Foodservice Water Heating Systems

Market Characterization Report

September 14, 2026



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

REPORT # MR26-012

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List of Abbreviations

Abbreviation	Definition
A	Ampere (amp)
APCD	Air Pollution Control District
AQMD	Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
Btu	British thermal unit
CALGreen	California Green Building Standards Code
CARB	California Air Resources Board
CBP	County Business Patterns
CBSA	Commercial Building Stock Assessment
CCDEH	California Conference of Directors of Environmental Health
CCUS	Carbon capture, utilization, and sequestration
CDR	Carbon dioxide removal
CEC	California Energy Commission
CEUS	California Commercial End-Use Survey
CFR	Code of Federal Regulations
C&I	Commercial and industrial
CPUC	California Public Utilities Commission
DAC	Disadvantaged community
D&B	Dun & Bradstreet
EPA	United States Environmental Protection Agency
ESJ	Environmental Social Justice
FSWH	Foodservice Water Heating / Foodservice Water Heating Systems
GHG	Greenhouse gas
GPH	Gallons per hour
HPWH	Heat pump water heater
HVAC	Heating, ventilation, and air conditioning
IOU	Investor-owned utility
J	Joule
kBtu	1,000 British thermal units
LADWP	Los Angeles Department of Water & Power
ng	Nanogram
NOx	Nitrogen oxides
QA/QC	Quality assurance / quality control
PG&E	Pacific Gas & Electric
PHCC	Plumbing-Heating-Cooling Contractors Association

POU	Point-of-use
ppmv	Parts per million by volume
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SME	Subject matter expert
SMUD	Sacramento Municipal Utility District
V	Volt

1 Executive Summary

This market characterization report is an output of the Phase II research for the Foodservice Water Heating Systems Advancement Plan, finalized in October 2024.[1] The Advancement Plan described the research needed to support the development of the Foodservice Water Heating Systems Market Transformation Initiative (MTI) Plan. CalMTA's Foodservice Water Heating MTI will focus on electrification of water heating in full-service and quick-service restaurants and in cafes, with a focus on promoting the adoption of heat pump water heaters (HPWHs) as the primary hot water source. This report examines the California market for water heating systems in the foodservice sector, including the characteristics of restaurant establishments and existing water heating equipment, supply chain dynamics, workforce and stakeholder roles, and the operational, financial, technical, and regulatory factors influencing equipment selection and replacement decisions.

1.1 Objectives and Methods

CalMTA had the following research objectives:

- Understand the foodservice water heating market landscape and baseline market conditions in California.
- Assess restaurant operator perspectives on barriers, opportunities, and decision-making related to water heating technologies.
- Understand the supply-side dynamics of commercial water heating systems.
- Understand the policy and regulatory landscape influencing water heating electrification and decarbonization in the foodservice sector.
- Contribute to baseline market adoption forecasts for HPWH technologies across foodservice establishment types.

To address these objectives, CalMTA conducted various primary and secondary research activities, summarized in Table 1.

Table 1. Summary of Foodservice Water Heating Systems Research Activities

Task	Details
Secondary research	Review of relevant industry literature, reports, regulatory requirements, and data to understand current water heating market, including market size, restaurant characteristics, technology adoption, regulatory drivers,

[1] CalMTA. (2025). *Market Transformation Advancement Plan: Foodservice Water Heating Systems.* https://calmta.org/wp-content/uploads/2025/04/MTI-AP-Foodservice_2025-Update.pdf

Task	Details
	supply chain dynamics, workforce considerations, and opportunities for decarbonization and HPWH adoption
Foodservice operator interviews	33 interviews with independent, franchise-owned, and chain-owned establishments across full-service restaurants, quick-service restaurants, and cafes Explored current water heating practices, replacement decision-making, technology adoption, barriers, and operational considerations
Association interview	One interview with the National Restaurant Association to understand industry awareness, adoption trends, and barriers associated with efficient water heating technologies
Contractor interviews	20 interviews with plumbers, HVAC technicians, and consultant engineers involved in commercial water heater projects in California Explored installation practices, technology recommendations, market barriers, electrification challenges, and supply chain perspectives
Manufacturer interviews	Three interviews with international water heater manufacturers with expertise in the California commercial market Assessed product offerings, market readiness, supply chain dynamics, policy influences, and barriers to HPWH adoption
Workforce interview	One interview with a commercial foodservice energy research and education facility Explored workforce awareness, training considerations, and opportunities related to commercial water heating electrification
Foodservice operator survey	Survey of 210 foodservice establishments across California, including cafes, full-service restaurants, and quick-service restaurants Collected information on building characteristics, ownership structure, equipment types, replacement practices, technology awareness, decision-making, sustainability practices, and future equipment preferences

Study results draw from all of the primary and secondary research activities summarized above and are presented in an integrated fashion in each report section. Section 9 describes the methodology for each research activity.

1.2 Key Findings and Conclusions

1.2.1 California's foodservice market targeted by the MTI consists of more than 80,000 individual establishments.

These establishments are split into full-service restaurants (43% of the total), quick-service restaurants (42%), and cafes (15%). These restaurant types are defined by the extent of their food selections and how the food is served. They exclude food trucks and non-restaurant providers of food and meals. Full-service restaurants provide seated dining with table service, where customers are served by staff and pay after the meal. Each group includes independently owned and branded establishments, franchises that are owned separately from a brand but operated in a consistent fashion with the same offerings, and chain-owned restaurants owned by the company that also owns the brand.

1.2.2 Water heater replacements are largely reactive and employ like-for-like replacements.

Replacements are typically unplanned and occur only after equipment failure (28% of establishments surveyed by CalMTA) or significant performance decline (67%), limiting consideration of alternative technologies. During these situations, restaurant operators prioritize rapid restoration of hot water service, minimizing downtime, and maintaining business continuity. As a result, decisions are often made quickly, with emphasis placed on equipment availability, upfront cost, familiarity, and speed of installation.

1.2.3 Decision-making on water heater replacements varies by ownership type.

Decision-making is local and concentrated among establishment owners for independent restaurants that own their own space. Some chains and franchises have approved equipment or vendor lists that offer both a barrier to heat pump water heater adoption (when applicable equipment choices and vendors who support them are not on the approved lists) and a potential opportunity (when they are). Within leased spaces, landlords or restaurants can own the water heaters, and decision-making can be driven by the landlord or involve both the landlord and restaurant when the water heater is landlord-owned.

1.2.4 Water heating in California foodservice establishments is fueled largely by natural gas water heaters, with use of electric systems increasing slowly and saturation of heat pump water heaters still low.

We estimate that natural gas accounts for 70% to 75% of primary water heaters in restaurants, with electric-resistance tank and tankless water heaters accounting for most of the remainder. We estimate use of heat pump and hybrid water heaters to be between 2% and 15% of primary water heaters in restaurants, with actual saturation likely toward the lower end of that range. More precise estimates for the saturation of heat pump and hybrid water heaters will likely require sales tracking or site surveys.

