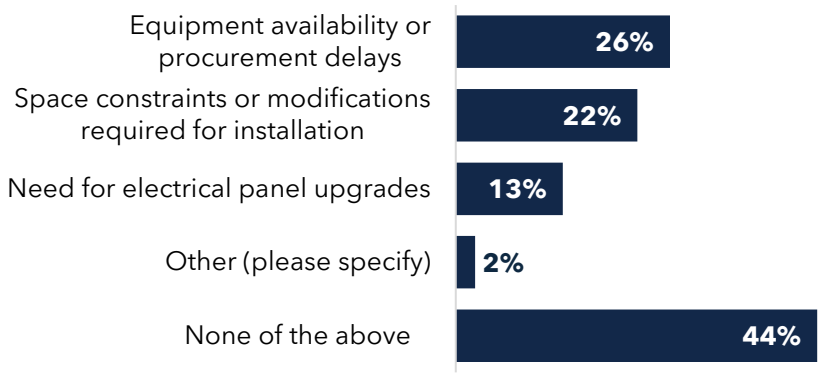


Source: CalMTA Building Owner and Property Manager Survey, QB8. "What percent of the water heaters you purchased were purchased in each of the methods below? (If a single purchase, enter as "100%." Enter "0" for any categories that do not apply.)" (n=62).

Factors affecting purchase selection

Among residents who recently purchased water heaters, the most common barriers were equipment availability and procurement delays, followed by space constraints and the need for electrical panel upgrades (Figure 31).

Figure 31. Factors affecting water heater type purchased reported by residents

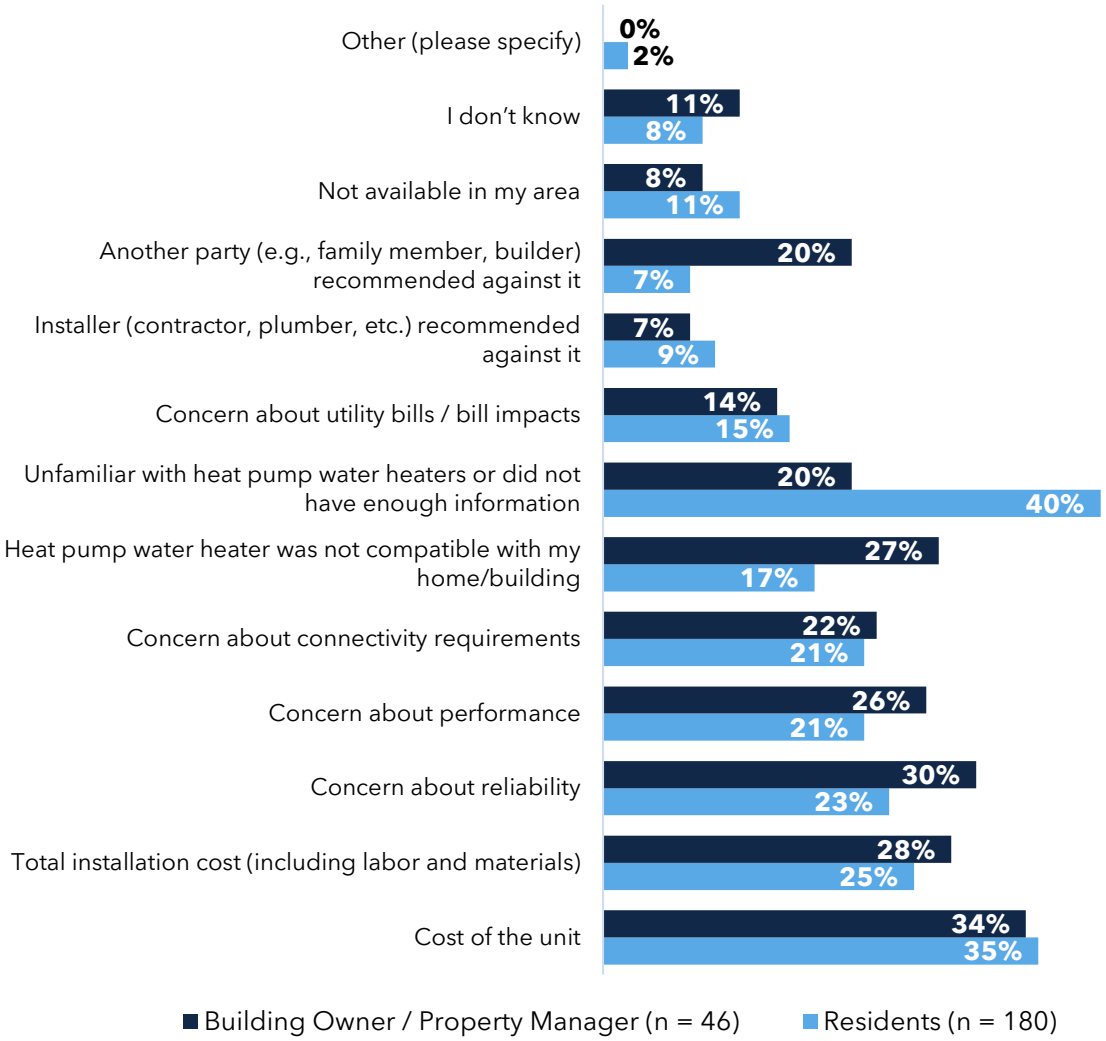


Source: CalMTA Residential Survey Q. B5. Did any of the following factors influence your decision on the type of water heater you installed? Select all that apply." (n=346).

Residents and building owners or property managers most frequently cited unit cost as the primary reason for not choosing an HPWH. Among residents, unfamiliarity with HPWHs was a common

barrier, while building owners and property managers were more concerned about reliability. Additionally, building owners and property managers were more likely than residents to report being discouraged by recommendations from others against installing HPWHs (Figure 32).

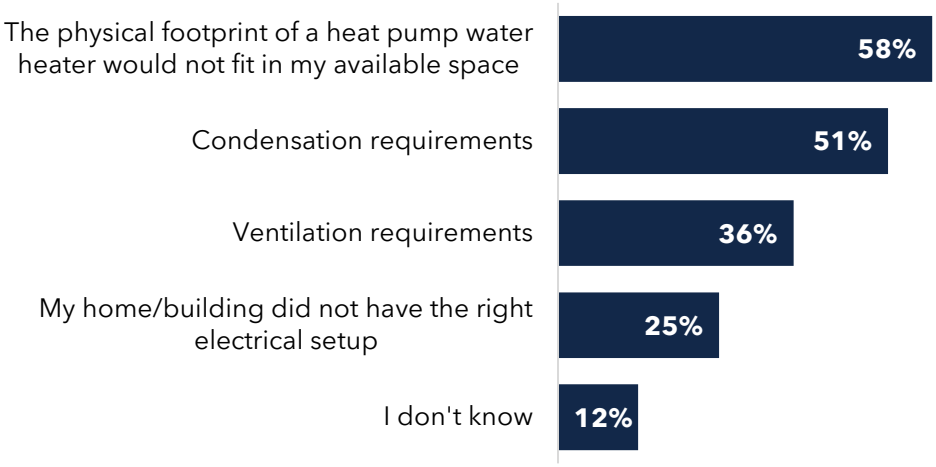
Figure 32. Factors preventing residents and building owners/property managers from choosing a HPWH



Source: CalMTA Residential Survey Q. C5. "What factors prevented you from choosing a heat pump water heater? Select all that apply." (n=180: all respondents that are aware of HPWHs but installed a non-HPWH) and CalMTA Building Owner/Property Manager Q. C5. "What factors prevented you from choosing an HPWH? Select all that apply." (n=46)

Figure 33 shows the barriers to HPWH installation reported by residents who indicated that HPWHs were incompatible with their home or building (17%, as shown previously in Figure 32).

Figure 33. HPWH incompatibility barriers (residents)

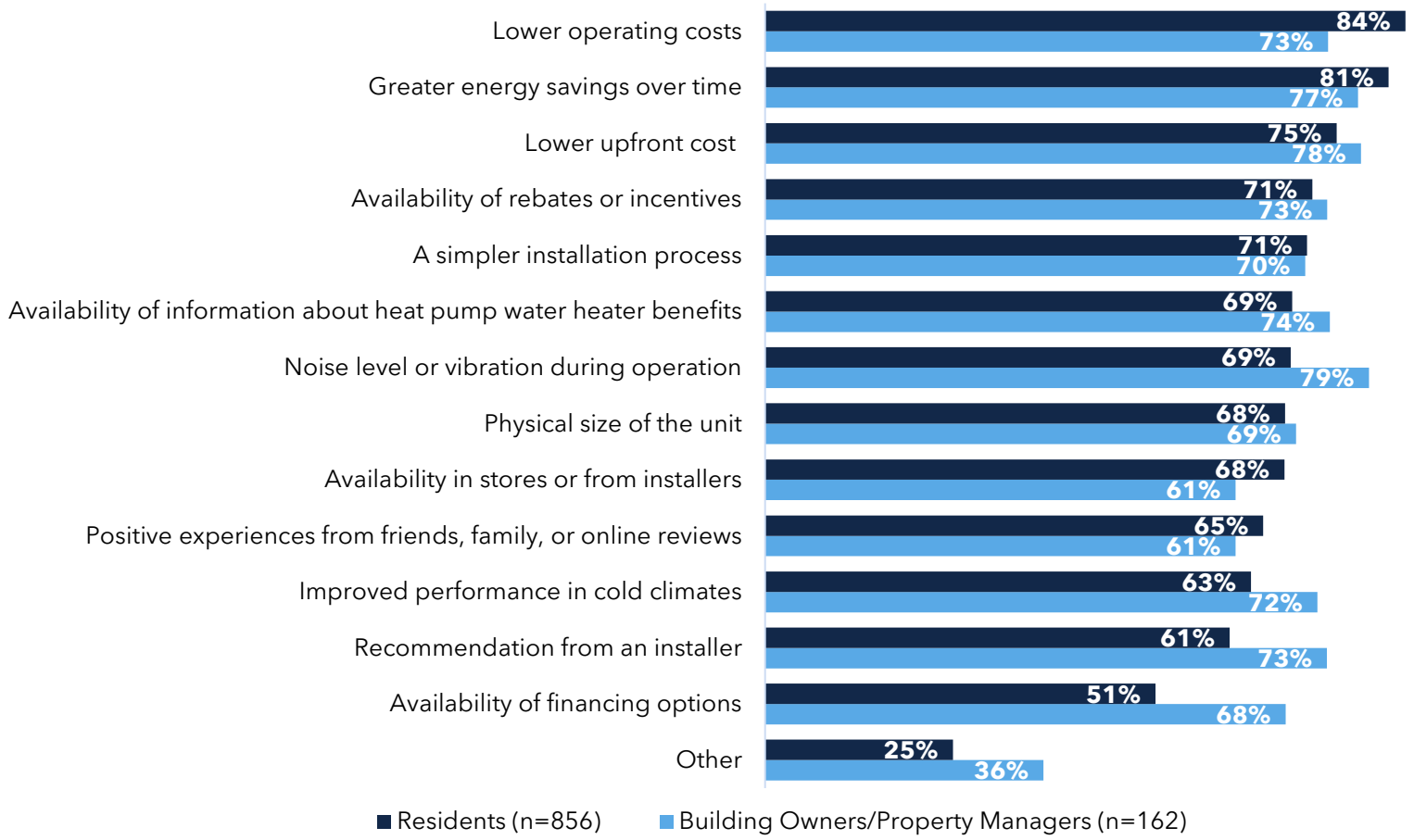


Source: CalMTA Residential Survey Q. C7. "What specific challenges related to your home or building prevented you from installing a heat pump water heater? Select all that apply." (n=39)

Factors affecting the likelihood of future HPWH purchase

To better understand what might drive future adoption of HPWHs, the survey asked residents and building owners/property managers which factors would most influence their decision to choose a HPWH over another type of water heater. Residential customers were most influenced by long-term energy savings and lower operating costs when deciding whether to purchase a HPWH (Figure 34). Up-front cost, available incentives, and ease of installation were also important. Building owners shared similar priorities but placed additional value on noise level during operation, installer recommendations, and access to more information.

Figure 34. Factors influencing HPWH purchases (residents and building owners/property managers)

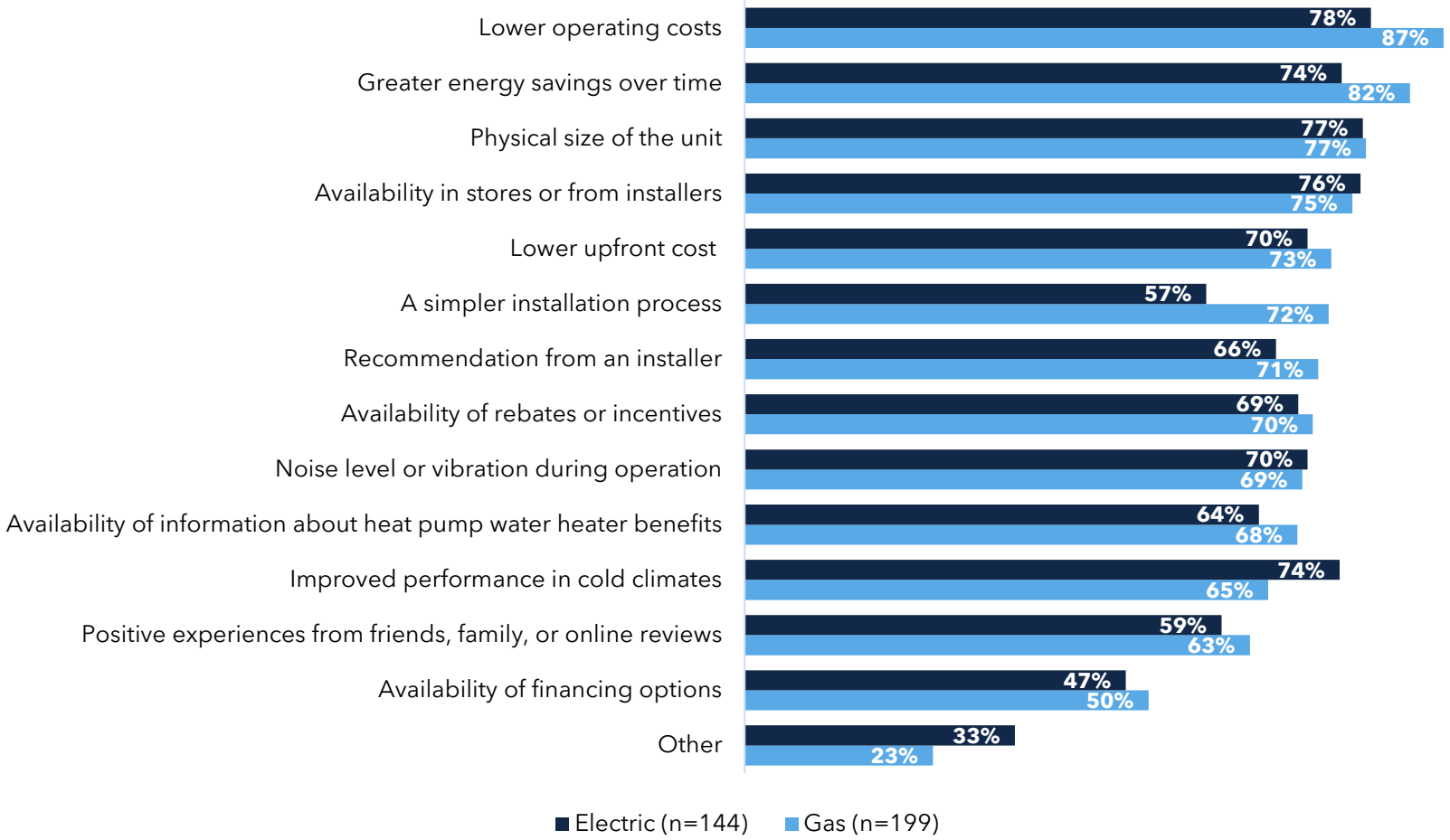


Source: CalMTA Residential Survey Q. H2. "When replacing your water heater, how much would each of the following factors influence your decision to choose a heat pump water heater over another type of water heater? Please rate each factor on a scale from 1 to 5 where 1 means *not at all influential* and 5 means *very influential*." (n=856) & CalMTA Building Owner/Property Manager Survey Q. H2. "When replacing your water heater, how much would each of the following factors influence your decision to choose a heat pump water heater over another type of water heater? Please rate each factor on a scale from 1 to 5 where 1 means *not at all influential* and 5 means *very influential*." (n=162)

Residential customers reported being less influenced by the availability of financing options than building owners/property managers. Only 51% of customers stated the availability of financing options would be *influential* or *very influential* when purchasing an HPWH in the future, compared to 68% of building owners/property managers.

As Figure 35 shows, both electric and gas water heater purchasers would be influenced by lowering operating costs and greater energy savings, along with lower upfront cost, availability, and physical size. Gas water heater purchasers also indicated that a simpler installation process would influence their decision to purchase an HPWH.

Figure 35. Factors affecting HPWH purchases (electric vs. gas)



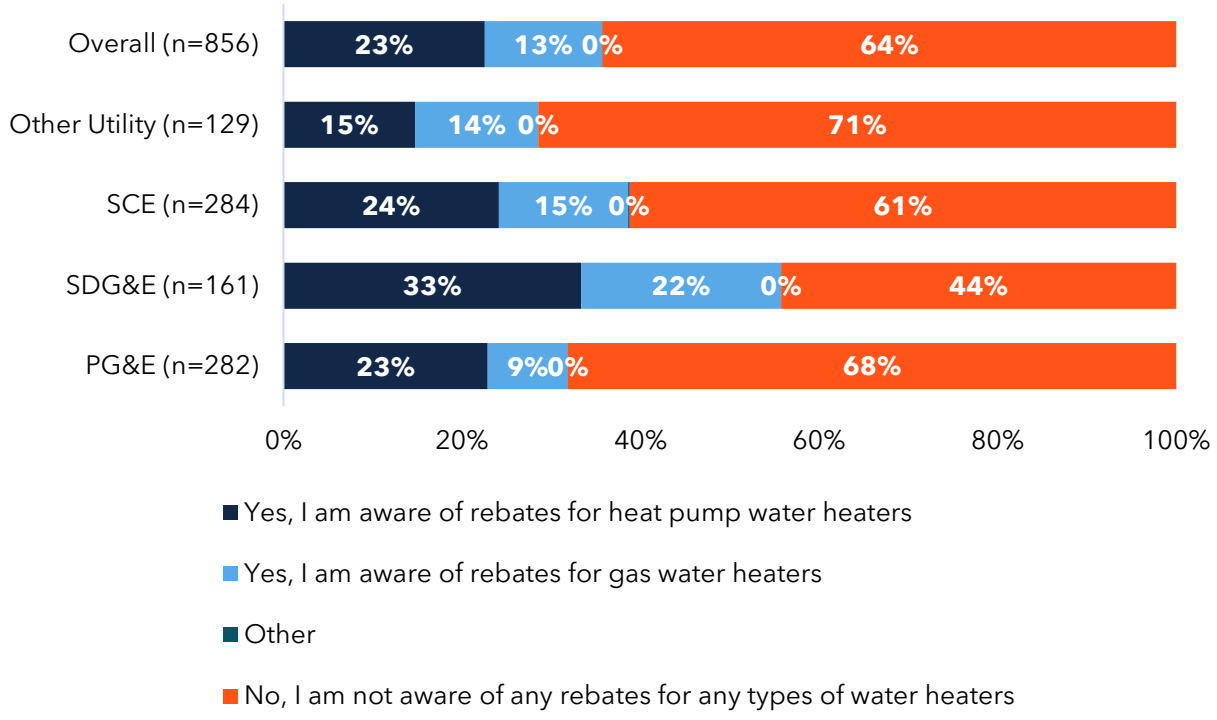
Source: CalMTA Residential Survey Q. H2. "When replacing your water heater, how much would each of the following factors influence your decision to choose a heat pump water heater over another type of water heater? Please rate each factor on a scale from 1 to 5 where 1 means *not at all influential* and 5 means *very influential*." (n=343)

5.2.3 Incentive awareness and utilization

Survey results indicate relatively low levels of awareness of water heater incentives, but relatively high rates of application among those that are aware (particularly among HPWH purchasers). Apart from lack of awareness, those that didn't apply for incentives indicated application complexity, demand response requirements, and questions over eligibility as reasons for non-application.

As Figure 36 summarizes, 64% of residential survey respondents reported they were unaware of water heater rebates, with awareness of incentives significantly lower among SDG&E customers.

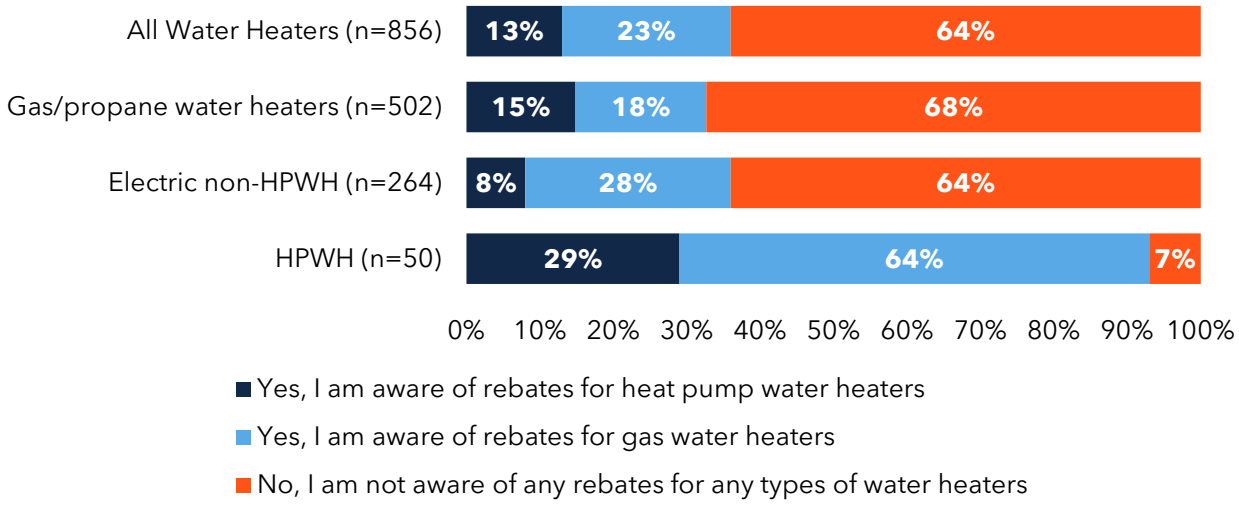
Figure 36. Awareness of incentives by IOU



Source: CalMTA Residential Survey Q. G1, "Are you aware of rebate or incentive programs for water heaters?" (n=856)

Awareness of HPWH-specific rebates was higher among respondents with existing electric water heaters (28%) than those with gas or propane water heaters (17%). Not surprisingly, awareness of HPWH rebates was much higher (64%) among respondents who reported having an HPWH (Figure 37).

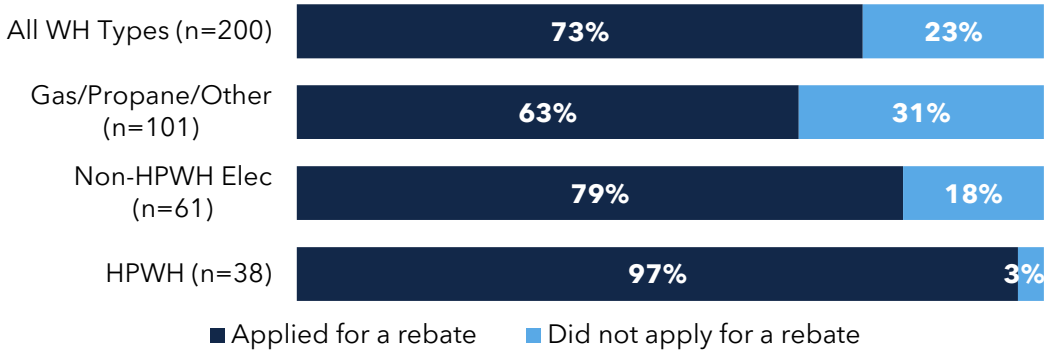
Figure 37. Residential incentive awareness by existing water heater type



Source: CalMTA Residential Survey Q. G1, "Are you aware of rebate or incentive programs for water heaters?" (n=856)
Note: The response "I don't know" (n=28) and "Solar water heater" (n=9) for water heater type is not broken out but is included in all water heaters.

As shown in Figure 38, 73% of purchasers who were aware of rebates reported that either they or their installer applied for them, with HPWH buyers showing the highest participation.

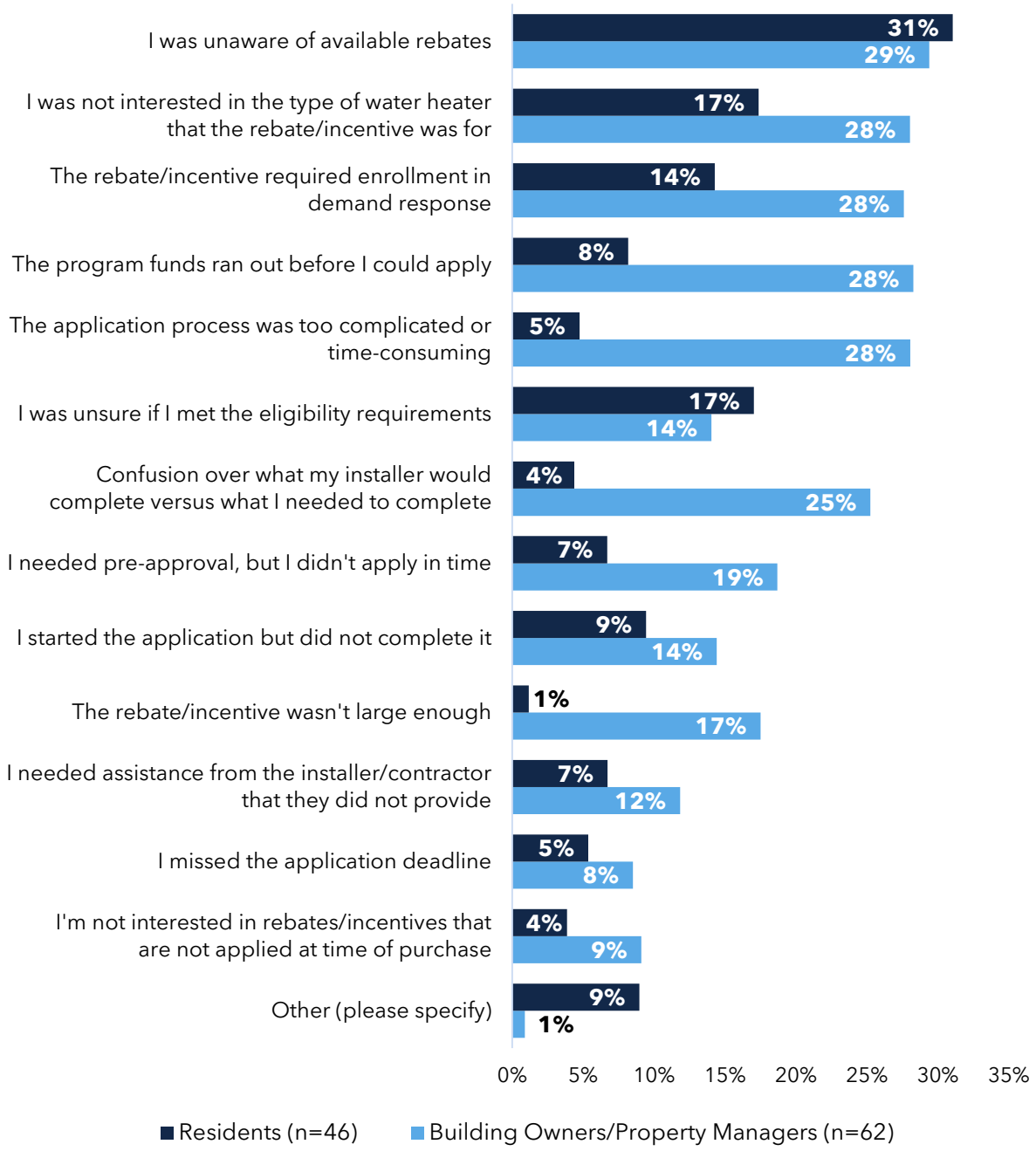
Figure 38. Rate of application for rebates (purchasing residents aware of rebates)



Source: CalMTA Residential survey Q. G4. "Did you or your installer apply for a rebate or incentive for your water heater?" (n=200) represents purchasing respondents aware of rebates. This question asked about respondents' primary water heater purchase.

Lack of awareness was the top barrier to successfully applying for rebates reported by residents (31%) and building owners and property managers (29%). Building owners and managers cited a handful of additional barriers such as insufficient program funds, complicated application process, insufficient support from the installer, and required enrollment in demand response program (Figure 39).

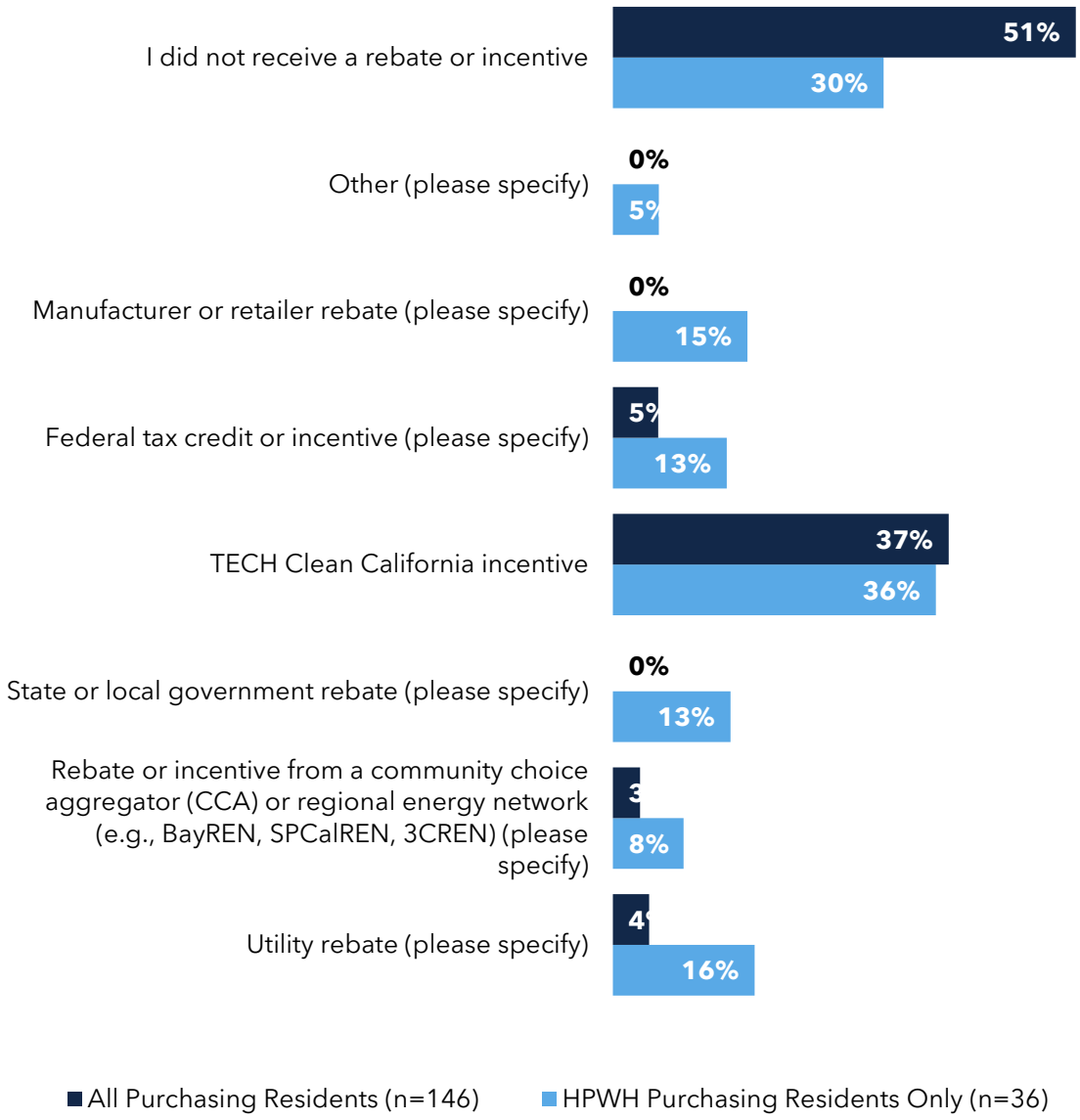
Figure 39. Barriers to rebate application: residents and owners/managers



Source: CalMTA Residential Survey Q. G5. "What prevented you from successfully applying for the rebate or incentive program? Select all that apply (n=46, respondents that reported being aware of incentives but not applying at the time of their water heater purchase). CalMTA Building owner and property manager survey Q. G5. "What prevented you from successfully applying for the rebate or incentive program? Select all that apply." (n=62, respondents that reported being aware of incentives but not applying at the time of their water heater purchase).

Many purchasers reported receiving incentives for HPWHs, with the TECH Clean California program cited most frequently (Figure 40). CalMTA looked at the difference between the rebates received by HPWH residential purchasers and all residential purchasers. Note that while survey results indicate that 51% of HPWH purchasing rebate applicants reported not receiving a rebate (as do 30% of all residential purchasers), this may be due to participation in incentives that are technically received by the contractor.

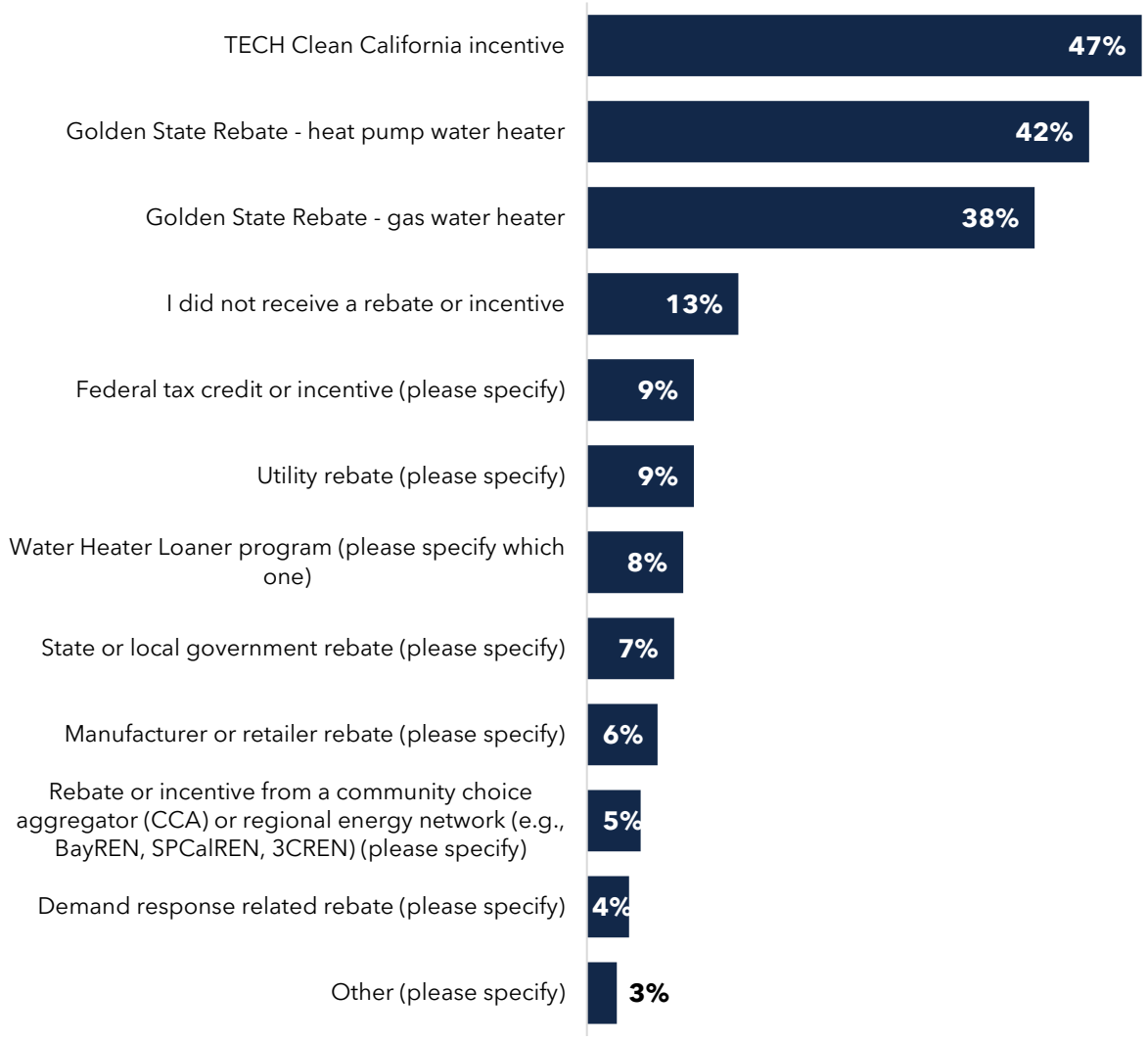
Figure 40. Type of rebates received (residential rebate applicants)



Source: CalMTA Residential Survey Q. G6. "What type of rebate or incentive have you received for your water heater(s)? Select all that apply." (n=146), reflecting all purchasing residents that reported applying for rebates themselves or had an installer apply on their behalf.

Building owners and property managers also frequently reported receiving the Golden State Rebate for either HPWHs or gas water heaters (and Figure 41).[185]

Figure 41. Type of rebates received (owner/manager rebate applicants)

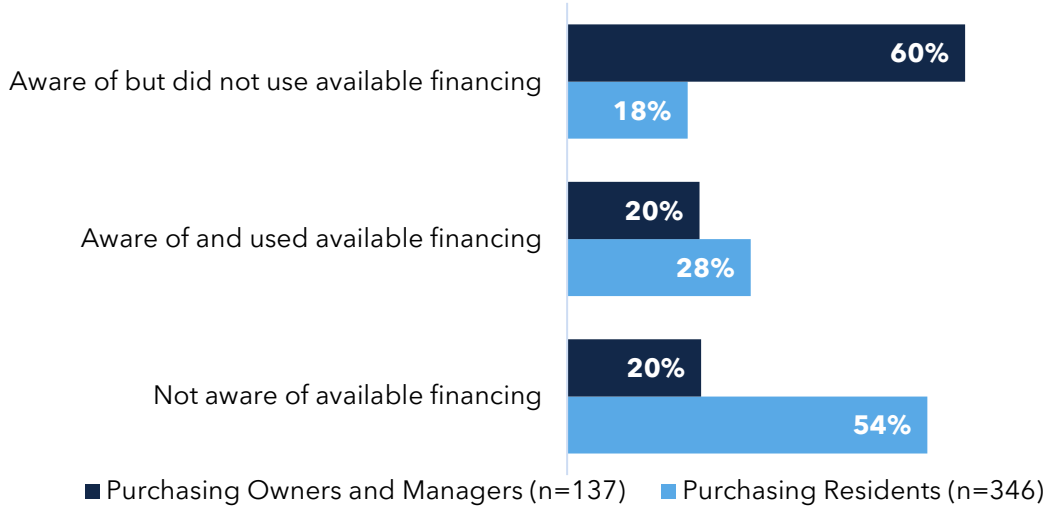


Source: CalMTA Building Owner and Property Manager Survey Q. G6. "What type of rebate or incentive have you received for your water heater(s)? Select all that apply." (n=105), reflecting all purchasing owners and managers that reported applying for rebates themselves or had an installer apply on their behalf.

[185] Thirty percent of resident purchasers and 13% of owners and managers who applied for incentives also reported receiving no rebate; however, it is unclear if this is due to issues with the rebate application process, or due to respondents wanting to share that they did not personally receive a rebate (which they would not if participating in midstream rebates that are received by the contractor.

As illustrated in Figure 42, more than half of purchasing residents are not aware of financing to support HPWH purchases, whereas the majority of owners and managers are aware.[186] Residents most often used manufacturer or retailer plans (47%), bank loans (33%), or home equity credit (29%), while utility-based financing was rarely used. Building owners and property managers most frequently relied on home equity loans (55%), manufacturer or retailer plans (47%), and bank loans (38%). Utility, CCA, or REN-based financing was rarely used by either group (4% residential and 2% building owner/property manager).[187]

Figure 42. Financing use by building owner/property manager and resident purchasers aware of financing



Source: CalMTA Residential Survey Q. D1: "Were financing options (including pay-over-time options) available when purchasing your water heater?" (n=346) and CalMTA Residential Survey Q. D3. "Did you use any financing options to purchase your water heater(s)?" (n=178) and : CalMTA Building Owners/Property Managers Survey Q. D1: "Were financing options (including pay-over-time options) available when purchasing your water heater(s)?"(n=137) and CalMTA Building Owners/Property Managers Survey Q. D3. "Did you use any financing options to purchase your water heater(s)?" (n=116). Note: "Yes" indicates respondents who use any financing options (including pay-over-time options); "No" indicates respondents who did not use financing.

5.2.4 Installation experience

Research indicates that residents have had mostly positive experiences with HPWH installation. Permitting rates are higher (91%) than the average permitting rate for all water heater types (55%). Although survey respondents indicated some installation challenges including tank sizing (36%) and the need for electrical work (24%), 96% of HPWH purchasers surveyed said they would

[186] A 2022 TECH survey indicated that about 50% of TECH program participants (including HVAC heat pumps and HPWHs) utilize financing. https://calnext.com/wp-content/uploads/2024/12/ET23SWE0063_Residential-Heat-Pump-Financing-Mechanisms-Analysis_Final-Report.pdf.