1.2.5 Awareness of heat pump water heaters by restaurant decision-makers is similar to that of more traditional technologies, but understanding of performance and requirements is incomplete.

Self-reported awareness of restaurant operators that heat pump water heaters exist nearly matches that of traditional natural gas tank water heaters – with only 8% indicating that they have never heard of heat pump water heaters, and 36% indicating they know what they are (compared with 42% for natural gas and electric storage water heaters) – but understanding of heat pump technology, applicability, and performance is low. This suggests that restaurant decision-makers have name recognition of heat pump water heating technology but not the familiarity needed to make informed choices.

1.2.6 Heat pump water heaters have higher installed equipment and operating costs than most traditional technologies, while offering substantial cost savings compared with electric-resistance storage systems.

Equipment cost is higher for HPWHs than for equivalently sized natural gas storage water heaters, often adding 50-100% to total installed costs for natural gas systems with typical tank sizes, which range from $3,000 to $17,000.[2] This cost differential is exacerbated by intentional oversizing of HPWHs to overcome slower recovery rates and/or meet hot water draw patterns and address water heater sizing requirements for foodservice establishments by local environmental health agencies.

In addition to higher equipment cost, HPWH operating costs are higher than for natural gas storage and tankless systems. HPWHs offer substantial energy cost savings compared with electric-resistance storage systems, however. To illustrate, a typical full-size restaurant in the Bay Area faces annual energy costs at typical current California energy rates of around $5,000 for heat pump water heaters, but closer to $3,500 for natural gas storage or tankless systems and $13,000 for electric-resistance storage systems.[3]

1.2.7 Installation of heat pump water heaters requires infrastructure upgrades in some buildings to accommodate electrical, ventilation, and space requirements.

Research suggests that 80% of restaurants could require electrical panel upgrades to handle new electrical loads for heat pump water heaters that replace natural gas water heating.[4] HPWH evaporator coils also require sufficient ventilation and airflow, which may require accommodation

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[2] These ranges correspond to consumer water heaters and commercial-grade systems with energy inputs of up to 150 kBTU per hour paired with a storage tank of 100 gallons.

[3] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

[4] Ibid.

in small equipment or utility rooms. Heat pump water heater oversizing to accommodate slower recovery rates and food safety regulatory requirements requires more physical space for the water heater, which can be a constraint in tight spaces.

1.2.8 Regulatory standards will affect water heating technologies available to foodservice establishments in coming years.

Federal efficiency standards and proposed and planned California air quality standards will affect the types of water heaters available in the market, while California health and safety standards that apply to foodservice establishments pose a barrier to heat pump water heaters unless or until sizing guidelines are updated.

- Federal efficiency standards are slated to eliminate manufacturing of new consumer-grade electric-resistance water heaters by 2029, while relevant standards for commercial-grade electric systems (including residential-duty commercial systems) are not changing. This change in the market will require existing users of consumer-grade electric-resistance storage water heaters to shift to a different water heater technology upon equipment replacement. Electric tankless systems will continue to be permissible. Restaurants with comparatively lower hot water needs can and do use consumer-grade systems, while larger restaurants tend toward commercial systems.
- Statewide air quality regulations being considered could reduce the availability of natural gas water heaters beginning in 2030, while existing regional air quality regulations that affect allowable NOx emissions from water heaters may leave electric water heating as the only option for newly installed equipment in various parts of the state. Implementation of established and proposed standards is still uncertain and addresses different classes of water heaters in different parts of the state, but any enforcement of these standards can be expected to shift the market toward electric water heating.
- Health and safety standards that affect foodservice businesses currently present barriers to the adoption of heat pump water heaters by requiring either the oversizing of heat pump water heaters or the justification of appropriately sized units through engineering calculations that are not typical for water heater replacements. Observers of the regulatory process suggest that regulators and stakeholders recognize that the sizing guidelines are not appropriate for heat pump water heaters; however, more performance information is needed before the guidelines are likely to be updated.

1.2.9 Heat pump water heaters could address both California's policy objectives and restaurant sustainability goals, but restaurants are not yet focused on state policy goals and focus only lightly on energy efficiency as part of their sustainability initiatives.

Adoption of heat pump water heaters is consistent with California's decarbonization goals and can support restaurant sustainability initiatives. These factors were envisioned by CalMTA as

potential drivers for the technology. However, the statewide goals and standards are not yet influencing restaurants' water heater selections to any measurable degree. In parallel, restaurants widely reported sustainability efforts of their own, usually as informal efforts rather than formal programs. These efforts have resulted in the intentional selection of energy efficiency equipment among only 13% of respondents to the CalMTA foodservice operator survey.

1.2.10 Restaurants in ESJ and non-ESJ communities differ little on the barriers to heat pump water heater adoption.

Overall, the key barriers to water heating electrification are broadly consistent across both community types. Survey results show no meaningful differences in space ownership, building age, replacement practices, HPWH awareness, or the share of operating costs tied to energy. Restaurants in ESJ areas did report a slightly higher rate of electrical system upgrades overall but a lower rate of major or full replacements (20% vs. 30%) in the past five years than restaurants in non-ESJ areas. However, restaurants in ESJ areas reported higher HPWH adoption (11% vs. 3% in non-ESJ areas), while self-reported hybrid water heater adoption was similar (16% in ESJ vs. 13% in non-ESJ). The research conducted for this report addressed the prevalence of these barriers, but it did not explore differences in implications or consequences of these barriers for ESJ versus non-ESJ communities. Nor did this research explore the ability of restaurants in and outside ESJ communities to overcome barriers.

Separately, interviews with restaurant operators connected to ESJ communities highlighted several challenges to heat pump water heater adoption, including limited capital access, difficulty navigating the processes of incentive programs, language and information access barriers, landlord-tenant split incentives, aging building infrastructure, and higher perceived risk around unfamiliar technologies.

2 Introduction and Target Market

A heat pump water heater is an all-electric system that uses a vapor compression refrigeration cycle to transfer heat from the surrounding air to the water. Because HPWHs use a refrigeration cycle to move thermal energy rather than generate it through combustion or resistance heating, they are more energy efficient than conventional gas and electric-resistance water heaters. In addition, and in contrast to natural gas or propane water heaters, HPWHs produce no localized emissions. As a result, HPWHs represent a key enabling technology for advancing electrification and decarbonization in California's foodservice sector. Many existing heat pump water heaters also provide electric-resistance heating elements for faster recovery when needed and are marketed as hybrid water heaters. We included both in this study.

HPWHs are somewhat larger than conventional systems and require sufficient airflow, appropriate ambient conditions, and sufficient physical space. Further, converting from non-electric to electric

water heaters of any type requires sufficient capacity in the electrical panel and associated electrical infrastructure.

CalMTA conducted this study to characterize the California foodservice water heating market, understand baseline market conditions, and identify key market, technical, and policy barriers and opportunities related to water heating technologies. The findings are intended to support the Market Transformation Initiative (MTI) team in developing market transformation strategies that advance energy savings, electrification, and California's decarbonization goals.

2.1 Research Objectives

This market characterization study seeks to provide a general understanding of the state of water heating in the foodservice sector in California, including current trends in water heater adoption, replacement practices, technology prevalence, supply chain dynamics, purchase decision-making, and workforce characteristics.

High-level research objectives were included in the Advancement Plan:

- Characterize the market landscape and baseline market conditions.
- Assess restaurant owners' perspectives and decision-making processes on efficient water heating systems.
- Assess perspectives of manufacturers, installers, and design professionals on barriers and opportunities.
- Describe the policy and regulatory landscape.

Together, information gathered about these topics was also intended to inform the market adoption baseline model.

CalMTA's market research and evaluation team for the Foodservice Water Heating (FSWH) MTI explored these questions in an adaptive manner, guided by the Advancement Plan's initial intent and an evolving understanding of opportunities, barriers, and potential approaches for the MTI resulting from the MTI team's market research, technical assessment, and strategy considerations throughout Phase II of the MTI process.

To accomplish these research objectives, the CalMTA team conducted secondary research, interviews, and foodservice operator surveys. Details on the team's research approach and activities can be found in Section 9, Methodology.

2.2 Product Definition and Evolution

As noted in the Advancement Plan, CalMTA's Foodservice Water Heating MTI will focus on electrification of water heating in full-service and quick-service restaurants and in cafes, with a focus on promoting the adoption of HPWHs as the primary hot water source.

The MTI "product definition," the term CalMTA uses to define technology specifications and any behavioral components of the MTI, includes strategies to shift electrical demand for water heating from peak periods (e.g., 4:00-9:00 p.m.), integrating water heating with space conditioning, minimizing distribution losses through optimized piping design and decentralized (point-of-use) solutions, and lowering overall hot water demand through the adoption of efficient end-use equipment, such as low-temperature or ventless dishwashing systems. As of the completion of this report, CalMTA had not finalized the MTI product definition.

2.3 Target Market

The MTI target market is foodservice establishments in California that rely on water heating systems to support daily operations, including dishwashing, cleaning, food preparation, and sanitation. The target market includes existing establishments and new construction across full-service, quick-service, and cafe segments.

2.4 Heat Pump Water Heater Types

Heat pump water heaters serving restaurants span a range of configurations and equipment types. Restaurants with smaller hot water demands may use consumer-grade integrated HPWHs, which combine a storage tank, heat pump, and electric-resistance backup into a single package. Facilities with larger hot water demands may use commercial-grade integrated units or a central split-system HPWH where the heat pump and storage components are separated. Split-system products are increasingly available in the U.S. and are commonly used for larger commercial hot water demand applications. Choices among integrated commercial units are limited, according to the MTI's technical assessment team and supply chain market actors interviewed by CalMTA.

CalMTA's survey (see Section 3.2.2) and a CalNEXT study[5] indicate that most restaurants with storage water heaters use units with tank capacities in the 50- to 100-gallon range. These systems may be residentially sized consumer-grade systems or commercial systems. The research conducted for this market characterization report did not gather information about energy input capacities of the water heaters, which dictate whether they are considered consumer or commercial systems and regulated as such.

Water heaters with energy inputs of up to 75,000 Btu per hour or 12 kilowatts (for systems with storage tank capacity of up to 120 gallons) are considered residential consumer-grade. Those with higher energy capacities and those with storage tanks exceeding 120-gallon capacity are

[5] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf.

considered commercial-grade.[6] Further information on technical topics, including technical product details, will be available in a future report on technical assessment research conducted by CalMTA on foodservice water heating systems.

3 California Market Characteristics

Foodservice refers to establishments that prepare and serve food and beverages for immediate consumption and include full-service restaurants, quick-service restaurants, and cafes. The term is broader than restaurants and may include institutional dining and catering. This study focuses on restaurant-based segments, where full-service, quick-service, and cafes are treated as distinct due to differences in service models and operations. Unless otherwise noted, we use the terms "restaurants" and "foodservice establishments" interchangeably to refer to these three types of establishments collectively.

3.1 Foodservice Establishments in California

The California restaurant industry describes itself as encompassing over 80,000 establishments, 1.85 million employees, and $220 billion in sales.[7] Data from the U.S. Census Bureau's County Business Patterns (CBP) survey indicate that there were 81,326 establishments in California in 2022 within the three restaurant categories included in this study. Dun & Bradstreet (D&B) business data suggest that approximately 2,605 corporate entities operate foodservice establishments in the state.[8]

3.1.1 Establishments by Type and Ownership Distribution

Within this study, foodservice establishments are classified into three distinct segments:

- Full-service restaurants that provide seated dining with table service, where customers are served by staff and pay after the meal, and may also offer alcohol, takeout, or entertainment.
- Quick-service restaurants, or limited-service restaurants, which require customers to order and pay before eating, with food consumed on-site, taken out, or delivered.
- Cafes, which focus on coffee and other nonalcoholic beverages, along with light snacks and pastries, including coffee shops and doughnut shops.

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[6] Federal Register. (2024). *Commercial Water Heaters, Hot Water Supply Boilers and Unfired Hot Water Storage Tanks*. 10 C.F.R. Section 431. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-431/subpart-G

[7] National Restaurant Association. (2025). *California State Fact Sheet 2025*. Restaurant.org. NatRestAssoc_2025_StateFactSheet_TC_V1.indd

[8] We note that CBP and D&B data are not fully consistent. We relied on CBP data as the most complete and accurate data source, and we drew on D&B data to describe more granular submarkets when those data were not available from CBP.

Full-service and quick-service restaurants are the most common and are present in roughly equal numbers across California.

Ownership and affiliation with brands tend to be divided into three groups as well:

- Small independent establishments are single-location or limited multi-location businesses that are locally owned and operated, with no affiliation to a national or regional brand. These establishments are typically characterized by decentralized decision-making.
- Regional or mid-size chains are defined as multi-unit operators with a defined geographic footprint (e.g., within a state or region). These establishments are typically owned by a parent company or a small group of investors and may operate under a common brand with partial standardization across locations.
- National or large chains are defined as multi-unit operators with extensive geographic presence across multiple states or nationwide. These establishments are typically owned by large corporations or structured as franchise systems, with centralized management, standardized menus, procurement systems, and operational practices.

  As shown in Table 2, full-service and quick-service restaurants are much more common in California than the smaller cafes, while independent restaurants and regional or mid-size chains are more common than national chains.