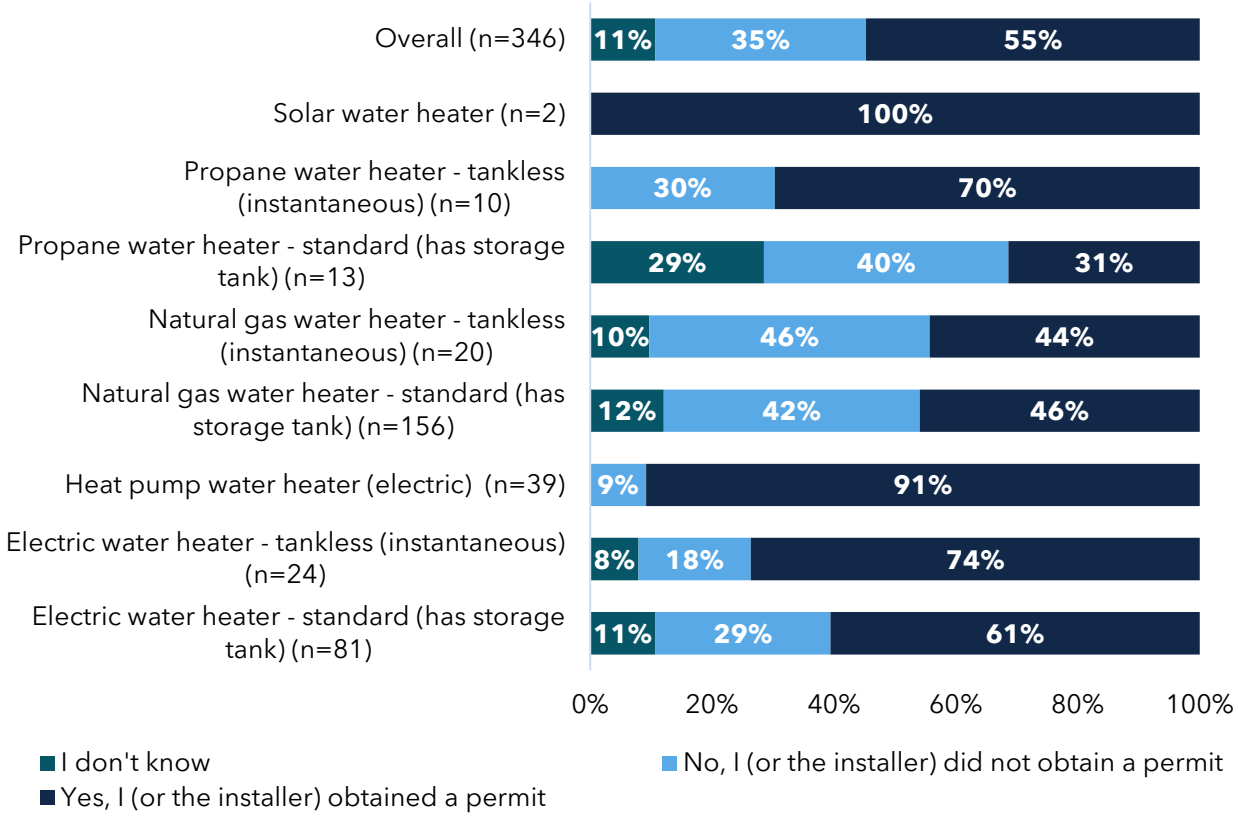
[187] CalMTA Residential Survey Q. D4. "What type of financing, or other pay-over-time options, did you use? Select all that apply."

be somewhat or very likely to consider installing an HPWH for their next water heater replacement.

Permitting rate

Survey results suggest that rates of HPWH permitting are higher than those for standard water heaters (Figure 43), which aligns with research indicating permitting is a prerequisite to accessing HPWH incentives and pointing to the importance of mitigation of permitting challenges.

Figure 43. Permitting rates by water heater type purchased



Source: CalMTA Residential Survey Q. E1. "Was your water heater installation project permitted?" (n=346) and Q. A167a: "What type of water heater did you purchase?" (n= 346)

Overall, residents who used professional installers permitted their installations more (66%) than DIYers (37%).188 CalMTA further asked residents and building owners about their reasons for permitting or not permitting their water heater installations and found that 24% of residents and

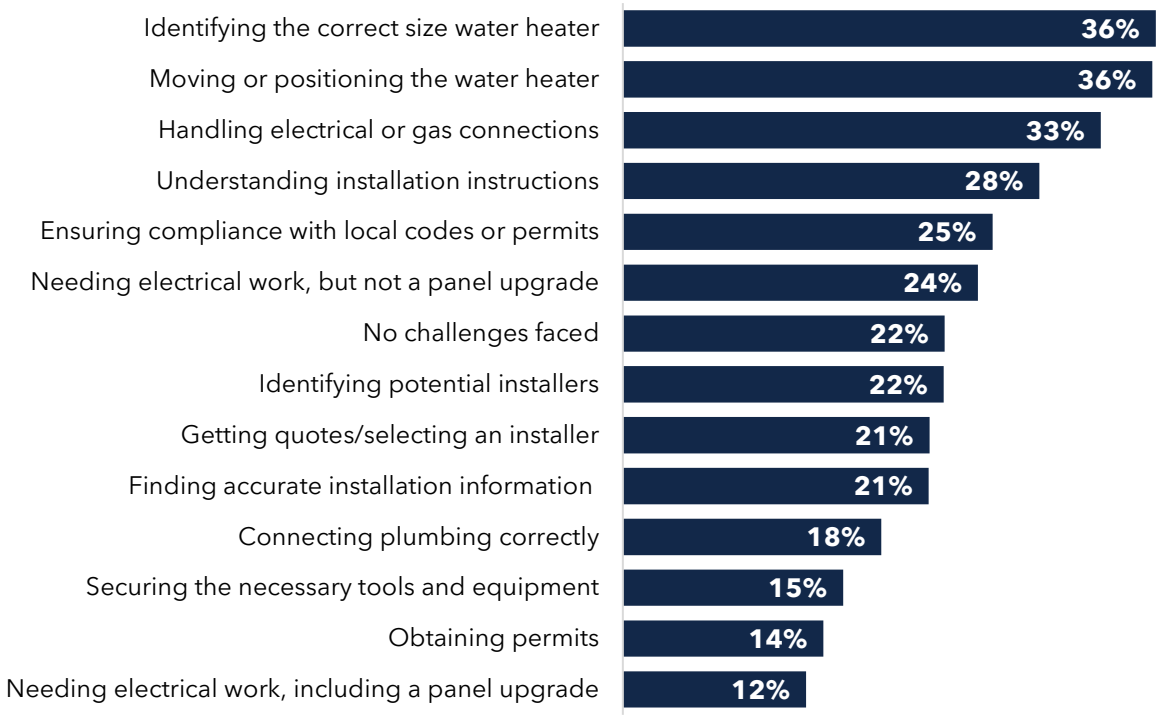
[188] CalMTA Residential Survey Q. E1. "Was your water heater installation project permitted?" (n=345) and Q. A16_a: "What type of water heater did you purchase? " (n= 345). Represented total is one less than total purchasers (n=346) due to one respondent answering "I don't know" for Q. A18.

46% of building owners and managers report permitting in part due to incentive application requirements.

Installation challenges

As reflected in Figure 44, residential survey respondents reported several challenges during HPWH installation, with the most common being identifying the correct size, positioning the unit, and managing electrical or gas connections.

Figure 44. Challenges encountered during HPWH installation



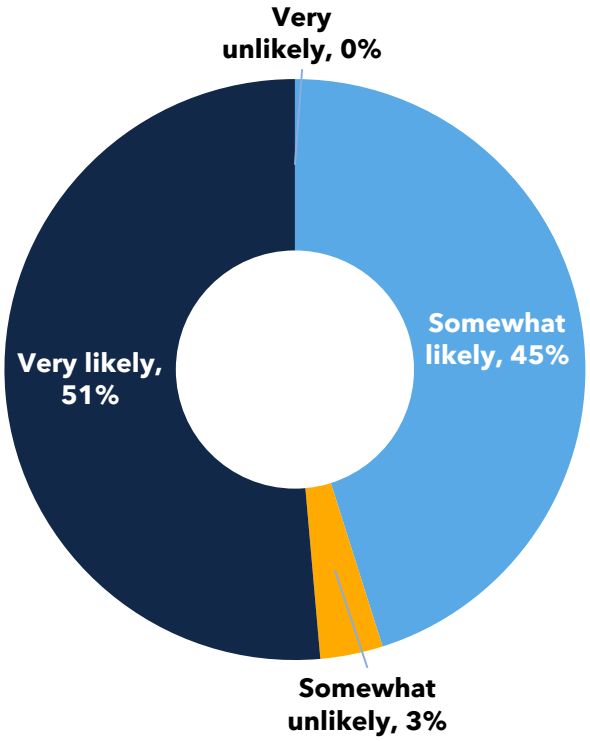
Source: CalMTA Residential Survey Q. B7. "What challenges did you face during the installation process (if any)? Select all that apply" (n=39)

Perceptions post-HPWH installation

Several programs have collected feedback from participants who installed HPWHs. In a survey of 300 single-family homeowners and renters who installed HPWHs through TECH between November and December 2022, three-quarters of respondents reported the highest level of satisfaction with HPWHs. Most respondents found their HPWH to be a good investment and were likely to recommend it as cost effective, high quality, and beneficial to the environment.

When asked about future water heater replacements, most residential survey HPWH purchasers said they were likely to choose an HPWH again, with nearly all expressing at least some likelihood of repurchasing (Figure 45).

Figure 45. Likelihood of HPWH purchasers choosing an HPWH in the future



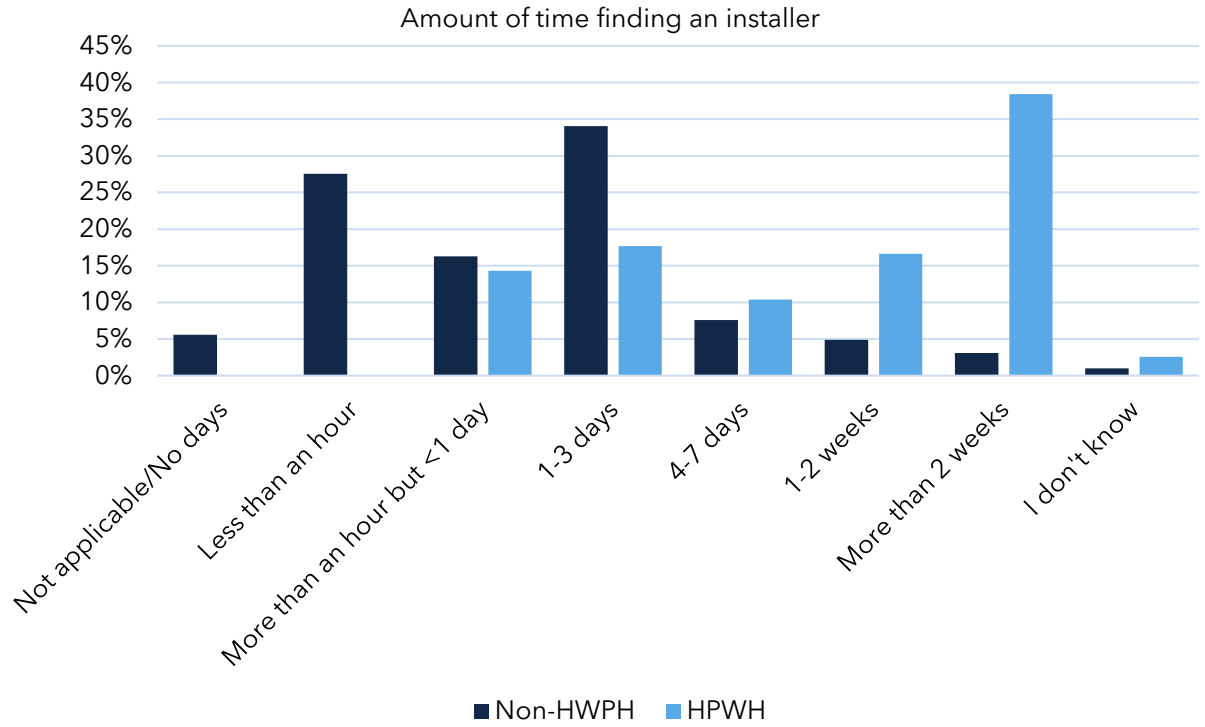
Source: CalMTA Residential Survey Q. H1. "Based on what you know today, how likely are you to consider installing a heat pump water heater for your next water heater replacement?" (n=48) , Q. A16_a. "What type of water heater did you purchase?" (n=48), and Q. A16_b. "What type of second water heater did you purchase?" (n=48)

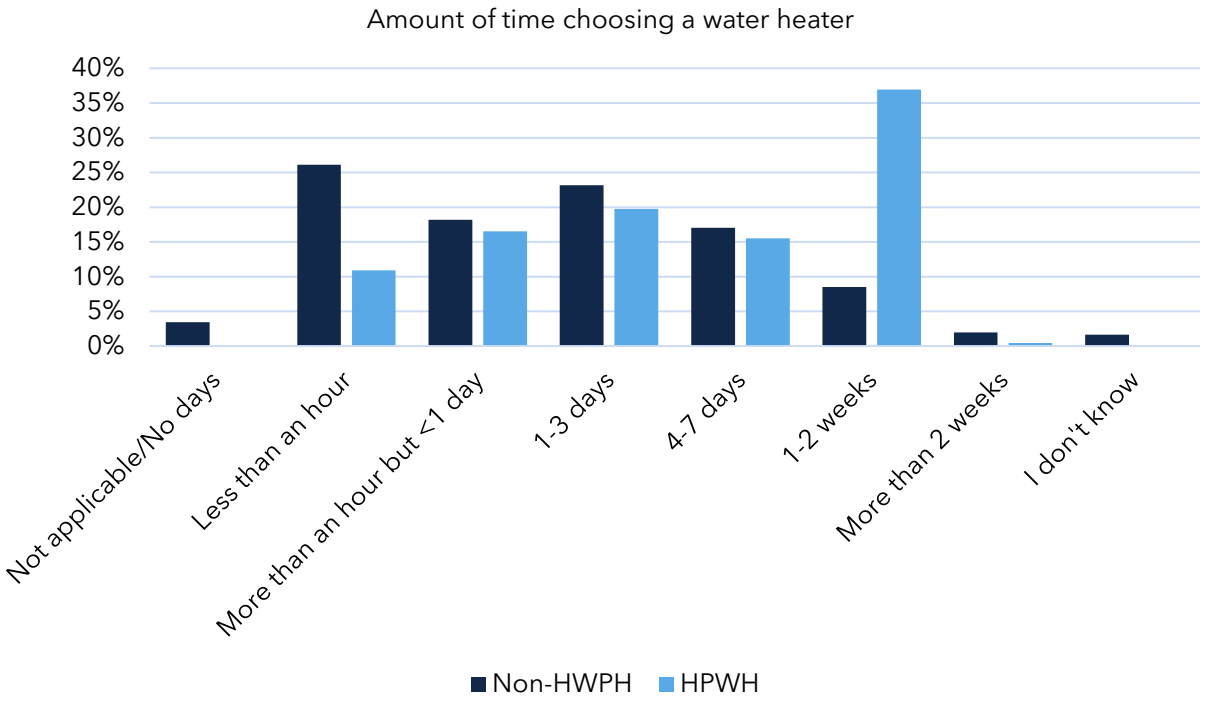
5.2.5 Customer journey timeline

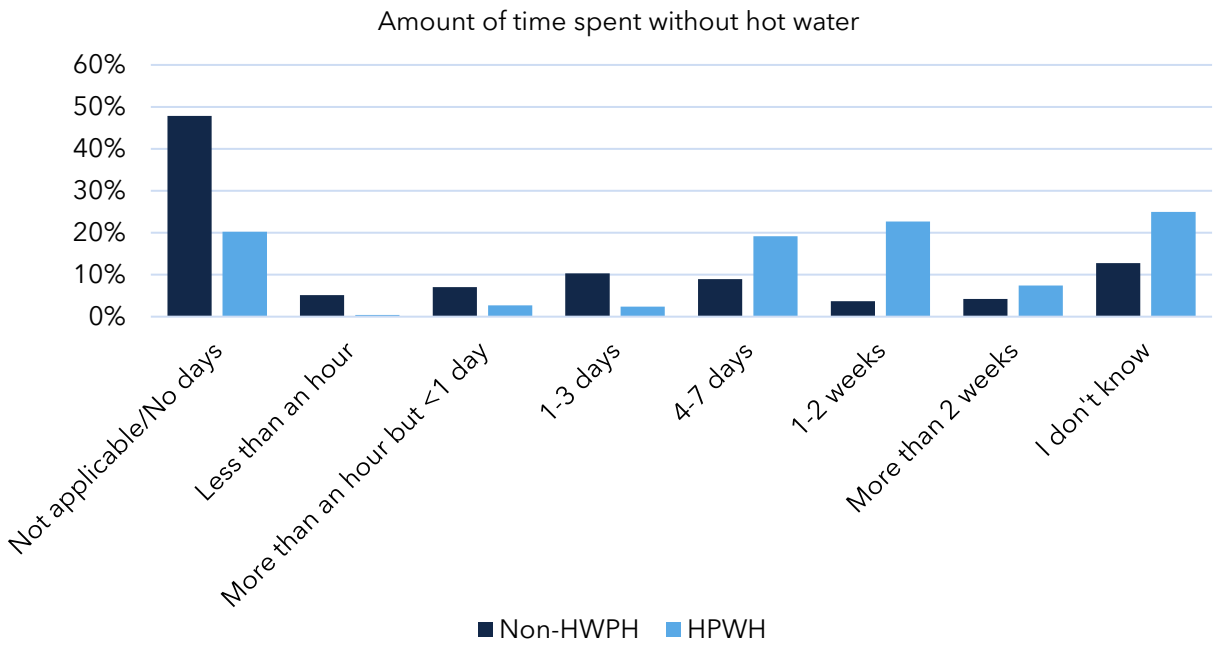
Survey results on the overall purchase timeline, from initial need awareness to post-installation, show that HPWH purchasers typically experience a longer selection and installation process compared to those purchasing other types of water heaters. As shown in Figure 46, while 74% of non-HPWH purchasers reported their total water heater purchase journey took three days or less, only 46% of HPWH purchasers reported the same. In contrast, 37% of HPWH purchasers reported their total water heater purchase and installation journey took at least a week, while only 6% of non-HPWH purchasers reported the same. Additional distinctions between the time required by HPWH purchasers vs. non-HPWH purchasers are summarized below:

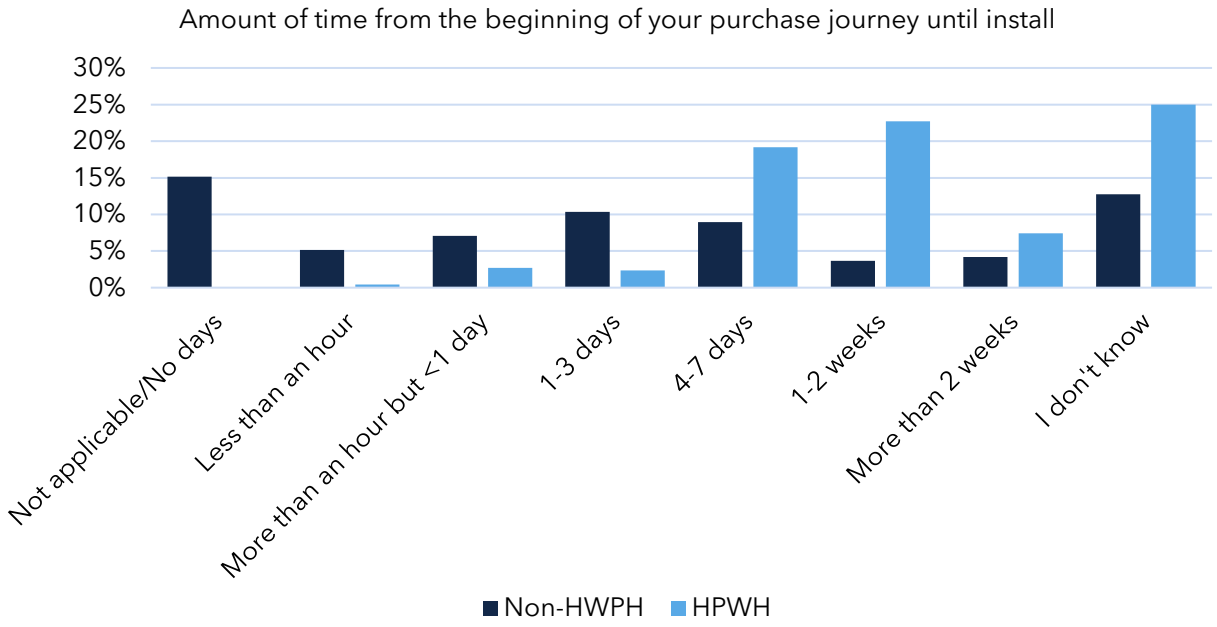
- Project duration and disruption to hot water supply took longer for HPWH installations. Results indicate that 48% of non-HPWH purchasers spend "no time" without hot water, compared to 20% of HPWH purchasers. 55% of HPWH purchasers said it took them at least a week to find an installer; only 8% of non-HPWH purchasers reported the same.

Figure 46. Time required for water heater journey steps - overall





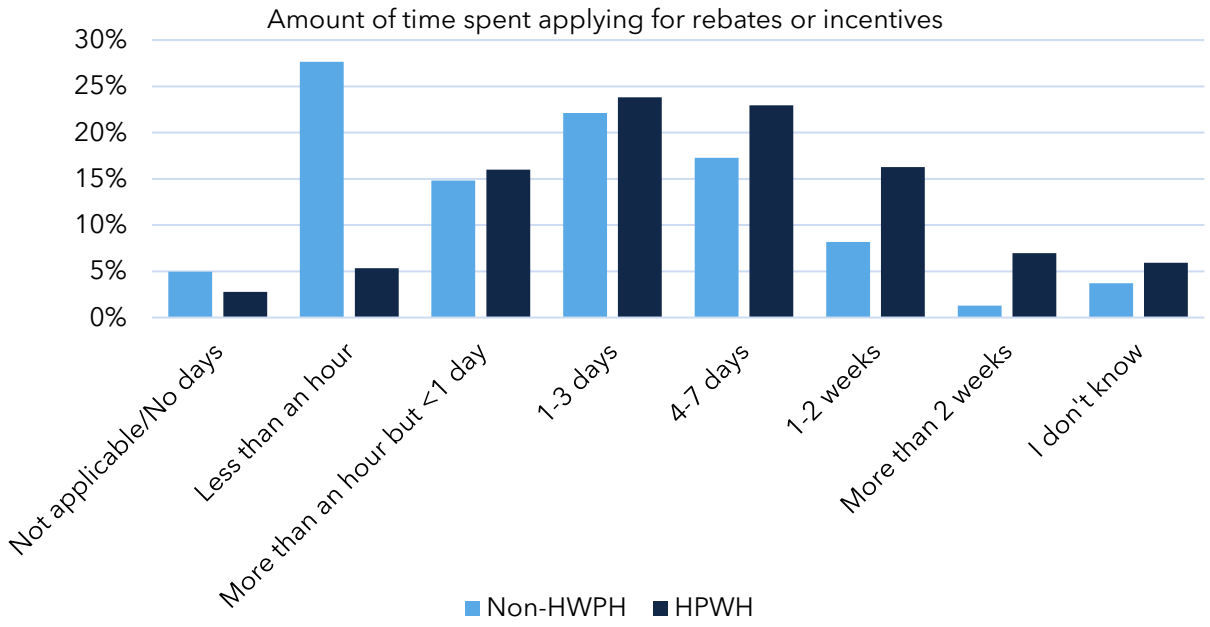


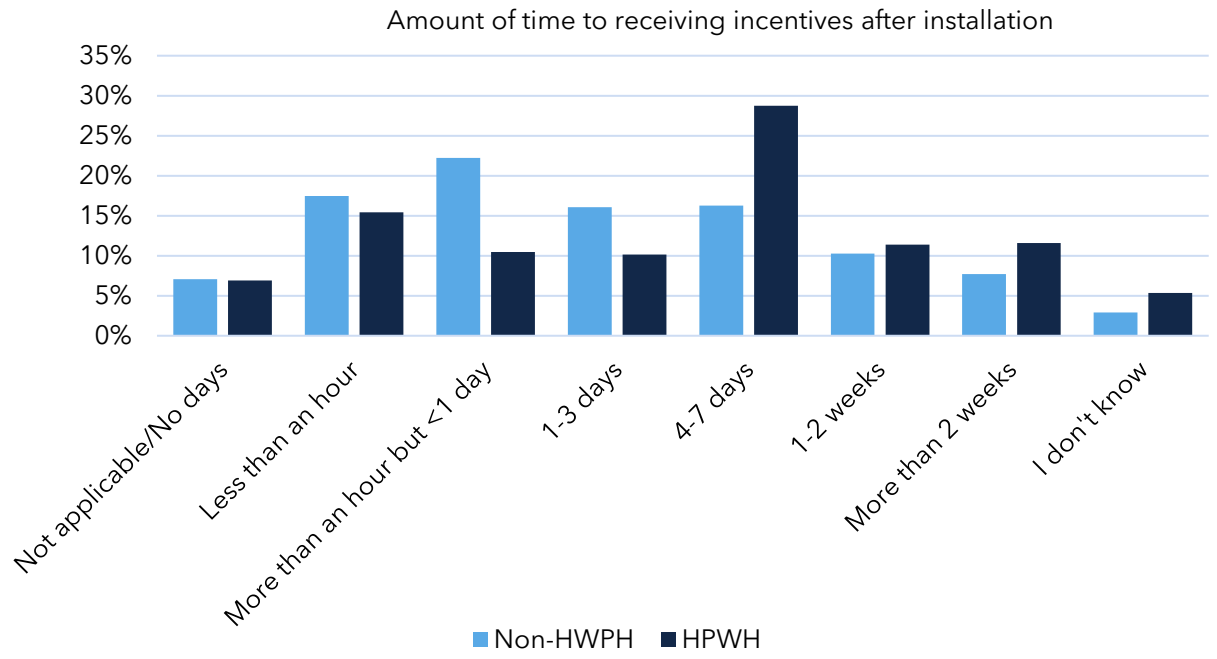


Source: CalMTA Residential Survey Q. G7. "Thinking about your most recent water heater purchase, approximately how long did each of the following steps take? If not applicable, please select "not applicable". (n=200). N values for each figure vary depending on the respondent's answers to previous questions: for "Finding an Installer," Non-HPWH n=106, HPWH n=34; for "Choosing a Water Heater," Non-HPWH n=162, HPWH n=38; for "Amount of time spent without hot water," Non-HPWH n=162, HPWH n=38; and for "Amount of time from the beginning of your purchase journey until install," Non-HPWH n=162, HPWH n=38.

- **Application for and receipt of HPWH incentives took substantially longer than for non-HPWH incentives**. Fifty-two percent of HPWH purchasers reported that it took four or more days following project completion to receive their incentive, compared to 34% of non-HPWH purchasers. While 28% of non-HPWH purchasers said that applying for incentives took them less than an hour, only 5% of HPWH purchasers said the same (Figure 47).

Figure 47. Time required for water heater journey steps – incentives



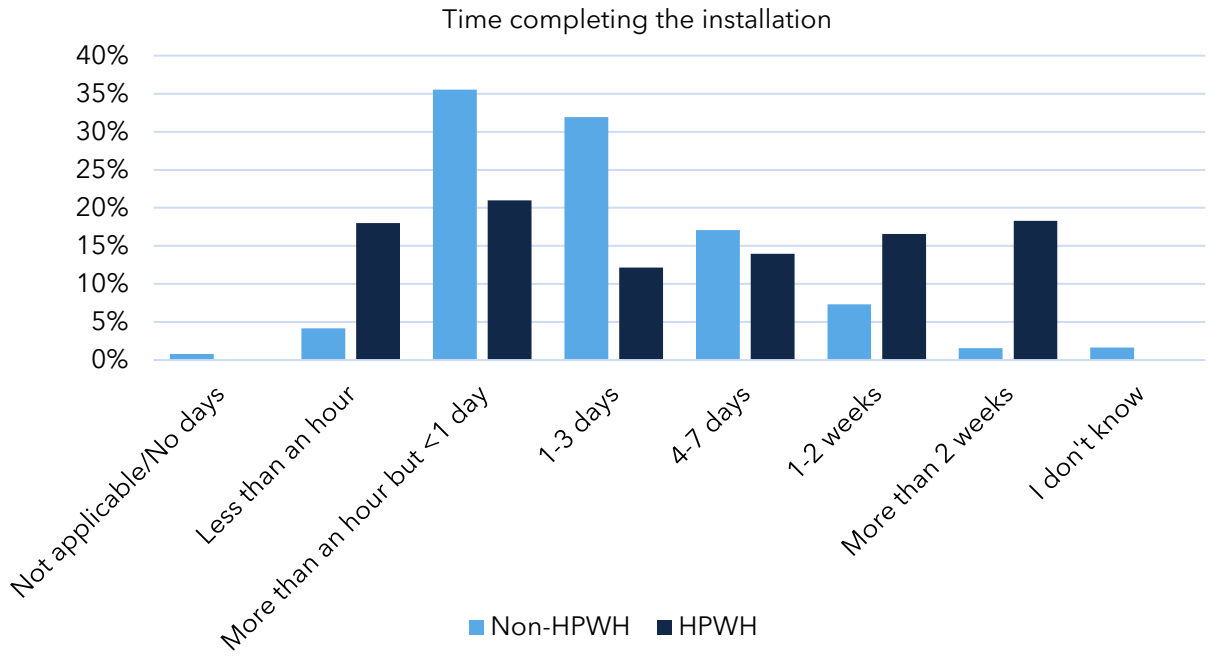


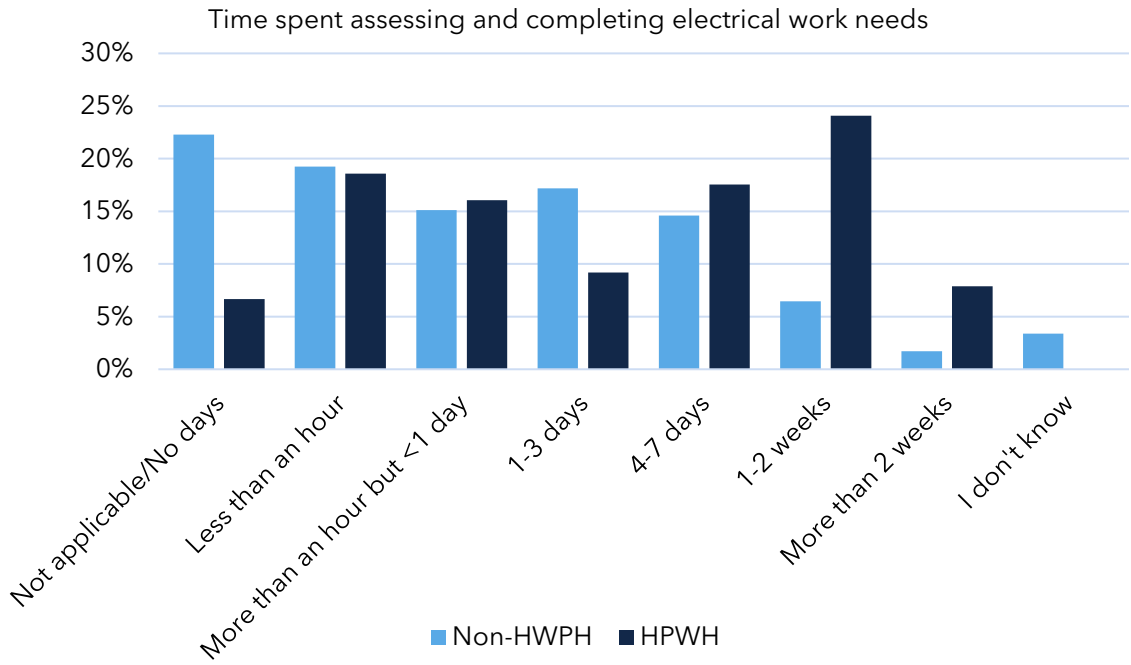
Source: CalMTA Residential Survey Q. G7. "Thinking about your most recent water heater purchase, approximately how long did each of the following steps take? If not applicable, please select "not applicable" (n=200). N values for each figure vary depending on the respondent's answers to previous questions: for "Applying for rebates or incentives," Non-HPWH n=110, HPWH n=36; for "Receiving incentives after installation," Non-HPWH n=110, HPWH n=36.

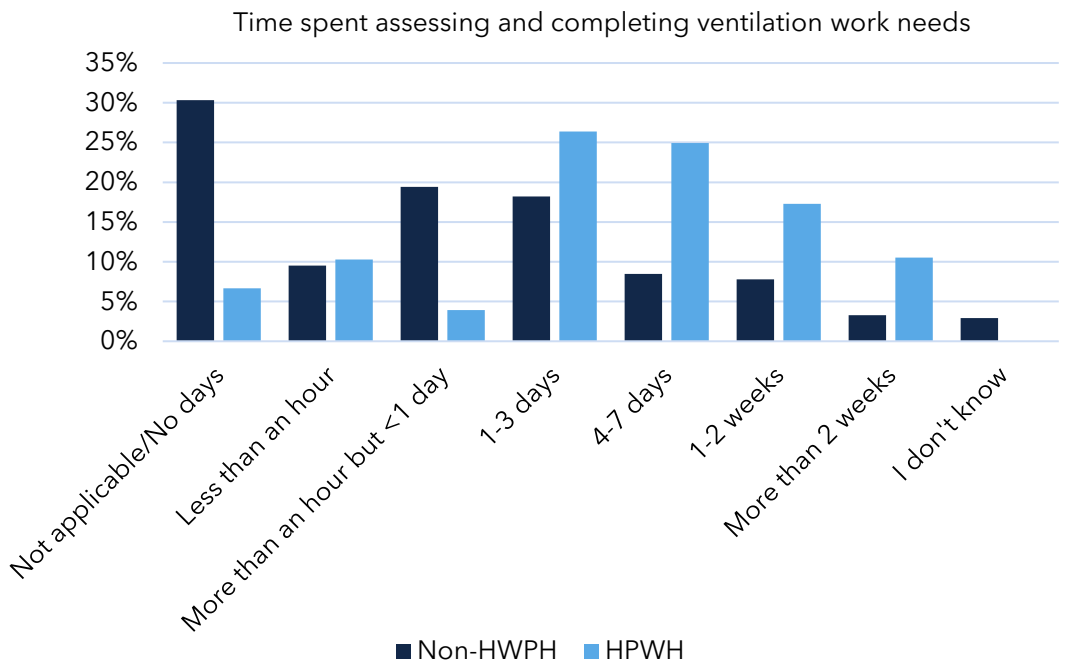
- **Technical aspects of HPWH installations, including ventilation and electrical work, took substantially longer**. Seventy-nine percent of HPWH purchasers reported ventilation work took anywhere from one day to two weeks or more, compared to 38% of non-HPWH purchasers reporting the same. Nearly a third (32%) of HPWH purchasers took a week or more for assessment and completion of electrical work, compared to 8% of non-HPWH purchasers (Figure 48).[189]

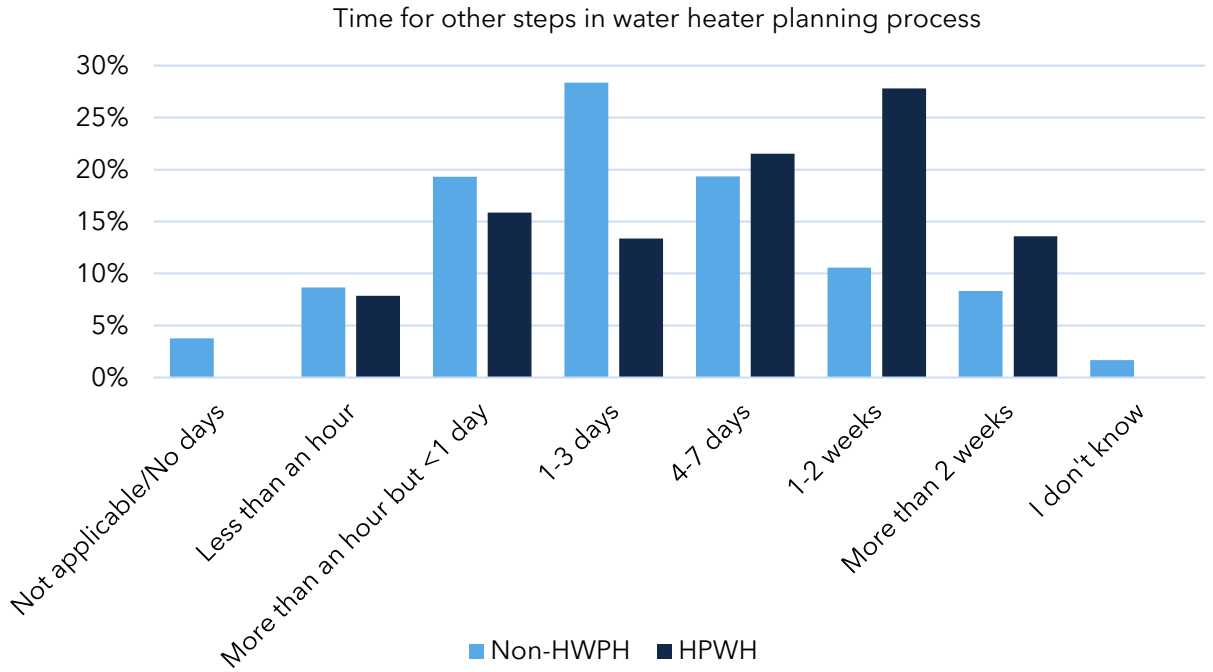
[189] Aligning with findings on electrical work causing longer timelines for HPWH projects, the *2024 California Water Heating Market Study*'s survey of installers found that, of HPWH installers, only 30% relied solely on in-house staff for electrical work, and those that used subcontracted electricians reported electricians requiring one week or more of lead time 32% of the time. (Opinion Dynamics. *Op cit*. March 29, 2024.) CalMTA stakeholder interviews further found that professional installers have reported holding off on bringing electrical capacity in-house due to their perception of uncertainty in the market, driven by uncertainty around availability of incentives.

Figure 48. Time required for water heater journey steps - technical work









Source: CalMTA Residential Survey Q. G7. "Thinking about your most recent water heater purchase, approximately how long did each of the following steps take? If not applicable, please select "not applicable" (All figures, Non-HPWH n=162, HPWH n=38).

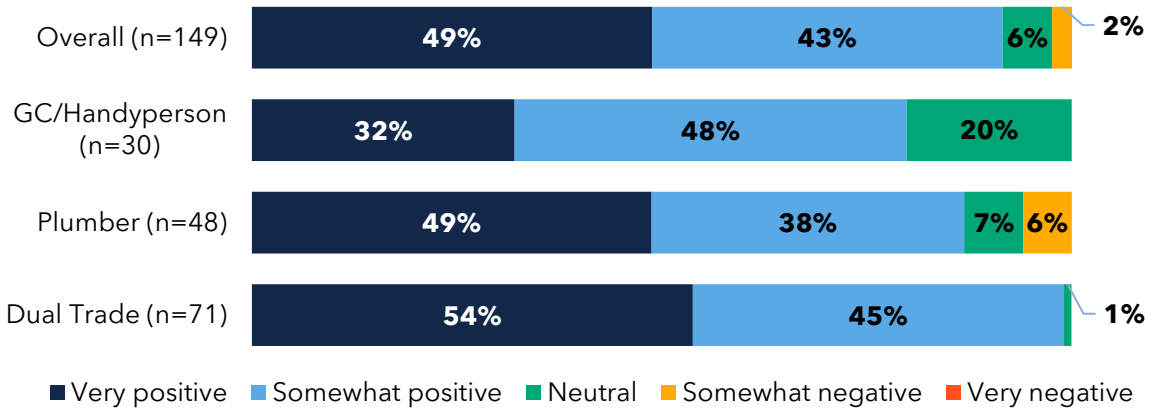
5.3 Water heater and HPWH sales and installation experience: installers

This section presents findings from the CalMTA installer survey, including insights into installer awareness and perceptions of HPWHs, frequency of recommendation and installation, and experience with incentive and financing programs, training, and permitting processes.

5.3.1 Installers' awareness and perceptions of HPWHs

The survey results indicated high levels of installer awareness and familiarity with HPWHs. All respondents had heard of HPWHs,[190] and most reported *somewhat* or *very favorable* impressions of the technology. Impressions varied by trade (Figure 49), with more dual trades contractors (i.e., those that install both HVAC and water heating) reporting a *very positive* view of HPWHs, and at higher rates than general contractors and handypersons.

Figure 49. Installer impressions of HPWHs by installer type



Source: CalMTA Installer Survey Q. B1. "Based on what you have heard, read, or experienced, how would you rate your impression of heat pump water heaters?" (n=149).

When segmented by IOU service territory, installers operating in SCE territory reported the highest rate of *very positive* impressions of HPWHs (58%), followed by installers in PG&E territory (49%) and SDG&E territory (33%).[191] Results reporting installer agreement with different statements about HPWHs indicate frequent agreement that HPWHs provide utility bill savings benefits (Figure 50), suggesting their experience with HPWH installations may be mainly replacing electric-resistance water heaters to HPWH or in specific territories in which rates are favorable for fuel substitution.