Table 2. Distribution of Foodservice Establishments in California by Type and Ownership[9]

Ownership Type	Full-Service	Quick-Service	Cafe	Total (Percentage)
Small Independent	12,103	11,171	4,447	**27,721 (34%)**
Regional or Mid-Size Chain	15,947	15,989	4,188	**36,124 (44%)**
National or Large Chain	6,601	6,915	3,965	**17,481 (21%)**
Total	**34,651 (43%)**	**34,075 (42%)**	**12,600 (15%)**	**81,326 (100%)**[a]

[a] *Percentages shown for each ownership type do not total to 100% due to rounding*

[9] U.S. Census Bureau. (2022). *All Sectors: County Business Patterns, Including ZIP Code Business Patterns, by Legal Form of Organization and Employment Size Class for the U.S., States, and Selected Geographies: 2022 (Table CB2200CBP).* Economic Surveys, County Business Patterns. https://data.census.gov/table/CBP2022.CB2200CBP?g=040XX00US06,06$8610000&codeset=naics~722511:722513:722515

Source: U.S. Census Bureau. (2022). County Business Patterns (CBP) Survey.

3.1.2 Geographic Distribution

As shown in Table 3, slightly more than half of California's foodservice establishments are located in the Metropolitan Los Angeles and San Diego region (55%), followed by the Greater Bay Area (22%) and the rest of California (23%). Across all regions, full-service and quick-service restaurants account for the majority of establishments, while cafes represent a smaller share of the market, accounting for 15% of all establishments.

Regionally, the Metropolitan Los Angeles and San Diego area has the greatest number of establishments across all restaurant types, with most restaurants in the quick-service category. The Greater Bay Area shows a relatively higher concentration of full-service restaurants compared with quick-service establishments, while the rest of California exhibits a more balanced distribution between the two segments. Cafe presence remains smaller across all regions but is proportionally more concentrated in urban markets.

Table 3. Distribution of Foodservice Establishments in California by Region

Region	Residents	Full-Service	Quick-Service	Cafe	Total (Percentage)
Metropolitan LA and San Diego	16.3 million	17,544	19,448	6,946	**43,938 (55%)**
Greater Bay Area	9.2 million	8,402	6,309	2,775	**17,486 (22%)**
Rest of California	14.0 million	7,644	7,962	2,535	**18,141(23%)**
Total	**39.5 million**	**33,590**	**33,719**	**12,256**	**79,565 (100%)**

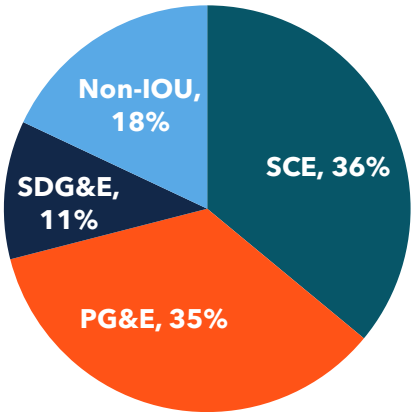
Sources: U.S. Census Bureau. (2022). County Business Patterns (CBP) Survey for restaurant populations; Metropolitan and Micropolitan Statistical Area Population Totals and Components of Change: 2020-2025 for residential population estimates (https://www2.census.gov/programs-surveys/popest/datasets/2020-2024/metro/totals/csa-est2024-alldata.csv).

The distribution of foodservice establishments by electric utility territory shows that investor-owned utilities (IOUs), including both electric-only and dual fuel utilities, serve the majority of establishments statewide (82%), with nearly equal shares in Southern California Edison (36%) and Pacific Gas & Electric (35%) service areas, and a smaller share in San Diego Gas & Electric (11%) (Figure 1).

Among non-IOU electricity providers, the Los Angeles Department of Water & Power (LADWP) serves the highest share of foodservice establishments, with 6,877 businesses representing 49% of the total in this category. This is followed by the City and County of San Francisco, which

account for 3,051 establishments (22%), and the Sacramento Municipal Utility District (SMUD), with 1,781 establishments (13%). Survey responses skewed toward non-IOU electricity providers and underrepresented IOUs, as shown in Section 9.

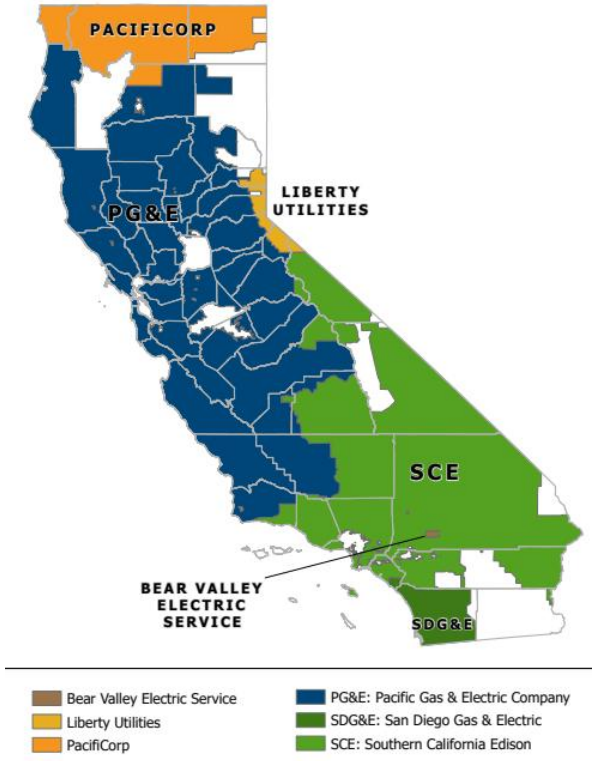
Figure 1. Distribution of Foodservice Establishments by Electric Utility Provider



Sources: U.S. Census Bureau. (2022). County Business Patterns Survey; NREL Open Energy Data Initiative. (2024). U.S. Electric Utility Companies and Rates: Look-up by ZIP Code.

For reference, Figure 2 illustrates the map of electric investor-owned utility (IOU) providers in California.

Figure 2. Map of Electric Investor-Owned Utilities in California



Source: California Energy Commission. (2022). Electric Investor Owned Utility Areas. *https://gis.data.ca.gov/documents/CAEnergy::electric-investor-owned-utility-areas/explore?path=*

3.1.3 By Environmental and Social Justice (ESJ) Communities

Identifying restaurants with equity implications is complex and nuanced. For analyses of survey data across ESJ and non-ESJ communities, we used restaurant location as a proxy for ESJ status. We classified restaurants located in disadvantaged communities (DACs), as defined by CalEnviroScreen 4.0 data,[10] as located in ESJ communities and compared them to restaurants outside DACs.

[10] Environmental justice principles are an important part of CalEPA's goal to restore, protect, and improve the environment and to ensure the health of people, the environment, and the economy. State law defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations, and policies." CalEnviroScreen was developed to identify communities suffering from cumulative impacts of multiple pollutants and people who are vulnerable to pollution's effects. It uses environmental, health, and socioeconomic information to produce scores for every census tract in the state. The scores are mapped so that different

Table 4 shows the distribution of restaurants in and outside these geographies by IOU service area. Slightly more than half of foodservice establishments in SCE and PG&E service areas are located in disadvantaged communities, compared with 18% in SDG&E. Statewide, an average of 46% of foodservice establishments are located in disadvantaged communities. We acknowledge that the California Public Utilities Commission's definition of ESJ extends beyond disadvantaged communities defined by CalEnviroScreen to include tribal areas and hard-to-reach communities that are not as easily incorporated into geographic analysis.[11]

Table 4. Distribution of Foodservice Establishments in Located in Disadvantaged Communities by Utility Provider

Utility Name	Share of Restaurant Establishments in ESJ Communities
SCE	58%
SDG&E	18%
PG&E	58%
Other/Non-IOUs	52%
Statewide Average	46%

Source: U.S. Census Bureau. (2022). County Business Patterns (CBP) Survey; California Office of Environmental Health Hazard Assessment. (2021). CalEnviroScreen 4.0 Data Dictionary. https://oehha.ca.gov/media/downloads/calenviroscreen/document/calenviroscreen40resultsdatadictionaryf2021.zip

3.2 Water Heating System Characteristics in Foodservice Establishments

Water heating systems in foodservice establishments typically rely on one or more water heaters. The broader water heating system includes dishwashing machines, the plumbing system that distributes hot water, and fixture components like faucet aerators. The hot water demand and draws over the course of the day influence the opportunities for heat pump water heating. We discuss water heating systems and water heating needs among California foodservice establishments in this section.

communities can be compared. An area with a high score experiences a much higher pollution burden than areas with low scores. CalEnviroScreen 4.0 was last updated in October 2021.

[11] Non-geographic ways of accounting for restaurants' affiliations with ESJ communities, such as the races, cultures, or incomes of individual establishments' owners, are more complex and difficult to ascertain accurately in survey research. CalMTA did not ask about the demographic characteristics of the owners of restaurants represented in our survey.

Study results presented in this section draw on CalMTA's restaurant survey of foodservice establishments, interviews with supply chain market actors, and secondary information. Results from the foodservice survey were stratified by restaurant type, so results are weighted when presenting aggregate data across types.

3.2.1 Water Heater Types and Distributions in California Restaurants

Water heating systems in foodservice establishments in California rely primarily on natural gas water heaters. The 2022 California Commercial End Use Survey (CEUS) reports that approximately 73% of California restaurants relied on gas water heating and approximately 25% relied on electricity. [12] [13] The 2022 study is based on data collected from 22,933 commercial facilities between 2018 and 2022, including 2,899 foodservice establishments. Comparison with the previous CEUS, published in 2006, shows that saturation of electric water heating increased from approximately 15% to 19% of floor area over the 15-year period between the studies (

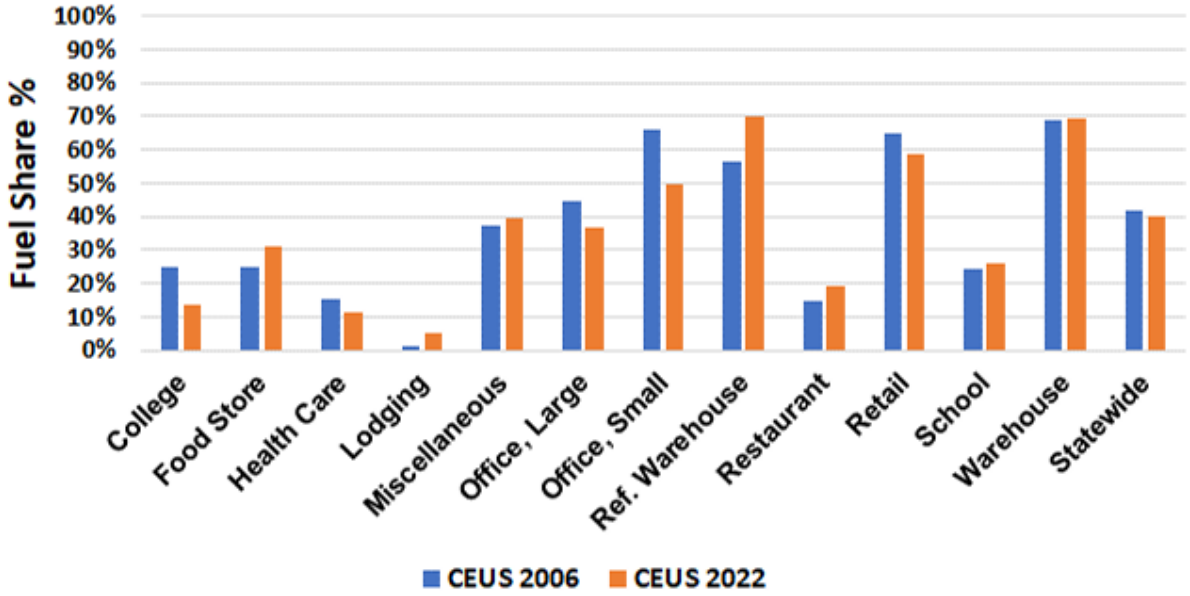
Figure 3).[14] The CEUS studies represent the most rigorous California-specific sources on commercial end-use energy equipment, but they include only water heating fuel – not water heating equipment type.

[12] These percentages represent the proportion of sites surveyed relying on gas versus electric; the remaining sites relied on propane and solar water heating.

[13] California Energy Commission. (2022) *California Commercial End-Use Survey (CEUS)*. Publication Number: CEC-200-2023-017. February 2024. https://www.energy.ca.gov/sites/default/files/2024-02/2022%20CEUS%20Final%20Report_ada.pdf

[14] Comparisons with the 2006 CEUS are based upon the proportion of floor area, rather than the proportion of sites, because 2006 site data is not readily available. Although the proportion of floor area with electric water heating (19%) in the 2022 study was lower than the proportion of restaurant sites with electric water heating (25%), we expect that the increase in electric water heating saturation from 15% to 19% of floor area is comparable to the increase in the proportion of restaurants with electric water heating over that period.

Figure 3. Cross-CEUS Comparison of Electric Water Heating Fuel Share by Building Type



Source: 2022 CEUS.