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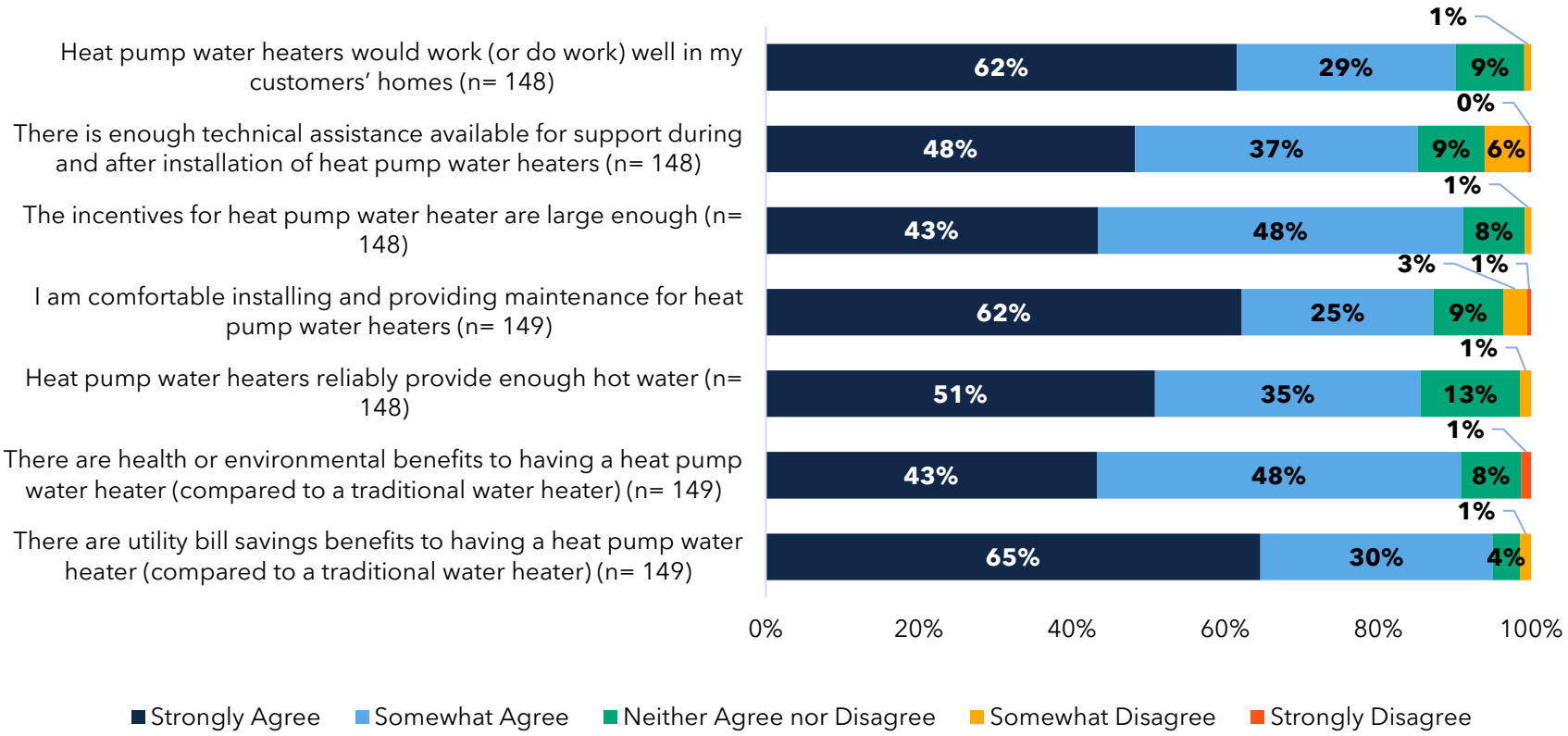
[190] Note that while all respondents reported awareness of HPWHs, stakeholder interviews indicated that there are installers that are unaware of HPWHs. Lack of awareness was reported as less common in most urban areas and more likely in the Sierra and Northern non-urban areas.

[191] Installers serving areas categorized as "Other" reported a 98% rate of *very positive* impressions, though this group was small (n=3). CalMTA Installer Survey Q. B1. "Based on what you have heard, read, or experienced, how would you rate your impression of heat pump water heaters?" (n=149).

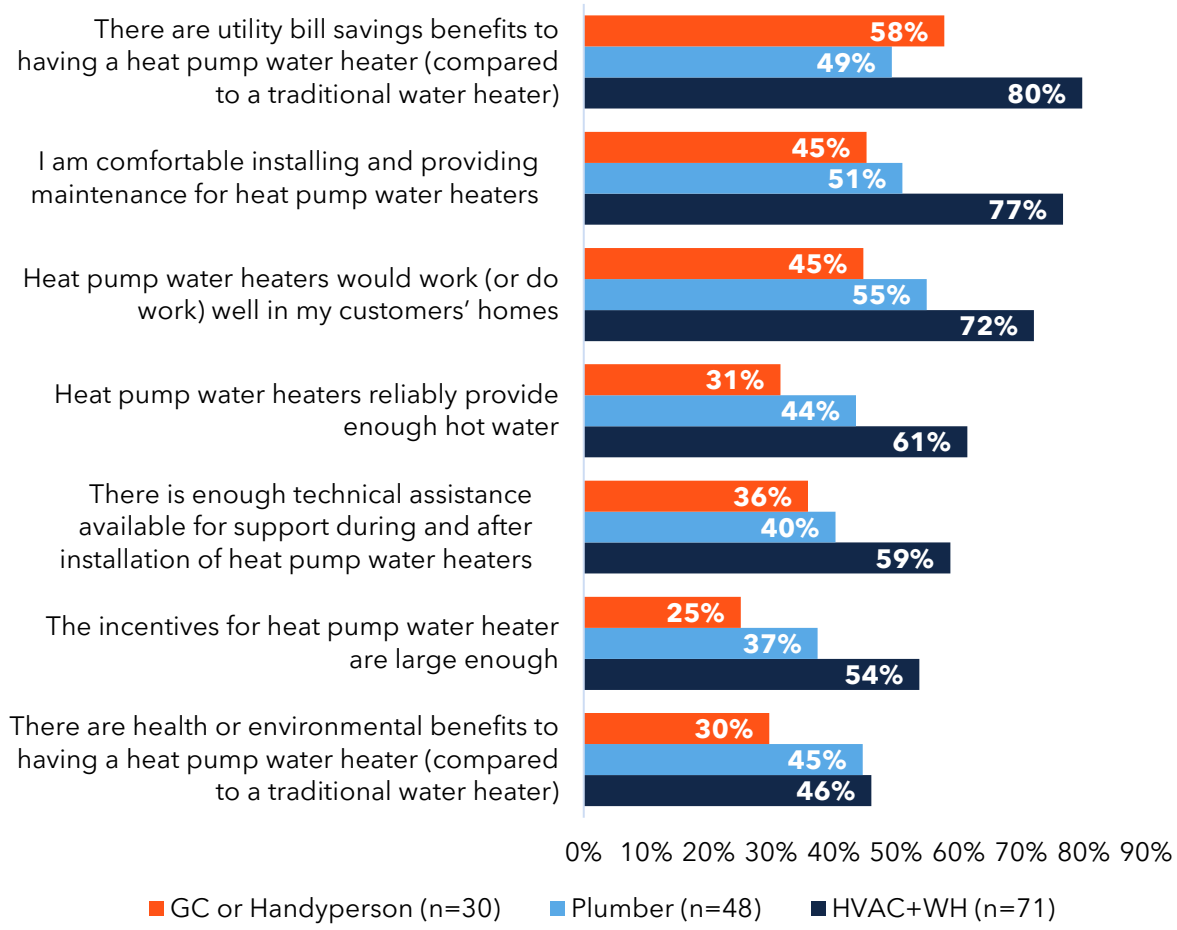
Figure 50. Agreement with HPWH-related statements (installers)



Source: CalMTA Installer Survey Q. B2. "Based on what you have heard, read, or seen, how much do you agree or disagree with the following statements about heat pump water heaters?" (n=149)

Survey results in Figure 51 indicate that dual trades installers report the highest confidence in HPWHs across the range of perceptions, while general contractors and handypersons had the least confidence in HPWHs, with 31% reporting they reliably provide enough hot water.

Figure 51. Installer perceptions of HPWHs by installer type

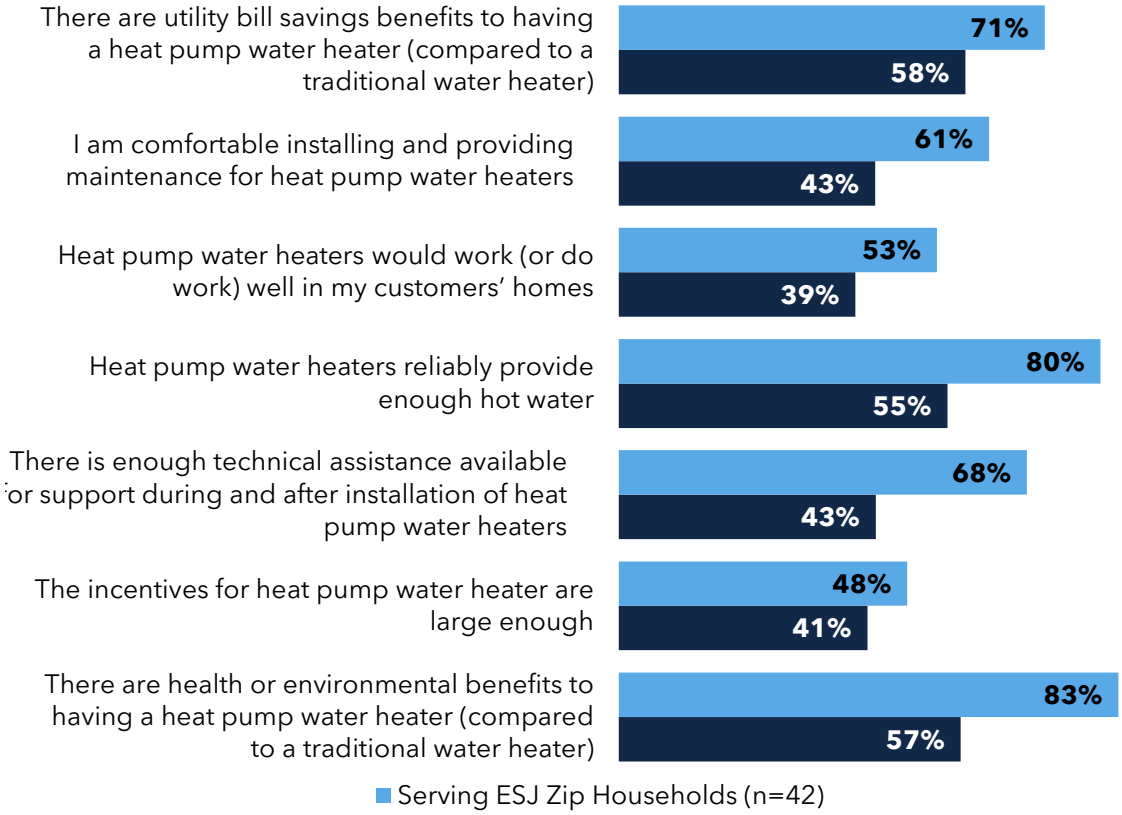


Source: CalMTA Installer Survey Q. B2. "Based on what you have heard, read, or seen, how much do you agree or disagree with the following statements about heat pump water heaters?" (n=149). Note: This chart only captures *strongly agree* sentiment on a 1 to 5 scale with 1 being *strongly disagree* and 5 being *strongly agree*.

Installers serving ESJ communities were more likely to express comfort with installing HPWHs, report that they reliably provide hot water, and report that they work well in customer homes (Figure 52).[192]

[192] It is possible that higher rates of standard electric-resistance water heaters found in homes in ESJ communities; CalMTA residential survey results indicate that 29% of residents in zip codes meeting ESJ criteria have standard electric water heating, compared to 21% of residents in zip codes not meeting ESJ criteria.

Figure 52. Installer perceptions of HPWHs by service to ESJ communities

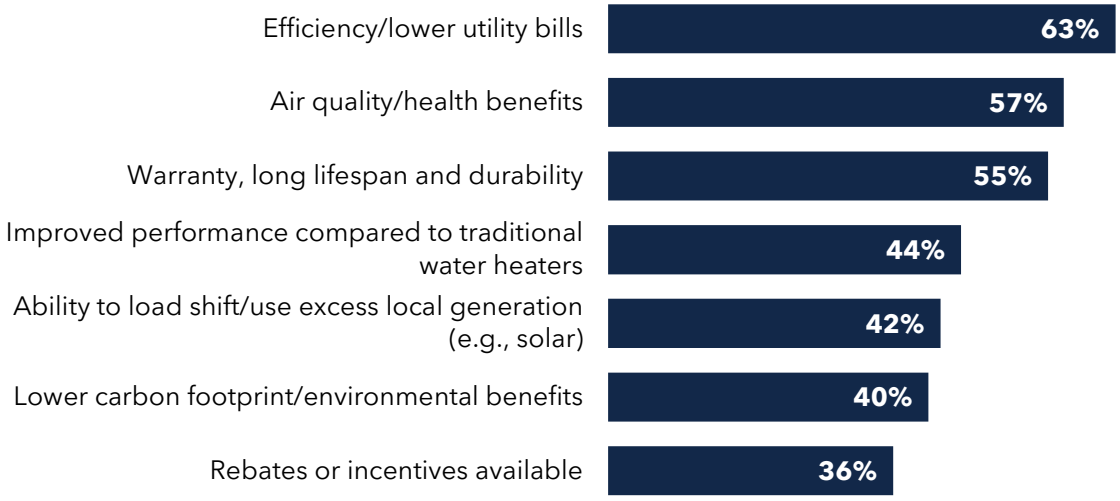


Source: CalMTA Installer survey Q. B2. "Based on what you have heard, read, or seen, how much do you agree or disagree with the following statements about heat pump water heaters?" (n=149). Note: This chart only captures *strongly agree* sentiment on a 1 to 5 scale, with 1 being *strongly disagree* and 5 being *strongly agree*.

5.3.2 Value proposition of HPWHs

Installer survey results show that customers most often chose HPWHs for efficiency and utility bill savings, followed by health benefits (Figure 53). Fewer installers perceived lower carbon footprint/environmental benefits as a primary reason customers purchase HPWHs.

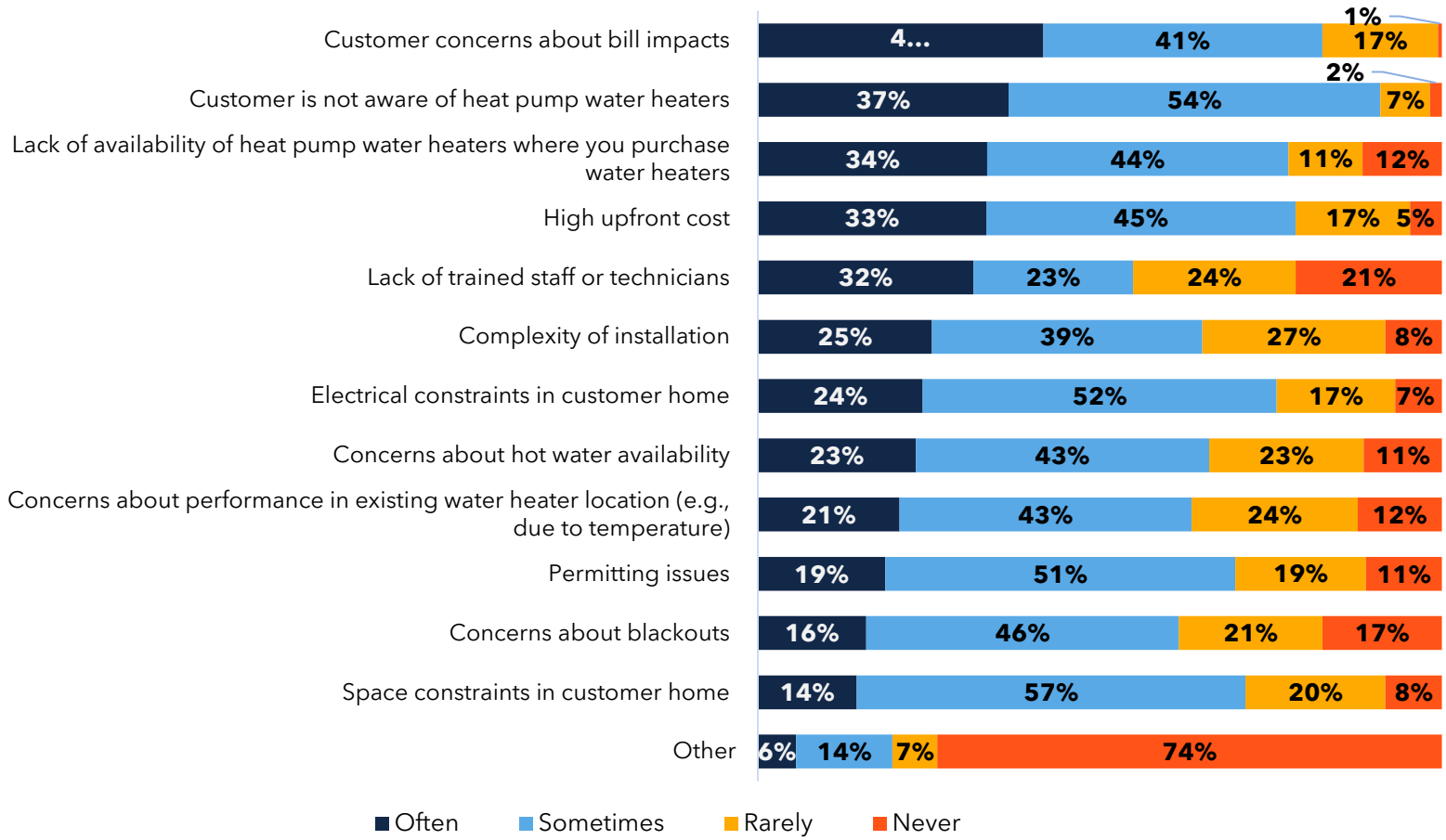
Figure 53. Installer perceptions on customer interest in HPWHs



Source: CalMTA Installer Survey Q. B6. "In your experience, what are the most common reasons customers choose a heat pump water heater?" Select all that apply. Note: Multiple responses allowed, and the sum may exceed 100%. (n=118)

Installers also shared their perspectives on why customers ultimately choose water heaters other than HPWHs (Figure 54), citing concerns about energy bill impacts and limited customer awareness of HPWHs as top drivers. They also reported that electrical constraints are often (24%) or sometimes (52%) a factor in selecting something other than a HPWH.

Figure 54. Installer-reported reasons customers choose non-HPWH water heaters

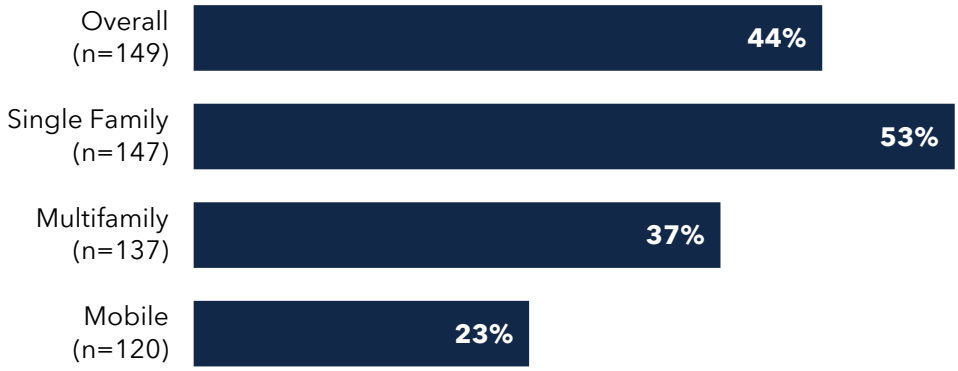


Source: CalMTA Installer Survey Q. B8. "Please indicate how frequently each of the following factors influences or contributes to customers' decision to install a water heater that is not a heat pump water heater?" (n=149)

5.3.3 Installer recommendations and installation rates of HPWHs

Installers surveyed recommended HPWHs in an average of 44% of cases (Figure 55). They most frequently recommended HPWHs for single-family homes, and less frequently for multifamily and mobile homes.

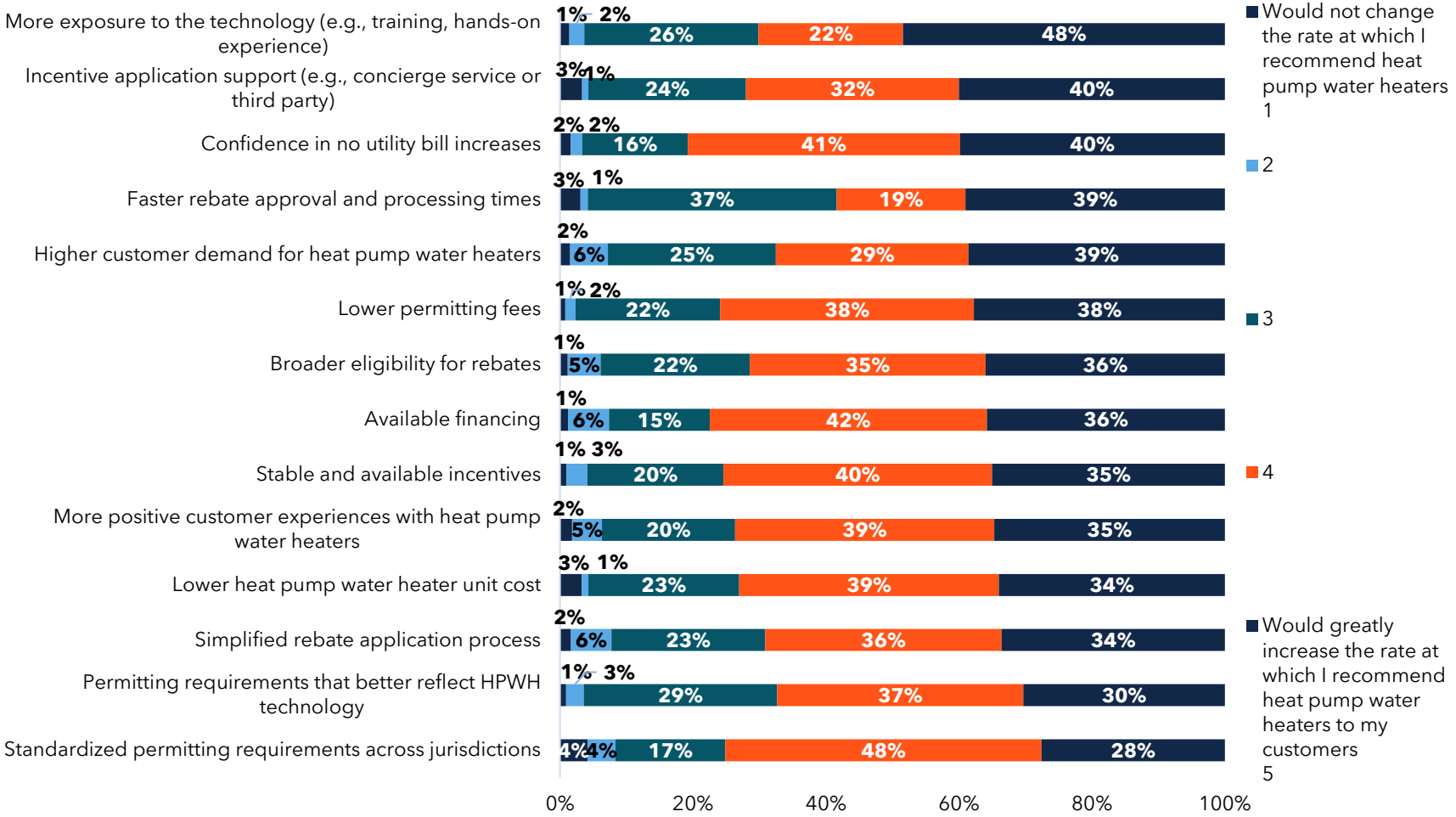
Figure 55. Percentage of sales for which installers recommend HPWHs by residence type



Source: CalMTA Installer Survey Q. B7. "Overall, in what percent of your sales do you recommend a heat pump water heater to a customer? Your best guess is fine." (n=149)

Installer survey results indicate most installers expect to recommend HPWH more often in the coming years. Greater exposure to the technology, help with incentive applications, and confidence in avoiding utility bill increases were the top factors that could further boost recommendations (Figure 56).

Figure 56. Factors impacting likelihood of increasing installers recommendations of HPWHs



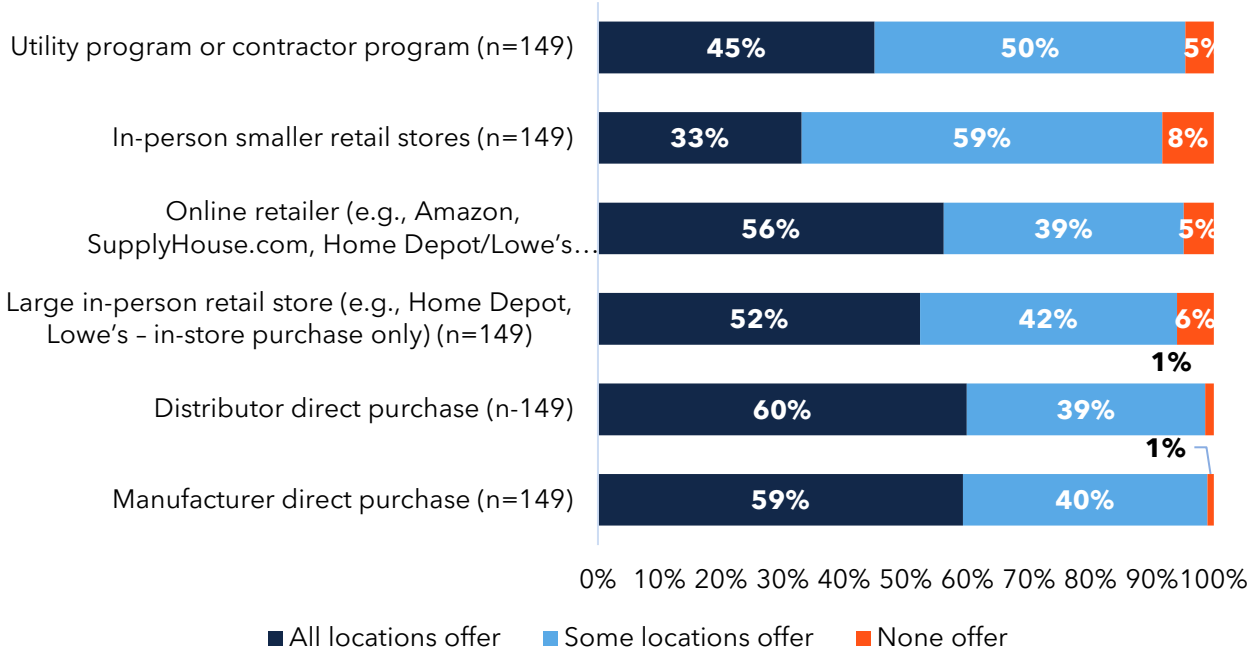
Source: CalMTA Installer Survey Q. F5. "Please rate how much each of the following factors would change how often you recommend heat pump water heaters to your customers. Use a scale of 1 to 5, where 1 means "would not change how often I recommend heat pump water heaters" and 5 means "would make me much more likely to recommend heat pump water heaters to my customers." (n=149)

5.3.4 HPWH availability

Installers reported that HPWHs are widely available through distributors, while availability is more limited at smaller retail stores. Very few said HPWHs were completely unavailable across any channel (Figure 57).

Results further indicate that dual trade installers report the highest availability of HPWHs across all purchase channels, while plumbers reported moderate access across channels, and general contractors or handypersons consistently reported the lowest availability. These findings suggest that experience with HPWHs and stronger supply chain connections may contribute to differences in perceived access.

Figure 57. HPWH availability by procurement location type, reported by installers

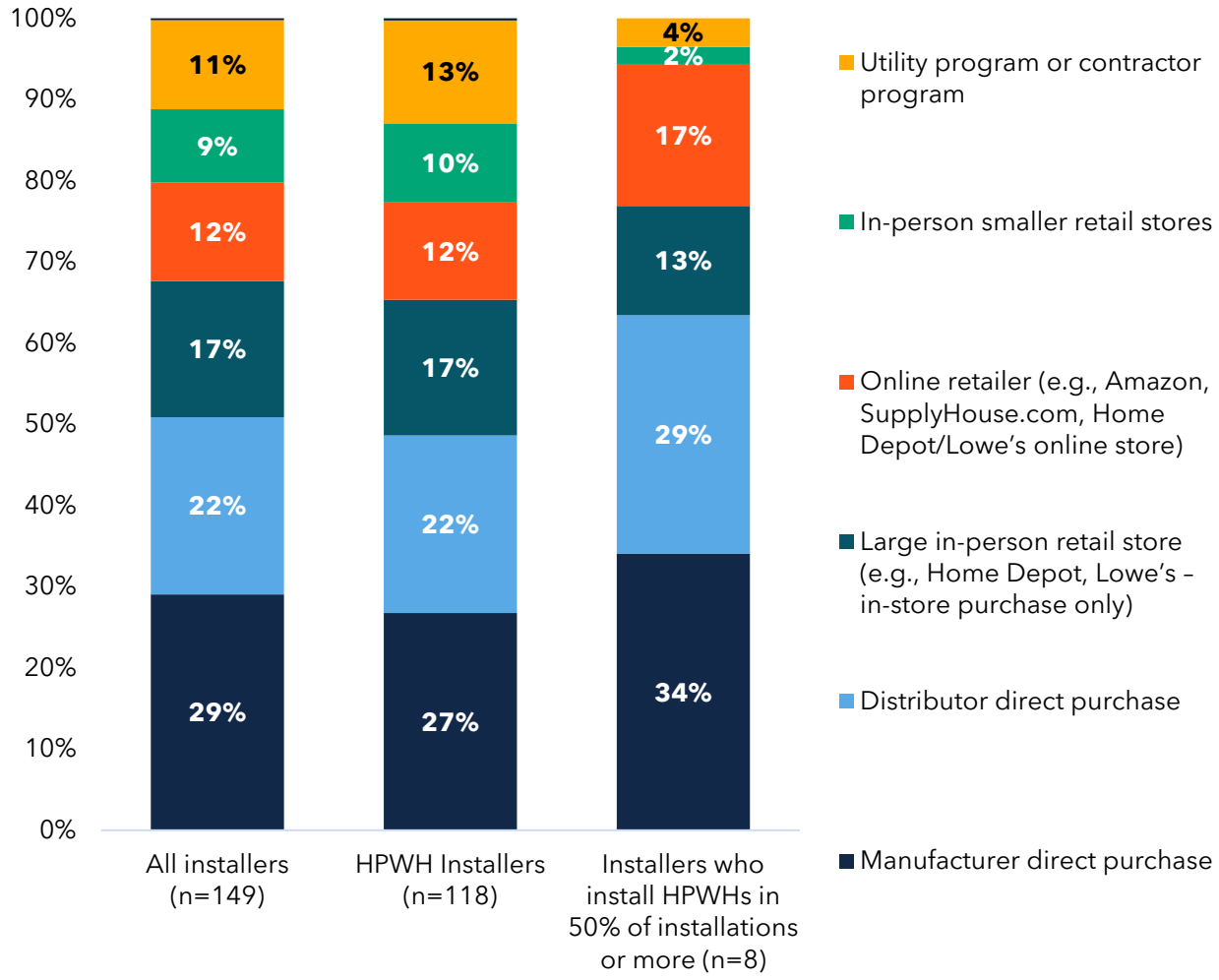


Source: CalMTA Installer Survey Q. B4. "Do the following procurement channels that you access make heat pump water heaters available at all locations, some locations, or no locations?" (n=149)

5.3.5 Water heater purchase locations

Surveyed installers reported purchasing water heaters from manufacturers 29% of the time, from distributors 22% of the time, and from retail sources 38% of the time. Installers that install HPWHs 50% or more of the time indicated purchasing from manufacturers and distributors more frequently, and from retail less frequently (note that results should be read with care given the small sample size (Figure 58).

Figure 58. Purchase channel use reported by installers



Source: CalMTA Installer Survey, QB3. "Approximately what percentage of water heaters do you purchase from each of the following sources? (Please ensure the total adds up to 100%.)" (n=149); and Q A7 "What percent of your installs are each of the water heater types below? Please share your best estimate. (Enter a percent for each type. If none, enter "0." Please ensure the total adds up to 100%.)". Note: The legend reflects the original survey response options. While the response option was labeled "online retailer," examples provided included both retail and distributors.

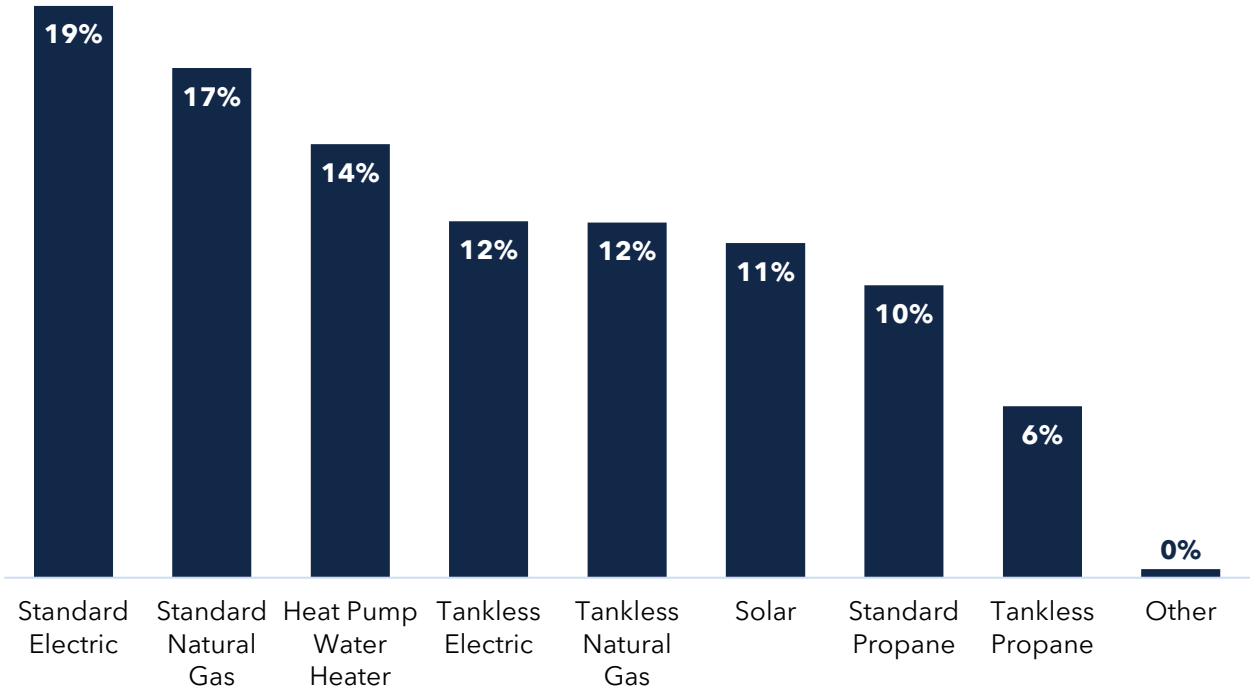
5.3.6 HPWH installation

Seventy-nine percent of the installers surveyed reported installing HPWHs (n=118).193 This distribution was relatively consistent across IOU service territories, across installers serving different housing segments, and between installers serving ESJ and non-ESJ zip codes. The

[193] CalMTA Installer Survey Q. A7. "What percent of your installs are each of the water heater types below? Please share your best estimate. (Enter a percentage for each type. If none, enter "0." Please ensure the total adds up to 100%.)"

resulting HPWHs as a share of installer-reported installations (14%; Figure 59) is higher than the results reported in the residential survey, and higher than CalMTA's estimate of HPWH market share, which aligns with expectations that there would be a higher rate of HPWHs installed by professional installers compared to DIYers. However, we note that sample bias is possible, as respondents working with HPWHs may have been more likely to take a survey about HPWHs. It is also possible that the different time horizons of the survey (the installer survey asked about installations completed in the last year, while the residential survey asked respondents about water heaters they installed in the last three years) indicate an increased rate of HPWH installation in the last year. The 2024 Water Heating Market Study also found higher rates of installers installing HPWHs, with surveyed installers reporting installing HPWHs in 20% of installations.[194]

Figure 59. Rate of installation of different types of water heaters by installers

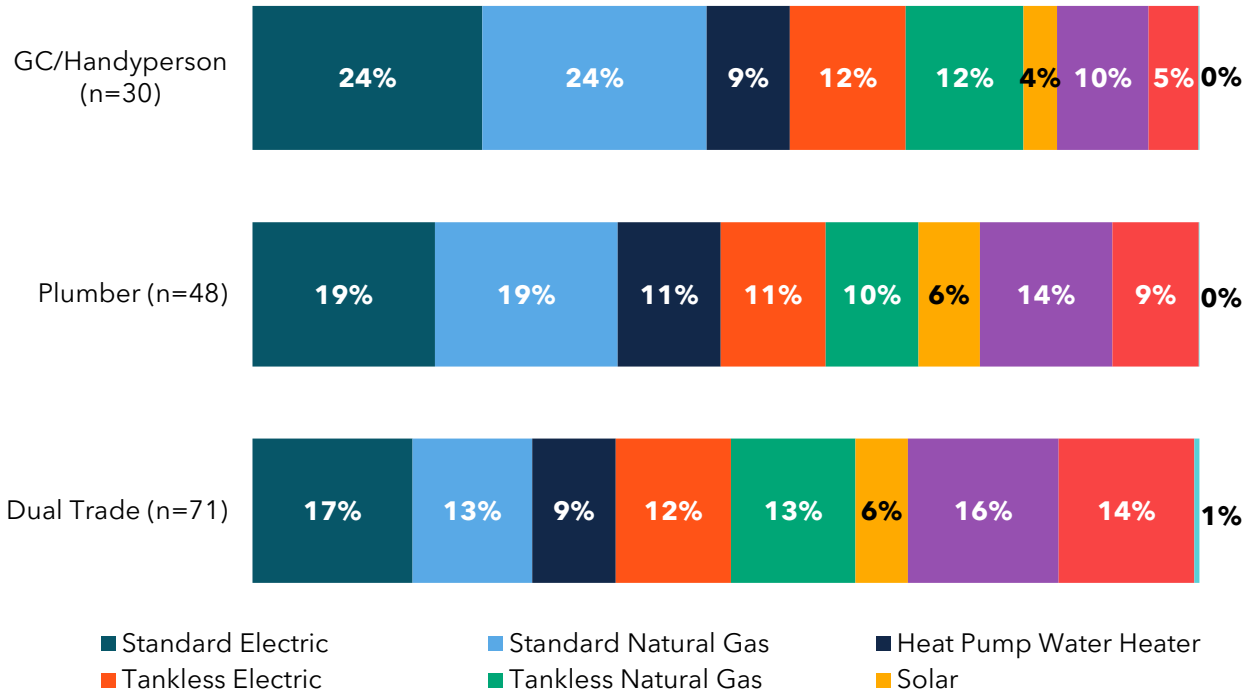


Source: CalMTA Installer Survey Q. A7. "What percent of your installs are each of the water heater types below? Please share your best estimate." (n=149)

General contractors or handypersons were less likely to install HPWHs (10% of installs, compared to 16% of dual trade installers and 14% of plumber installs), and more likely to install standard electric or natural gas units (Figure 60).

[194] Opinion Dynamics, *op cit.* March 29, 2024. https://pda.energydataweb.com/api/downloads/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

Figure 60. Rate of installation of different types of water heaters, by installer type

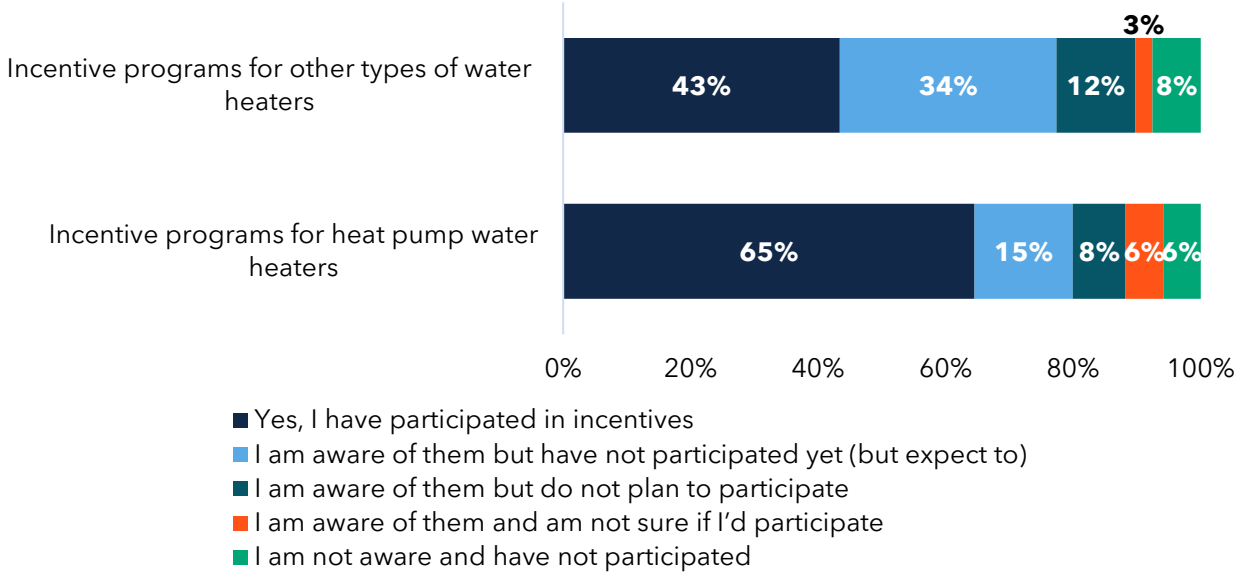


Source: CalMTA Installer Survey Q. A7. "What percent of your installs are each of the water heater types below? Please share your best estimate." (n=149)

5.3.7 Incentive program awareness and utilization

Results indicate that most installers (65%) have participated in HPWH incentive programs (Figure 61).

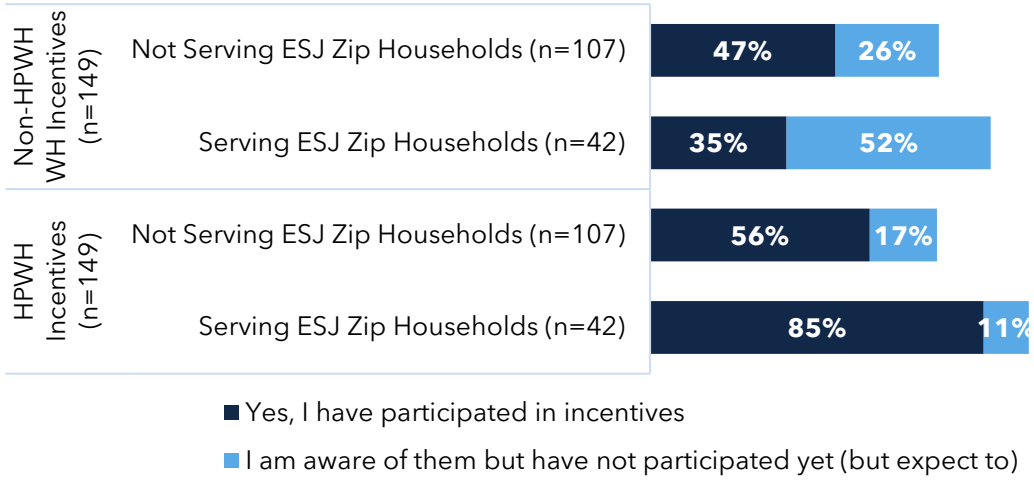
Figure 61. Installer awareness and participation in water heater incentive programs



Source: CalMTA Installer Survey Q. D1. "Have you participated in any incentive programs to support your sale of certain types of water heaters?" (n=149)

Results indicate that respondents representing 85% of installations in ESJ communities reported use of HPWH incentive programs (Figure 62), while 35% reported use of non-HPWH incentive programs.