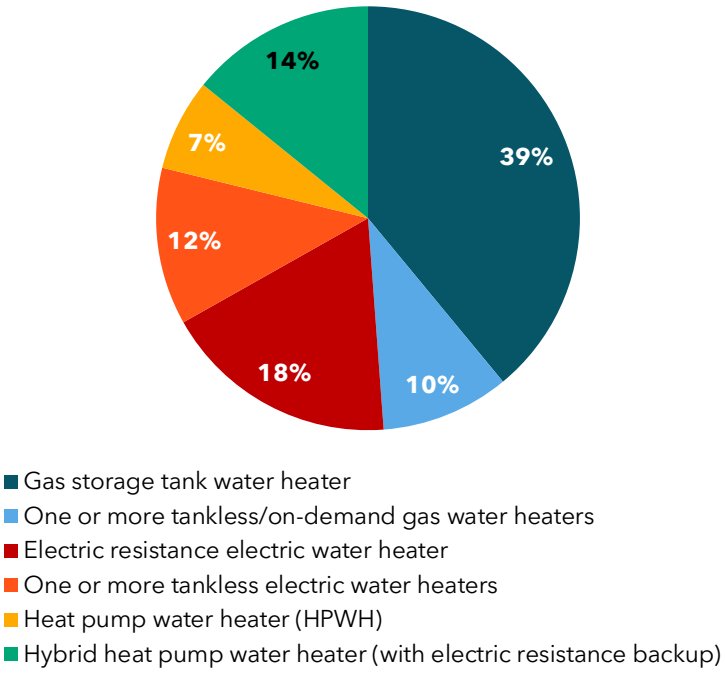
Saturation of specific technologies such as heat pump water heaters and tankless units is less certain because it is less well researched, though a CalNEXT study estimated that the market penetration of installed heat pump waters was less than 1% of foodservice water heaters overall, based on a review of published information. [15]

Findings from CalMTA's survey of restaurant operators showed higher self-reported saturations of both electric and heat pump water heaters than secondary sources suggest, as well as greater reliance on electric water heaters overall. Specifically, as shown in Figure 4, 51% of respondents reported using electric water heaters for their primary water heater. This share consisted of electric storage or tankless units (30% of the total) and heat pump or hybrid units (21%). Natural gas systems of any type accounted for 49% of self-reported primary water heaters.[16]

[15]TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

[16] Propane water heating accounted for less than 1% of primary water heaters reported and does not appear in the figure.

Figure 4. Self-Reported Distribution of Primary Water Heater Technologies (n=210)



Source: CalMTA Foodservice Operator Survey, Q22: "What fuel does your primary water heater use?" Respondents reporting natural gas or propane were asked Q23: "Is the water heater a storage tank water heater, one or more tankless/on-demand water heaters, or other?" Respondents reporting electricity were asked Q24: "Is the water heater a standard electric resistance water heater, one or more tankless electric water heaters, a heat pump water heater (HPWH), a hybrid heat pump water heater, or other?" Results shown reflect the combined classification of fuel type and water heater technology. These results are weighted by establishment type (sampling weights) and ESJ vs. non-ESJ ZIP code. See Methodology section for more information.

We interpret the foodservice operator survey results as an upper bound of heat pump water heater adoption that likely includes mistaken self-reports, despite our attempts to confirm responses and actual technology used through follow-up questions in the survey (see Methodology section.).

When viewed holistically across the data sources reviewed, it seems likely that the actual HPWH adoption falls in a plausible range from 2% to 15%.[17][18] Electric water heaters represent roughly 25% of the total, with a plausible range from 25% to 30%.[19] More precise estimates of the saturation of heat pump and hybrid water heaters will require sales tracking or site surveys.

3.2.2 Water heater distribution by restaurant types

CalMTA's survey of foodservice operators provides indications of how water heater types are distributed among different types of restaurants, even if percentages of heat pump and hybrid water heaters are potentially overstated (Figure 5).

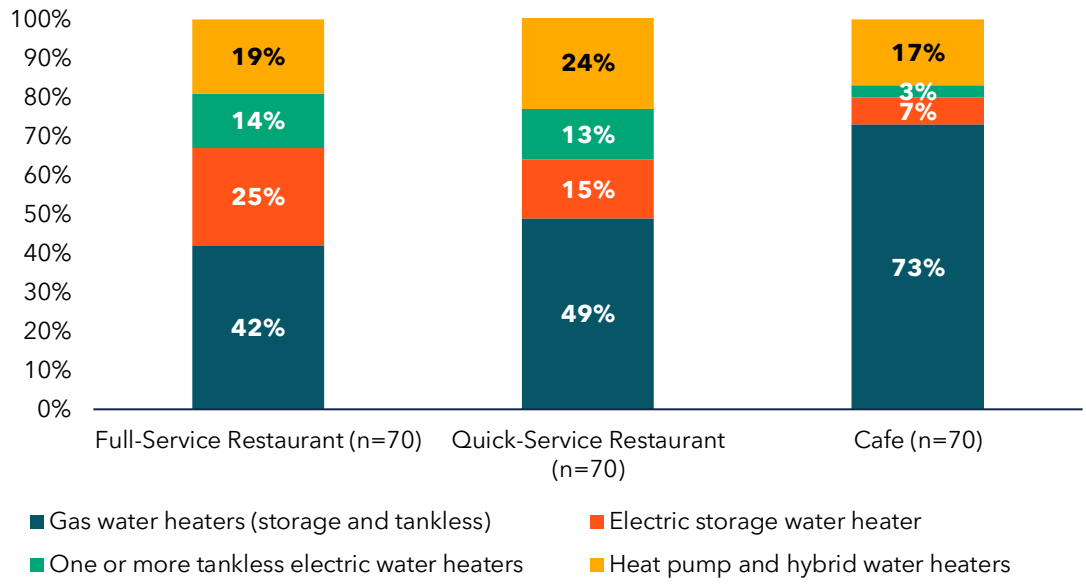
- Natural gas water heaters (storage and tankless) are the most common across all restaurant types, accounting for 42% of systems in full-service restaurants, 49% in quick-service restaurants, and 73% in cafes, which show the highest reliance on gas systems.
- Full-service restaurants report the highest use of electric-resistance storage water heaters (25%), compared with 15% in quick-service restaurants and 7% in cafes. Use of tankless electric water heaters varies across segments, reported by 14% of full-service restaurants, 13% of quick-service restaurants, and 3% of cafes.
- Heat pump technologies (hybrid and HPWH) are reported at similar levels across all restaurant types, accounting for 19% in full-service restaurants, 24% in quick-service restaurants, and 17% in cafes.

[17] This estimate is anchored at the bottom end by the CalNEXT study and at the top end by the CalMTA foodservice operator survey. We did not use either study's actual point estimate, however. We selected a slightly higher lower end than the CalNEXT study's estimate due to multiple references in qualitative interviews conducted for this market characterization study of heat pump water heater adoption in restaurants and the much higher self-reports from the CalMTA foodservice operator survey. Similarly, we used a lower top end than the survey results because we suspected inflated self-reports, as discussed in the text above.

[18] Qualitative market interviews about market activity, secondary literature, and regulatory hurdles to heat pump water heater adoption by restaurants suggest that the actual saturation likely falls toward the lower end of our estimated range.

[19] This estimate is based largely on the 2022 CEUS study for the bottom end of the range, and evidence that electric water heating has been trending upward, per the increase between the 2006 CEUS and 2022 CEUS, as well as qualitative information from study interviews. The CalMTA Foodservice Operator survey found higher substantially higher electric water heating saturation (51%), but evidence suggests that result reflects a combination of sampling bias and possible respondent confusion about water heating technology.