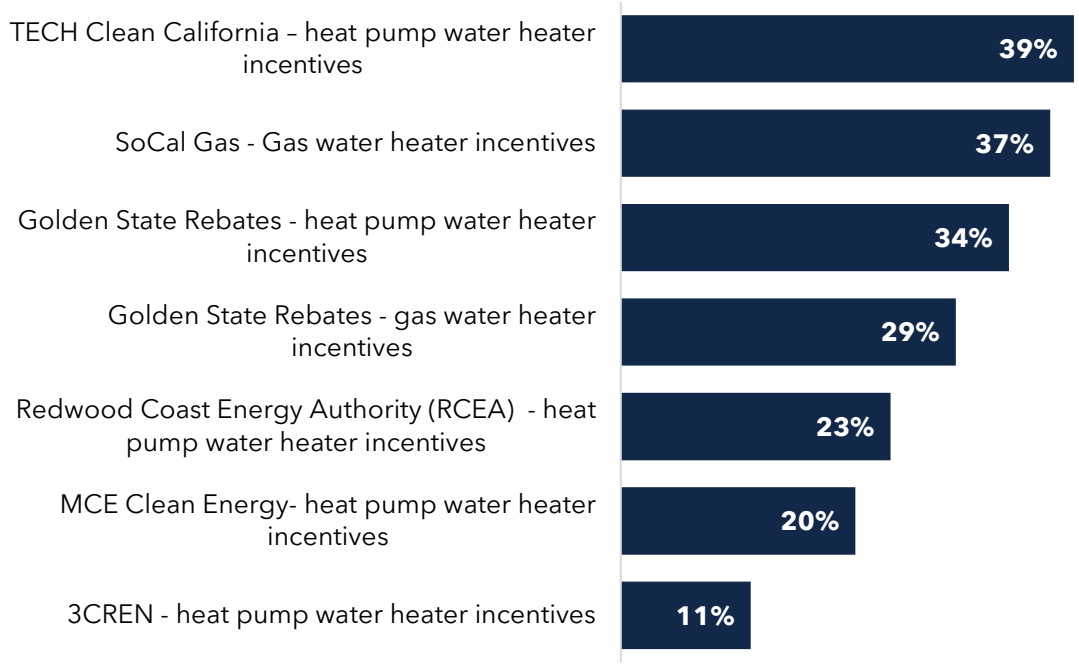
Figure 62. HPWH vs. non-HPWH incentives by service to ESJ zip codes



Source: CalMTA Installer Survey Q. D1. "Have you participated in any incentive programs to support your sale of certain types of water heaters?" (n=149). Note: Figure does not display these responses: "I am not aware and have not participated", "I am aware of them but do not plan to participate", and "I am aware of them and am not sure if I'd participate."

Figure 63 shows similar rates of installer participation in TECH and SoCal Gas incentives for gas water heaters.

Figure 63. Installer engagement with different incentive programs

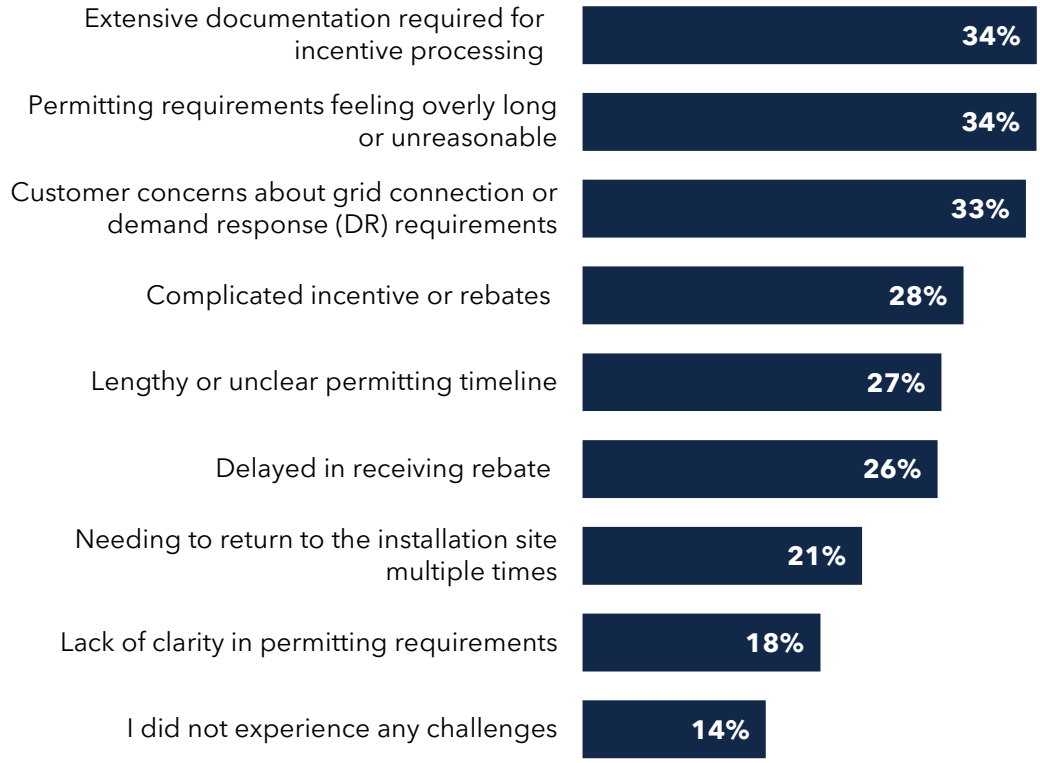


Source: CalMTA Installer Survey Q. D2. "Which rebate programs have you participated in for water heater sales and installations? Select all that apply" (n=56). No respondents reported use of the answer option "Water Heater Loaner Program" (not in figure).

5.3.8 Incentive and permitting challenges

Installers reported their experience with challenges to HPWH installation (Figure 64); results indicate that 86% of all installers experience some kind of challenge – with incentive documentation, permitting requirements, and customer concerns about demand requirements being most commonly reported. Survey results also indicate that 21% of installers reported needing to return to the customer site as a barrier to HPWH installations. When asked what necessitated the return to the site, responses were split evenly between customer callbacks and the requirements of an incentive program.

Figure 64. Permitting and incentive program barriers to HPWH installation (reported by installers)



Source: CalMTA Installer Survey Q. D4. "Which, if any, of the following challenges have you experienced in installing heat pump water heaters? Select all that apply." (n=149)

Those that indicated challenges due to "complicated incentives or rebates" (n=36), further reported that this was most frequently due to a lack of expertise (59%) or lack of confidence that the incentive would be available when needed (51%).[195]

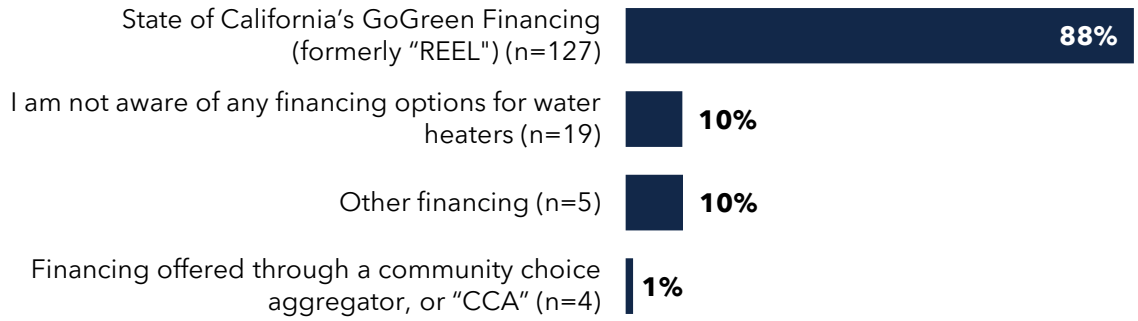
More than half of installers aware of incentives (n=137) reported not recommending or installing a HPWH at least once in the last year due to the administrative burden of incentives.[196]

[195] Installer survey Q. D7. "You mentioned facing challenges with complicated incentives or rebates. What were the specific reasons for these challenges? Select all that apply." (n=36).
[196] CalMTA Installer Survey Q. D8. "In the past year, approximately how many heat pump water heater installations, if any, did you choose not to recommend or install because of challenges with rebate paperwork?" Calculated the weighted count of respondents who reported any number greater than zero for installations not recommended in response to this question.

5.3.9 Financing

Stakeholder and manufacturer interviews identified financing as a potential tool to mitigate the barrier of high up-front HPWH costs; however, stakeholders raised questions regarding customers' and installers' interest in engaging with financing for a water heater project. To gain insight into this, CalMTA asked installers about awareness and promotion of financing options. Ninety percent of installers reported being aware of HPWH financing, and 88% indicated familiarity with California's GoGreen Financing program (Figure 65).

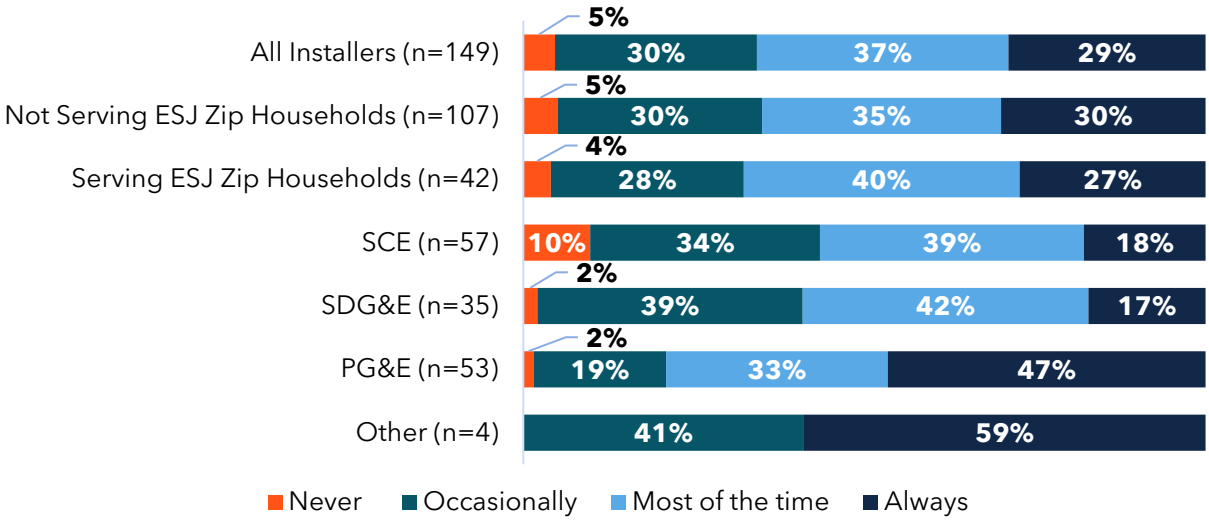
Figure 65. Installers aware of water heater financing options



Source: CalMTA Installer Survey Q. C1. "Are you aware of any financing programs available for water heater installations? Please identify which ones you've heard of and select all that apply" (n=148). Note: removed one respondent, who selected they were not aware of, and another choice, which should not have been possible.

Sixty-six percent of installers reported suggesting financing to their customers *most of the time* or *always* (Figure 66). The highest frequencies of recommendation of financing (80%) were reported by installers in PG&E territory.

Figure 66. Frequency of installers suggest financing

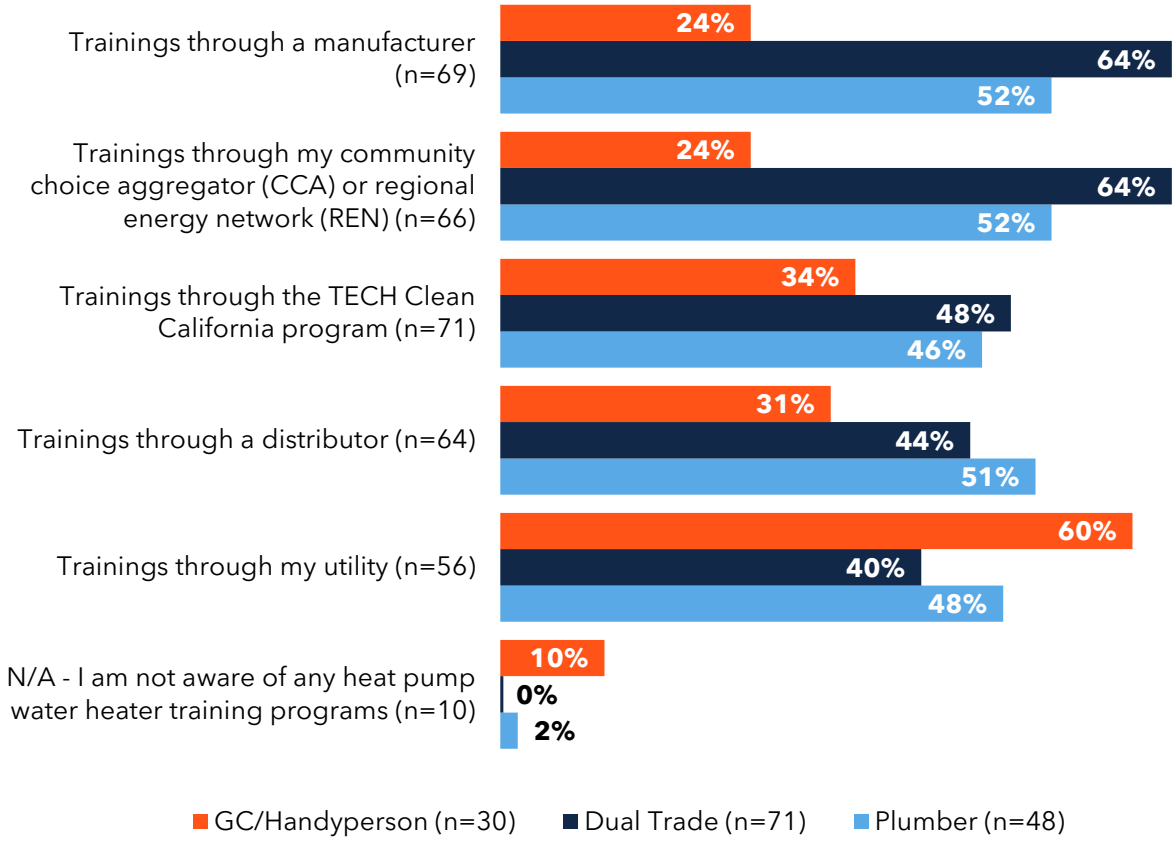


Source: Installer Q. C2. "How frequently do you offer to suggest financing to your prospective customers?" (n=149)

5.3.10 Engagement with training and training programs

CalMTA asked installer respondents about their awareness of HPWH training programs, and found that general contractors and handypersons reported being most aware of trainings through utilities, while dual trades contractors and plumbers were most aware of trainings through manufacturers, CCAs, and RENs (Figure 67).

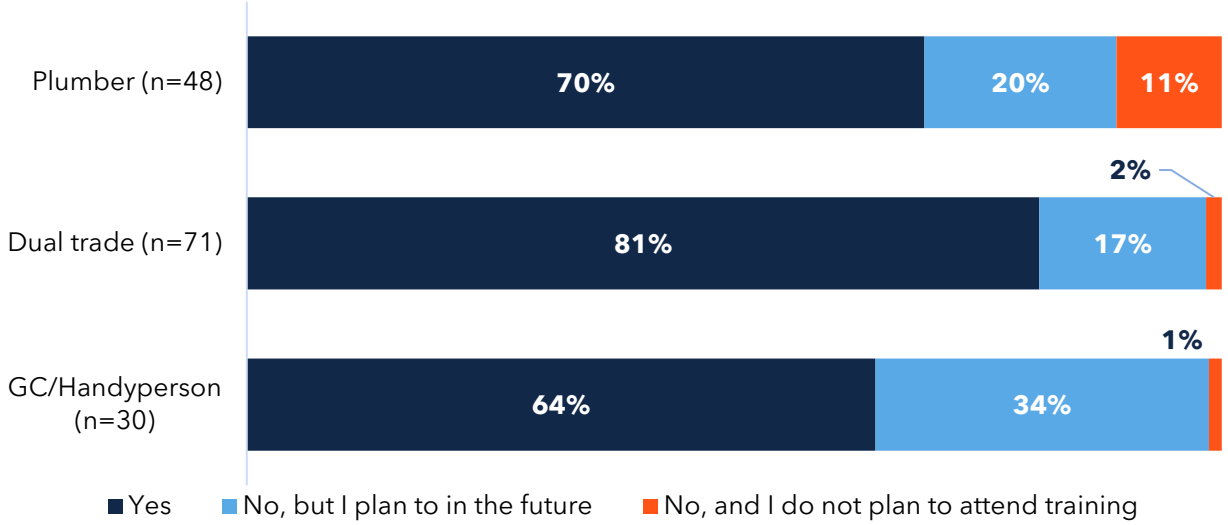
Figure 67. Installer awareness of training by installer type



Source: Installer Survey Q. E3. "Which heat pump water heater training programs are you aware of? Select all that apply." (n=149)

As Figure 68 shows, 81% of dual trade installers reported participation in HPWH training programs, followed by plumbers (70%) and then general contractors and handypersons (64%).

Figure 68. Utilization of trainings by installer type



Source: CalMTA Installer Survey Q. E5. "Have you participated in any HPWH heat pump water heater training programs?" (n=149)

The leading reason that general contractors and handypersons attended HPWH training was due to a requirement by their employer or contract (63%). Dual trade installers and plumbers most frequently attended trainings to support business growth (61% and 46%, respectively).[197]

CalMTA also asked why installers did not pursue trainings and found variations by installer type. Plumbers (n=15) most frequently cited lack of availability of online trainings, cost, or inconvenient locations as reasons for non-attendance, while dual trades (n=27) most frequently noted that they did not perceive a need and that training time competes with billable time. General contractors (n=15) most frequently reported not having time, or finding training inconvenient or irrelevant.[198]

6 Supply-side characteristics

CalMTA conducted a review of existing market actors and purchasing behavior, unit and installation pricing, and feedback from different market actors. This section presents those findings.

6.1 Market actors

The following sections characterize market actors that participate in the residential water heater supply chain; in the majority of water heater purchases, manufacturers ship to distributors and

[197] Installer Survey Q. E15. "What was the primary reason you attended a heat pump water heater training?" (n=71)
[198] Installer Survey Q. E8. "What are the main reasons why you have not attended a heat pump water heater training? Select all that apply." (n=57)

retailers, installers purchase from distributors or retailers, and customers purchase from retailers (estimated percentages and total water heaters are detailed in the next section.)

6.1.1 Manufacturers

The overall water heater market is currently dominated by three manufacturers: A.O. Smith, Rheem, and Bradford White. Both A.O. Smith and Rheem combine to account for approximately 70% of the residential water heater market (approximately 33% to 39%, each), while Bradford White represents approximately 20% of the market.[199,200] These three manufacturers also account for approximately 60% of the residential HPWH market specifically.[201] This estimate is supported by the U.S. International Trade Commission (2022) finding that Rheem and A.O. Smith currently have the most ENERGY STAR-certified HPWH models available on the market.[202,203] Leading manufacturers A.O. Smith and Rheem also sell water heaters under the brand names including American Standard and Reliance (A.O. Smith) and Ruud (Rheem).

In addition to these top three manufacturers, at least three interviewed stakeholders noted new entrants to the HPWH market, including Midea, LG, and Bosch; stakeholders also mentioned GE's return to the HPWH market. Manufacturers Embertec and Eco-Logical (new entrants to the California market) have started to market new products in 2025 with form factors that will allow for targeting the mobile-home market for HPWH installation. Specifically, both manufacturers market split systems characterized as "more affordable split system options" than the current market option.

The largest source of U.S. imports of HPWHs appears to be Mexico, where A. O. Smith and Rheem have HPWH manufacturing plants. This is similar to the overall import pattern for electric water

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[199] The U.S. International Trade Commission 2022 Briefing references A.O. Smith and Rheem having combined market share of over 70%, referring to the manufacturers' own estimates. U.S. International Trade Commission. February 2022. *Residential Heat Pump (Hybrid) Water Heater Market, Production, and Trade*. https://www.usitc.gov/publications/332/executive_briefings/ebot_residential_heat_pump_hybrid_water_heaters.pdf.

[200] A.O. Smith, Rheem Manufacturing, and Bradford White manufacture 88% of residential water heaters. More than two dozen companies manufacture the remaining 12%. U.S. Department of Energy. *2009 Water Heater Market Profile*. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.energystar.gov%2Fia%2Fpartners%2Fprod_development%2Fnew_specs%2Fdownloads%2Fwater_heaters%2FWaterHeater_MarketProfile09.doc&wdOrigin=BROWSELINK.

[201] The 2024 Water Heating Market Study estimates these manufacturers have nearly 60% of the residential HPWH market in the United States. Opinion Dynamics. *Op cit*. March 29, 2024. https://pda.energydataweb.com/api/view/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

[202] U.S. International Trade Commission, *Op cit*. February 2022.

[203] ENERGY STAR. Accessed May 19, 2025. "ENERGY STAR Certified Heat Pump Water Heaters." https://www.energystar.gov/productfinder/product/certified-heat-pump-water-heaters/results, May 2025.

heaters, for which 88% of U.S. imports originated in Mexico in 2020.[204] Rinnai advertises that it manufactures in Georgia (United States).[205]

Larger manufacturers may use manufacturer representatives as their "eyes and arms in the market" to provide support to distributors, builders, and installers.[206]

Interviewed manufacturers indicated that program incentives are key to mitigate the high costs of HPWHs. They spoke favorably of the Golden State Rebates program due to its simplicity and availability at distribution and at retail. Manufacturers also spoke favorably of the TECH program for its incentive size, but also identified that changes in incentive availability and its complex contractor requirements are major barriers to participation.

6.1.2 Distributors

Distributors report that professional water heater installers value their expertise and seek their advice due to their professional reputation.[207] Access to HPWHs through manufacturers is generally not an issue for distributors.[208] Distributors identify a need for increased demand for HPWHs from contractors, and for contractor training to support HPWH familiarity, to ensure successful adoption.[209] Existing research notes that distributors may, on occasion, purchase from retail if needed.[210] As of 2023, the TECH program has engaged 45 distributors of HVAC heat pumps or HPWHs.[211] As of July 2025, 20 distributors offering HPWHs are engaged with the statewide Golden State Rebates program (currently paused).[212]

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[204] U.S. International Trade Commission. February 2022. *Residential Heat Pump (Hybrid) Water Heater Market, Production, and Trade.* https://www.usitc.gov/publications/332/executive_briefings/ebot_residential_heat_pump_hybrid_water_heaters.pdf.

[205] Rinnai America Corporation. (2024). *Rinnai REHP Series Electric Heat Pump Water Heater.* May 17, 2024.https://media.rinnai.us/salsify_asset/s-d4b33c29-f618-4951-ab22-e97c02bf7c1e/Rinnai%20Electric%20Heat%20Pump.REHP%20Brochure.

[206] Manufacturer interviews, January and February 2025.

[207] Opinion Dynamics. (2021). *Ameren Illinois' Market Effects Pilot – Heat Pump Hot Water Market Characterization Report*. September 15, 2021.https://www.ilsag.info/wp-content/uploads/AIC-Market-Effects-2021-HPWH-Market-Characterization-Report-FINAL-2021-09-15.pdf.

[208] PG&E. (2022). *Midstream Heat Pump Water Heater (HPWH) Market Study and Field Test.* December 16, 2022. https://etcc-ca.com/reports/midstream-heat-pump-water-heater-hpwh-market-study-and-field-test.

[209] PG&E. (2022). *Midstream Heat Pump Water Heater (HPWH) Market Study and Field Test.* December 16, 2022. https://etcc-ca.com/reports/midstream-heat-pump-water-heater-hpwh-market-study-and-field-test.

[210] Opinion Dynamics, *op cit*., September 15, 2021

[211] Opinion Dynamics, *op cit.,* July 18, 2024. https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.

[212] Heat Pump Water Heaters. Golden State Rebates program, accessed July 10, 2025. https://goldenstaterebates.com/goldenstaterebates/rebates/heat-pump-water-heaters/.

6.1.3 Retailers

The retail channel is key to HPWH market growth, with survey results pointing to more than half of all water heater sales coming through retail (see Section 6.2).[213] This channel is the main purchasing channel accessed by DIYers and BIYers (i.e., customers that purchase their water heaters directly); retail may also be the source of purchasing for some professional installers.

A driving force in water heater purchase decisions is retail availability, and HPWHs are currently not as readily available as standard water heaters, thus limiting their market potential.[214] Interviewed stakeholders noted that there are challenges regarding the promotion and availability of HPWH in retail. Limited in-store HPWH availability is particularly an issue in rural areas that are not likely to have large retailers such as Home Depot or Lowe's. Retailers are also hesitant to stock HPWHs, as they feel that current demand does not justify the required floor or storage space; they do not want to stock products that may not sell well.[215] For those that do market HPWH at large retail locations, marketing strategies including signage, aisle displays, rebates, and advertising engagement with a contractor network, are among the key promotional activities.[216]

The TECH program has engaged with two retailers (Home Depot and Lowe's) in 28 and 29 counties of California's 52 counties, respectively.[217] TECH has noted that their engagement of retail may not be appropriate, due to the program's focus on gas conversions and requirement to work through a contractor; however, some interviewed stakeholders and manufacturers noted that limited TECH program engagement at the retail level limits HPWH adoption because the primary incentive available at retail is the Golden State Rebates incentive (currently paused). Retailers engaged with GSR include Best Buy, Home Depot, and Lowe's.[218]

6.1.4 Professional installers

Research shows residential water heater installers are often unlicensed, non-union, and part of a fragmented market. Some segments of the water heater installer market are known to be less-

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[213] CalMTA Residential Survey Q. B9. "Where did you purchase your water heater?"

[214] CalMTA Residential Survey Q. B5. "Did any of the following factors influence your decision on the type of water heater you installed? Select all that apply." and Building Owner and Property Manager Survey Q. B5. "Which of the following best describes why you have installed per-unit water heaters in the last three years?"

[215] Retailers have expressed concerns about slow sales for HPWHs, and hesitancy to stock HPWHs due to the costs associated with excess inventory, which is exacerbated by their size and handling requirements that exceed those of traditional water heaters. CalMTA stakeholder interview, December 2024.

[216] CalMTA stakeholder interviews.

[217] Opinion Dynamics, *op cit.,* July 18, 2024. https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.

[218] See GSR list that shows Best Buy, Home Depot and Lowe's locations: https://goldenstaterebates.clearesult.com/media/wysiwyg/view_capla/pdf/ParticipatingRetailerList.pdf. See also Clean Power Alliance list of qualifying retail locations in CPA territory, which lists only Lowe's and Home Depot. https://files.cleanpoweralliance.org/uploads/2025/06/CPA-Retailer-List_English.pdf.

focused on sales pitch and more focused on efficiently completing sale and installation.[219] With high retirement rates and few new entrants, demand for professional installers is strong, and interest in training for new technologies like HPWHs is low.[220] Installers report relatively low customer demand for HPWHs (see Water heater and HPWH sales and installation experience: installers). Research suggests that installers prefer to go to distributors and manufacturers for training.[221] Interviewed manufacturers suggested that available incentives – especially instant rebate programs – are key motivators for contractors to sell HPWHs.

6.1.5 Builders

Manufacturers noted that demand for HPWHs from builders has provided market stability; one manufacturer asserted that builder demand has driven distributor stocking of HPWHs. However, one stakeholder noted that affordable housing builders have at time been driven to gas water heater installations due to their desire to keep costs low and avoid energy rebate programs that they find too burdensome.

6.2 Supply chain map and purchase channels

Through synthesis of secondary research, interviews, and customer and installer survey insights, CalMTA has summarized the supply chain for residential HPWHs that serve a single household.

6.2.1 Manufacturer feedback on sales channels

Manufacturers provided insight into their preferred sales channels, revealing distinct strategies based on market position, customer type, and distribution goals via CalMTA interviews:

- **Sales to distributors**: Large manufacturers tend to have strong partnerships with distributors. Two large manufacturers stated that nationally, approximately 50% of their HPWH sales were through distributor channels. Another large manufacturer noted that they sell solely through distributors, while a smaller manufacturer reported that 70% of their sales are direct to distributors. One manufacturer said that when they receive bulk orders such as requests from housing developers for 100 units or more, they refer the buyer directly to a distributor to help minimize issues like shipping damage and ensure smoother fulfillment.
- **Sales to retailers**: Two large manufacturers estimated that roughly 50% of their sales flow through retail channels. Another manufacturer reported that approximately 30% of their inventory was distributed through retail. Manufacturers reported use of larger national chains such as Home Depot and Lowe's, along with various smaller independent retailers.

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[219] CalMTA stakeholder interviews, December 2024 to February 2025; also CalNEXT, *op cit.,* June 26, 2024 and Opinion Dynamics, *op cit.* March 29, 2024.
[220] CalMTA stakeholder and manufacturer interviews, December 2024 to February 2025.
[221] Opinion Dynamics, *op cit.* March 29, 2024.

- **Sales to large buyers and energy efficiency contractors**: Two manufacturers new to California prefer partnering with large buyers and energy efficiency contractors using a direct-to-install model. Though not yet established in California, the approach of installing products in bulk across neighborhoods, reduces logistics costs and installation issues, allowing manufacturers to offer lower prices.

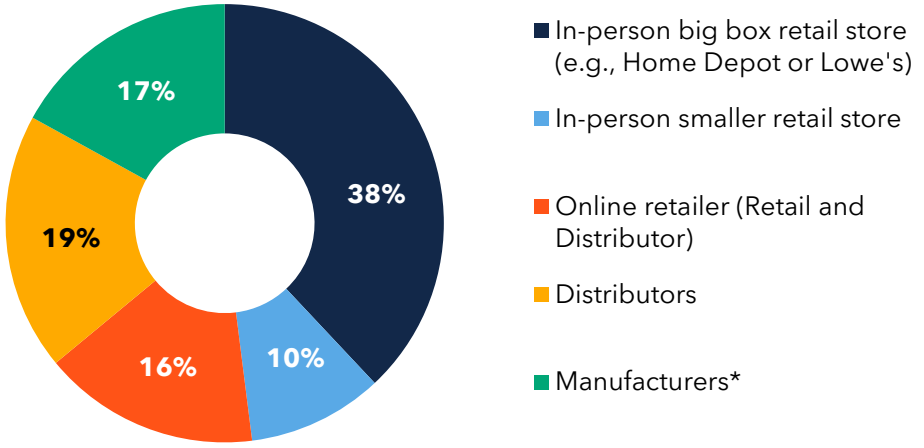
6.2.2 CalMTA survey purchase channel analysis

To support analysis of purchasing channels used for water heaters supplied to existing buildings (representing 669,432 units, Figure 5), CalMTA examined the reported purchasing behavior of residents, and building owners and property managers that reported being the direct purchasers of their water heater (as either DIYers or BIYers; see residential results summarized in Figure 29), and installers as reported in the CalMTA installer survey (see results summarized in Figure 58). The aggregated results of the DIY and BIY purchasers of the residential survey and the installers of the installer survey (weighted to their respective proportional representations of 45% and 55%), are presented in Figure 69. These combined results indicate that respondents report most water heater purchases (48%) occurring at in-person retail locations, with more than a third (38%) explicitly purchased in-person at big-box retail stores, and 10% in-person at small retail. Another 16% of water heaters are reported purchased via a retail or distributor online sales platform, and 17% are reported through manufacturers.[222,223]

[222] Research indicates that manufacturer representatives also play a part in this supply chain, supporting manufacturer interactions with distributors and installers. CalMTA manufacturer interviews; see also CleaRESULT, 2016. *Energy Trust of Oregon Existing Homes Gas Water Heater Market Research Report*. https://www.energytrust.org/wp-content/uploads/2016/12/Gas_Water_Heater_Market_Research_Report_Public_FINAL_wSR.pdf.

[223] CalMTA established assumptions around survey results that describe the customer or installer initiation of a purchase, but not necessarily the channel through which it was completed. For example, 7% of customers cited purchasing through a manufacturer (representing 3% of all water heater purchases), despite direct manufacturer purchases of water heaters being very rare; however, a customer on a manufacturer website may click a link directing them to an installer of a selected product in their area. (For example, Rheem's "Find a Pro" and A.O. Smith's "Plumbers Near Me" tools connect water heater shoppers to installers. https://www.rheem.com/find-a-pro/. https://www.hotwater.com/plumbers-near-me.html. SanCO's website similarly links to a "Find a Contractor" tool. https://eco2waterheater.com/where-to-buy-residential/.) For supply chain mapping, CalMTA assumes this 3% of purchases may be distributed across installer purchasing channels. Installers were also offered the option to report purchasing "through a utility program." For supply chain mapping, CalMTA assumes these purchases would take place through a distributor.

Figure 69. How customers and installers report purchasing - all water heaters



Source: CalMTA Residential Survey, QB9. "Where did you purchase your water heater?" (n=159); CalMTA Installer Survey, QB3. "Approximately what percentage of water heaters do you purchase from each of the following sources? (Please ensure the total adds up to 100%.)" (n=149).
*Manufacturers may also include manufacturers' representatives.

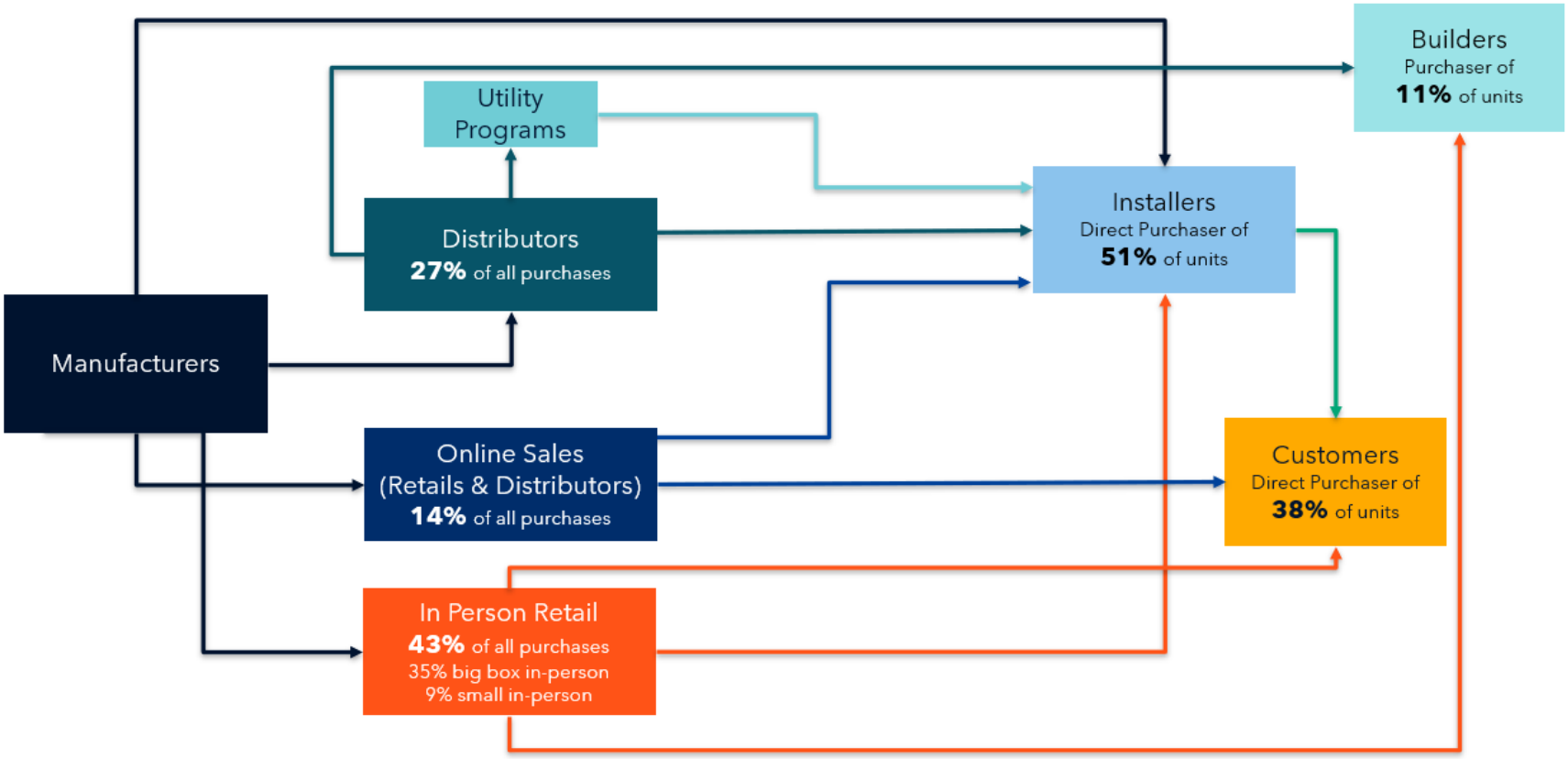
CalMTA is unable to integrate the results of the building owner and property manager survey with the residential survey, due to different question structure between the two surveys.

6.2.3 Supply chain map

Of the total 753,052 non-central water heaters estimated to be sold each year in California, CalMTA estimates that approximately 83,758 water heaters are sold for new construction (see Section 4.3). CalMTA estimates that new construction water heaters, which are not represented in CalMTA survey results,[224] are purchased through distributors approximately 90% of the time, with the remaining 10% purchased through specialty retail.[225] A view across the full market, inclusive of both new construction and existing market findings, is summarized in Figure 70 below, which indicates approximately 27% (204,831 units) of non-central water heaters come through distributors, 43% (326,818) units are purchased through in-person retail, and 14% (107,536 units) come through online sales (including both retail and distribution).

[224] Survey samples focused on existing residents, owners, and managers of households and not builders, and survey results indicated respondent purchases of water heaters for new construction or additions at the rate of 2% (in both the Residential and Building Owner/Property Manager surveys), while California new construction rates suggest an 11% new construction rate.
[225] See manufacturer feedback on direction of builders to distributors, Section 6.1. Also https://thomasgalbraith.com/knowledge-center/buying-a-new-water-heater/#:~:text=Plumbers%20purchase%20water%20heaters%20through,you%20don't%20have%20to.

Figure 70. California residential non-central water heater supply chain map



This supply chain map indicates a contrast between manufacturer feedback – with most interviewed manufacturers indicating that national sales are generally split evenly or lean toward distribution – and the resulting supply chain map, which show high rates of retail purchases and a maximum of 41% (27% plus 14%) of units moving through distributors. However, these results do align

directionally with existing research that shows a growing number of water heater purchases occurring at the retail level.[226,227] Research also indicates that delineation of distributors and retailers is sometimes not well-defined, with single entities playing retail and wholesale roles (e.g., SupplyHouse.com and Ferguson).[228]

6.3 Pricing and incremental cost

The following section examines cost data on HPWHs as identified from retail research, interviews, relevant programs, and survey results, and describes the higher cost of HPWH unit cost and installation cost compared to alternate installations.

6.3.1 Unit costs

The unit cost of HPWHs may be $1,100 to $1,600 more than a standard gas water heater or $100 to $1,000 more than a standard electric water heater, depending on the size and voltage; Table 16 summarizes average unit prices by water heater type and size. Within HPWH offerings, 120-volt HPWHs are often more expensive than their 240-volt counterparts. Split-system HPWHs, which separate the outdoor compressor from the indoor storage tank, are ideal for homes with limited interior space or noise sensitivity but carry a higher up-front cost (in part due to the extra refrigerant piping and mounting hardware that they require).[229]

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[226] These stores tend to have contracts with plumbers who will install the equipment for the homeowner. Opinion Dynamics, *op cit.*, September 15, 2021.

[227] *Ibid.*

[228] CleaRESULT, 2016. *Energy Trust of Oregon Existing Homes Gas Water Heater Market Research Report*. https://www.energytrust.org/wp-content/uploads/2016/12/Gas_Water_Heater_Market_Research_Report_Public_FINAL_wSR.pdf.

[229] Split systems available in California have been more expensive than other water heating options until 2025. The introduction of more affordable split system units this year in California has been highlighted as an important potential opportunity in stakeholder interviews.
Green Building Advisor. November 20, 2023. *SANCO2 Heat Pump Water Heater*. https://www.greenbuildingadvisor.com/article/sanco2-heat-pump-water-heater.

Table 16. Water heater unit retail price averages, by water heater type and size

Unit Size	HPWH			Standard Electric[a]	Standard Gas[a]	Tankless Gas[b,c]
	240V (Integrated)[c]	120V (Integrated)[c]	Split System[d]			
40 Gallon	$1,800	$2,000	$3,350-$5,856	$1,000	$700	$865
50 Gallon	$2,100	$2,100		$1,100	$1,000	$1,196
65 Gallon	$2,400	$2,600		$2,100	-	$1,706
80 Gallon	$2,500	$3,000	$3,650-$6,128	$2,400	$1,400	$1,733

a: The cost data for standard electric and standard gas water heaters was obtained from Home Depot and Lowe's websites, accessed December 2024 and revisited August 2025. The average cost was calculated using prices from those websites specific to California zip codes.
b: Tankless water heaters, which are differentiated by gallon per minute (GPM) flow rather than by tank size in gallons (and therefore are not summarized in the table), range in cost from $750 to $3,050 per TECH's Baseline Market Assessment. https://techcleanca.com/documents/3697/TECH_Baseline_Market_Assessment_Final_Report_8AHwAxk.pdf. The exact sizing of a tankless water heater will vary by location and household conditions. A tankless gas water heater of 10 GPM may be compared to a 50-gallon standard tank water heater. https://waterheatersnow.com/understanding-how-many-gpm-for-tankless-water-heater-you-need/. https://tanklessheaterguides.com/replacing-a-50-gallon-water-heater/.
c: Home Depot and Lowe's websites, accessed July 2025. The average cost was calculated using prices specific to California zip codes.
d: Note that these represent single observations per model, and owing to the limited sample size and cross-model heterogeneity, the values are illustrative and should not be interpreted as market averages or used to infer inter-size price relationships. Split system data referenced for a 40-gallon unit is from the $SANCO_2$ available in 43-gallon ($5,856), 83-gallon ($6,139), and 119-gallon ($6,994), https://plumbestore.com/collections/heat-pumps/heat-pump?view=list. Data for a 50-gallon unit is from Eco-Logical's OMNI Series Split System HPWHs ($3,350), based on data accessed August 2025. https://eco-logical.com/products/omni-splits/. The 80-gallon model is based on the price range of $SANCO_2$ (https://plumbestore.com/collections/heat-pumps/heat-pump?view=list) and Eco-Logical OMNI Series units.