Figure 5. Self-Reported Distribution of Water Heater Technologies by Restaurant Type



Source: CalMTA Foodservice Operator Survey. Q3a: "Which of the following best describes [your establishment]?" and Q22: "What fuel does your primary water heater use?" and Q23–Q24: "Is the water heater …?" These results are weighted by establishment type (stratification weights), regions, and ESJ vs. non-ESJ ZIP code.

Among restaurants with storage tank water heaters, most restaurants (80%) self-reported tank sizes in the 50-to-100-gallon range, with some (19%) reporting tanks larger than 100 gallons, and 1% reporting water heaters smaller than 50 gallons. Nearly all electric-resistance storage water heaters fell into the 50- to 100-gallon range.

Larger tank sizes (100 gallons and above) are found predominantly in full-service restaurants, reflecting their higher hot water demand, while 50- to 100-gallon tanks are more evenly distributed across all three restaurant types.

3.2.3 Consumer Versus Commercial Water Heaters

Water heaters in restaurants can be either consumer-grade (residential) or commercial equipment. This distinction affects products costs and the efficiency and air quality regulations that apply to equipment replacements, which we discuss in Sections 6.4 and 7, respectively. As noted in Section 2.4, the difference between residential and commercial systems is defined by energy ratings (systems up to 75,000 Btu per hour or 12 kW are classified as consumer-grade, and systems above these limits are classified as commercial) with further subclass distinction

based on storage tank size.[20] The commercial-grade category also contains a "residential duty" class. Table 5 outlines how consumer, residential duty commercial, and commercial water heaters are defined for the purposes of efficiency standards.

Table 5. Water Heater Regulatory Classifications

Category	DOE Electrical Threshold	DOE Gas Threshold	Phase Requirement
Consumer	• Electric storage or instantaneous: ≤ 12 kW • Heat pump type: ≤ 24 A at ≤ 250 V	• Gas storage: ≤ 75,000 Btu/h • Gas instantaneous: < 200,000 Btu/h	DOE does not impose a universal single-phase requirement in the basic consumer definition; consumer units are typically single-phase.
Residential-Duty Commercial	• Electric instantaneous: > 12 kW and ≤ 58.6 kW, with storage ≤ 2 gallons • Electric storage: None Classified as consumer or commercial.	Gas storage: > 75,000 to ≤ 105,000 Btu/h, generally ≤ 120 gallons	Must be single-phase; cannot be designed for outlet temperatures above 180°F
Commercial	Above the consumer/residential-duty limits; commercial HPWHs are > 24 A or > 250 V	• Gas storage: generally > 105,000 Btu/h, > 120 gallons, or outside the residential-duty limits • Gas instantaneous: > 200,000 Btu/h and at least 4,000 Btu/h per gallon of storage	May be single-phase or three-phase, depending on the model

Sources: Federal Register. (2024). Definitions. 10 C.F.R. Section 430.2. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-A/section-430.2. Federal Register. (2024). Definitions concerning commercial water heaters, hot water supply boilers, unfired hot water storage tanks, and commercial heat pump water heaters. 10 C.F.R. Section 431.102. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-431/subpart-G#431.102

CalNEXT has classified smaller establishments that correlated with the cafe category as typically using smaller water heaters with storage tanks in the 50- to 75-gallon range and with energy

[20] There is a third designation of residential-duty commercial water heaters for those commercial water heaters with tank sizes and/or energy ratings on the lower end of what is classified as commercial equipment, if the water heaters also meet additional electrical and temperature specifications.

inputs of 50,000-75,000 Btu per hour, which would classify them as consumer-grade.[21] However, CalNEXT suggests that quick-service restaurants typically use 100-gallon water heaters with energy ratings of 100,000 Btu per hour, which would place many quick-service restaurants' water heaters in the commercial class. Full-service restaurants typically use 150-gallon water heaters with energy ratings of 150,000 Btu per hour, which would suggest that most of these restaurants use commercial water heaters.

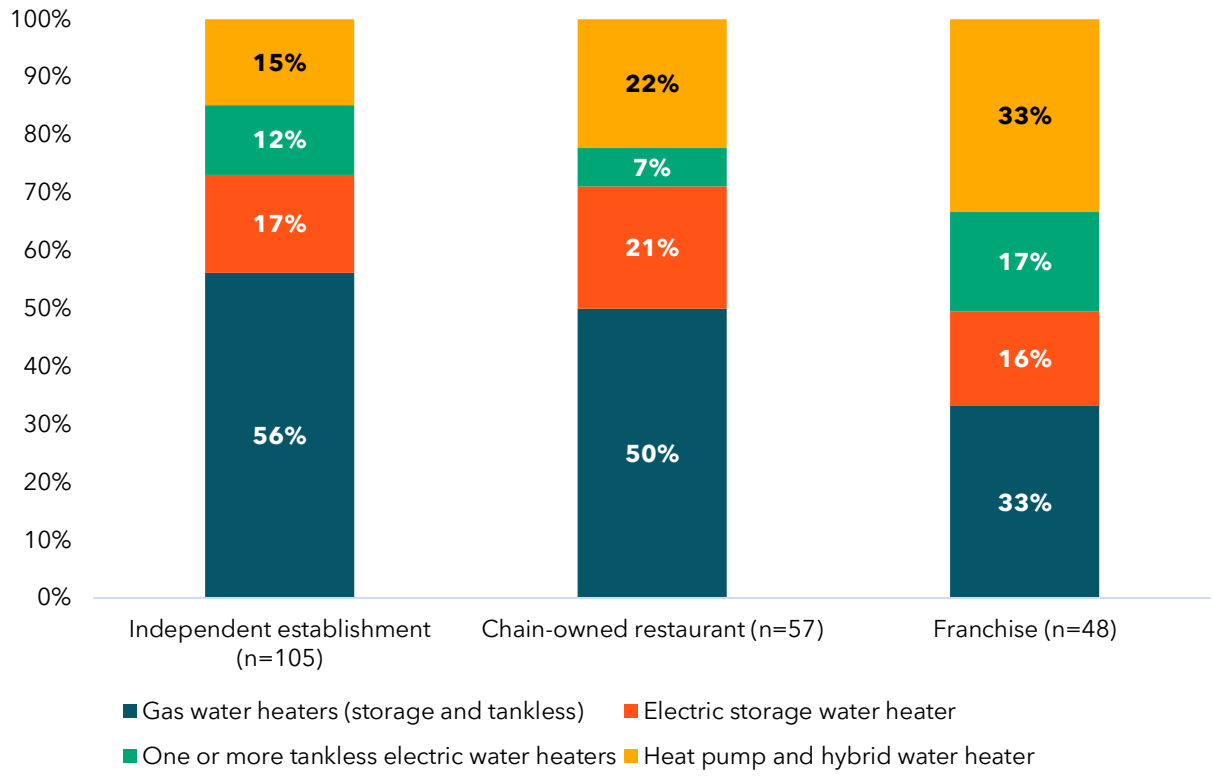
Self-reports to the CalMTA foodservice operator survey suggest the use of smaller water heaters than those classified as typical by CalNEXT and may mean a greater use of consumer-grade water heaters. As noted in Section 3.2.2, 81% of all storage water heaters reported in the survey were in the 100-gallon or smaller category. More specifically, even among full-service restaurants with storage water heaters, 65% of respondents self-reported sizes of 100 gallons or less. This result suggests smaller water heaters than CalNEXT described. The survey did not ask for energy ratings of water heaters, as restaurant operators were unlikely to be able to provide that information in a broad-ranging survey.