Current costs, as detailed in Table 16, are higher than the median HPWH cost of $1,300 reported in the 2022 Heat Pump Market Study,[230] suggesting that unit costs are increasing.

The relationship of 120-volt HPWH total installed costs compared to those of 240-volt HPWHs varies depending on install type and size. A recent PCE study of HPWH installations found installed costs for 120-volt HPWH to be $1,200 less than an equivalent 240-volt 65-gallon HPWH, but $500 more than an equivalent 240-volt 80-gallon HPWH.[231]

6.3.2 Total cost of installation

Additional costs beyond the unit cost of the water heater involved in installation include permits, installation labor, and electrical upgrade costs; some households, particularly ESJ households,

[230] See Opinion Dynamics, (2022), Attachment C: Excerpts from the California Heat Pump Market Characterization and Baseline Study, April 4, 2022. *California Heat Pump Market Characterizations and Baseline Study*. https://docs.cpuc.ca.gov/PublishedDocs/SupDoc/A2112009/5608/497866884.pdf.
[231] Peninsula Clean Energy. (2025). 120-Volt Heat Pump Water Heater Pilot. Peninsula Clean Energy Home Upgrade Program, June 2025. https://library.peninsulacleanenergy.com/m/4070947505d4f80a/original/120V-Heat-Pump-Water-Heater-Pilot-Results.pdf.

may also require remediation. Several interviewed stakeholders estimated that HPWH installations performed by a professional installer typically cost between $6,000 and $7,000 before incentives. According to information published by one California plumber that specializes in water heating, total installation (including unit purchase) of gas storage water heaters ranges from $2,500 to $4,500, gas tankless water heaters range from $7,000 to $11,000, and standard electric water heaters range from $2,000 to $3,000.[232]

CalMTA reviewed cost data from the TECH program to better understand the cost of HPWH projects that have moved through TECH, while also noting that projects incentivized by TECH may not represent the average HPWH installation. Analysis of data available through the TECH program shows an average cost for single-family projects of $7,770 for an incentivized 240-volt HPWH, while the average installed cost for a 120-volt unit is $5,800; an analysis of TECH data published in CleanTechnica similarly finds that the installed cost of 120-volt HPWH is on average 22% lower than the installed cost of a 240-volt HPWH[233] The average total cost of a split-system installation is approximately $20,000. TECH public data average costs, by HPWH type installed and housing segment, are shown in Table 17.

[232] Barnet Plumbing and Water Heaters. Accessed January 15, 2025. "How Much Do Water Heaters Cost in California?" https://philbarnettplumbing.com/water-heater-cost.
[233] CleanTechnica, (2025). "Significant Savings from 120-Volt Heat Pump Water Heaters." October 7, 2025. https://cleantechnica.com/2025/10/07/significant-savings-from-120-volt-heat-pump-water-heaters/.

Table 17. TECH-installed HPWH costs per unit installed, TECH public data

Household and HPWH Type	All Installs	Electric Service Upgradea	No Electric Service Upgrade
Single-Family Projects, All HPWH Types	$7,348 (n=9,361)	$9,077 (n=2,375)	$6,764 (n=6,986)
Single-Family Projects, 240V HPWH	$7,667 (n=7,767)	$9,068 (n=2,339)	$7,066 (n=5,428)
Single-Family Projects, 120V HPWH	$5,800 (n=1,594)	$9,695 (n=36)	$5,715 (n=1,558)
Single-Family Projects, Split System HPWH	$19,981 (n=49)	$17,638 (n=15)	$21,338 (n=34)
Multifamily Projects (All HPWH Types)	$7,452 (n=1134)	$7,227 (n=65)	$6,425 (n=1037)

a: Electric service upgrade refers to any upgrades made to the home's electrical panel during the HPWH installation.
https://techcleanca.com/documents/5633/Data_Dictionary_-_TECH_Working_Data_Set_Single_Family_CXuejHp.xlsx
Source: Analysis of TECH Clean California Working Datasets, 5-26-2025 (Downloaded June 9, 2025)

These data also show projects requiring electrical service upgrades versus those that do not. On average, single-family projects that included electrical service upgrades cost $2,300 more than projects that did not. Multifamily projects that included service upgrades cost an average of $800 more than those that did not. Reports from 2022 and 2023 on the TECH Clean California program estimate the cost of specific installation components as shown in Table 18.[234]

Table 18. Breakdown of HPWH total installation costs

Activity	% Installations Requiring Activity		Cost Range (Typical Cost)	
	240V	120V	240V	120V
Permit	100%	100%	$75-$200 ($200)	$75-$200 ($200)
Installation Labor	See note[a]		$300-$1,850 ($805)	
Space ventilation[b]			$0-$650 ($234)	
Extension of shared circuit	--	40%-60%	--	$100-$500 ($100)
Dedicated circuit	100%	--	$400-$1500 ($800)	--
Replacement panel or subpanel without amperage service upgrade	15%-45%	--	$2,000-$5,000 ($3,000)	--

[234] The data for the table is sourced from two key references. The information on permits, extension of shared circuits, dedicated circuits, replacement panels, and amperage service upgrades is drawn from the Plug-in Heat Pump Water Heater Field Study Findings & Market Commercialization Recommendations (2023). Meanwhile, the data on installation labor and space ventilation comes from the TECH Baseline Market Assessment (2022).

Activity	% Installations Requiring Activity		Cost Range (Typical Cost)	
	240V	120V	240V	120V
Amperage service upgrade	10%	--	$3,000-$28,000 ($15,000)	--

a: See DIY and BIY Rates and Motivations.
b: The TECH Baseline Market Assessment (2022) does not cite frequency of ventilation costs being incurred, but does say "participants reported location of the water heater and the time involved in installation as the main reasons for cost variation in space ventilation costs."
https://www.calmac.org/publications/TECH_Baseline_Market_Assessment_Final_Report.pdf. Sources: TECH Baseline Market Assessment (2022); Plug-in Heat Pump Water Heater Field Study Findings & Market Commercialization Recommendations (2023).

6.3.3 Survey findings on water heater costs

The CalMTA survey asked respondents who purchased a water heater in the last three years to report on the cost of their purchased water heater, for all water heater types. Respondents most frequently reported a price range between $2,000 and $3,000.[235] Purchasers of HPWHs most frequently reported a price range between $3,000 and $3,500, which is $1,500 above the price range most frequently reported by gas water heater purchasers and by electric-resistance water heater purchasers. Sixty percent of all other water heater types have costs below $2,500; no HPWH purchasers reported costs below $2,500.

Surveyed DIY water heater resident purchasers more frequently reported total water heater costs of less than $1,500 (58% vs. 11% of non-DIY resident respondents), suggesting DIY purchasers have a distinct and much lower willingness to pay than non-DIY purchasers.

Surveyed ESJ water heater purchasers (both DIY and non-DIY) more frequently reported total water heater costs of less than $1,500 (31% vs. 5% of non-ESJ respondents). Non-ESJ respondent purchasers most frequently report costs in the $1,500 to $2,500 range (24% each reporting both $1,500 up to $2,000 and $2,000 up to $2,500), suggesting ESJ respondents have a distinct and much lower willingness to pay than non-ESJ respondents.

Manufacturer feedback and price forecasting

Established manufacturers communicated seeing HPWHs as a premium product that may evolve with growing market share and federal standards driving a greater focus on HPWH as residential ERWH production sunsets. They appeared focused on engaging select market segments with

[235] Note that survey respondents were not explicitly asked to report costs before incentives, which may result in lower costs reported for incentivized water heaters (particularly high efficiency gas water heaters and HPWHs). Analysis first excludes those that did not recall how much their water heater cost (4% of respondent water heater purchasers). Results are shown in Appendix H, Pilots Supporting HPWH Deployment in California. Several pilots supporting HPWH adoption (summarized in Table 36) have moved forward, supported by programs including TECH, CalNEXT, and the Low-Income Weatherization Program.
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fewer adoption barriers such as new construction, driven by California's Title 24, and electric-resistance to HPWH replacements in buildings with sufficient space (which face fewer electrical constraints and costs). Interviewed manufacturers were uncertain regarding the forecast for HPWH prices but shared potential influences on unit price and total installation cost, summarized in Table 19.

Table 19. Influences of HPWH cost reported by manufacturers

Potential for Cost Increases	Potential for Cost Decreases
Increases in cost of product components. Manufacturers flagged that the materials required to produce premium products, such as HPWHs, are expensive and were expected to remain expensive in the coming years. One manufacturer reported that prices would likely rise by about 10% to 15% in the next five to 10 years as costs related to materials and shipping for HPWHs will continue to curb profitability. Refrigerant regulation. Manufacturers also cited refrigerant regulations as barriers to price decreases. Incentive levels increasing total installation cost. Two other manufacturers noted that incentive amounts drive up the costs for equipment and installations, indicating that the current incentive structure, in which customers continue to pay a steady amount above the incentive, serves to increase profit for contractors while harming customer perceptions of affordability.	Scale and market competition. Two manufacturers cited that increases in the scale of production driven by federal standards – and associated competition – would also reduce costs. Bulk purchases lower total costs. Some new manufacturers in the California market report embracing a vertically integrated model in which manufacturers work directly with installers to install HPWH in bulk in targeted areas and believe that streamlining transit costs and installer training, while reducing risks, could reduce HPWH unit costs.

7 Market barriers and opportunities

This section summarizes primary and secondary research findings related to barriers and opportunities to HPWH adoption.

7.1 Market barriers

Section 5 details key barriers to HPWH adoption identified by residents, building owners and property managers, and installers in surveys – including the lack of awareness of HPWHs, unit and installation cost, bill savings concerns, household fit, complexity of installation and access to incentives, and concerns about product performance and reliability. In the following section, CalMTA integrates these findings with interview feedback and secondary research to summarize barriers to market adoption.

7.1.1 Cost

CalMTA's research found that the high up-front cost of HPWHs is the main reason Californians who are aware of HPWHs choose other water heater options. Research and stakeholder interviews conducted to date revealed that most water heater customers spend little time considering their

water heater unless it is not working, and are extremely price sensitive. All 20 interviewed stakeholders mentioned the cost of HPWHs as a leading barrier, which is reinforced in survey results (Figure 32).

The costs of HPWHs in California are higher than in other regions for both 240-volt and 120-volt installations. While interviewed expert stakeholders estimated total installation cost nationally at $1,000 to $5,000, data show installation costs in California ranging from $3,500 to $7,000 (Section 6.3), and California stakeholders most frequently reported HPWH installation costs in California of $6,500-$7,000 (compared to $2,500 for standard gas water heaters).[236] This gap in price between HPWHs and standard gas and electric models is made up of higher incremental unit costs, as well as higher installation costs. Incremental installation costs were found to have wide ranges, especially compared to like-for-like replacements, caused by HPWH units' distinct space needs. Additionally, HPWHs have a large physical footprint, have greater ventilation requirements than standard water heaters, and require management of condensate and electrical needs.[237, 238] A 2022 analysis of HPWH installation costs suggests that the total cost of installation also varies with contractor experience, as contractors may mark up equipment costs to cover installation overhead, and contractors with more HPWH projects may be able to buy in bulk to lower costs.[239]

7.1.2 Electrical upgrades

Buildings retrofitting to a typical 240-volt HPWH from other water heater types, particularly gas, often face the need for electrical upgrades prior to installation, which can substantially increase up-front costs, ranging from a few hundred dollars to many thousands, exceeding that of a standard HPWH installation,240 and (as examined in Customer journey timeline) project

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[236] See also a 2025 report from Advanced Water Heating Initiative (AWHI) summarizing that while installation costs of a 120V HPWH average $2,100 in the Midwest, in California they average $3,400. New Buildings Institute, 2025. *Residential Heat Pump Water Heater Cost Drivers and Opportunities for Compression*. https://advancedwaterheatinginitiative.substack.com/p/new-report-alert-residential-hpwh.

[237] CalMTA stakeholder interviews.

[238] Installation costs may vary across all market segments. A recent pilot that conducted water heater assessments, tune-ups, and HPWH installations in low-income single-family homes in disadvantaged communities, found that "deferred maintenance and unpermitted or non-code-compliant gas water heaters created unique conditions that introduced substantial, and often unanticipated, variations in the cost of HPWH retrofits." TECH Clean California. (2024). *Basset Avocado Heights Advanced Energy Community Heat Pump Water Heater Initiative*. August 21, 2024. https://techcleanca.com/documents/5416/The_Energy_Coalition-_Final_Report_v240821.pdf.

[239] Corroborated by stakeholder interviews. Opinion Dynamics. July 15, 2022. *Technology and Equipment for Clean Heating (TECH) Initiative*. https://techcleanca.com/documents/3697/TECH_Baseline_Market_Assessment_Final_Report_8AHwAxk.pdf.

[240] TECH data indicate electrical panel service upgrades for single-family properties may average between $2,300 and $9,100. In multifamily housing, two recent studies estimate the cost of electrical panel upgrades for smaller properties at $12,000 to $89,000, and $179,000 to $281,000 for larger properties. (Jones, B. (2021). Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities. Inclusive Economics.

timelines.[241] Required electrical upgrades can range from smart circuit breakers, load sharing, or circuit pausers or circuit splitters, subpanels, smart panels, or a full panel upgrade. Due to the substantial cost of upgrades, there is an increasing focus on optimization as a more affordable route for electrification.[242,243,244] Several HPWH incentive programs advertise on their website that opportunities to avoid panel upgrades may exist and should be explored. Stakeholders interviewed by CalMTA discussed efforts underway to mitigate this barrier for established 240-volt products. These efforts involve taking a more critical look at the specific electrical needs of HPWH technologies, including energy draw, through informally collected datasets and reviews of electrical calculations that trigger panel, wiring, or service upgrades, as well as exploration of panel optimizations. PCE estimates that 80% of homes in their territory use 38 amps or less,[245] and therefore could reasonably explore the electrification of appliances such as HPWHs without panel upgrades.

Beyond the barrier of cost, electrical upgrades are often complicated by the fact that customers and installers lack sufficient data to confirm whether electrical panel upgrades are needed; the work needed to determine the extent, cost, and timeline for potential electrical upgrades is a

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Oakland, CA.) These costs vary substantially by the service required, and a report by the Association for Energy Affordability and Stopwaste found that service upgrades could range between $300 and $80,000, with higher end estimates including utility-side service upgrades (such as underground or overhead service connections and new transformers). (Stopwaste. May 2021. *Accelerating Electrification of California's Multifamily Buildings*. https://www.stopwaste.org/accelerating-electrification-of-california%E2%80%99s-multifamily-buildings.)

[241] If determined to be necessary, upgrade requests may add years to a project. *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy.

[242] See 2023-2025 effort by National Renewable Energy Laboratory and Lawrence Berkely National Laboratory involving utility partners from around the country for review of options for affordable and equitable electrification without panel upgrades.
National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory. Accessed January 20, 2025. "Affordable and Equitable Residential Electrification Under Electrical Panel and Service Constraints." https://www.energy.gov/sites/default/files/2023-07/bto-peer-2023-32645-affordable-electrification-nrel-jin.pdf.

[243] The CPUC and other stakeholders have advocated exploring the viability of meter socket adapters as an alternative to panel upgrades to reduce costs for both the customer and the utility companies. In a July 2024 staff proposal, the CPUC instructed IOUs to provide information such as peak demand data to customers to support assessment and has also proposed expanding cost recovery for IOUs to expand their approval process for MSAs and similar non-electrical isolating devices. R.19-01-011 Phase 4A Staff Proposal. CPUC Energy Division Staff. July 18, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M536/K015/536015666.PDF.

[244] CalNext. (2024). *Residential Electrical Service Upgrade Decision Tool*. September 10, 2024. https://calnext.com/wp-content/uploads/2024/09/ET23SWE0021_Residential-Electrical-Service-Upgrade-Decision-Tool_Final-Report.pdf.

[245] Reyes, R. (2024). "Thinking Inside the Box" Presentation, California Efficiency and Demand Management Council, Nov 6-7, 2024. https://cedmc.org/wp-content/uploads/2024/11/Full-Presentation-2024-CEDMC-Fall-Conference.pdf.

major barrier for many buildings.[246] The Pacific Northwest National Laboratory has developed a tool for assessing household electrical capacity, referred to by several interviewed stakeholders; however, one stakeholder explained that while they thought the tool was fine, they elected to do their own calculations, given that plumbing code first-hour rating (FHR) is based primarily on the number of bedrooms and bathrooms, and they needed to account for factors such as occupancy type and requirements for different rooms. Multiple organizations are currently engaged in the development of a tool to facilitate the evaluation of whether service upsizing is needed.[247]

120-volt HPWH application and reception

Installation of a 120-volt HPWH instead of the standard 240-volt is one potential solution to electrical capacity limitations. Use of 120-volt HPWHs could limit or eliminate the need for an electrical contractor, lead to faster installations, and reduce the total electrical load increase.[248] However, 120-volt HPWHs as currently developed are not appropriate for all use cases, due to limitations to hot water delivery, especially when placed in locations exposed to low temperatures.[249]

A study from New Buildings Institute estimates that 120-volt HPWHs could directly support 22% to 30% of California homes.[250] While the market share of 120-volt models is not well documented,

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[246] Assessment of a building's electrical capabilities may involve locating the building's as-built documentation and electrical service size from the utility, which utilities may or may not be able to provide. Without documents from the utility, a 30-day meter reading of 15-minute interval data per national electrical code may be performed to determine the necessary electrical upgrades. The rate at which this information is available by utility may differ; one engineer engaged with the pilot noted that PG&E has not been able to provide electrical service size, or peak load information recognized by state electrical code, but that SCE has typically had this information readily available. *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy.

[247] See CEC grant GFO 23-303 featured in Build It Green, 2024. The POWER Group's Overview and Key Projects. Emerging Tech Summit 2024 presentation. https://www.etcc-ca.com/sites/default/files/2024-10/Decarb%20-%20Panel%20Upsizing%20-%20Low%20-%20Final.pdf.

[248] CalNext. (2024). *Increasing Heat Pump Water Heater (HPWH) Deployment.* October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.

[249] Opinion Dynamics, *op cit.,* May 17, 2022 https://www.calmac.org/publications/OD-CPUC-Heat-Pump-Market-Study-Report-5-17-2022.pdf

[250] An interviewed stakeholder and former installer indicated that some installers follow the practice of only installing 120-volt units in households that have sufficient water provided by a 40- to 50-gallon standard electric or gas water heater. Using this rule of thumb and saturation rates of gas water heating found in RECS, CalMTA produced a similar estimate that 120-volt HPWHs may be appropriate to serve approximately 26% of California households but notes that the ideal percentage may be lower given estimated decreases in saturation of gas water heating (see Section 4.1)

research and data from select programs suggest it is growing,[251] with a review of TECH data showing 120-volt units were installed in 13% of TECH single-family HPWH installs.[252]

Research shows that 120-volt units have received mixed reception, in part due to hot water runouts in households with average or high hot water demands, upsizing needs, and seeming lack of clarity regarding circuitry needs.[253,254] As noted in stakeholder interviews, measure definitions in the California eTRM have also restricted 120-volt deployment due to a lack of suitable direction on UEFs for 120-volt units; one interviewed manufacturer discussed how issues with the definition prevented their 120-volt units from being eligible for GSR program incentives.

7.1.3 Uncertain utility bill impacts

Many stakeholders cited the potential for gas to HPWH conversion to result in higher net energy costs as a major barrier to HPWH adoption. [255] Multiple stakeholders stressed the importance of confirming bill impacts for hard-to-reach and low-income customers who cannot bear any additional financial burden. SMUD was the only utility territory in which utility rates were confirmed to consistently offer savings in gas-to-electric conversions (see studies of bill impacts in Section 7.2).

> *"You can do all the education, but if customers are going to pay more to switch to electric, they won't want to move forward."*

Numerous interviewed stakeholders said that the ongoing uncertainty around rates makes customers hesitant to switch to electric and adopt HPWHs even if presented with opportunities for immediate savings. One implementor noted that even with bill calculators showing a potential

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[251] CalNext, *op cit*., October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.
[252] TECH Public Data, Last Accessed June 9, 2025.
[253] One interviewed program implementer shared their common practice to have installers avoid 120-volt installations unless the upgrade is in a household with very limited hot water demand (for example, a two-bedroom, one-bath space) and an existing outlet is readily available, explaining that the installer would otherwise have to run a circuit. In other cases, a 240-volt unit is preferable to lower the risk of hot water runouts and customer complaints. The stakeholder also noted that 120-volt installations require additional upsizing beyond the upsizing already needed for the replacement of a gas water heater with a 240-volt HPWH. Another study identified that some jurisdictions require all 120-volt HPWH units to be on dedicated circuits, which the study states essentially negates the purpose of their installation (versus a 240-volt unit), and contends that this can be resolved with education to ensure 120-volt unit installations deliver the intended benefits. CalNext, *op cit*., October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.
[254] Note that some 120-volt units require dedicated circuits and others do not; it is unclear whether this was a source of this requirement. AWHI Residential Working Group Meeting, January 21, 2025. https://www.youtube.com/watch?v=MbGjrq7EKHQ
[255] Ten of 20 interviewed stakeholders listed uncertainty around bill impacts as a top barrier. CalMTA stakeholder interviews, December 2024 to February 2025.

savings of $500 per year, customers remained skeptical due to distrust in utilities and concerns about future rate changes.

Stakeholders suggested few strategies to reduce bill impacts from HPWHs. While some mentioned pairing with solar or demand response, most did not see current programs as effective.[256,257] Research shows combining HPWHs with other measures or whole-home electrification can lead to savings.[258, 259] Interviewees also recommended correct sizing and venting, enrolling in optimal rate plans (such as TOU or electrification rates), and keeping resistance elements off to improve bill impacts.

7.1.4 Fit in existing homes and space constraints

HPWHs require more space and ventilation than standard water heaters, posing installation challenges in many California homes. CalMTA survey data highlights how these constraints affect households, with 17% of residents and 27% of owners and managers reporting lack of compatibility as the reason for not choosing a HPWH (see Figure 32). Condensate management may also require additional space. Installers may also hear that there is a need to upsize the gallon capacity when installing a HPWH.

[256] Many interviewees said that demand response programming offered little change to customer bills due to both the small demand shift effected by a single HPWH and the small financial compensation offered by current program design (see *Incentive program barriers*). When asked about the pairing of solar with HPWH marketing or incentives, stakeholders could not think of current programs that supported this. One stakeholder mentioned trying to promote the pairing of solar with HPWH installations to their contractors, citing opportunities through the NEM-3 rate, but concurrently noted the decreased rate of incentives for solar in California and said that at $4 per watt, the promotion of solar for demand response, was "not that compelling." CalMTA stakeholder interviews, December 2024-February 2025.

[257] Note that while solar plus HPWH was not reported as an opportunity by stakeholders, a survey of customers that had installed HPWHs incentivized by the TECH program found 51% have solar already, and 11% plan to install solar in the future.

[258] Peninsula Clean Energy. (2023). News release: *Joint Analysis Shows On-Bill Savings By Switching From Gas To Electric Appliances: First-time analysis combines household customer and modeled data to quantify electrification benefits*. December 20, 2023. https://www.peninsulacleanenergy.com/news-releases/savings-switching-gas-to-electric/.

[259] Shea, et al. (2025). *Heat Pumps Can Lower Energy Bills for Californians Today*. Rocky Mountain Institute, April 28, 2025. https://rmi.org/heat-pumps-can-lower-energy-bills-for-californians-today/.

Upsizing and Right-Sizing: Frequency and Complications

Upsizing during HPWH installation has been noted by interviewed stakeholders and is also evident in program data. A 2025 summary of TECH-incentivized HPWH installations shows that 73%-97% of installations involve upsizing of 20% or more.[260]

Customers and installers have reported confusion around HPWH right-sizing; research on upsizing indicates a mix of messages, with several in favor of upsizing as a rule (Table 20).[261]

Table 20. Upsizing references

Source	Description
Expert Guidance	One educational U.S.EPA-funded YouTube video shares the rule of thumb that homes that previously had gas water heaters should plan on sizing up by one size (e.g., if the home had a 50-gallon gas water heater tank, it should consider a 65-gallon HPWH tank). If moving to a 120-volt HPWH, the customer should consider moving up two sizes.[262]
Manufacturer Guidance	In a fall 2024 manufacturer roundtable, manufacturer A.O. Smith mentioned that sizing up to a larger tank will help the customer save more since it reduces the odds of using electric-resistance backup elements. Manufacturer Rheem recommends sizing similarly to how one does for tankless gas installations, by using winter conditions and the incoming water temperature as guidance.[263]
Program Signals	TECH SGIP HPWH has operated using an FHR standard based on plumbing code.[264] TECH SGIP HPWH has also offered a bonus incentive of $700 for installing a unit of 55 gallons or more.[265]

[260] 73% of installations replace 50- to 60-gallon water heaters, upsizing at least 20%; 88% of installations replace 40- to 50-gallon water heaters, upsizing at least 20%; and 97% of installations replace water heaters less than 40 gallons, upsizing at least 20%. Based on a summary of single-family program installations only. TECH Clean California. April 2, 2025. *13th Quarterly Stakeholder Meeting*. https://techcleanca.com/documents/5581/TECH_13th_Quarterly_Stakeholder_Meeting.pdf.

[261] More than a third (36%) of customers find identifying the right size of water heater a challenge during an HPWH installation (Figure 44).

[262] Risinger, M. (2024). "The Build Channel," YouTube video, 21:32, posted January 9, 2024, https://youtu.be/YT0zTRD7N2s.

[263] Manufacturer roundtable, AWHI Oct 4, 2024.

[264] Opinion Dynamics, *op cit.,* May 7, 2024. *Re*. https://techcleanca.com/documents/4819/Memo_on_Reduced_TECH_Incentive_Applications_in_2023_Final_3.4.24_For_PDF.pdf

[265] See CPUC's 2022 Decision Establishing Heat Pump Water Heater Requirements, page 38. "We are persuaded that this additional incentive will help ensure right-sizing of customer HPWH units, which may need to have somewhat larger capacities than the water heater being replaced due to the pre-heating and load-shifting requirements we adopt here. It is critical that units are correctly sized at this nascent stage of market development to ensure customer satisfaction and thus the long-term effectiveness of this program."
CPUC. February 11, 2022. "Decision Establishing Heat Pump Water Heater Program Requirements." https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M463/K622/463622210.PDF.

Installation of a thermostatic mixing valve (TMV) has been presented as a way to avoid some upsizing, though one interviewed stakeholder experienced with TMV installation said it does not mitigate the need for upsizing on its own, because manufacturer requirements drive upsizing.

A TECH contractor noted that outdated plumbing code standards led to oversizing HPWHs, increasing costs and conflicting with other program guidance. The contractor also explained that sizing based on these standards assumes use of backup resistance heating, which lowers efficiency and raises bills.[266] As a result, sizing based on plumbing code FHR guidance will likely lead to the use of electric-resistance backup heat, which reduces efficiency and increases utility bill costs.

Different market actors have developed sizing tools. Some manufacturers, such as A.O. Smith, recommend their own sizing tool. PNNL developed an HPWH installation tool, but some stakeholders said it lacks nuance. [267] One stakeholder indicated they use custom calculations to better reflect household-specific hot water needs, such as dorms or farmworker housing.

Space constraints

A third of stakeholders interviewed cited space constraints as a major barrier to HPWH adoption, with one implementer estimating relocations were needed in 30% of cases, excluding those abandoned due to space issues. Mobile homes were especially challenging, often forcing installers to walk away.[268] One stakeholder noted that multifamily units can rarely accommodate HPWHs, in part due to "the need to upsize." Outdoor relocation adds cost and complexity, with unclear rules from HOAs and mobile home parks. The San Joaquin Valley (SJV) pilot reports also noted frequent relocations requiring protective enclosures.[269] CalMTA survey results show that 17% of recent water heater residential customers who chose not to purchase a HPWH did so because the HPWH did not fit in their home.[270] Twenty-seven percent of building owners/property managers reported the same issue.

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[266] Opinion Dynamics, *op cit.,* May 7, 2024. *Re*. https://techcleanca.com/documents/4819/Memo_on_Reduced_TECH_Incentive_Applications_in_2023_Final_3.4.24_For_PDF.pdf.

[267] Office of Energy Efficiency and Renewable Energy. Accessed March 12, 2025. "Heat Pump Water Heater Installation Tool." https://basc.pnnl.gov/hpwh_installation_tool.

[268] Interviewed stakeholders mentioned the current lack of clarity around the permissibility of exterior water heating equipment at many mobile home parks; one interviewed stakeholder and one interviewed manufacturer mentioned that removal of exterior water heating equipment was required by HCD following their installation.

[269] TECH Clean California. Accessed April 15, 2025. "Encouraging Heat Pump Technology for San Joaquin Valley Residents." https://techcleanca.com/about/news/encouraging-heat-pump-technology-for-san-joaquin-valley-residents/.

[270] CalMTA Residential and Building Owner and Property Manager Surveys Q C5 and C7. Fifty-eight percent of purchasers that identify HPWHs to be incompatible with their home in C5 (with 17% and 27% reporting this, respectively). When segmented by housing segment, single-family responses to C7's question about the physical footprint of an HPWH fitting in the available space in one's home are 58%, MF is 58%, and MH is 70%.

Homes designed for tankless water heaters face particularly challenging space constraints. One manufacturer of tankless water heaters explained that as a result of California's building energy code promoting high-efficient gas tankless water heaters in recent decades, "many new homes have been designed to eliminate the space requirement for storage-type water heaters because tankless water heaters are compact and wall-hung. Retrofitting these homes to accommodate HPWHs will be difficult, expensive, and time-consuming."[271] Multiple stakeholders mentioned a potential solution for addressing concerns about space constraints by using split systems and units with a smaller unitary form factor, such as "lowboys," which are shorter, more compact water heaters designed to fit smaller spaces.

7.1.5 Low customer awareness and motivation

Low customer awareness rates are well documented in the research and confirmed in CalMTA-conducted interviews and surveys as a key barrier to HPWH adoption. CalMTA survey results show low awareness of HPWHs – 50% of the general population, 56% in ESJ communities, and 61% among mobile home residents. Even after purchasing a water heater, 37% of buyers remained unaware of HPWHs. Awareness is likely shaped by retail visibility, with big-box stores and online retailers most likely to display HPWHs.[272] Installer training also plays a role, as 25% have not completed HPWH training.[273] Research and interviews to date have found that most customers are motivated first and foremost by low costs and avoiding the risk of hot water runouts, and fewer by efficiency.

Nearly all interviewed stakeholders said that better messaging and awareness building would be needed to improve HPWH adoption; however, stakeholders disagreed regarding what that messaging should be. Factors explored include:

- **An environmentally motivated customer market segment may not mind higher costs:** One stakeholder noted that financial competitiveness may not be necessary for some market segments if environmental messaging can excite customers, and said this had been tested and found true in the Pacific Northwest.
- **Financial considerations take priority:** Stakeholders said financial concerns outweigh environmental benefits,[274] with most customers focused on cost and avoiding hot water

[271] Navien. (2023). *Working Group Comments.* Memo to South Coast Air Quality Management District. October 18, 2023. https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/navien-inc---1146-2-working-group-comments.pdf?sfvrsn=8.

[272] Stakeholder interviews (December 2024 to February 2025) connect awareness to visibility and accessibility. For rates of availability and visibility see Section 5.1.

[273] CalMTA Installer Survey Q. E4. "Which heat pump water heater training programs are you aware of?"

[274] Stakeholders expressed the feeling that few purchasers put environmental benefits as a top reason for purchase. CalMTA notes that survey results indicate that 21% of residents and 26% of owners and managers listed

outages. Stakeholders recommended highlighting bill impacts and clearly communicating cost benefits to customers.

- **Education on technical considerations and unit suitability to different conditions:** Several stakeholders and one manufacturer noted the importance of clarifying what types of units are available, and how different offerings can affect installation, noting the different sizes and air exhausts of different units. Additionally, confusion over whether units required dedicated circuits also arose during the discussion of application of 120-volt models with two interviewed stakeholders. One mentioned that 120-volt HPWHs were described "as a panacea" when they first hit the market, which was "a problem." This stakeholder explained that it has taken time for a suitable application to be appropriately scoped, noting that manufacturers now communicate that if one can choose a 240-volt unit, they should.
- **Limited benefits create greater customer price (and bill savings) sensitivity:** Many established manufacturers and stakeholders said HPWHs lack a compelling value for all customers, especially when bill savings aren't guaranteed. One called them a niche product, noting incentives are needed for fuel switching conversions. Without clear savings, customers may not see a reason to switch. Program administrators emphasized the need for education on the applicability and value of HPWHs to their customers, even if units are free, since HPWHs offer no noticeable performance difference.

7.1.6 Incentive program barriers

The multitude of programs supporting residential HPWHs offer a variety of resources to customers and their contractors; however, many barriers limit customer and installer engagement with these programs and access to incentives. Through research, including stakeholder and manufacturer interviews, CalMTA identified barriers to accessing program offerings described below.

environmental benefits as a top factor influencing their purchase. However, other sources note that only 8% of customers are motivated by higher efficiency. Residential Heat Pump Water Heater – Fuel Substitution. CA eTRM. file:///var/www/media/exported_measures/job_86010221-b2fb-4254-8b86-138343a5b92b/html/measure.html.

Variations in incentive availability

Incentives available for HPWHs vary widely across California, in part due to geographic coverage and eligibility based on whether customers are served by IOUs or POUs. This results in a patchwork of availability, where some areas benefit from incentive layering when customers or contractors are informed, while others lack coverage, particularly in areas not included in the statewide TECH and GSR programs.[275] Incentives may also not be consistently available across a single program's territory; a 2024 report found that 84% of TECH HPWH installations had occurred in PG&E's service territory.[276,277]

Incentive availability has also fluctuated over time. Interviewed stakeholders and manufacturers[278,279] both explained that one of the biggest challenges in using California incentives is the lack of long-term incentive stability, noting in particular the TECH program's "starts and stops" due to intermittent availability of funding.[280]

> *Stakeholders and manufacturers indicated that one of the biggest challenges in using California incentives is the lack of long-term incentive stability, noting in particular the TECH program's "starts and stops" due to intermittent availability of funding… … in some cases this has also discouraged broader contractor participation.*

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[275] For example, customers in Marin County or within PCE or SVCE territory may be eligible for thousands of dollars more in incentives – in some cases double the incentives – than in other parts of the state where TECH incentives are not available.

[276] CalNEXT, *op cit.,* June 26, 2024. https://calnext.com/wp-content/uploads/2024/07/ET23SWE0020_Emergency-Replacement-HPWH-Market-Study_Final-Report.pdf.
Similarly, a CalMTA review of HPWH installations through TECH public data conducted Fall 2024 shows that 74% of installations occurred in Northern California vs. Southern California, while only 26% of households were in Northern California vs. Southern California.
TECH Clean California. Accessed December 1, 2024. "Heat Pump Data Download." https://techcleanca.com/heat-pump-data/download-data/.

[277] The TECH program's HPWH incentive was adjusted in the December 2024 relaunch of the program to offer higher incentives in Southern vs. Northern California in response to uneven geographic uptake. TECH Clean California 13th Stakeholder Meeting presentation, Apr 2, 2025.
https://techcleanca.com/documents/5581/TECH_13th_Quarterly_Stakeholder_Meeting.pdf.

[278] Interviewed stakeholders include California program administrators, implementers, and HPWH subject-matter experts. See Methodology section for overview of interviewed stakeholders and manufacturers.

[279] Manufacturers focused most of their feedback on the TECH program, noting that the strengths of TECH included the total volume of funding provided (mentioned by three manufacturers) and the total rebate amount (two manufacturers).

[280] TECH HPWH incentives first launched in December 2021, but incentive funding was exhausted in six months (by May 2022) in PG&E and SDG&E territories, while funding in SCG's territory remained available until June 2023. New incentives became available statewide in November 2023 through the SGIP HPWH program, though with modified eligibility requirements, including enrollment of installed HPWHs in demand response programs. TECH

Secondary research confirms that sudden discontinuation of incentives across large territories (specifically noting TECH) has not reduced incentive uptake but in some cases has also discouraged broader contractor participation.[281] Interviewed stakeholders highlighted the following impacts of start-and-stop cycles on programming:

- **Challenges to administration of complementary programming:** Multiple interviewed stakeholders[282] commented on the extremely short window that TECH was open and the short notice (24 hours) for incentive changes, noting the difficulty created in planning complementary programming. One explained that "program start and stops leave contractors hanging." Another noted that the TECH HPWH equity budget in one territory "seemed to go from 80% to 10% in one day," disrupting plans for equity programs designed to complement TECH incentives.
- **Contractor reluctance to engage:** Stakeholders and manufacturers communicated the concern that incentives would not be available to contractors when needed – leading contractors to not build their business operations around program offerings. Interviewees emphasized that keeping track of starts, stops, and incentive changes also take up contractor time that could be spent on sales. One stakeholder serving as a "TECH-designated applicant"[283,284] noted specifically that contractors in their area were not interested in TECH due to lack of certainty around incentive availability.

HEEHRA's multifamily HPWH incentives launched in January 2025, which, after a pause in the program in February, restarted and are available as of July 2025. Single-family TECH incentives closed in February 2025 and reopened July 15, 2025, supported by the Greenhouse Gas Reduction Fund.
Opinion Dynamics. May 7, 2024. *Reduced Tech Incentive Application in 2023*. https://techcleanca.com/documents/4819/Memo_on_Reduced_TECH_Incentive_Applications_in_2023_Final_3.4.24_For_PDF.pdf.
See email listserv communication from TECH program titled "Statewide Small Multifamily Incentives – Now Available!", Jan 29, 2025, and "Last Day to Reserve Single-Family Heat Pump Water Heater Incentives," Feb 24, 2025. HEEHRA Phase I launched October 2024 but does not provide incentives for HPWHs.
[281] Interviews with TECH contractors conducted in May 2024 found that water heating contractors submitted fewer TECH applications in 2023 because of a lack of HPWH incentives and uncertainty about where the incentives were available. Opinion Dynamics, *op cit.,* May 7, 2024. https://techcleanca.com/documents/4819/Memo_on_Reduced_TECH_Incentive_Applications_in_2023_Final_3.4.24_For_PDF.pdf.
[282] Four interviewed stakeholders involved in complementary programs offered by three different program administrators.
[283] TECH-designated applicants assist local contractors who are not comfortable using the TECH portal.
[284] TECH program's website explains that the program is trying to mitigate abrupt funding interruptions by offering lower incentives, explicitly stating "the goal is to continue to provide incentive levels that help contractors close sales, while also having the budget last longer and reach more installations." TECH Clean California. Accessed February 1, 2025. "Heat Pump Water Heater Incentive Funding Updates for PG&E, SMUD, and Municipality Service Areas. https://techcleanca.com/about/news/heat-pump-water-heater-incentive-funding-updates-for-pge-smud-and-municipality-service-areas/.

- **Engaged contractors disengaging:** One interviewed stakeholder noted that TECH notices alerting contractors to "get applications in by tomorrow" are a barrier to contractors who operate with customers in a queue. They explained that several "mom and pop [contractors] are fronting losses due to this type of program operation" and that they no longer wanted to participate in these incentives.
- **Engaged contractors not hiring:** Two interviewed stakeholders[285] said installer companies are continuing to subcontract HPWH electrical work, partly due to a lack of confidence in the continuity of HPWH programming and the demand and feasibility of HPWH installations. One stakeholder pointed out that incentive programs with abrupt starts and stops may put installer jobs at risk: "If you hire people to do this and then rebates are gone, what happens to those people?"

Program and application complexity

Even if incentives are confirmed to be available, stakeholders and manufacturers communicated that the complexity of program eligibility confirmation, application, and integration into the business case is a barrier to participation (Table 21).

Table 21. Challenges to (active) incentive program participation

Challenge	Supporting Evidence
Confirmation of HPWH eligibility	Stakeholders said that different HPWH models may qualify for different programs, which leads to confusion in the market. For example, the SVCE HPWH rebate, the PCE HPWH and Panel Upgrade Incentive program, and the BayREN Contractor Incentive program require a UEF of at least 3.1. In contrast, Sonoma Clean Power's program requires a UEF of at least 3.43, and the City of Redding's program requires a UEF of 3.09.
Confirmation of customer eligibility	Much like variations in HPWH eligibility, multiple stakeholders said different program schedules (including different funding sources from TECH, leading to changes in incentive availability by IOU or POU territory) exacerbate the already challenging task of identifying what incentives are available to specific customers in different territories.
Incentive layering	Incentive layering may make certain HPWH projects feasible, but it may also lead to increases in contractor installation costs.[286] Several interviewed program administrators said they recommend seeking multiple bids to try to keep them competitive.[287] Program administrators described efforts to design incentive levels and program requirements that align with other incentive programs, including TECH, to maximize customer engagement –but noted that unexpected starts and stops make this challenging. Three stakeholders said the difficulty in participating

[285] One CalMTA interviewee was focused on workforce education and training and one on program administration.

[286] For example, a 2024 CalNEXT report correlated the higher total incentives of PG&E territory to $2,000 higher project installation costs compared with other parts of the state. (CalNEXT, *op cit.,* June 26, 2024.*)* Also noted in manufacturer and stakeholder interviews.

[287] CalMTA stakeholder interviews; also see San Jose Clean Energy FAQ.
San Jose Clean Energy. Accessed January 10, 2025. "Ecohome Rebate."
https://sanjosecleanenergy.org/ecohome-rebate/#toggle-id-9-closed.

Challenge	Supporting Evidence
	and the inconsistency across programs have proved to be "too big a burden for contractors," and led to many contractors opting out.
Complex applications	Stakeholders and manufacturers noted that installers frequently request a simpler application process, including automation of data requests and limited asks for duplicate information uploads and noted that complex application processes can discourage participation, noting in particular that this is true for those for whom English is a second language.
Incentive payout and cash flow	Multiple stakeholders flagged that programs that do not pay incentives fast enough create issues for many installers. In particular, this makes it harder for smaller contractors, who may have less cash on hand, to engage with programs.
Competing offerings	Two manufacturers noted that the availability of gas water heating rebates in Southern California sends mixed market signals.

Demand response requirements

As noted in surveys, 21% of customers expressed being impacted by concerns about grid connectivity and demand response requirements; surveyed installers further noted challenges in HPWH installation due to customer concern around grid connection requirements 33% of the time. While two stakeholders (one at the state level and one at the national level) were positive about HPWH program requirements for demand response connectivity or program enrollment, multiple stakeholders and one manufacturer identified demand response requirements and related complications as a major source of program complexity.

Stakeholders said that imposing onerous demand response enrollment requirements on programs intended to accelerate HPWH adoption can hinder uptake, especially for customers already contending with cost and other barriers. One stakeholder summarized, "With market size where it is, you're sacrificing long-term adoption by shoving everything up front in process." Key themes discussed by those who raised issues are summarized in Table 22.

Table 22. Barriers to demand response programs

Challenge	Supporting Evidence
Benefits do not outweigh the costs	Stakeholders noted limited customer benefits from HPWHs in current grid programs due to low amp draw and minimal demand savings. Some cautioned that load shifting potential may be overstated. Incentives like $100 sign-up and $5 monthly credits were seen as insufficient. One manufacturer said added functionality raises unit cost by $250, and several noted that market share is too low to deliver meaningful grid value.[288] One stakeholder elaborated, "Are we really holding customer interest here? We

[288] One stakeholder acknowledged there may be financial benefits through the time-of-use rates in addition to the $5 per month.

Challenge	Supporting Evidence
	need a better way to get the value that is theoretically there for the grid into the customers' hands."[289,290]
Connectivity issues discourage participation	Stakeholders identified unstable Wi-Fi as a barrier to HPWH demand response participation, especially for hard-to-reach and ESJ households. Another noted they often need to revisit homes to fix connectivity issues, and many don't know how to promote enrollment.[291] One implementer engaged with installers said, "Once you explain demand response, and get over privacy concerns – because that is big for [the] customer – is it worth it? Or are you just jeopardizing the sale of the HPWH?"
Program requirements exclude certain customers	Stakeholders noted that demand response enrollment requirements tied to SGIP HPWH funding through TECH have created eligibility challenges for POU customers.[292,293,294] Another stakeholder noted seeking exemptions to TECH 2.0's demand response requirements for customers unable to participate proved too onerous.[295]

[289] This stakeholder also noted that because demand response programs were relatively "slow to evolve" due to their tariff-based structure that requires multiple steps to CPUC approval.

[290] One stakeholder suggested that demand response initiatives might provide more meaningful benefits if at least 10,000 HPWH units could be available in a program's territory. Another stakeholder suggested demand response programs would be more successful and appropriate once HPWHs achieved at least 60% market share in the program territory.

[291] The SGIP HPWH TECH Handbook requires TECH contractors to take specific trainings covering the contractor's role in meeting TOU and demand response requirements. *SGIP HPWH Program*. https://techcleanca.com/documents/1520/Final_SGIP_HPWH_Handbook.pdf.

[292] One program administrator from a POU described unsuccessful efforts to secure exceptions for customers that did not meet requirements to participate in SGIP HPWH-funded TECH incentives. Another leading manufacturer noted issues with access to the TECH incentive in Los Angeles as a major barrier.

[293] The SGIP HPWH CPUC Decision required customers to enroll in qualified CAISO market-integrated supply-side demand response – to which some POU customers have limited access. ASSIGNED COMMISSIONER'S RULING SEEKING ADDITIONAL COMMENTS ON SELF-GENERATION INCENTIVE PROGRAM AND HEAT PUMP WATER HEATER PROGRAM IMPROVEMENTS. CPUC Ruling Filed July 12, 2023. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M513/K886/513886938.PDF.

[294] Note TECH plans to cover incentives for customers without demand response program access through non SGIP HPWH funding, Stakeholder Workshop, June 2023. https://techcleanca.com/documents/1486/SGIP_HPWH_Stakeholder_Workshop.pdf.

[295] While they were unable to confirm the specifics of access challenges, research suggests that LADWP customers could have had issues with SGIP TECH eligibility due to their lack of access to a demand response program to enroll in. The California Municipal Utilities Association noted in regulatory comments that POU demand response enrollment remained unresolved as of 2023.

HPWH eligibility, cost effectiveness, and California's eTRM

Several stakeholders discussed how programs that operated using energy efficiency ratepayer funding can only offer incentives for measures that are cost effective in the eTRM, which has affected how HPWH incentives are structured. One stakeholder said that the lengthy review period for the eTRM led to excluded measures from the 2025 update that many stakeholders believe should have been included;[296] specifically, the 120-volt HPWH product, which was excluded due to the eTRM's focus on FHR, which one stakeholder described as the "last-minute maximum output rather than most efficient heating of water." The stakeholder said that the GSR program must align with the eTRM, which uses a cost-effectiveness methodology that prioritizes lower up-front cost over efficiency.[297] One stakeholder also noted that residential market access programs typically cannot offer incentives for HPWHs due to cost-effectiveness constraints.

7.1.7 Permitting

Challenges in permitting are well documented in secondary research and flagged as a top barrier to residential adoption of HPWH in the majority of the stakeholder interviews and CalMTA survey results.[298] Interviewed stakeholders – in particular, California PAs and subject-matter experts – cited longer review periods and excessive and untargeted requirements.

A report on the TECH Clean California Streamlining Permitting Pilot found that issuance of an HPWH permit takes an average of 5.9 days, and that timelines and challenges vary widely by jurisdiction.[299] In contrast, building departments typically allow like-for-like replacements of gas water heaters to be permitted over the counter on the same day. Reported reasons for the lengthier permitting time for HPWH were a lack of knowledge of HPWHs by permitting staff, the need to review both electrical capacity and new infrastructure needs, condensate

[296] The stakeholder noted proposed measure updates were due in May 2024 for submission into the DEER for 2026-27 program measures.

[297] The stakeholder noted that affordability programs such as ESA have a different cost effectiveness and may allow a higher up-front cost.

[298] As seen in the CalMTA residential and building owner/property manager surveys, customers reported permitting their water heaters 55% of the time. However, consumers reported a much higher rate of permitted HPWH projects (91%), likely driven by lower rates of HPWH DIY and higher rates of engagement with incentives that require permits.

[299] 5.9 days represents 3.3 days from application to approval and 2.6 days from approval to permit issued. Of the 51 jurisdictions with verified HPWH-permitted projects in the TECH Clean California incentive program during the period examined, 16 jurisdictions had a single-day permit process for HPWHs, and 25 of the 51 jurisdictions issued 75% or more of their HPWH permits in one day or less. TECH Clean California. Accessed May 15, 2025. "Pilot Addresses Barriers to Heat Pump Water Heater Permits." https://techcleanca.com/about/news/pilot-addresses-barriers-to-heat-pump-water-heater-permits/.

requirements,[300] and contractor barriers (such as lacking a license or experience for electrical upgrades).[301]

Interviewed CalMTA stakeholders cited permitting as a major barrier to HPWH adoption, with some avoiding cities that require costly additions like dry wells. Complex site conditions and unclear inspector guidance also make installations difficult or infeasible.[302] San Francisco was noted for requiring multiple permits, making it more expensive than the equipment itself. Despite these challenges, stakeholders generally agreed that permits are important for ensuring quality installations.

7.1.8 Low availability of contractors motivated to promote and install HPWHs

Research indicates that there are contractors not engaging with HPWHs. Gaps remain in California water heater installers' connection with HPWH incentive programs; a 2024 CalNEXT report cites nearly 20,000 licensed California C-36 plumbing contractors,303 while data show that 531 contractors have installed HPWHs through TECH,304 and just over 300 contractors have installed non-central HPWHs through TECH.305 Some likely reasons for limited engagement, or disengagement, with programs are discussed in Incentive program barriers. CalMTA residential survey results also indicate that customer challenges in finding a

> *"I can't say they've raised prices because of rebates, but I will say most contractors enrolled [in TECH] are the bigger and more expensive contractors. [The] top 15 probably represent 70% of installs."*

[300] Some jurisdictions mistakenly reviewed the condensate as if it were acidic flue gas condensate produced by natural gas water heaters.

[301] TECH Clean California. (2024). *Streamlining Permitting and Installation of Heat Pump Water Heaters. Final Pilot Report*. May 14, 2024. https://techcleanca.com/documents/4721/TECH_StreamliningPermittingPilot_Report_v2403_1.pdf.

[302] One interviewed stakeholder who manages installers said they stopped working in one city because they required the installation of HPWHs to be paired with the installation of a dry well (which requires cutting concrete and filling a two-foot hole with gravel). Another interviewed stakeholder mentioned that, in their own home, the existing water heater's placement on the second story and far from the garage, which would need to be accessed for condensate drainage per local permitting, made an HPWH installation cost-prohibitive and infeasible. One program implementer interviewed by CalMTA said that many building inspectors lack an understanding of HPWHs and that their firm has stopped working in one city because they require dry wells, which is dangerous and unnecessary.

[303] CalNext, *op cit.,* June 26, 2024. https://calnext.com/wp-content/uploads/2024/07/ET23SWE0020_Emergency-Replacement-HPWH-Market-Study_Final-Report.pdf.

[304] TECH Clean California. (2015). *13th Quarterly Stakeholder Meeting.* April 2, 2015. https://techcleanca.com/documents/5581/TECH_13th_Quarterly_Stakeholder_Meeting.pdf.

[305] Analysis of unique contractor IDs in public data on HPWH installations through TECH's single-family, multifamily, and income-qualified programs, available from TECH Clean California, last downloaded 30 Sept 2024.

contractor have complicated customers' attempts to install HPWHs.[306]

Research suggests that the number of contractors installing HPWHs is increasing,[307] and many contractors reported that they had begun to install HPWHs in the last several years.[308]

Certain installer segments are more motivated (or able) to install HPWHs. It may be less cost effective, or otherwise less desirable, for smaller businesses or plumbers (vs dual trades) to promote HPWHs. Research indicates that dual trade installers install HPWHs at higher rates than plumbers, general contractors, and handypersons.[309] The research also indicates that smaller businesses install HPWHs less frequently than larger businesses.[310] Stakeholders cited several reasons for this disparity, including limited capacity among plumbers and small contractors to track available incentives, verify customer eligibility, and complete application paperwork on time. Additionally, some installers may not feel the need to take on HPWH work due to already having a steady flow of jobs. Attempts to recruit workers from other trades, such as electricians and other types of contractors, have faced skepticism, as many are reluctant to pursue additional licensing.

Installers identified specific barriers to HPWH engagement. The 2024 Water Heating Market Study found that those who did not install HPWHs reported low customer demand,[311] price, and installation complexity as the top three reasons for not installing. A lack of trained employees was cited by 39% of dual trade (water heater and HVAC) respondents, compared to 13% of

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[306] 22% of purchasers note this in CalMTA Residential Survey Q. B7. 55% of HPWH purchasers said it took them at least a week to find an installer (while only 8% of non-HPWH purchasers reported the same).

[307] CalMTA's installer survey results indicate that 79% of residential water heater installers have experience with HPWH installations, suggesting an increase since a 2022 study found that 70% (of licensed California contractors) had experience with HPWH installations. The assessment also concluded that licensed contractors are found to have a higher rate of engagement with HPWHs.
Opinion Dynamics. (2022). *Technology and Equipment for Clean Heating (TECH) Initiative*. July 15, 2022. https://techcleanca.com/documents/3697/TECH_Baseline_Market_Assessment_Final_Report_8AHwAxk.pdf.

[308] Fifty-two percent (n=35) of installers surveyed in the 2024 Water Heating Market Study reported that their HPWH installations started in or after 2019. https://opiniondynamics.com/california-water-heating-market-study.

[309] Multiple interviewed stakeholders (n=5) spoke to higher rates of HPWH installation and engagement by dual trades installers than by plumbers, though one other interviewed stakeholder felt that in their territory, plumbers and dual trades were evenly engaged. CalMTA survey results indicated dual trades installing HPWHs at a rate of 16%, compared to 12% for plumbers and 9% for general contractors or handypersons. Within 53% of surveyed installers identified by the 2024 Opinion Dynamics study, 55% of dual trades (water heating and HVAC) installers install HPWHs vs. 48% of water heating only installers. Opinion Dynamics, *op cit*.,March 29, 2024. https://opiniondynamics.com/california-water-heating-market-study.

[310] The study found that only 28% of sole operator businesses install HPWHs, compared to 57% of non-sole operators. Additionally, 46% of businesses with fewer than 10 employees install HPWHs, and 63% of businesses with at least 10 employees do so. Opinion Dynamics. *Op cit.*, March 29, 2024.

[311] CalMTA installers also cited low customer demand and reported that customers did not choose HPWHs primarily due to a lack of awareness and uncertainty around bill impacts. CalMTA Installer Survey Q. B8.

respondents who only install water heaters. The time required to complete installation was cited as a reason by 31% of sole operators, compared to 9% of non-sole operators. Installer respondents to the CalMTA survey further reported incentive processes, including customer concerns about required grid connection, permitting, and site returns, as challenges experienced during HPWH installations.[312]

Installers have also reported that water heaters with unfamiliar or more frequent maintenance or repair requirements were less attractive and may contribute to lower recommendation rates. The CalMTA installer survey asked installers about HPWH repair and found that 53% of installers cited the higher cost of repair parts.[313]

Contractors and training

Interviewed stakeholders and research indicate that contractor trainings are successfully growing HPWH awareness and familiarity, but also pointed to the remaining reluctance to participate by many contractors.[314] Installer survey results suggest that while installers who take trainings value them, the contractors who do not take trainings largely have competing priorities.[315,316] It is also likely that contractor training programs are reaching some parts of the state more comprehensively than others.[317]

7.1.9 HPWH availability

Stakeholder interviews and program data reveal that HPWH availability varies across regions of the state. One stakeholder highlighted the absence of big-box retail in their area and noted that HPWHs were neither available locally nor accessed by installers through local channels. CalMTA residential survey results (Figure 25) show that big-box retailers are most likely to prominently display HPWHs (47% of purchasers), while smaller stores are least likely (32%). In regions lacking

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[312] These were reported 73%, 54%, and 21% of the time, respectively. CalMTA Installer Survey Q. D4.

[313] Fifty-three percent of installers also cited limited manufacturer support or training. CalMTA Installer Survey Q. B12. " When servicing heat pump water heater units, what are the most common issues that led to a warranty claim? Select all that apply." (n=111).

[314] BW Research Partnership. (2024). *Workforce Challenges for Zero NOx Requirements - Implementation Working Group Research*. Memo to Bay Area Air Quality Management District. June 6, 2024. https://www.baaqmd.gov/~/media/files/community-health/building-appliance-implementation/workforce-summary-memo-pdf.pdf

[315] 93% of installers were aware of HPWH trainings, 62% reported taking them. CalMTA Installer Survey Q. E3. "Which heat pump water heater training programs are you aware of? Select all that apply."; and Q E5. "Does your employer promote or support water heater training opportunities for employees?"

[316] CalMTA Installer Survey Q. E8. "What are the main reasons why you have not attended a heat pump water heater training? Select all that apply." (n=57)

[317] A presentation by TECH highlighted HPWH contractor availability by county as of October 2024, with some counties served by over 100 contractors, while others have as few as two.
TECH Clean California. 12th Quarterly Stakeholder Meeting October 9, 2024. https://techcleanca.com/events/12th-quarterly-stakeholder-meeting/.

retail or distribution access, customer and contractor awareness of HPWHs is limited. Additionally, in the CalMTA residential survey, 11% of non-HPWH purchasers cited lack of local availability as a key influence on their decision (Figure 32).

7.1.10 Performance

Survey respondents identified certain HPWH performance issues as barriers to adoption, including hot water runouts and noise and vibration of the units.

Hot water runouts. In the CalMTA surveys, 30% of residents and 12% of owners and managers aware of HPWHs disagreed that HPWHs provide sufficient hot water (Figure 17 and Figure 18), and several stakeholders discussed performance issues with HPWHs. Research suggests that rightsizing can mitigate hot water runouts (see *Upsizing and Right-Sizing: Frequency and Complications* in Section 7.1).

Noise and vibration. Manufacturers noted noise and vibration as the primary negative customer perception of HPWHs, especially when installed near bedrooms or kitchens. However, some stakeholders and manufacturers indicated these issues can be mitigated through installation techniques or equipment scheduling. Survey and TECH evaluation findings confirm that noise concerns influence residents' and building owners/property managers' HPWH purchasing decisions and are commonly reported post-installation.[318]

Some interviewed stakeholders also identified the importance of managing product quality and reliability. Stakeholders mentioned various opportunities that could help mitigate performance issues, including developing more consistent and standardized communication and product development, using new form factors, and increasing avenues for education and support from manufacturers to installers.

HPWH benefits and market opportunities

The following section looks at the benefits that HWPHs currently offer and explores opportunities for increased HPWH market adoption identified in primary and secondary research.

7.1.11 Benefits of HPWHs

CalMTA identified the following benefits of HPWHs through primary and secondary research.

Energy cost savings

The greater efficiency of the HPWH means that customers converting from standard electric units will see bill savings, and those replacing other types of water heaters may also see savings –

[318] Opinion Dynamics, *op cit.,* March 27, 2025. https://www.calmac.org/publications/TECH_Updated_Customer_Experience_and_Satisfaction_Report_3.31.2025_Clean_UPDATED.pdf.

though impacts vary by territory and utility rates, as well as climate conditions and operation.[319,320] CalMTA's review of existing research, residential and installer survey results, and interviews indicate that water heater bill savings can motivate customer water heater purchases.[321,322]

Interviews and literature review indicated that bill savings from gas to HPWH conversions are reliably found in SMUD territory and are likely to occur in PG&E territory, while bill impacts are less likely to be favorable in other territories. Several studies reviewing likely net bill impacts are summarized in Table 23.

Table 23. Bill impacts of HPWHs

Study	Supporting Evidence
PG&E, *Net Electric and Gas Bill Impact Study* (2022)[323]	Found that customers switching from gas water heaters to electric HPWHs can achieve net bill savings if enrolled in PG&E's electrification rate schedule, as long as a more-efficient HPWH (with a UEF of 3.7 or higher) is installed and tank temperature set to 120 degrees; PG&E notes this is likely to be conservative, since gas rates are expected to increase at a faster rate than electric rates.
SVCE and PCE, *Bill Impacts of Decarbonizing Existing Single-Family Homes* (2023)[324]	Found that full-home electrification can lead to bill savings in SVCE and PCE territories – operating within PG&E territory – provided the appropriate PG&E utility rate is selected

[319] TECH Clean California. Accessed February 12, 2025. "Heat Pump Water Heater Energy Costs and Usage." https://techcleanca.com/about/energy-costs-and-usage/.

[320] ENERGYSTAR shares that, with efficiency of up to three to four times that of standard electric or gas water heaters, an HPWH serving a family of four could save up to $550 annually and have a payback period of three to six years.
U.S. Department of Energy. Accessed February 9, 2025. "Heat Pump Water Heaters." https://www.energy.gov/energysaver/heat-pump-water-heaters. Also Energy Star. February 2, 2024. *What Goes into the Cost of Installing a Heat Pump Water Heater?* https://www.energystar.gov/products/ask-the-experts/what-goes-cost-installing-heat-pump-water-heater.
However, the higher rate of gas and propane water heating in California means that general marketing on HPWH benefits may not apply to a larger portion of the population.

[321] For example, interviews with installers and distributors reported customers motivated to explore HPWH due to the potential to save on monthly water heating costs in Ameren, Illinois.
Opinion Dynamics, *op cit.* September 15, 2021. https://www.ilsag.info/wp-content/uploads/AIC-Market-Effects-2021-HPWH-Market-Characterization-Report-FINAL-2021-09-15.pdf.

[322] CalMTA residential survey results also share that 72% of purchasers rate picking a water heater that wouldn't increase their utility bill as highly influential to their water heater selection.

[323] PG&E. (2022). *Net Electric and Gas Bill Impact Study for Residential Customers Who Switch from Natural Gas Water Heater to Heat Pump Water Heater, in Compliance with D.21-11-002*. February 7, 2022. https://www.pge.com/tariffs/assets/pdf/adviceletter/GAS_4571-G.pdf.

[324] Stakeholder interviews. Also see Silicon Valley Clean Energy. September 2023. "Bill Impacts of Decarbonizing Existing Single-Family Homes." https://svcleanenergy.org/wp-content/uploads/SVCE-PCE-Single-Family-On-Bill-Impacts-Results-2023.pdf.

Study	Supporting Evidence
NBI, *Plug-In Heat Pump Water Heater Field Study Findings* (2023)[325]	Found average energy cost savings of 50% for PG&E and SMUD customers converting to 120V HPWHs from gas water heating. SCE customers switching from gas water heating experienced comparable costs in the summer and slightly higher costs in the winter.[326]
RMI, *Heat Pumps Can Lower Energy Bills for Californians Today* (2025)[327]	Found that average single-family households in almost all of California can reduce their bills by converting to heat pumps for both space and water heating.

Stakeholders agreed with research that correct rate selection (typically to a TOU or an electrification rate) is critical for optimal bill impacts and also emphasized that HPWHs must be operated in heat pump mode, rather than electric-resistance backup, as often as possible. PG&E's 2022 study showed that customers on low-income CARE rates are expected to see greater savings than non-CARE customers, as electric CARE discounts (35%) exceed gas CARE discounts (20%). Customers switching from propane water heating to HPWHs are also likely to see benefits; one study found households switching from propane to a 120-volt HPWH achieved net energy bill savings of 26% to 41%.[328,329]

Health and safety benefits

HPWHs offer improvements to the indoor air quality when compared to gas water heaters by eliminating the production of toxic combustion byproducts like carbon monoxide, nitrogen

[325] A 120V HPWH also consistently delivers cost savings compared to the pre-existing gas water heaters in PG&E territory under both tiered and TOU rate structures for the higher hot water users. For the lower hot water users, the HPWH results in cost savings under the tiered rate compared to the historical gas maximum rate. However, it does not offer cost savings under the TOU rate structure. Median monthly costs for HPWHs ranged from $26 (tiered rates) to $30 (TOU rates), well below the $71 to $91 median range for gas heaters. (For households of two individuals, daily consumption of 50 gallons is considered high usage. Similarly, for households with four members, daily consumption of 65 gallons is classified as high hot water usage.) Plug-In Heat Pump Water Heater Field Study Findings, July 12, 2023. https://newbuildings.org/resource/plug-in-heat-pump-water-heater-field-study-findings-market-commercialization-recommendations/.

[326] The study concluded this was due to reduced efficiency in colder temperatures and lower gas prices in the SCG territory.

[327] Shea, et al. (2025). *Heat Pumps Can Lower Energy Bills for Californians Today*. Rocky Mountain Institute, April 28, 2025. https://rmi.org/heat-pumps-can-lower-energy-bills-for-californians-today/.

[328] Plug-In Heat Pump Water Heater Field Study Findings. https://newbuildings.org/resource/plug-in-heat-pump-water-heater-field-study-findings-market-commercialization-recommendations/.

[329] See also PG&E estimates in that switching from propane water heating to HPWH would save customers a net of $147 annually in 2020. CPUC, 2020. Resolution E-5073. Approving with modifications Pacific Gas and Electric Company's Advice Letter 5731-E. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M349/K865/349865969.PDF.

oxides, methane, and volatile organic compounds.[330, 331] By eliminating combustion, HPWHs also reduce associated risks of fire or explosion that can occur with gas water heaters.[332]

The BAAQMD estimates that eliminating PM2.5 from water heaters, furnaces, and boilers would eliminate approximately 65 premature deaths, 7,000 lost workdays, 15,000 incidents of asthma symptoms, and 120 new asthma cases per year.[333] They valued the health benefits at approximately $700 million a year. SCAQMD projects that elimination of PM2.5 would prevent 4,000 premature deaths, 16,000 new cases of asthma, and 4,000 emergency room visits.[334]

HPWHs can additionally offer a health benefit by dehumidifying the air as they operate, which helps to prevent the growth of mold and dust mites, which are common triggers for allergies and respiratory issues.[335,336] A 2024 ACEEE study estimates HPWHs specifically provide an average health savings of $68 annually.[337] Removal of gas appliances also provides safety benefits, such as the reduced risk of gas leaks.[338]

One implementer noted that health-related messaging around HPWHs and electrification resonates well with customers. While stakeholders agreed that improved messaging is crucial,

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[330] BAAQMD. February 26, 2021. *2022 AQMP: RESIDENTIAL AND COMMERCIAL* BUILDINGS https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/2022-aqmp-residential-and-commercial-buildings-working-group/2022-aqmd-residential-and-commercial-building-wgm-2.pdf?sfvrsn=6.

[331] ENERGY STAR. Accessed January 22, 2025. "Considerations for Equity in HPWH Programs." https://www.energystar.gov/partner-resources/products_partner_resources/retailer-resources/heat-pump-water-heater-guide/considerations-equity.

[332] ENERGY STAR. Accessed January 22, 2025. "Best Practices and Technical Considerations for Single-Family New Construction." https://www.energystar.gov/partner-resources/residential_new/educational_resources/sup_program_guidance/heat_pump_water_heater_guide.

[333] Sierra Club, SPUR, RMI. 2022. *Gas Appliances and Smog: California's Hidden Air Pollution Problem*. https://www.spur.org/sites/default/files/Gas%20appliances%20and%20Smog%20(NOx%20Report).pdf.

[334] South Coast AQMD. Accessed January 15, 2025. *South Coast AQMD is Conducting Rulemaking that Could Impact Your Home Water Heaters and Furnaces*. https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1111-and-1121/rule-1111-1121-fact-sheet-english.pdf?sfvrsn=6.

[335] Southern California Edison. Accessed March 13, 2025. "Heat Pump Water Heaters." https://www.sce.com/sites/default/files/inline-files/Heat%20Pump%20Water%20Heater%20Fact%20Sheet%20r4_WCAG.pdf

[336] https://rpsc.energy.gov/sites/default/files/tech-resource/attachment/Natl-Grid_Cape-Light-Compact_HPWH_Installation-Guide_2012.pdf.

[337] Gruenwald, et al. (2024). *In the Air Tonight: How Residential Electrification Can Lead to Cleaner Air and Better Health*. 2024 ACEEE Summer Study. https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722160821828_77d49516-2d72-4d23-a843-5086459d4375.pdf.

[338] City of Palo Alto Sustainability and Climate Action Plan Ad Hoc Committee. (2021). *Residential Building Electrification Overview*. https://www.paloalto.gov/files/assets/public/v/1/sustainability/reports/residential-building-electrification-overview.pdf.

views on the most effective focus varied. Although some customers are motivated by health or climate concerns, health benefits were not emphasized in manufacturer interviews or explicitly prioritized by most stakeholders, indicating it may be viewed as a secondary, rather than primary benefit.

Decarbonization and grid resilience

HPWHs are the most energy-efficient choice of water heater in whole home decarbonization. Achievement of decarbonization goals and targeted electrification through strategic gas decommissioning is anticipated to result in large-scale benefits to Californians, including improvements to energy equity and savings on utility bills. Shifting resources to reinforce the electrical capacity will allow widespread retirement of aging gas pipelines that are in need of expensive repair throughout the state.[339,340] The addition of load management of HPWHs further reduces GHG emissions and helps strengthen the resiliency of the electricity grid.[341] See MTI Appendix C. Product Assessment Report for additional details on product efficiency as well as GHG reduction and grid impacts.

7.1.12 Opportunities

CalMTA has identified, through stakeholder and manufacturer feedback (with supporting details provided from secondary and other research), the following opportunities to mitigate barriers to adoption. Note that opportunities described in this section span ideas that may or may not be appropriate for an MTI.

Awareness building of HPWH use and value proposition

Interviewed manufacturers and stakeholders discussed the importance of increasing awareness of HPWHs and highlighting their value proposition. To do so, both groups emphasized the importance of clear communication of decarbonization goals and policies, such as those limiting NOx. Interviewees noted that effective messaging must come in waves through multiple channels. One stakeholder reported that manufacturers had asked program leads for more compelling messaging, saying "don't talk UEF, talk saving money and incentives," and "with the incoming administration, we'll see more talk about money and quality and less [energy efficiency] and decarbonization, new tech, [and] new jobs."

Many interviewees recommended improved communication to retailers and distributors; with the high rates of customer-direct purchase through BIY and DIY installations, and lower engagement

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[339] CEC. (2024). "An Analytical Framework for Targeted Electrification and Strategic Gas Decommissioning: Identifying Potential Pilot Sites in Northern California's East Bay Region." https://www.energy.ca.gov/sites/default/files/2024-06/CEC-500-2024-073.pdf.

[340] Building Decarbonziation Coalition. (2024). "New state report finds that neighborhood-scale building decarbonization saves ratepayers money." July 8, 2024. https://buildingdecarb.org/new-state-report-finds-that-neighborhood-scale-building-decarbonization-saves-ratepayers-money.

[341] https://www.energy.ca.gov/programs-and-topics/topics/load-flexibility/load-management-standards.

of retail through contractor-focused programs such as TECH, greater retail engagement was pointed to as a particularly key opportunity. California's *2024 Water Heater Market Study* proposed strategies to reach DIY customers with marketing and tools specifically to support their adoption of 120-volt units, due to safety concerns with 240-volt DIY installation.[342,343] Surveyed building owners and property managers have reported that case studies would be helpful, as would access to experienced contractors who can speak with authority about the process.[344]

Compelling engagement of new contractors

Increasing the number of contractors who promote and provide quality HPWH installations would address one of the top barriers to HPWH adoption. Stakeholders and manufacturers stressed the need to grow the pool of HPWH installers, recommending continued engagement with community colleges, trade schools, and pre-apprenticeship programs. In survey results, installers indicated that hands-on exposure to HPWHs increases their likelihood of recommending the technology. Training initiatives like the CalNEXT Increasing HPWH Deployment project have helped build contractor familiarity by providing HPWHs for personal use.[345]

One stakeholder emphasized the importance of making sure HPWH trainings follow industry standards and provide a career trajectory, as opposed to standalone trainings on a single appliance type. Existing studies and stakeholder interviews indicate that HPWH trainings would benefit from a standardized curriculum and provide up-to-date and clear information on incentives;[346] one manufacturer recommended a centralized portal that could build installer confidence in available incentives. CalMTA installer survey results also suggest that opportunities may exist in tailoring HPWH adoption strategies by contractor type.

Building market share through focus on electric-resistance water heater to HPWH retrofits

Several manufacturers and stakeholders indicated that targeting "low-hanging fruit" market segments, such as conversion of standard electric to HPWH and use of HPWHs in new

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[342] The *2024 Water Heating Market Study* notes appropriate activities could include educating communities on electrification and promoting panel optimizations like circuit pausers and circuit splitters, panel upgrades, panel replacements, or even smart panels, which could provide savings when paired with demand response programming. (Opinion Dynamics, *op cit.* March 29, 2024.)

[343] Note that in contrast, one interviewed subject matter expert stakeholder suggested that HPWHs were not as complex as most perceive them and warned against requiring more licensing and certification than is required; this stakeholder recommended encouraging purchasers to feel comfortable hiring an installer or choosing to DIY.

[344] *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy.

[345] CalNext. (2024). *Increasing Heat Pump Water Heater (HPWH) Deployment.* October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.

[346] Opinion Dynamics, *op cit*., March 29, 2024. https://opiniondynamics.com/california-water-heating-market-study.

construction, could help build market share and reduce costs, which would ease further market adoption.

New form factors

Several stakeholders noted that product development focused on new form factors could mitigate some of the space limitations that installers face when trying to install HPWHs, which are generally larger than traditional water heater units. Embertec, for instance, offers a split system 120-volt product at a lower price point than many current split system options, and is designed to fit into smaller spaces, such as multifamily and mobile home units. Eco-Logical is another manufacturer that offers product flexibility ranging from 50 to 80 gallons in 120-volt and 240-volt versions, which helps customers choose between multiple options to best suit their needs.[347] GE is re-entering the HPWH market with a product that offers 240-volt and 120-volt operation in one single unit (i.e., convertible dual voltage), allowing greater flexibility.[348]

Bulk purchasing

Bulk pricing may present opportunities for lower pricing. Stakeholders and manufacturers identified bulk purchasing through distributors as a promising strategy for reducing HPWH costs. Efficiency Maine's low-income program was cited as an example, securing discounted units through distributor partnerships. Stakeholders suggested California explore similar models.[349,350]

Many new turnkey direct install programs are using a model in which the implementer is the one to secure the HPWHs installed (rather than an independent installer), which stakeholders have suggested may enable lower costs.[351,352] Several of these new programs use the same

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[347] Ecological Heat Pump Water Heaters. Accessed March 12, 2025. "OMNI SERIES Split System Heat Pump Water Heaters." https://eco-logical.com/wp-content/uploads/2025/07/ECO-03599-Eco-Logical-Omni-Series-2-Page-Broch-v1B.pdf.

[348] Advanced Water Heating Initiative. July 10, 2025. *GE's New Heat Pump Water Heater Takes the Technology to New Heights.* GE's New Heat Pump Water Heater Takes The Technology To New Heights.

[349] Specifically, Efficiency Maine managed to enact a bulk purchase at a rate of $889 per HPWH from distributor Ferguson for 650 HPWH per year. The program also recruited 20 plumbers to supply and install HPWHs for $1,700 using the bulk purchase price.

[350] One manufacturer experienced with Efficiency Maine emphasized that bulk purchases should occur at the distributor level.

[351] Interviewed stakeholders, and secondary research, indicated this shift is a response to a need for wrap-around services for these programs to meet equity goals and to simplify incentive navigation. Interviewed stakeholders also noted that this structure allows program implementers to negotiate lower bulk pricing for HPWHs.

[352] BayREN EASE launched in 2025, replacing past downstream and midstream programming, and operates using a fixed pricing model. EASE incentivizes installations of energy efficient equipment with up to a 20% customer co-pay, or of decarbonization measures up to a 50% co-pay. The October 2024 award of the BayREN "Single-Family Program Design and Implementation Services" to Franklin Energy is posted at https://mtc.bonfirehub.com/opportunities/148358. Franklin Energy was also implementer for the San Jose Home

implementer (Franklin Energy), which may enable benefits through economies of scale. Another program from SCE is offering incentives for measures, including HPWHs, through a turnkey implementer, Synergy, that also uses fixed pricing.[353]

One interviewed manufacturer also highlighted a new program in the Southeast that reduces complexity and cost through HPWH bulk purchasing. Two new manufacturers entering the California market discussed the use of a vertical direct install model in which manufacturers partner with an installer team and enter neighborhoods directly, offering HPWH installations at lower costs. One manufacturer was particularly interested in using this model to support mobile home adoption of HPWHs, but also noted that clarity from HCD was needed regarding the types of allowable exterior installations in mobile home parks (e.g., ground-mounted vs. wall-mounted).

Simplified HPWH program offerings

Interviewed manufacturers and stakeholders, and existing research, indicate a need for simplified program requirements (see *Incentive program barriers*). Changes to the TECH program shared in a July 2025 TECH stakeholder meeting suggest a response to some of the challenges that installers face, including no longer requiring confirmation of customer enrollment in TOU rates before incentive payment to the installer; the program lead, presenting these updates, identified this requirement as "the biggest pain point."[354] The BayREN EASE program also seeks to limit the burden of program complexity by requiring contractors to apply for all available incentives on behalf of the customer, eliminating the need for customers to identify and apply for incentives themselves.

Statewide coordination for permitting standardization and training

Eleven of the 20 interviewed subject-matter experts and stakeholders proposed permitting support and standardization to streamline process and reduce costs as a key opportunity to support HPWH adoption (Table 24).[355] Multiple interviewees noted opportunity for statewide coordination to share best practices, citing multiple existing regional efforts underway.

Appliance Savings Program (closed); is implementer for PCE's Home Upgrade Services program; and is engaged in Market Access Programming. https://sanjosecleanenergy.org/home-appliance-savings-program/. https://www.peninsulacleanenergy.com/residential/home-electrification/full-service-home-electrification/. https://448562.fs1.hubspotusercontent-na1.net/hubfs/448562/Franklin%20Energy/Non-Image%20Downloadable%20Files/Franklin-Energy_Delivered-Grid-Reliability.pdf. SVCE also offers HPWHs through a turnkey direct install program.

[353] SCE also operates a multifamily direct install program. CalMTA stakeholder interviews, January 2025.

[354] TECH Clean California, *op cit.*, July 23, 2025. https://techcleanca.com/documents/5622/TECH_14th_Quarterly_Stakeholder_Meeting.pdf.

[355] The TECH Permitting Pilot findings also included a recommendation that direct support be provided for select jurisdictions during the first 10 to 20 HPWHs permitted within their jurisdictions. *Ibid.*

Table 24. Regional permitting efforts

Region	Description of Permitting Efforts
Santa Barbara Clean Energy	The County's Home Electrification Accelerator Program (launched January 2025)[356] advertises streamlined permitting for HPWH installs.[357]
Ava Clean Energy	This CCA has launched a project to extend SolarAPP+ to include HPWHs by partnering with the SolarAPP Foundation to build out the features in the existing SolarAPP+ software to enable automated permitting for residential HPWH in single-family homes.[358]
San Mateo County	The County plans to pilot HPWH permit streamlining in ten county jurisdictions and in partnership with BayREN codes, exploring an approach similar to that used to improve permitting of solar projects.[359]
Santa Clara County	The County reported to have received a grant to review and improve HPWH permitting.
Heat Pump Access Bill (SB 282)	While no longer moving forward, the "Heat Pump Access Bill," [360] had sought to develop a state-managed program in which installers could become certified and can then self-certify projects, mitigating the need for inspection. The bill also proposed allowing installers who did not undergo the certification process to be certified based on their number of successful installs with no callback.[361]

Stakeholders also suggested that expanding training for inspectors could help streamline HPWH permitting,[362] as well as creating a vehicle for a statewide communication of the best practices from the regional and local pilots exploring HPWH permitting improvements that are currently underway.

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[356] Santa Barbara Independent. (2025). *New Rebates with Fast and Free Permitting for Heat Pump Water Heaters.* August 5, 2025. https://www.independent.com/2025/01/15/new-rebates-with-fast-free-permitting-for-heat-pump-water-heaters/.

[357] Home Electrification Accelerator Program – Guidelines and Terms & Conditions. Updated July 1, 2025. https://sustainability.santabarbaraca.gov/sites/default/files/2025-01/HEAP%20Guidelines_Terms%20%26%20Conditions_1.14.25.pdf.

[358] AVA Community Energy. (2024). "Approving a Resolution to Authorize the Chief Executive Office to Enter into a Two year Agreement with SolarAPPP+Foundation." November 20, 2024. https://avaenergy.org/wp-content/uploads/2024/11/9.-Consent-Item-9-SolarAPP-Contract.pdf

[359] BayREN. "Simplifying HPWH permitting across San Mateo County." https://www.bayren.org/sites/default/files/documents/2024/Permit-Simplification-Board_Dighe-FINAL-wNOTES.pdf.

[360] Co-sponsored by BAAQMD, SPUR, and the Building Decarbonization Coalition (BDC). The Office of Scott Wiener. February 6, 2025. *To Slash Energy Costs, Air Pollution & Climate Emissions, Senator Wiener Introduces Legislation to Streamline Heat Pump Permitting.* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202520260SB282.

[361] The bill was held in committee in May 2025. LegiScan. *California Senate Bill 282*. https://legiscan.com/CA/bill/SB282/2025.

[362] One stakeholder reported running into issues with permitting for 120-volt, since some inspectors did not believe they worked. The stakeholder spoke to an installer that did training for inspectors and suggested this could be addressed further.

Financing

CalMTA survey results indicate that financing is used by some customers, and more than half of owners and managers, and that many installers have integrated it into their recommendations to customers. Stakeholders and manufacturers identified financing as an opportunity to engage the market, with some pointing to the investigation into new financing models underway through TECH and SVCE. One stakeholder suggested financing was a key opportunity to provide capitalization and mitigate up-front costs, which was (according to them) very much needed to support the market following AQMD/CARB zero nitrogen oxides (NOx) rules. They estimated that the rules could drive demand from 300 to 400 installations per year (in their territory) to 10,000 in the next couple of years.[363]

Regulatory proceedings in California acknowledge the potential for improved financing options to support HPWHs.[364] TECH has partnered with SVCE to support the design and launch of a pilot Tariffed On-Bill program following the ENERGY STAR-supported model of inclusive utility investment financing (see Relevant pilots in Section 3.3). Research suggests that point-of-sale (POS) contractor-originated financing is more attractive and accessible to both contractors and customers than more time-consuming options (including the GoGreen Home program).[365] Stakeholders noted opportunity for further research to better understand the financing options currently used by contractors and what additional needs they may have to be better able to support HPWH adoption.

Demand response program design improvements

One interviewed stakeholder suggested that the load shifting benefits of HPWH through demand response could be optimized by adopting an HPWH-specific utility rate. Several interviewed stakeholders also proposed creating a more straightforward exemption process for customers who cannot meet the demand response program requirements.

Other opportunities

Interviewed manufacturers and stakeholders identified the following activities as potential mitigations of adoption barriers:

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[363] Other stakeholders thought financing would not be of interest to customers due to the scale of water heater projects (these stakeholders thought financing would more likely be used for larger projects).

[364] CPUC. Accessed March 15, 2025. "Clean Energy Financing."https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/clean-energy-financing.

[365] A redesign of the GoGreen Home program aims to increase accessibility, but a recent study found that the multistep and multiday process remains unappealing to many contractors. This study further finds that "customers rarely shop around for the best financing offer, and POS lenders have responded to this trend by prioritizing solutions that contractors want to use over options that may offer a better deal to a customer." CalNext, *op cit.*, December 6, 2024. https://calnext.com/wp-content/uploads/2024/12/ET23SWE0063_Residential-Heat-Pump-Financing-Mechanisms-Analysis_Final-Report.pdf.

- **Dedicated program budget for HPWH incentives:** Interviewed manufacturers suggested establishing separate budgets for HPWHs, identifying that HVAC heat pumps and HPWHs are often funded from the same budget, and that, given the HVAC heat pump market's greater maturity and access to a sales-savvy contractor base, this results in greater HVAC installations and reduced budget to support HPWHs.
- **Program design to support small contractors:** One stakeholder said they would consider a set-aside for small contractors that could be used to direct program dollars to mitigate cash flow issues experienced by small contractors, which can bar their participation in programs.[366] Another stakeholder suggested cash flow financing as a respectful way to mitigate this issue.
- **Improved HPWH controls:** One stakeholder suggested standardizing unit controls to simplify demand response participation, describing it as a "turn-on, not an add-on" approach. Another noted that controls and electronics are a newer challenge for a traditionally hardware-focused industry and may require improvement.
- **Pre-planning for space requirements in the multifamily sector:** One developer has shared information on a multifamily project in which louvered doors addressed the ventilation issues they faced in upgrading their multifamily buildings to in-unit HPWHs – but also noted this added time and project complexity.[367] However, there may be households in which venting or louvered doors do not resolve airflow concerns, because they may deliver air that is too cold.[368]

Weighting methodology

Weighting is a statistical technique used to adjust the sample data to reflect the actual population of interest. The goal of applying weights is to extrapolate results from the sample to the population. CalMTA applied weights to the residential HPWH residential customer survey and the respective building owner and property manager survey, based on each survey's respective target population and sample target variables. For the residential customer survey, the goal was to ensure that the survey was representative of all households in California. For the building owner and property manager survey, the goal was to ensure that the survey aligned with the distribution of rented households in California.

Weighting variables

Residential customer survey

[366] One stakeholder identified this payment structure as a barrier to unionization, clarifying that union contractors must pay weekly—otherwise, their assets could be frozen, potentially putting them out of business.
[367] *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy.
[368] CalMTA stakeholder interviews, December 2024 to February 2025.

The team selected four target variables to use for weighting for the residential survey, based on available data. Table 25 provides a summary of the data sources, and their associated population proportions, used to develop population estimates used for weighting.

Table 25. Population proportions for variables used to inform weighting for residential survey

Variable	Stratum	Population Proportion (13.7 million)	Adjusted Population Proportion (11.5 million)[a]	Source
Climate Region[369]	Coastal	35%		CA Energy Commission; California Open Data Platform
	Inland and Desert	65%		
Electric Utility	SDG&E	10%		Form EIA-861 Annual Electric Power Industry Report
	PG&E	36%		
	SCE	32%		
	Other	22%		
Housing Segment[370]	Single-Family	64%	77%	ACS DP04 – Selected Housing Characteristics
	Multifamily	32%	19%	
	Mobile Homes and Other	4%	4%	
Environment and Social Justice (ESJ)	Respondents with household zip codes[371] classified as "ESJ" OR that	59%		https://calenviroscreen-oehha.hub.arcgis.com/#Data

[369] Climate region populations were established by taking the populations from the ZIP codes from each climate zone. Population by ZIP code was identified from https://data.ca.gov/dataset/ca-ZIP-code-boundaries.

[370] Housing segments were summarized directly from the recalibration of RECS 2020 data conducted using the ACS 2025 data. Classification of housing segment follows Census's definitions, which make a distinction between attached single-family homes and multifamily buildings. "A structure is a separate building which either has open space on all four sides or is separated from other structures by dividing walls that extend from ground to roof. In double houses, row houses, and houses attached to nonresidential structures, each building is a structure if the common wall between them goes from ground to roof." Two homes that are physically attached – such as townhouses or row homes - are treated as single-family attached under this definition, as long as each unit is in its own structure and contains only one housing unit. Multifamily applies when there are multiple units within the same structure. https://www.census.gov/housing/hvs/definitions.pdf.

[371] ZIP codes present in CalEnviroScreen 4.0 (https://calenviroscreen-oehha.hub.arcgis.com/#Data) have been classified by Cadmus as "ESJ" ZIP codes, or "non-ESJ" ZIP codes, based on whether or not they are at least 60% (by population) made up of census tracts that are: (1) identified as disadvantaged communities (DACs) in CalEnviroScreen 4.0, (2) identified as DACs in the 2017 CalEnviroScreen, OR (3) left without an overall CalEnviroScreen score but score in the top five percent for pollution burden per CalEnviroScreen 4.0. These checks are made to align with the components of ESJ identified in the CPUC ESJ Action Plan 2.0. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/esj/esj-action-plan-v2jw.pdf.

Variable	Stratum	Population Proportion (13.7 million)	Adjusted Population Proportion (11.5 million)[a]	Source
	report income ≤ 80% AMI[372] [373]			
	Respondents that neither have household zip codes classified as "ESJ" NOR reported income ≤ 80% AMI	41%		

a: Adjustment reflects updated population proportions after removing 50% of occupied multifamily households that are assumed to be served by central water heating.

CalMTA developed the population used in the weighting by starting with the total number of occupied households in California[374] (13,699,816 households) and applying an assumption that 50% of occupied multifamily households in California are served by central water heating and therefore not represented by the survey respondents.[375] The survey team therefore removed 2,186,785 households (50% of total multifamily households) from the total population of

[372] Area median incomes are reviewed as defined by county in https://sf.freddiemac.com/working-with-us/affordable-lending/area-median-income-and-property-eligibility-tool, downloaded March 18, 2025. A four-person household is assumed for the quota, due to a lack of data on household count that can be tied to specific reported incomes. Household count will be reviewed in post-survey analysis.

[373] Analysis conducted to combine ZIP codes identified as ESJ, and respondents with income at 80% of below AMI are described in a section below.

[374] U.S. Census Bureau: California Total Households by Occupancy Status. This source provides the total number of both occupied and vacant housing units in California. For our population counts, we use the number of occupied households.

[375] The prevalence of central water heating systems is not well documented but has been estimated by subject-matter experts and cited in some sources as serving approximately 50% of multifamily. See minute 6:16, *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy. Also New Buildings Institute's Central Heat Pump Water Heater Market Research (2023-2025) https://static1.squarespace.com/static/605d0aa46f4b6f47e0ab88af/t/68266ae73e7ed6516015a59f/1747348205401/NBI_MAGIC_MarketResearch_202505.pdf estimating 47% in-unit and 53% central systems. One stakeholder involved in multifamily program implementation in California shared that this percentage varies depending on building size and geography, with approximately one-third of urban multifamily having in-unit water heating, but that the prevalence of in-unit water heating is around 80% to 90% in more rural areas. This stakeholder also shared that central water heating is more common in multifamily buildings with four or more stories. Data from RASS is limited, given only 48% of multifamily responded with proposed types asked about water heaters serving households, and the rest shared Not Applicable.

occupied households, resulting in a final population of 11,513,033 households, to which the survey was weighted.

The population proportions by housing segment were appropriately updated in the weighting to reflect this decrease in the multifamily population. Due to a lack of data on the distribution of multifamily households in California across the other variables, remaining multifamily households were assumed to occur evenly across the other variables listed in Table 26, and these population proportions were not adjusted.

Building owner/property manager survey

The team used two variables to weight the building owner and property manager survey. The population used as a starting reference in analysis of the building owner and property manager survey was 5,777,597, which is the total number of rental dwellings in the state.[376] CalMTA weighted survey findings by the number of rental dwellings managed so that results reflect the rental market as a whole, rather than giving equal weight to each property manager.

Table 26. Population proportions for variables used to inform weighting for building owner/property manager survey

Variable	Stratum	Population Proportion (5.8 million)	Population Proportion, Adjusted Pop. (3.9 million)	Source
Electric Utility	SDG&E	10%		Form EIA-861 Annual Electric Power Industry Report
	PG&E	36%		
	SCE	32%		
	Other	22%		
Single-Family vs. Multifamily	Single-Family	35%	52%	ACS DP04 – Selected Housing Characteristics
	Multifamily	65%	48%	

Similar to the residential survey, the building owner and property manager survey used the assumption that 50% of occupied multifamily households in California are served by central water heating and therefore not represented by the survey respondents. These rental dwellings (totaling 1,877,719 units) were therefore excluded from the population to which the survey was weighted, creating a final population of rental dwellings assumed to have at least one water heater dedicated to their household of 3,899,878.

The population proportions by housing segment were appropriately updated to reflect this decrease in the weighted multifamily population. Due to a lack of data on the distribution of

[376] U.S. Census Bureau: 2022 1-Year American Community Survey PUMS file – csv_hca.ZIP.

multifamily households in California across electric utilities, multifamily households were assumed to occur evenly across electric utilities, and these population proportions were not adjusted.

Weighting methodology detail

To apply the weights, CalMTA used a method called raking, or iterative proportional fitting. Raking uses iterative post-stratification to match marginal distributions of a survey sample to known population margins. The algorithm starts with initial weights and then calculates adjustment factors based on the ratio of the population proportion to the sample proportion for a given variable, and multiplies the weights by these factors to match the marginal totals. This process is repeated several times for each variable until the weights converge to a satisfactory match with the population totals.

Like the tool working the soil in alternate directions till it is smooth, the raking method adjusts weights over several iterations to get the distribution of the weighted survey sample to align with the distribution of the population, based on the selected characteristic variables. Raking is relatively simple to implement, only requiring the population and sampling distributions for each variable chosen for the weighting scheme. According to Pew Research Center, raking is the standard weighting method used by them and many other public pollsters.[377]

The team utilized R to generate the survey weights, specifically the rake function from the survey package. The function takes in the sample distribution (counts) for the target variables along with the population distribution (counts) of the same target variables to generate the final weights. The number of iterations required to generate the weights depends on the number of target variables. Since six target variables were chosen, the team set the maximum iterations to 20 to ensure convergence to weights that most balance out the survey data.

ESJ and area median income intersection calculations and assumptions

To determine the best estimate of the population of households that were either within ESJ zip codes (as defined above) or qualifying as at or below 80% of Area Median Income (AMI), the team assessed the population of each, as well as the overlap between the two populations. In this analysis:

(A)	The team calculated the population of the ESJ zips as the population of the census tracts with such zip codes, as represented in CalEnviroScreen 4.0. Based on the database's total population of 39,283,497, the 326 ESJ zip codes with a population of 10,473,554 represent 26.7% of the CES 4.0 population.

[377] Mercer, et al. (2018). *How Different Weighting Methods Work.* Pew Research Center. Retrieved from https://www.pewresearch.org/methods/2018/01/26/how-different-weighting-methods-work/.

(B)	The team calculated the population of households at or below 80% of AMI using the percentage of households reporting income at or below 80% of AMI for a household of four persons[378] as defined for their county[379] in a given census tract. Multiplying the percentage of households at or below 80% AMI for each census tract by each tract's population results in an estimated population 16.3 million, or, as a percentage of 39.7 million, 40.9% of that database's population.
(C)	The team calculated the overlap between these populations as the total population to be estimated at or below 80% of AMI, by percentage of population within each census tract, that overlapped with census tracts already assigned to ESJ zip codes. Given CalEnviroScreen 4.0 uses 2010 census data[380] for its census tracts, and the team saw value in using the most recent census data's income levels, census tracts needed to be crosswalked for this analysis. The team used the 2010-2020 census tract crosswalk developed by Drexel University and hosted on Brown University's Longitudinal Tract Database (LTDB) website.[381] This overlap was calculated as approximately 3.5 million.

The final numbers representing the ESJ population in the analysis, per the above, are (A) + (B), minus (C), for a total estimate of 23.4 million, or 58.9% of the population.

Installer survey

While the population of licensed water heater installers may be informed by databases such as the California State Licensing Board, the total population of unlicensed water heater installers in California – which research has shown to be a substantial portion of residential water heater

[378] As it was not feasible/pragmatic to analyze AMI for all distinct household counts, the standard four-person household AMI was used across all data.

[379] This analysis assigned a percentage of each census tract by population as at or below 80% AMI as calculated using the 2024 census field "MSA/MD median family income," and the percentage of families reporting income at different levels; these fields are populated using American Community Survey (ACS) 2020 5-year estimates. See for reference, 2024 State Income Limits Briefing Materials (California Housing and Community Development): *"In estimating FY 2024 median family incomes, HUD uses median family income data (as opposed to median household income data) from the 2022 American Community Survey (ACS) as calculated by the Census Bureau. The Census Bureau produces two types of ACS estimates: the "one-year" data, which represent estimates as of 2022; and the "five-year" data, which represent estimates as of 2018-2022 (but are inflated to 2022 dollars)."* https://www.hcd.ca.gov/sites/default/files/docs/grants-and-funding/income-limits-2024.pdf. Also https://www.huduser.gov/portal/sites/default/files/pdf/Assessment-of-Small-Area-Median-Family-Income-Estimates.pdf.

[380] https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf.

[381] https://s4.ad.brown.edu/projects/diversity/Researcher/LTDBDPDload/Default.aspx.

installations – is more difficult to assess. CalMTA therefore weighted the installer survey within the survey itself, by number of reported installations, unless otherwise specified.

The team used the number of water heaters installed by a respondent for weighting the installer survey. In the survey, respondents were asked to provide an approximate count of the number of water heaters they install annually. Weights were calculated by dividing each respondent's annual count of installed water heaters by the sum total of water heater installations across all survey respondents. Respondents that installed more units in a year received larger weights than those that did not install many units. The sum of weights for this survey added up to 1. Population totals for the count of water heater installers in California were not available.

ESJ classification of installers

CalMTA analyzed the ESJ segment based on two different data points reported by the respondent installer: (1) the installer's business zip code[382], and (2) the zip codes in which the installer reported most frequently installing water heaters. Similar to the approach taken in the ESJ classification in the residential survey, CalMTA reviewed zip codes to determine whether they met at least one of the following criteria: having an income at or below 80% of the area median income as determined by county-level thresholds from the California Department of Housing and Community Development (HCD), residing in a zip code where at least 60% of the population lives in census tracts identified as disadvantaged communities per CalEnviroScreen 4.0 (2017 data), or residing in a zip code where at least 60% of the population lives in census tracts identified as ranking in the top 5% for pollution burden.

Resulting samples (unweighted)

Residential survey

Table 27 shows the final sample by key segments.

Table 27. Achieved residential survey sample by IOU, housing segment, and ESJ-status

Strata	Single-Family		Multifamily		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
Coastal: All	**96**	**46**	**98**	**23**	**43**	**8**	**314**
PG&E	39	10	53	6	31	1	140
SCE	19	11	17	6	4	3	60
SDG&E	26	22	27	11	5	3	94
Other	12	3	1		3	1	20
Inland: All	**227**	**84**	**112**	**22**	**86**	**11**	**542**
PG&E	64	16	27	3	29	3	142
SCE	81	31	57	15	36	4	224

[382] This approach is also taken in a recent assessment of TECH Key Performance Indicators. https://www.calmac.org/publications/TECH_Clean_California_Key_Performance_Indicator_Assessment.pdf.

Strata	Single-Family		Multifamily		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
SDG&E	29	19	4		12	3	67
Other	53	18	24	4	9	1	109
Total	**323**	**130**	**210**	**45**	**129**	**19**	**856**

Note: Unweighted data shown to describe the raw sample characteristics. All other survey results in this report are weighted to reflect the target population.

Table 28 provides response rates for residential HPWH purchasers, and Table 29 shows results for aware respondents.

Table 28. Achieved residential purchasers sample by region, by IOU, housing segment, and ESJ-status

Strata	Single-Family		Multifamily		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
Coastal: All	**38**	**23**	**34**	**11**	**17**	**5**	**128**
PG&E	13	3	23	2	10		51
SCE	9	4	4	2	2	2	23
SDG&E	13	16	7	7	3	3	49
Other	3				2		5
Inland: All	**105**	**42**	**29**	**8**	**28**	**6**	**218**
PG&E	33	7	5	1	8	2	56
SCE	32	17	16	6	9	1	81
SDG&E	20	16	1		10	3	50
Other	20	2	7	1	1		31
Total	**143**	**65**	**63**	**19**	**45**	**11**	**346**

Note: Unweighted data shown to describe the raw sample characteristics. All other survey results in this report are weighted to reflect the target population.

Table 29. Achieved sample of residents aware of HPWHs by region, IOU, housing segment, and ESJ-status

Strata	Single-Family		Multifamily		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
Coastal: All	**43**	**25**	**48**	**12**	**18**	**6**	**152**
PG&E	17	5	31	3	11		67
SCE	6	6	5	2	1	3	23
SDG&E	16	13	12	7	3	3	54
Other	4	1			3		8
Inland: All	**102**	**55**	**54**	**14**	**33**	**5**	**263**
PG&E	30	8	14	2	10	1	65

Strata	Single-Family		Multifamily		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
SCE	35	18	26	11	13	1	104
SDG&E	19	16	3		8	3	49
Other	18	13	11	1	2		45
Total	**145**	**80**	**102**	**26**	**51**	**11**	**415**

Note: Unweighted data shown to describe the raw sample characteristics. All other survey results in this report are weighted to reflect the target population.

Building owner/property manager survey

Table 30 contains the final sample by key segments. The final sample exceeds the target (of 92 respondents) due to additional responses needed to fulfill the quota of ESJ respondents.

Table 30. Achieved building owner and property manager sample by IOU, housing segment, and ESJ-status

Strata	Single-Family		Multi-family		Mobile		Total
	ESJ	Non-ESJ	ESJ	Non-ESJ	ESJ	Non-ESJ	
Coastal: All	**5**	**27**	**0**	**7**	**0**	**1**	**40**
PG&E	3	14	0	1	0	0	18
SCE	1	3	0	0	0	1	5
SDG&E	1	7	0	6	0	0	14
Other	0	3	0	0	0	0	3
Inland: All	**36**	**58**	**12**	**13**	**2**	**1**	**122**
PG&E	16	21	3	3	0	0	43
SCE	11	25	5	4	2	0	47
SDG&E	8	8	3	3	0	1	23
Other	1	4	1	3	0	0	9
Total	**41**	**85**	**12**	**19**	**2**	**2**	**162**

Installer survey

Table 31, Table 32, and Table 33 contain the final sample by key segments.

Table 31. Achieved installer sample by territory and ESJ designation

	PG&E	SCE	SDG&E	Other	Coastal	Inland	Total
Installer – Total	53	57	35	4	29	120	149
Installers – ESJ (Business zip)	28	32	14	0	2	72	74
Installers – Non-ESJ (Business zip)	25	25	21	4	27	48	75

Table 32. Achieved installer sample by installer type

	PG&E	SCE	SDG&E	Other	Coastal	Inland	ESJ	Non-ESJ
Installers – Total	53	57	35	4	29	120	74	75

	PG&E	SCE	SDG&E	Other	Coastal	Inland	ESJ	Non-ESJ
Installers – Plumber Only	23	10	14	1	16	32	20	28
Installers – Dual Trade	20	33	15	3	6	65	40	31
Installers – GC/ Handyperson	10	14	6	0	7	23	14	16

Table 33. Achieved installer sample by installer licensing

	C-36 Plumbing License		C-20 HVAC License		General Building Contractor License		C-10 Electrical License	
	Personally Holds	Employer Holds	Personally Holds	Employer Holds	Personally Holds	Employer Holds	Personally Holds	Employer Holds
Installers – Total	**77**	**54**	**79**	**55**	**86**	**51**	**72**	**62**
Installers – Plumber Only	30	14	24	21	32	12	27	19
Installers – Dual Trade	39	26	46	21	43	24	35	30
Installers – GC/Handyperson	8	14	9	13	11	15	10	13

Source: CalMTA Installer Survey Q. E1. "Which of the following licenses or certifications do you or the company you work for currently hold? Select all that apply." (n=149)

Zip code and climate zone mapping

CalMTA characterized the samples by key characteristic variables such as climate zones and regions. To identify the climate zone for the survey sample, we applied the California Energy Commission (CEC) mapping of zip code to California Building Climate Zones.[383]

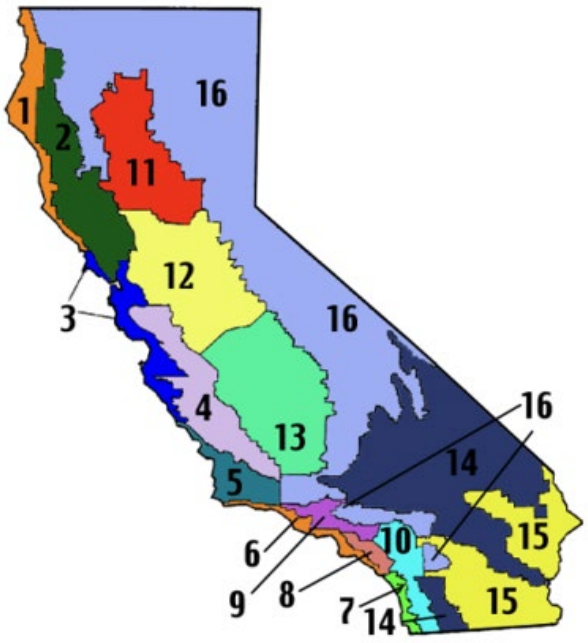
CalMTA then developed broader definitions of climate regions for the survey sample by mapping the CEC climate zones to regions, as identified by the CPUC Impact Evaluation of Water Heating Measures report.[384] These climate regions are listed below and shown in Figure 71:

1. Coastal/Mild Climate Region: Includes CEC climate zones 1, 2, 3, 4, 5, 6, 7, and 16.
2. Inland Climate Region: Includes climate zones 8, 9, 10, 11, 12, 13, 14, and 15.

[383] https://www.energy.ca.gov/media/3560.

[384] DNV. (2019). *Impact Evaluation of Water Heating Measures*. Retrieved from https://www.calmac.org/publications/CPUC_Group_A_Report_Water_Heating_PY_2019_Final_CALMAC.pdf.

Figure 71. CEC climate zones



Research instruments

HPWH incentive programs

Table 34 lists the programs and resources to lower the up-front cost to HPWH installations in California and summarizes eligibility for each program by project type and housing segment[385], shares details on incentive levels, and indicates whether the program's website co-markets financing or training opportunities. More than 50 programs have been identified as making incentives available to HPWHs, not counting demand response programs, or HPWH emergency loaner programs. Of these, 32 have been identified as active as of September 2025.

Table 34. Programs incentivizing HPWHs (as of September 2025)

Program Name	Program Administrator	Status (September 2025)	Incentive ($)	Project Type, Segment					Type	Eligibility	Co-Marketing	
				New Con.	Retrofit	Single-Family	Multifamily	Mobile Home			Financing	Training
HPWH Rebate[a]	Alameda Municipal Power	Available	Rebates up to $1,500 when install HPWH	--	--	✓	--	--	Downstream	Current AMP account holder, must replace a natural gas water heater.	--	--
BayREN Multifamily Property Owners[b]	BayREN	Not Available	Rebates at $500 - $6,000+ per unit	--	--	--	✓	--	Downstream	Project must save 10% or more of whole building energy use Multifamily property of five units or more in the nine-county Bay Area	--	--
BayREN Home+ Program[c]	BayREN	Not Available	Offered moderate-income customers low-cost upgrades and expert guidance	--	--	✓	--	--	Downstream	Single-family homeowners in BayREN (nine-county Bay Area) territory	--	--
EASE Program	BayREN	Available	Incentivizes installations of energy-efficient equipment including HPWHs with up to a 20% customer co-pay, or of decarbonization measures up to a 50% co-pay.[d]	--	✓	✓	--	--	Direct install (Downstream)	Residents located in the counties of Alameda, Contra Costa, Marin, San Francisco, Solano, and Sonoma	--	--
Low Income Weatherization Program - Multi-Family and Farmworker Housing[e]	California Community Services Department	Unconfirmed	Covers 30% to 100% of energy efficiency upgrades and 50 to 100% of solar installations. No-cost services through Farmworker Housing Component[f]	--	✓	--	✓	--	Downstream	Low-income multifamily with at least five units OR farmworker Single-family housing	--	--
Weatherization Assistance Program	California Community Services Department	Unconfirmed	No-cost replacement of hot water systems[g]	--	✓	✓	--	--	Downstream	Income-qualified households	--	--
BUILD[h]	California Energy Commission	Available	$500 per JA13-compliant HPWH installed in an income-qualifying new construction project	✓	--	✓	✓	✓	Midstream (to Builder)	Private or public owner or developer, nonprofit, or tribal community	--	--
HOMES P4P[i]	California Energy Commission	Not yet available	$.55 or $1.10/kWh saved up to 100% project cost	--	✓	✓	✓		Downstream	ENERGY STAR equipment, Income verification, non-duplication with other federal programs	--	✓

[385] While the table stratifies "housing segment" into single family, multifamily, and mobile home, it should be noted that the TECH program defines multifamily as any property with two or more units, while many other programs define multifamily as having five or more units.

Program Name	Program Administrator	Status (September 2025)	Incentive ($)	Project Type, Segment					Type	Eligibility	Co-Marketing	
				New Con.	Retrofit	Single-Family	Multifamily	Mobile Home			Financing	Training
Equitable Building Decarbonization Program	California Energy Commission	Not yet available	No-cost retrofits for low-income, + electrical upgrade coverage of $6,000/single-family and multifamily unit and $7,200/manufactured and mobile homes. ($567M in funding total.)	--	✓	✓	✓	✓	Downstream	Low-income or in low-income or under-resourced communities and homes determined most likely to benefit	✓	--
California Electric Homes Program[j]	California Energy Commission	Available	HPWH incentives for new construction; bonus incentives are also available for HPWH controllers (modular controller compliant with CTA-2045 or integrated controller)[k]	✓	--	✓	✓	--	Midstream (to builder)	TMVs are required for non-ADU installs unless using a recirculation loop NEEA Tier 3+ HPWHs	--	--
Electrify Your Home[l]	Central Coast Community Energy	Not Available (anticipated October 2025)	Grid-Connected Heat Pump Water Heater Incentives	--	--	✓	✓	--	Midstream	All contractors enrolled in TECH Clean California are eligible	--	✓
HPWH Rebate[m]	City of Healdsburg	Available	$500 per unit for new construction, existing electric heater, or system with gas back up. $2,000 per unit, if existing gas water heater is fully removed	✓	--	✓	✓	--	Downstream	ENERGY STAR certified, 3.30 Unified Energy Factor or higher	--	--
Full-Service HPWH (FS HPWH) Program	City of Palo Alto Utilities	Available	$2,300 (remainder paid by City), $1,000 credit for site preparedness[n]	--	✓	✓	✓	✓	Downstream	Must replace gas water heater	✓	--
Electrification Pilot Rebate Program[o]	City of Piedmont	Available	Standard HPWH rebate: $800; Income-qualified rebate: $1,600	--	--	✓	✓	--	Downstream	Applicant must be a City of Piedmont property owner and provide proof of ownership	--	✓
Residential New Construction Electrification Program[p]	City of Redding	Available	$1,800 HPWH Rebate	✓	--	✓	✓	--	Midstream	Must be a developer, general contractor, or owner-builder. ENERGY STAR Certified HPWHs with UEF ≥ 3.09.[q]	--	--
Residential Electrification Rebates (HPWH)[p]	City of Redding	Available	$1,000 HPWH Rebate	--	--	✓	--	--	Downstream	Must replace natural gas water heater. A final City of Redding Building Permit is required.	--	--
HPWH rebate[r]	City of Roseville	Available	Electric to Electric $1,000 rebate. Gas to Electric $2,500 rebate		✓	✓	--	--	Downstream	HPWH must be NEEA Tier 3 or 4 rated unit.	--	--
Residential Rebate Program[s]	City of Shasta Lake	Available	$625 rebate per unit	--	--	✓	✓	✓	Downstream	Residential customers	--	--
CleanPowerSF HPWH Bill Credit[t]	CPSF	Available	Receive a $50 monthly bill credit for two years, three if CARE/FERA enrolled	--	✓	✓	✓	✓	Downstream	CleanPowerSF account holder	--	--
RISE Homes[u]	CPUC	Not Available	Ultra-Low GWP Refrigerant HPWH Base Incentive Amount: $3,000	✓	--	✓	✓	✓	Downstream	Property owner or account holder of participating IOU prior to or after disaster event	--	--
TECH 2.0 (SGIP HPWH)	ES, SCE	Not Available[v]	$3,100 ($4,185 low income) + $700 for ≥55 gallons, +$1,500 for low GWP systems,	--	✓	✓	✓	✓	Midstream	Unitary HPWH	✓	✓

Program Name	Program Administrator	Status (September 2025)	Incentive ($)	Project Type, Segment					Type	Eligibility	Co-Marketing	
				New Con.	Retrofit	Single-Family	Multifamily	Mobile Home			Financing	Training
			+$2,000 ($4,000 low income) for electrical upgrades									
TECH HEEHRA (Multifamily)	ES, SCE	Available[v]	HPWH (Electric to Electric) $700 In-Unit HPWH $1750[w]	--	--	--	✓	--	Midstream	LMI multifamily with five or more residential units	✓	✓
TECH GGRF	ES, SCE	Single-Family Available; Multifamily pending[v]	$1,100 NorCal incentive, $2,100 SoCal incentive for market rate HPWH projects and $3,500 for equity projects, +$700≥55 gallons, +$1,500 for low GWP systems. Electrical incentives are discontinued.	--	✓	✓	✓	✓	Midstream	Demand response/TOU enrollment still required but confirmation not required for contractor payment	✓	✓
TECH AB 157 (Aliso Canyon Disaster Areas)	ES, SCE	Not yet available[v]	TBD	--	✓	✓	✓	✓	Midstream	Must be in Aliso Canyon Disaster Areas in SoCal Gas territory	✓	✓
Energy Efficiency Home Improvement Tax Credit	Federal	Available	Up to $2,000 capped at 30% of install cost, plus up to $1,200 for audit, envelope measures.[x]	✓	✓	✓	✓	✓	Tax Credit to Customer	Customer must have a tax liability to recoup	--	--
San Joaquin Valley (SJV) Pilots[y]	IOUs, RHA	Not Available	No-cost upgrades to select customers lacking gas service	--	✓	--	--	--	Downstream	Income-qualified	--	--
Consumer Rebate Program[aa]	LADWP	Available	$1,500 Rebate for replacement of gas water heater with HPWH	--	✓	✓	✓	✓	Downstream	LADWP account holder ENERGY STAR® Qualified HPWH of uniform energy factor (UEF)[a] ≥ 3.3[z]	--	--
Lodi ENERGY STAR® Hybrid/HPWH Rebate [ab]	Lodi Electric Utility	Available	Rebate: $500	--	--	✓		--	Downstream	Offered to Lodi Electric Utility residential customers	--	--
Electrify Marin[ac]	Marin County	Available	$500 for standard, $2,000 income-qualified to replace gas or propane water heater with NEEA Tier 3+ HPWH	--	✓	✓	--	--	Downstream	Must replace gas or propane appliance	--	--
HPWH incentive program (MCE Clean Energy)[ad]	MCE	Available	$1,000 rebate to contractors enrolled in its HPWH incentive program. May layer with BayREN, TECH and MCE Strategic Energy Management incentives	--	✓	✓	--	--	Midstream	MCE territory customers	--	✓
Multifamily Energy Savings Program[ae]	MCE	Available	up to $6,000 per HPWH unit plus additional funding for electrical upgrades	--	✓		✓	--	Downstream	MCE territory. Must have five+ units and either be deed-restricted or offer affordable housing	--	--
HPWH rebate [af]	Modesto Irrigation District	Available	$500 Rebate per unit	--	--	✓	--	--	Downstream	Must qualify as an ENERGY STAR HPWH. Must replace electric tank storage water heater.	--	--
HPWH Rebates[ag]	PCE	Available	Rebate up to $2,500 for gas to HPWH, $500 for electric to HPWH	--	✓	✓	✓		Downstream	Resident or owner where upgrades are installed. May be contractor or DIY.	✓	--
Home Upgrade	Peninsula Clean Energy (PCE)	Available	Low-cost or (for income-qualified) no-cost electrification through PCE-negotiated fixed prices via PCE contractor[ah]	--	✓	✓	--	--	Midstream/ Downstream	Single-family homeowners, <five-unit home; upgrade must include HVAC HP or HPWH	✓	--

Program Name	Program Administrator	Status (September 2025)	Incentive ($)	Project Type, Segment					Type	Eligibility	Co-Marketing	
				New Con.	Retrofit	Single-Family	Multifamily	Mobile Home			Financing	Training
CA Energy-Smart Homes (Statewide)[ai]	PG&E	Available	SF: $3,000 and MF: $1,600	✓	--	✓	✓		Downstream	PG&E, SCE, or SDG&E customer	--	--
ESA Northern Multifamily Whole Building (MFWB)	PG&E	Unconfirmed	No-cost in-unit upgrades, including HPWHs and tankless water heaters	--	--	--	✓	--	Downstream	Residents living in MF properties, property owners of MF properties	--	--
HPWH Rebates	PG&E	Unconfirmed	$750 per unit for HPWH replacement of either electric or gas unit through the Comfortable Home Rebates Program[aj]	--	✓	--	✓	✓	Downstream	PG&E account holder. Units must be 3.24 EF / 3.09 UEF or better	--	--
Powerful Neighbors[ak]	PG&E	Available	Free to participate and upgrade to HPWH, with full electrification of customer's and neighboring homes	--	✓	✓	✓		Downstream	Homes and businesses in select neighborhoods	--	--
Heat Pump Rebates	RCEA	Available	$600 rebate, plus additional $100 bonus for replacement of gas or propane[al]	--	✓	✓	✓	✓	Downstream	RCEA Community Choice Energy customer	--	--
Building Electrification Rebate Program[am]	Redwood City	Available	$500 rebate for a new heat pump hot water heater replacing gas water heater	--	✓	✓	✓		Downstream	Must be homeowner	--	--
EcoHome Rebate[an]	San Jose Clean Energy (SJCE)	Available	HPWH: $2,000	--	--	✓	✓	✓	Downstream	Current SJCE customer	--	--
Home Electrification Accelerator Program[ao]	Santa Barbara Clean Energy	Available	Incentives for switching out gas appliances with clean all-electric versions, permit streamlining and fee waivers		✓				Downstream and Midstream	Income Qualified Customers		
ESA Main[ap]	SCE	Available	No-cost installation of energy saving measures, including HPWHs	--	✓	--	--	--	Downstream	Income-qualified; available in territories of all four large IOUs	--	--
ESA Building Electrification[aq]	SCE	Available	No-cost upgrades to HPWH from gas/propane water heat	--	✓	✓	--	--	Downstream	Income-qualified	--	--
Market Access Program[ar]	SCE	Unconfirmed	Incentives for cost-effective equipment		✓	✓			Midstream (to Contractor)			
Multifamily Direct Install Program[as]	SCE	Available	Receive no-cost products and services including HPWHs	--	--	--	✓	--	Downstream	Apartments must have active SCE account numbers and be equipped with operational central air conditioning	✓	--
ESA Southern MFWB Program	SCE, SDG&E, SCG	Unconfirmed	No-cost in-unit upgrades, including HPWHs and tankless water heaters, 50% cost share for common area measures in non-deed restricted buildings[at]	--	✓	--	✓	--	Downstream	Income-qualified customers with active SoCal Gas (including LADWP customers) or SDG&E account	--	--
Golden State Rebates[w]	SDG&E	Not Available	$500 for replacement of electric water heater, $700 to $900 for replacement of gas water heater	--	✓	✓	✓	✓	Downstream	PG&E, SCE, or SDG&E customer	--	--
HPWH Rebates	SMUD	Available	Up to $2,500 for NEEA Tier III or IV units[au]	--	✓	✓	--	--	Midstream	Must install TMV; must use SMUD Contractor Network contractor	--	✓

Program Name	Program Administrator	Status (September 2025)	Incentive ($)	Project Type, Segment					Type	Eligibility	Co-Marketing	
				New Con.	Retrofit	Single-Family	Multifamily	Mobile Home			Financing	Training
Small Multifamily HTR[av]	SoCalREN	Available	$1,945 for low-income customers	--	✓	--	✓	--	Downstream	Targets multifamily properties <50 dwelling units and disadvantaged community condominiums	✓	--
Appliance Rebates	Sonoma Clean Power	Available	$700 Rebate for HPWH installation		✓				Downstream	UEF of 3.43 or higher; SanCO2 models, 120-volt models with Wi-Fi Automatic enrollment in SCP's GridSavvy Rewards program[aw]		
Go Zero Rebate Program for Zero-Emission Appliance)[aw]	South Coast Air Quality Management District	Not Available	$1,000 to $2,000 for HPWH and application assistance[ax]	--	✓	✓	✓	✓	tbd	Contractors submit proposals.	--	✓
FutureFit HPWH program[ay]	SVCE	Available	$2,000 for standard, $3,000 for income-qualified customers.		✓	✓	✓	✓	Downstream	SVCE customers	--	✓
Single-Family Home Energy Savings[az]	Tri-County Regional Energy Network	No	150% of project costs through pay-for-performance FLEX Market program design[bb]	--	✓	✓	--	--	Midstream (to contractor)	Single-family, one- to four-unit properties, renters	✓	--
Multifamily Home Energy Savings[bc]	Tri-County Regional Energy Network	Available	Up to $1,500 back for each high-efficiency HPWH	--	✓	--	✓	--	Downstream	Owners of properties with five or more units in Tri-County Regional Energy Network territory	--	--
Residential Rebates [bd]	Turlock Irrigation District	Available	ENERGY STAR HPWH – $500	--	--	✓	--	--	Downstream	Must be installed and operate in a residence in the TID Service Area.	--	--

a: https://www.alamedamp.com/407/Rebates-and-Incentives
b: https://www.bayren.org/programs-rebates/multifamily-property-owners
c: https://www.bayren.org/residential; https://www.bayren.org/news/home-sunset
d: https://www.bayren.org/ease-home
e: https://www.csd.ca.gov/Shared%20Documents/AB1232-Report-May-2024.pdf
f: https://www.csd.ca.gov/Shared%20Documents/LIWP-Fact-Sheet.pdf
g: https://www.csd.ca.gov/Pages/Residential-Energy-Efficiency.aspx.
h: https://www.energy.ca.gov/sites/default/files/2022-03/CEC-300-2022-001-CMF.pdf; https://www.energy.ca.gov/filebrowser/download/5691?fid=5691.
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k: California Energy Commission. March 2024. "California Electric Homes Program – CalEHP Participant Handbook."
l: https://3cenergy.org/rebates/electrify-your-home/
m: https://ci.healdsburg.ca.us/234/Residential-Programs-Rebates
n: https://www.cityofpaloalto.org/Departments/Utilities/Residential/Ways-to-Save/Switch-to-a-Heat-Pump-Water-Heater/Electric-Water-Heater-FAQs.
o: https://piedmont.ca.gov/services___departments/planning___building/about_building_/rebates_and_incentives
p: https://files.cityofredding.gov/government/departments/redding_electric_utility/residential/residential_electrification_rebates.php
q: https://files.cityofredding.gov/Document%20Center/Departments/Redding%20Electric%20Utility/Residential/Residential%20Electrification%20Rebates/REU-Flier-Residential%20New%20Construction.pdf.
r: https://www.roseville.ca.us/government/departments/electric_utility/rebates_and_energy_savings/heat_pump_water_heater_archived.
s: https://www.cityofshastalake.gov/870/Efficiency-and-Rebates
t: https://www.cleanpowersf.org/waterheater ; https://www.cleanpowersf.org/customer-resources
u: https://wndrrstakeholders.com/
v: https://frontierenergy-tech.my.site.com/contractorsupport/s/article/Multifamily-HEEHRA-Rebates; See also TECH 14th Quarterly Stakeholder Meeting presentation, 23 July 2025. Note that TECH funds from HEEHRA Phase I for single-family projects are restricted to HVAC heat pumps.https://techcleanca.com/documents/5622/TECH_14th_Quarterly_Stakeholder_Meeting.pdf.

Buildings receiving incentives through Tribal Equitable Building Decarbonization-Direct Install must be residential buildings owned or managed by California Native American tribes or California tribal organizations and buildings owned by members of California Native American tribes. https://www.energy.ca.gov/publications/2023/equitable-building-decarbonization-direct-install-program-guidelines.

w: Golden State Rebates. Accessed January 1, 2025. "Heat Pump Water Heaters $500 Instant Rebate." https://goldenstaterebates.com/goldenstaterebates/rebates/heat-pump-water-heaters/. d CPUC Provides Additional Incentives And Framework for Electric Heat Pump Water Heater Program. April 7, 2022. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M466/K477/466477873.PDF.

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y: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M521/K572/521572762.PDF.

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af: https://www.mid.org/wp-content/uploads/MID_Rebate-Catalog_2025-REVISED.pdf.

ag: Peninsula Clean Energy. Accessed March 1, 2025. A Better Way to Have Hot Water." https://www.peninsulacleanenergy.com/water-heating/.

ah: Peninsula Clean Energy. Accessed March 1, 2025. Everything you Need to Upgrade Your Homes to Electric." https://www.peninsulacleanenergy.com/homeupgrade/.

ai: California Energy Smart Homes. February 2022. https://3cenergy.org/wp-content/uploads/2023/03/Energy-Smart-Homes_SingleFamilyAlterations_FS.pdf.

aj: https://comfortablehomerebates.com/home-energy-rebates/.

ak: https://powerfulneighborhoods.com/.

al: https://redwoodenergy.org/heat-pump-rebate-catalog/.

al: https://www.redwoodcity.org/departments/public-works/environmental-initiatives/environmental-initiatives-rebates; https://www.redwoodcity.org/home/showpublisheddocument/28678/638551701315830000.

an: https://sanjosecleanenergy.org/ecohome-rebate/.

ao: https://sustainability.santabarbaraca.gov/sites/default/files/2025-01/HEAP%20Guidelines_Terms%20%26%20Conditions_1.14.25.pdf.

ap: https://www.sce.com/save-money/income-qualified-programs/energy-savings-assistance-program.

aq: https://www.sce.com/save-money/income-qualified-programs/energy-savings-assistance-program.

ar: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/market-access-program.

as: https://www.sce.com/save-money/savings-programs/enroll-in-savings-programs/residential-direct-install-program.

at: https://www.sdge.com/sites/default/files/documents/RHAs%20MFWB%20IP%20Public%20Presentation%20Q%26A%202.17.23.pdf.

au: https://www.smud.org/Rebates-and-Savings-Tips/Improve-Home-Efficiency/Heat-pump-water-heaters.

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bd: https://www.tid.org/customer-service/rebates-and-savings/residential-rebates/.

Electrical capacity

The estimated number of homes with electrical constraints has been reviewed in several recent studies that have considered total household amperage, estimated remaining electrical capacity, to estimate the frequency with which panel upgrades or panel optimization may be required to accommodate the addition of 240-volt appliances. Table 35 summarizes key research sources.

Table 35. References on electrical capacity requirements

Detail	Source
35% of single-family homes require some electrical service upgrade before installing electrification technologies, such as 240-volt HPWHs	*Electrical Service Panel Capacity in California Households with Insights for Equitable Building Electrification* (Less et al., 2024) [386] *Quantifying the Electric Service Panel Capacities of California's Residential Buildings* (Fournier et al., 2024) [387]
19% to 27% of residential units are likely to require panel optimization services for electrification. 27% to 41% of residential units are likely to require panel upgrade for electrification	*CPUC Fuel Substitution Infrastructure Market Study* (2024)[388]
14% of single-family homes and 13% of multifamily units would require electrical panel upgrades for water heater electrification (no other measures) 30% of single-family homes and 41% of multifamily buildings would require panel optimization for water heater electrification (no other measures)	*Fuel Substitution Behind the Meter Infrastructure Market Study* (Guidehouse, 2024) [389]

[386] Less et al., (2024). *Electrical Service Panel Capacity in California Households with Insights for Equitable Building Electrification.* https://www.aceee.org/sites/default/files/proceedings/ssb24/pdfs/Electrical%20Service%20Panel%20Capacity%20in%20California%20Households%20with%20Insights%20for%20Equitable%20Building%20Electrification.pdf.

[387] Fournier, E. D., Cudd, R., Smithies, S., & Pincetl, S. (2024). "Quantifying the Electric Service Panel Capacities of California's Residential Buildings." *Energy Policy*, 192, 114238. https://www.ioes.ucla.edu/wp-content/uploads/2024/06/2024-Quantifying-the-electric-service-panel-capacities-of-Californias-residential-properties.pdf.

[388] California Public Utilities Commission. (2024). *Fuel Substitution Infrastructure Market Study*. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/cpuc_fsinframs_stakeholderpresentation_20240305.pptx.

[389] Guidehouse. (2024). *Fuel Substitution Behind the Meter Infrastructure Market Study*. May 17, 2024. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/fs-infra-ms_overall-report_20240606.pdf.

Detail	Source
BAAQMD estimates that a "watt diet" or panel optimization strategies could be used in 32% to 59% of California's single-family and multifamily homes to avoid panel and service upsizing.	*BAAQMD Staff Report*, 2024[390]
NBI estimates that 15% to 45% of California households require upgrades to support installation of a 240-volt unit.	*Plug-In heat Pump Water Heater Field Study Findings* (NBI, 2023)[391]
"Nearly one-fourth of HPWH customers required panel optimization (72 of 301; 24%) to accommodate the HPWH, and 9% required a complete panel replacement."	*TECH Clean California: Insights Into Customer Experience and Satisfaction* (Opinion Dynamics, 2025)[392]
A study of challenging installation scenarios in the Pacific Northwest estimated (based on installer feedback) that an average of 44% of households have insufficient existing wiring to accommodate an HPWH.	*Heat Pump Water Heater Market Research: Challenging Installations Scenarios* (NEEA, 2023)[393]
Installer respondents to the 2024 Water Heating Market Study survey (Opinion Dynamics) report electrical panel upgrades are needed 30% of the time.	2024 Water Heating Market Study survey (Opinion Dynamics)[394]
In a set of contractor estimates of the frequency of different types of upgrades, gathered by a TECH evaluation, nine out of 16 installers (56%) stated that gas to HPWH conversions require a panel upgrade "sometimes" or "always." Fourteen of 16 stated that such conversions require breaker upgrades "sometimes" or "always," 11 of 16 stated outlet upgrades are needed, and 9 of 16 stated that wiring and repatching was needed "sometimes" or "always."	*Residential Water Heater Sizing Measure Package Support* (CalNEXT, 2023)[395]

[390] Bay Area Air Quality Management District, (2024). *Staff Report: Informational Update Regarding Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters less than 75,000 BTU/hr*. December 2024. 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.

[391] New Building Institute. (2023). *Plug-In heat Pump Water Heater Field Study Findings & Market Commercialization Recommendations*. July 12, 2023. https://newbuildings.org/resource/plug-in-heat-pump-water-heater-field-study-findings-market-commercialization-recommendations.

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[393] NEEA. (2023). *Heat Pump Water Heater Market Research: Challenging Installations Scenarios.* April 20, 2023. https://neea.org/img/documents/Heat-Pump-Water-Heater-Market-Research-Challenging-Installation-Scenarios.pdf.

[394] Opinion Dynamics, *op cit.* March 29, 2024. https://pda.energydataweb.com/api/downloads/4024/Water%20Heater%20Market%20Characterization%20Study%20PDA%20Draft1%20_8_25_2024.pdf.

[395] CalNext. (2023). *Residential Water Heater Sizing Measure Package Support*. https://calnext.com/wp-content/uploads/2023/02/ET22SWE0036_Residential-Water-Heater-Sizing-Measure-Package-Support_Final-Report.pdf.

Reported existing water heaters, residential survey

As discussed in Section 4.2 of the Market Characterization, CalMTA reviewed a number of sources to estimate water heating saturations by California households served by a dedicated water heater – including the results of the CalMTA residential survey, which found a higher rate of electric water heating saturation than was deemed likely after triangulation with other sources. Table 36 provides a summary of the results reported by CalMTA's residential survey and extrapolated to the estimated number of households in California served by a water heater dedicated to only their household.[396] Results suggest that 3.5% of California households with a dedicated water heater currently have HPWHs, with higher uptake in single-family (3.7%, n=453) and mobile homes and other[397] (5.0%, n=148) compared to multifamily (2.1%, n=255) homes. Results indicate that natural gas and propane water heating (56.9% and 4.4% respectively, n=856) is the most prevalent in California households with dedicated water heaters among respondents, reported used by more than 61% of households, while 35% of households use electric water heaters. Gas water heating is slightly more common in single-family homes (62%) compared to multifamily homes (55%). In mobile homes and other, the most common fuel is also gas (69%), but more of these homes heat their water with propane (16%) compared to single-family (4%) and multifamily (2%).

Table 36. Primary per-household water heater type shared by surveyed water heater decision makers

Water Heater Type	% Total	By Housing Type			
		All Single-Family	All Multifamily	Mobile Homes	Other
ERWH Storage	25.57%	25.47%	27.91%	16.29%	19.86%
Electric Tankless	6.10%	5.08%	10.72%	4.51%	0.00%
All Non-HPWH Electric	**31.67%**	**30.55%**	**38.63%**	**20.80%**	**19.86%**
HPWH	**3.46%**	**3.70%**	**2.13%**	**5.18%**	**4.17%**
Gas Storage	50.78%	51.74%	47.16%	51.86%	38.23%
Gas Tankless	6.10%	6.34%	5.67%	4.17%	0.00%
All Natural Gas	**56.87%**	**58.08%**	**52.83%**	**56.03%**	**38.23%**

[396] Survey respondents with point-of-service water heating (i.e., heating provided at the appliance level) only were also removed from the survey, but the estimated total households in California served by this is <0.3% (RASS 2019) and so population was not adjusted to accommodate.

[397] Other includes recreational vehicles and vans.

Water Heater Type	% Total	By Housing Type			
		All Single-Family	All Multifamily	Mobile Homes	Other
Propane	**4.41%**	**4.29%**	**2.39%**	**15.52%**	**16.58%**
Other	1.11%	1.26%	0.42%	0.82%	4.61%
I don't know; n/a	2.48%	2.12%	3.59%	1.65%	16.54%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: CalMTA Residential Survey Q. A14. "Which of the following best describes the type of water heating system(s) used in your household? Note that we are defining water heater as a unit designed to serve more than one appliance, and typically one or more households." (n=856)

Table 37 summarizes reported water heater saturation results by renter vs owner for single family and multifamily segments. Saturation of electric water heating is significantly lower (32%) than for single family renters (39%), multifamily renters (36%), and multifamily owners (42%).

Table 37. Reported primary water heater type by housing type and wwner versus renter[398]

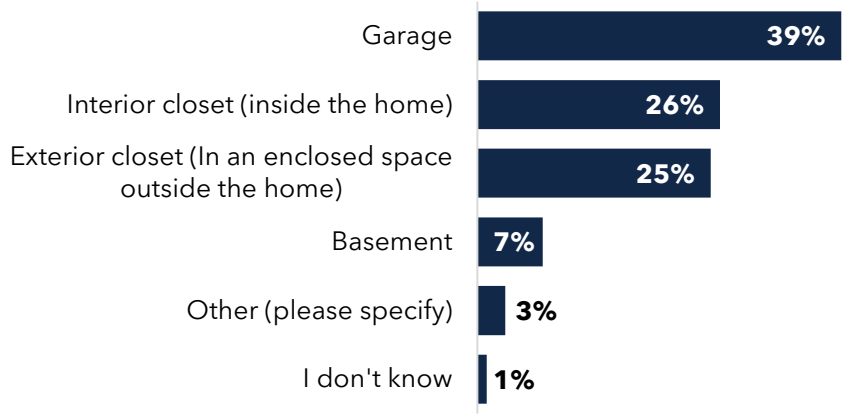
	Single Family		Multifamily	
	Owner (n=319)	**Renter (n=131)**	**Owner (n=65)**	**Renter (n=190)**
ERWH Storage	21.4%	36.6%	20.1%	31.0%
Electric Tankless	6.3%	1.8%	16.3%	8.6%
All Non-HPWH Electric	**27.7%**	**38.4%**	**36.3%**	**39.5%**
HPWH	**4.8%**	**0.8%**	**0.0%**	**3.0%**
Gas Storage	54.2%	45.6%	58.1%	42.9%
Gas tankless	7.6%	3.1%	3.0%	6.7%
All Natural Gas	**61.7%**	**48.7%**	**61.2%**	**49.6%**
Propane	**3.7%**	**5.9%**	**2.5%**	**2.3%**
Other	1.1%	1.7%	0.0%	0.6%
I don't know; n/a	1.0%	4.4%	0.0%	5.0%
Total	**100.0%**	**100.0%**		**100.0%**

The CalMTA residential survey found variation in water heater location within the home, as summarized in Figure 72. The team notes that the rate of garage placement reported in the survey is lower than that found in RECS data (which, as discussed in Section 5.1, finds 47% of

[398] Three single-family respondents identified as neither owners nor renters described reported living with friends of family or as a guest of the household owner.

water heaters located in the garage); after reviewing water heater location by respondent income, the team concludes this may be due to a higher representation of lower income respondents in the survey than the distribution across California's full population.

Figure 72. Location of existing water heater



Source: CalMTA Residential Survey Q. B1. "Where is your water heater located?" (n=856)

Estimation of 2024 HPWH and electric water heaters installed in new and existing homes

CalMTA used a variety of sources to estimate 2024 HPWH and non-HPWH units installed in residential new and existing homes. All estimates refer to non-central water heaters; CalMTA applied a general assumption that 50% of multifamily residences have central water heaters.

Table 38. Approach to estimating 2024 water heater units and percentage of sales

Estimation Step	Units	% of Sales in Segment	Source(s) or Equation
Estimating Overall 2024 WH Units Installed			
Annual WH Sales	800,000		CAHPP Blueprint notes ~800,000 in total annual sales (also cited by CPUC though slightly differently as "total replacements annually").
Central WH Units	46,948		RECS 2020 calibrated to ACS 2023, analyzed with assumption that 50% of multifamily units are served by central water heating.[399]
Annual In-Unit (non-central) WH Sales	753,052		Annual WH sales minus Central water heaters 800,000 - 46,948 = 753,052
WH Units in new construction	83,620		First Tuesday Journal new construction starts plus mobile home shipments: this is 61,229 (single family) + 39,156 x 50% (multifamily) + 2,813 (mobile home shipments); and Annual Totals of Shipments to States: 1994-2023. United States Census. Accessed September 30, 2025. "MHS Latest Data." (Census).
Estimated in-unit WH Retrofits	669,432		Annual in-unit WHs – units in new construction: 753,052 - 83,620 = 669,432
New Construction – Estimating HPWHs			
HPWH in single family new construction based on 2022 Permit Data	9,797	16%	2022 CHEERS data as cited by CEC
Estimated 2024 HPWH in single family new construction	13,201	21.6%	HPWH new construction units multiplied by growth in Energy Star certified water heater shipments from 2022 to 2023 (34.7%). ENERGY STAR Shipment Data. 2022: 141,000 units ENERGY STAR Shipment Data. 2023: 190,000 units

[399] While the prevalence of central water heating systems is not well documented, research indicates these systems serve approximately 50% of multifamily households. Sources include: CalMTA stakeholder interviews, December 2024 to February 2025; *Multifamily Electrification Strategies: Part 2: Electrification Readiness*. TECH Clean California webinar, Sept 20, 2024. https://vimeo.com/1026606048/85513c25df?share=copy; New Buildings Institute's Central Heat Pump Water Heater Market Research (2023-2025) https://static1.squarespace.com/static/605d0aa46f4b6f47e0ab88af/t/68266ae73e7ed6516015a59f/1747348205401/NBI_MAGIC_MarketResearch_202505.pdf (estimating 47% in-unit and 53% central systems).

Estimation Step	Units	% of Sales in Segment	Source(s) or Equation
Estimated 2024 HPWH in new multifamily construction and mobile homes (2024)	MF: 4,221 Mobile: 152	10.8% 5.4%	CalMTA assumed multifamily HPWH market share @50% of single-family new construction; 25% for mobile homes. Assumptions based on qualitative and secondary data review, including stakeholder and SME interview feedback and reports that multifamily installs face more challenges (but do occur), mobile homes also occur but less frequently. See also HPWHs promoted in new construction programs (CalEHP,[400] BUILD,[401] EnergySmart Homes.[402])
Total HPWHs in new construction	17,574	21%	Sum of estimated 2024 HPWH units for each housing type : 13,201 + 4,221 + 152 = 17,574; divided by total estimated WH units in new construction.
New Construction – Estimating non-HPWH Electric Water Heaters			
Electric WHs (HPWH and non-HPWH) in new construction	71,077	85%	Water heating SME Sean Armstrong estimates 80% of 2023 CA new construction is all electric, LinkedIn discussion. CalMTA assumed that a modestly higher proportion of new construction households than those that are all-electric (85%) installed electric WHs in 2024.
Total 2024 non HPWH electric sales in new construction	53,503	64%	Total electric WH in new construction minus HPWH in new construction = 71,077 – 17,574 = 53,503
Retrofits – Estimating HPWHs			
HPWHs incentivized through retrofit programs in CA (2024)	20,025		See narrative in HPWHs in program data
Total Retrofit HPWHs	25,429		CalMTA estimated 70% to 90% of HPWHs are incentivized based on various CalMTA survey results and triangulation with ENERGY STAR shipment data: 93% of residential survey respondents with existing HPWHs are aware of rebates (Q. G1);

[400] The California Electric Homes Program (CalEHP) provides incentives for multifamily (and single-family) new construction, with the requirement that residential spaces be fitted with heat pump water heating. *California Electric Homes*. Accessed 16 December 2025. https://caelectrichomes.com/.

[401] California Energy Commission. (2025). *Draft BUILD Program Guidelines Second Edition (Revised) - Clean Version*. October 28, 2025. https://efiling.energy.ca.gov/GetDocument.aspx?tn=266884.

[402] New Construction Program Prerequisites. (2025). *California EnergySmart Homes* webpage. Accessed December 16, 2025. https://caenergysmarthomes.com/new-construction/#pgmprereq.

Estimation Step	Units	% of Sales in Segment	Source(s) or Equation
			97% of HPWH purchasers aware of rebates report applying for them (Q. G4), but 51% of residents report not receiving an incentive (Q. G6) suggesting high rebate utilization but also perhaps a gap in understanding of who receives the rebate programming. 65% of installers report participating in HPWH incentives (Installer Survey Q. D1)– but note that installers do not represent all installs. Assumed 70% to 90% incentivization rate squares well with ENERGY STAR 2023 shipments because it implies that between 11% to 15% of national shipments were installed in CA. CalMTA estimated units as the midpoint.
Percent of retrofit WHs that are HPWHs		3.8%	Estimated retrofit HPWH units divided by total retrofit water heaters = 25,429 / 669,432
Retrofits – Estimating Non-HPWH Electric WHs			
Estimated total electric to electric retrofits in existing buildings	155,180		CalMTA estimates 23% saturation of electric water heaters in existing buildings. Analysis described in Section 4.2, Net additions of electric water heaters – new construction and retrofit, RECS, CalMTA survey, and new construction analysis (CHEERS data referenced by CEC). Estimated total retrofit water heater units multiplied by 23% saturation = 23% x 669,432
Estimated non-electric to electric retrofits in existing buildings	64,343		CalMTA Residential survey; 9.6% of recent purchasers reported replacing gas or propane water heaters with an electric water heater (Q. A16. "What type of water heater did you purchase?" and Q. B3. "What type of water heater did this unit replace?"). Growth (~+6%) also shown by ODC 2024 CA Water Heating Market Study. Estimated total retrofit water heater units multiplied by 9.6% growth in electric share = 9.6% x 669,432
Total 2024 electric retrofit sales	219,523	33%	
Total non HPWH electric retrofit sales annually	194,094	29%	(23) + (21) – (15) (See worksheet for calculation details: Supply Chain Map Support.xlsx) =155,180 + 64,343 – 25,429 = 194,094

In addition to the sources and references noted in Table 38 above, CalMTA cross-referenced findings with the sources in Table 39:

Table 38. Additional HPWH California annual market share references, non-central HPWHs

Reference	Type/ Application	Unit Reference	Source
3% to 5% of water heater sales are HPWHs	Overall market	22,592 to 37,653 units[a]	CAHPP Blueprint[b]
11% to 40% of new *electric* water heater installations are HPWHs	New construction (electric)	7,831 to 28,478 units[c]	ENERGY STAR[d]

a: Applies the 3%-5% range to the total estimate non-central water heaters sold annually (753,052).
b: California Heat Pump Partnership Blueprint. March 2025. *Scaling California's Heat Pump Market: The Path to Six Million.* https://heatpumppartnership.org/wp-content/uploads/2025/03/CAHPP-Blueprint-Final.pdf.
c: Applies the 11% to 40% range to estimates of electric new construction estimates for 2024 of 85%. (See Section 4.2, Table 11).
d: Accessed February 10, 2025. "Heat Pump Water Market Acceleration Guide." https://www.energystar.gov/partner-resources/products_partner_resources/retailer-resources/heat-pump-water-heater-guide.

Pilots supporting HPWH deployment in California

Several pilots supporting HPWH adoption (summarized in Table 38) have moved forward, supported by programs including TECH,[403] CalNEXT, and the Low-Income Weatherization Program.[404]

Table 39. Relevant pilots

Pilot	Dates	Description
Market Readiness for HPWH Load Shifting Pilot	2024–2025	Explored engaging with contractors on grid interactivity and developed recommendations, including a new proposed definition of HPWH upsizing.[405]
CalNEXT Increasing HPWH Deployment project	2024	Worked to build contractor familiarity by providing contractors with 120-volt HPWHs for use in their own home (augmenting TECH's Learn and Earn program, focused on 240V units). –
Streamlining Permitting and HPWH Installation Pilot	2024-2025	In collaboration with the BayREN's Codes and Standards program, the TECH permitting pilot team developed curriculum materials focused on educating permitting offices and sharing best practices in the adoption of HPWHs, including an HPWH building code assistance sheet, permit supplement templates, and an electrical load estimator. The pilot also involves collaborating with permitting and building

[403] TECH offers Quick Start Grants to support pilots that test approaches to overcoming market barriers to HVAC heat pump and HPWH adoption. https://techcleanca.com/quick-start-grants/.
[404] The first three pilots listed above were the subject of a recent TECH pilot evaluation, which found that pilot participants were generally pleased with the management, support, and available budget to conduct these large-scale pilots. Opinion Dynamics, *op cit.,* June 4, 2025. https://www.calmac.org/publications/TECH_Pilot_Evaluation_Report_2025-06-04.pdf.
[405] Opinion Dynamics, *op cit.,* June 4, 2025.https://www.calmac.org/publications/TECH_Pilot_Evaluation_Report_2025-06-04.pdf.

Pilot	Dates	Description
		department stakeholders with the goal of developing single-day permits for HPWHs.[406]
Inclusive Utility Investment Finance Pilot[407]	2023–Ongoing	Seeks to develop and launch a Tariffed On-Bill financing mechanism, testing its design, customer adoption, and measurement and verification methodologies.[408]
Bassett Avocado Heights Advanced Energy Community HPWH Initiative	2021–2024	Provided no-cost water heater system assessments (50), 14 water heater tune-up services, 20 home energy assessments, and 20 HPWH retrofits to educate on HPWH benefits and grow low-income community capacity.[409] Led by TECH, The Energy Coalition, and Day One.
Water Heater Loaner Program Development Pilot	2022–2023	Tested supplemental contractor payment of $975 to cover the added cost of installation and removal of the loaner water heater. The pilot increased the rate of customer conversion using gas water heaters from <1% to 17.1% and installed 149 HPWHs during the program period.
Low-Income Weatherization Program, Farmworker Housing Program HPWH, and Solar Installs	2020–2022	Supported by the state's Department of Community Services and Development (CSD)'s LIWP and the IOU ESA program, 3C-REN's implementer Community Action Partnership of San Luis Obispo, replaced 197 traditional gas-powered water heaters with HPWHs to test whether combining HPWHs and solar systems accelerates the adoption and installation of HPWHs in farmworker housing.[410]
Midstream HPWH Study and Field Test	2021–2022	Piloted distributor incentives and engagement of a thermostatic mixing valve incentive from September 2021 to November 2022. [411]
City of San Luis Obispo's Mobile Home Electrification Program	2023–2024	Goal to address the access disparity of heat pump space and water heating technologies by engaging with low-income communities including those who reside in mobile homes. The project seeks to understand awareness, interest, and

[406] TECH Clean California. (2022). *TECH HPWH Permitting Pilot.* January 27, 2022. https://energy-solution.com/wp-content/uploads/2022/02/01.27.2022_TECH-Permitting-Pilot-Working-Group.pptx.

[407] IUI financing ties repayment to the utility meter rather than the participant and increases financing access for customers who are typically disqualified due to low credit, low or no home equity (renters), or high debt-to-income ratios.

[408] TECH Clean California. (2025). *Inclusive Utility Investment Pilot* https://techcleanca.com/pilots/tariffed-on-bill-pilot/.

[409] TECH Clean California. (2024). *Basset Avocado Heights Advanced Energy Community Heat Pump Water Heater Initiative*. August 21, 2024. https://techcleanca.com/documents/5416/The_Energy_Coalition-_Final_Report_v240821.pdf.

[410] CivicWell. *Central Coast Savings for Farmworker Housing*. https://www.legacy.civicwell.org/newsletter/central-coast-savings-for-farmworker-housing/.

[411] PG&E. (2022). *Midstream Heat Pump Water Heater (HPWH) Study and Field Test.* December 16, 2022. https://etcc-ca.com/sites/default/files/reports/Final%20Report%20Midstream%20Heat%20Pump%20Water%20Heater%20%28HPWH%29%20ET21PGE82041.pdf.

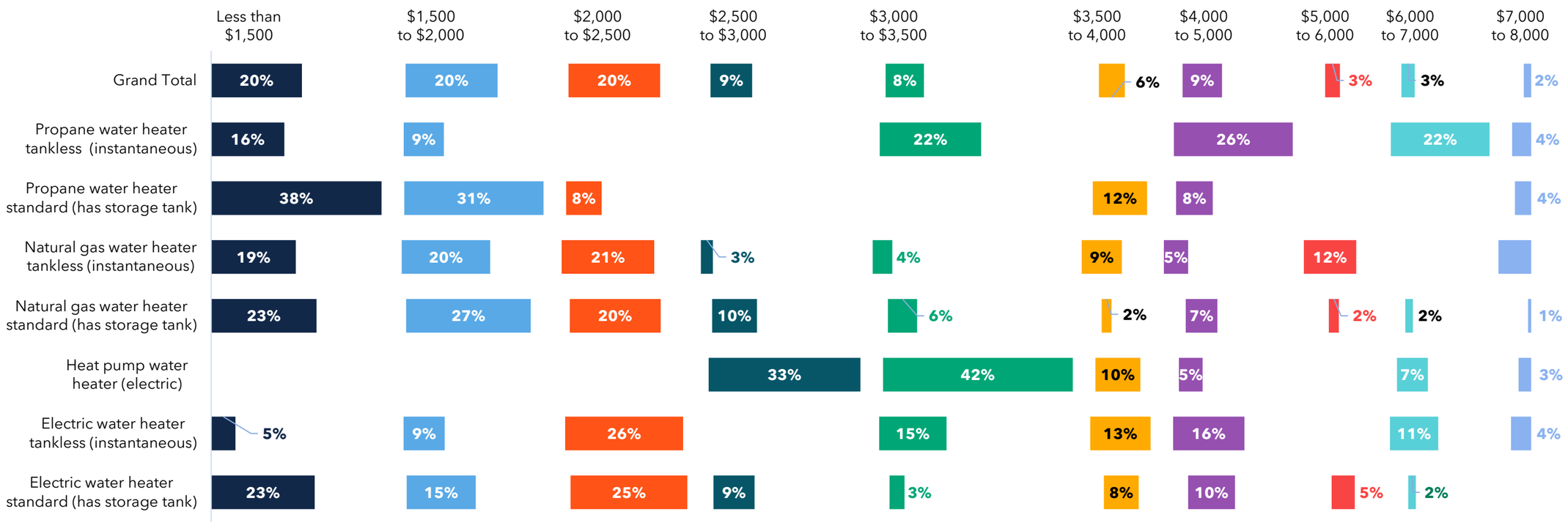
Pilot	Dates	Description
		perceived barriers to adoption through community outreach events and tailored education materials.[412,413]
PCE 120-Volt Heat Pump Water Heater Pilot	2023–2024	Supported by consultant RHA, PCE investigated 120-volt HPWH cost and performance to help define applicable home scenarios for 120-volt HPWHs. Pilot results recommend no installations of 120-volt HPWHs in locations where temperatures fall below 40 degrees Fahrenheit.[414]
Testing Heat Pump Water Heaters in Manufactured Housing	2024–2025	The project team sought to test ten HPWH deployments to mobile homes to resolve challenges to installation, modeled savings for HPWHs in mobile homes, and explored physical space, electrical service and wiring constraints, and permitting barriers.[415]

[412] Case study: SLO Green and Healthy Homes. *Rewiring America*. https://homes.rewiringamerica.org/ra-policy-site/local-government-leaders/case-studies/west-san-luis-obispo-ca-slo-green-and-healthy-homes.
[413] TECH Clean California. (2025). *Quick Start, Lasting Impact: Lessons from the TECH Clean California Quick Start Grant Program.* June 11, 2025. https://www.calmac.org/publications/TECH_Pilot_Evaluation_Report_2025-06-04.pdf.
[414] 120-Volt Heat Pump Water Heater Pilot. Peninsula Clean Energy Home Upgrade Program, June 2025. https://library.peninsulacleanenergy.com/m/4070947505d4f80a/original/120V-Heat-Pump-Water-Heater-Pilot-Results.pdf.
[415] AESC. (2025). Testing Heat Pump Water Heaters in Manufactured Housing. https://techcleanca.com/documents/5570/AESC_QSG_Final_Report_v250312.pdf.

Reported water heater costs, residential survey

This appendix provides additional detail on water heater costs, using analysis of CalMTA's residential survey. The survey asked respondents who purchased a water heater in the last three years to report on the cost of their purchased water heater, for all water heater types, shown below in Figure 73.

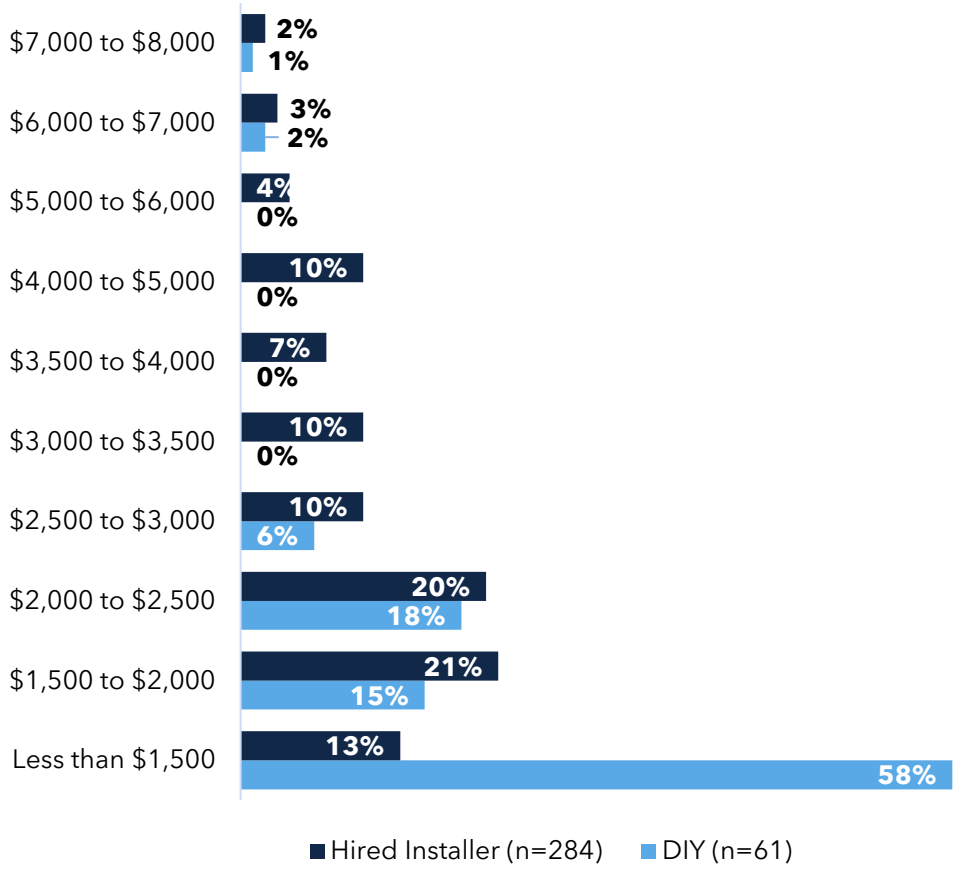
Figure 73. Reported water heater cost by water heater type



Source: CalMTA Residential Survey Q. B6." What was the total cost of your water heater, including both the purchase price and installation costs?" (n=346) Note: solar water heaters (n=2) are not pictured but results indicated 100% of costs as $3,500 to $4,000.

Surveyed DIY water heater resident purchasers more frequently reported total water heater costs of less than $1,500 (58% vs. 11% of non-DIY resident respondents), suggesting that DIY purchasers have a distinct and much lower willingness to pay than non-DIY purchasers (Figure 74).

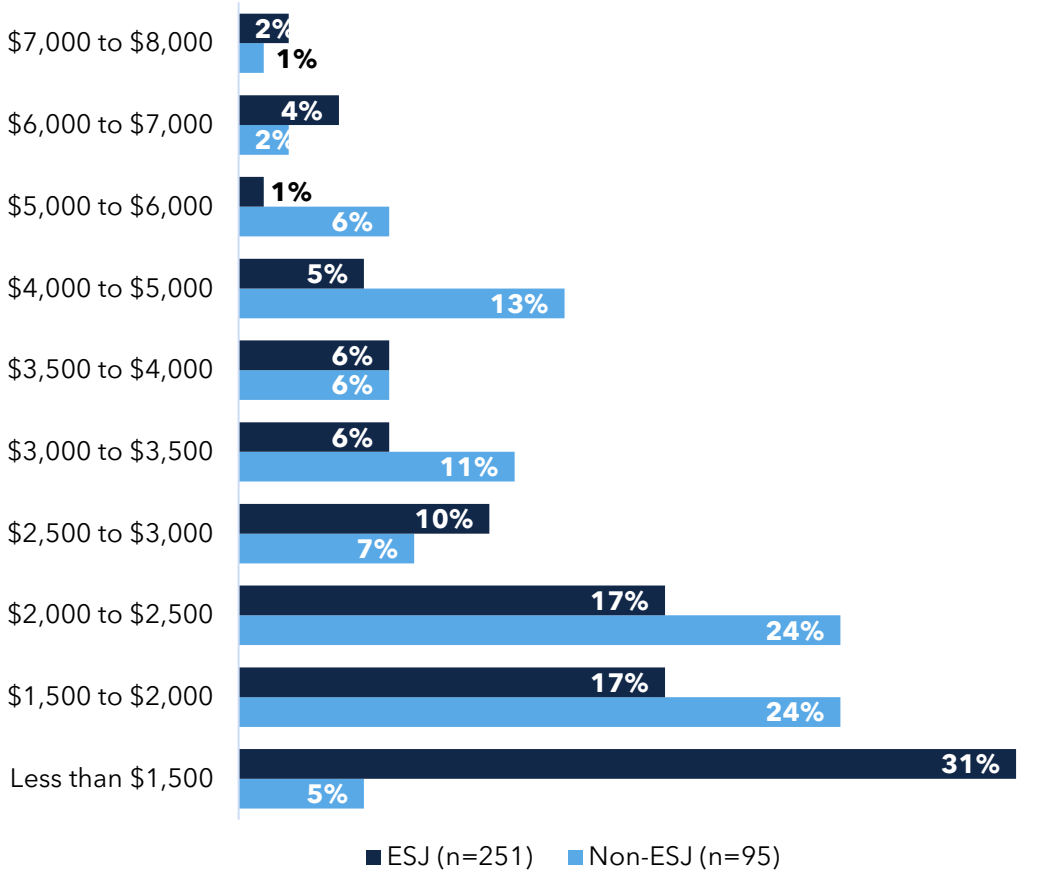
Figure 74. Reported water heater cost by DIY vs. hired installer



Source: CalMTA Residential Survey Q. B6." What was the total cost of your water heater, including both the purchase price and installation costs?" (n=345) The represented total is one less than the total purchasers (n=346) due to one respondent answering "I don't know" for QA18.

Surveyed ESJ water heater purchasers more frequently reported total water heater costs of less than $1,500 (31% vs. 5% of non-ESJ respondents). Non-ESJ respondent purchasers most frequently report costs in the $1,500 to $2,500 range (24% each reporting both $1,500 up to $2,000 and $2,000 up to $2,500), suggesting that ESJ respondents have a distinct and much lower capacity or willingness to pay than non-ESJ respondents (Figure 75).

Figure 75. Reported water heater Cost by ESJ vs. non-ESJ respondents



Source: CalMTA Residential Survey Q. B6." What was the total cost of your water heater, including both the purchase price and installation costs?" (n=346)

Reference on 120-volt HPWH applicability

Installation of a 120-volt HPWH instead of the standard 240-volt is one potential solution to electrical capacity limitations. Use of 120-volt HPWHs could limit or eliminate the need for an electrical contractor, lead to faster installations, and reduce the total electrical load increase.[416] However, 120-volt HPWHs as currently developed are not appropriate for all use cases. [417] Research and interviews conducted to date have concluded that the 120-volt system should only

[416] CalNext. (2024). *Increasing Heat Pump Water Heater (HPWH) Deployment.* October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.

[417] Opinion Dynamics, *op cit.,* May 17, 2022 https://www.calmac.org/publications/OD-CPUC-Heat-Pump-Market-Study-Report-5-17-2022.pdf.

be installed if a 240-volt installation is not considered a viable option. Elements influencing suitability include:

- **Total hot water demand.** 120-volt HPWHs are not appropriate for households accustomed to high usage, particularly due to their longer heating times and lower output compared to higher voltage models. Guidance as to what size household 120-volt units may be appropriate for is under development. New Buildings Institute found that a 120-volt HPWH is sufficient to serve households of up to six bedrooms,[418] but a recent study concluded that the technology is most suited for one- to four-person households. The results of a 120-volt HPWH pilot by PCE similarly but more restrictively concluded that one- to two-bedroom homes with an occupancy of no more than four persons, and also notes that a 120-volt circuit must be present with no other high electrical load appliances on the same circuit.[419] An interviewed stakeholder and former installer indicated that some installers follow the practice of only installing 120-volt units in households that have sufficient water provided by a 40-50-gallon standard electric or gas water heater. A recent field study of twenty 120-volt HPWH units installed in households of up to four people in different locations in the Midwest showed that customers experienced hot water runouts on an average of one out of 20 days throughout the year, with a higher frequency of runouts occurring in the winter and when groundwater temperatures were lower.[420]
- **Suitable locations**. Research suggests 120-volt units have challenges operating in heat pump mode at low temperatures, which could restrict 120-volt unit suitability if installed in outside locations, such as detached garages, sheds, or exterior closets.[421] (Note: some 120-volt models do not have electric-resistance backup and therefore would not produce enough hot water, or potentially any hot water if the ambient temperature is too low.[422]) Two stakeholders noted that this leads to climate considerations (or water heater relocation) and suggested that exterior installs of 120-volt may work in San Diego but not in other regions in California. One stakeholder provided specific guidance that if the ambient temperature is not kept above 50

[418] New Buildings Institute, *op cit.,* October 24, 2022. https://newbuildings.org/new-study-explores-potential-of-120-volt-heat-pump-water-heaters/.
[419] Peninsula Clean Energy. (2025). *120-Volt Heat Pump Water Heater Pilot 120V.* June 2025. https://library.peninsulacleanenergy.com/m/4070947505d4f80a/original/120V-Heat-Pump-Water-Heater-Pilot-Results.pdf.
[420] The Midwest 120V HPWH Field Study. AWHI Residential Working Group Meeting, January 21, 2025. https://www.youtube.com/watch?v=MbGjrq7EKHQ.
[421] Pacific Northwest National Laboratory. Accessed April 6, 2025. "Demonstration of 120-volt Heat Pump Water Heaters in a Warm/Hot Climate (New Project)." https://www.energy.gov/sites/default/files/2023-07/bto-peer-2023-141195-120v-hpwh-pnnl-butzbaugh.pdf.
[422] For example, 120V models from Rheem do not have electric-resistance backup, while 120V models from A.O. Smith do have backup.

degrees F, a 120-volt unit would not make sufficient hot water. PCE's pilot results recommend no installations where temperatures fall below 40 degrees Fahrenheit.[423]

- **Installation time**. While 120-volt HPWHs typically require fewer contractors for gas replacements, the installation process could take longer than a conventional installation, taking over four hours and sometimes over six hours. [424, 425]
- **Efficiency**. 120-volt HPWHs offer energy savings over gas or propane water heaters (43% to 50% if operating in heat pump only mode) but tend to have lower efficiency than 240-volt models, leading to slightly higher energy use in some cases, mainly due to longer compressor run times. One study also noted short-term equipment malfunctions and changes in room temperature in 120-volt installations.[426]

  The NBI study estimates that these plug-in water heaters could directly support 22% to 30% of California homes. Using the rule of thumb of only installing 120-volt HPWHs in homes previously served by 40- to 50-gallon water heaters, CalMTA produced a similar estimate that 120-volt HPWHs may be appropriate to serve approximately 26% of California households.[427] The current market saturation of 120-volt HPWH models is in its early stages and not well documented. However, research and data from select programs, such as TECH, suggest it is growing,[428] with a review of TECH data showing 120-volt units were installed in 13% of TECH single-family HPWH installs.[429]

Impact of 120-volt adoption on load shifting. Grid connectivity capabilities have been tested on 120-volt units, with one study conducted in different California territories in 2024, finding an

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[423] Peninsula Clean Energy. *Op cit.,* June 2025https://library.peninsulacleanenergy.com/m/4070947505d4f80a/original/120V-Heat-Pump-Water-Heater-Pilot-Results.pdf.

[424] Butzbaugh et al., (2024). *Field Study of 120-volt Heat Pump Water Heaters in the Big Easy.* ·https://www.aceee.org/sites/default/files/proceedings/ssb24/pdfs/Field%20Study%20of%20120-volt%20Heat%20Pump%20Water%20Heaters%20in%20the%20Big%20Easy.pdf.

[425] Demonstration of 120-volt Heat Pump Water Heaters in a Warm/Hot Climate (New Project). Pacific Northwest National Laboratory. *Op cit.* https://www.energy.gov/sites/default/files/2023-07/bto-peer-2023-141195-120v-hpwh-pnnl-butzbaugh.pdf#:~:text=Evaluate%20the%20energy%20efficiency%20and%20hot

[426] https://newbuildings.org/wp-content/uploads/2023/07/PlugInHeatPumpWaterHeaterFieldStudyFindingsAndMarketCommercializationRecommendations_NBI202308.pdf.

[427] See RECS 2020 estimates of the saturation of water heaters ≤ 50 gallons and rates of existing gas water heating.

[428] CalNext, *op cit*., October 29, 2024. https://calnext.com/wp-content/uploads/2024/12/ET22SWE0056_Increasing-Heat-Pump-Water-Heater-Deployment_Final-Report.pdf.

[429] TECH Public Data, Last Accessed June 9, 2025.

average load shift of 39.4% was achieved, with bill savings of 24.2%.[430] The pilot found customers had many questions about installation and recommended that utility programs record a video of installation for customer use to clarify the effort required and reduce the need for troubleshooting via calls or emails.[431]

[430] This study completed on units using CTA-2045 Load Up and Advanced Load Up (ALU) signals to pre-heat water ahead of curtailment events on twelve 120V units in three different California utility territories, despite communication issues. The study also found that with additional testing and resolution of communication issues, additional shifts from peak periods of 31% were expected to reduce operating costs by an additional 21%. New Buildings Institute, *op cit.*, June 2024. https://static1.squarespace.com/static/605d0aa46f4b6f47e0ab88af/t/66f3648182a024432f273144/1727227014664/NBI_120Vhpwh_PhaseII_FinalReport_202409.pdf.

[431] *Ibid.*