3.2.4 Distribution by Ownership Structure

Self-reported water heater fuels and technologies were similar for independent restaurants and for chain-owned establishments, but franchises reported a lower use of natural gas tank water heaters and a greater use of heat pump and hybrid models (Figure 6.). Here, too, the share of HPWHs might be overstated, but the data likely reflect the relative adoption rates among the three ownership structures, assuming overreporting is similar across them.

[21] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

Figure 6. Distribution of Water Heater Technologies by Ownership Structure



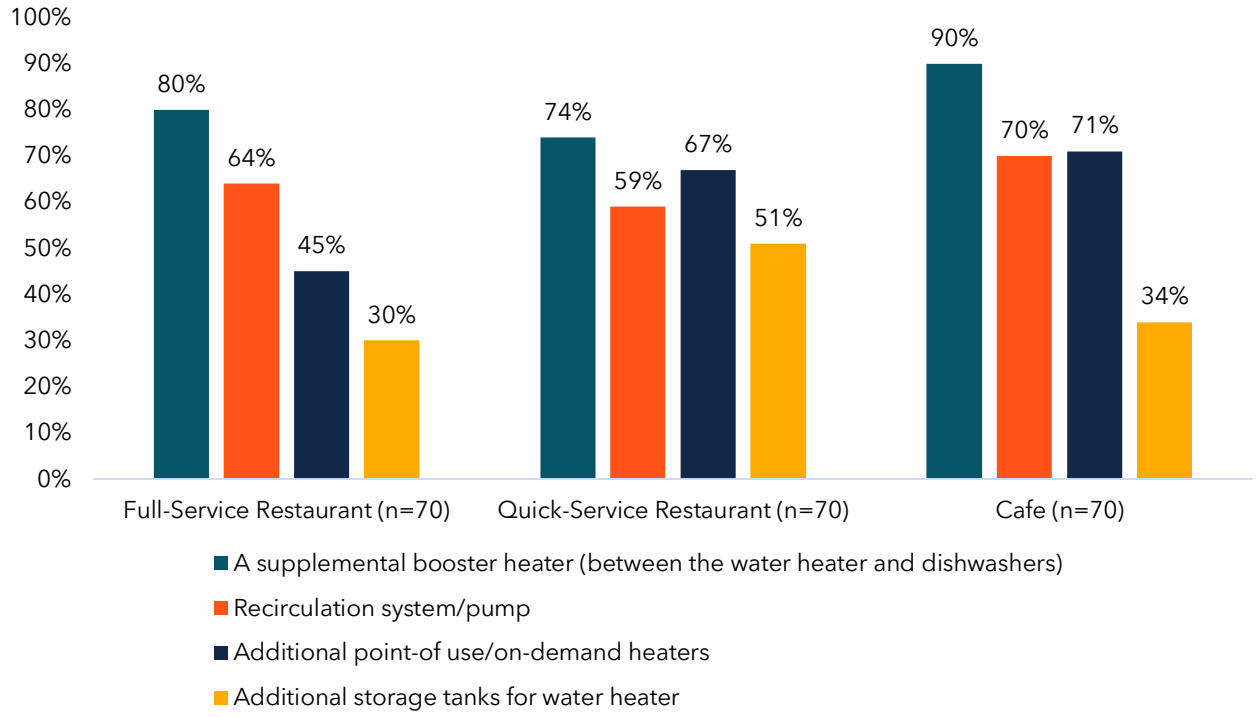
Source: CalMTA Foodservice Operator Survey. Q4: "Is this [establishment] a(n)_?" and Q22: "What fuel does your primary water heater use?" and Q23–Q24: "Is the water heater …?" Results reflect the combined classification of fuel type and water heater technology. These results are weighted by establishment type (stratification weights), regions, and ESJ vs. non-ESJ ZIP code.

Interviews with franchise corporate stakeholders provide additional context for water heater selection across restaurant formats. Corporate representatives indicated that larger casual dining or full-service locations typically use high-efficiency tank-type water heaters, which can meet higher hot water demand associated with larger kitchens and dishwashing operations. In contrast, smaller brands and quick-service restaurants more commonly use wall-mounted tankless (on-demand) systems. These systems are often selected for space efficiency, as mounting units on the wall frees floor space for storage and equipment. Interviewees also noted that multiple tankless units are sometimes installed in parallel to meet higher hot water demand, allowing operators to scale system capacity while maintaining a compact footprint and increasing reliability. Tankless systems in these settings may be gas or electric depending on site conditions, such as available utility infrastructure.

Use of Water Heater Add-Ons

Most restaurants also reported booster heaters, recirculation systems, and point-of-use heaters as part of their water heating systems, and some have additional hot water storage tanks. Figure 7 shows self-reports from the foodservice operator survey on these hot water system components by establishment type.

Figure 7. Use of Supplemental Water Heating Components by Restaurant Type



Source: CalMTA Foodservice Operator Survey. Q29: "In addition to your water heater, do you also have the following?"

We noted greater use of supplemental boosters among cafes than other restaurant types, comparatively less use of supplemental point-of-use water heaters among full-service restaurants, and higher use of additional storage tanks among quick-service restaurants. Across ownership types, we saw somewhat higher use of additional storage tanks and supplemental booster heaters among franchise establishments, while independent establishments showed greater use of additional point-of use water heaters.

Water Heater Age and Replacement Timing

Commercial water heaters are typically expected to last approximately 10 to 15 years,[22] depending on equipment type, usage intensity, maintenance practices, and water quality conditions, including water hardness. As one would expect, restaurants reported the age of their water heaters to be distributed across the spectrum of water heater lifespans, with most water heaters falling in the range of 3 to 10 years. Water heaters older than 10 years were uncommon.

Interviews with market actors suggest that replacement decisions are often made under constrained timelines. Operators described hot water systems as essential to daily kitchen functions, particularly for sanitation, dishwashing, and food preparation. As a result, replacement decisions are frequently driven by the need to restore service quickly and avoid disruption, rather than by long-term planning or technology optimization.

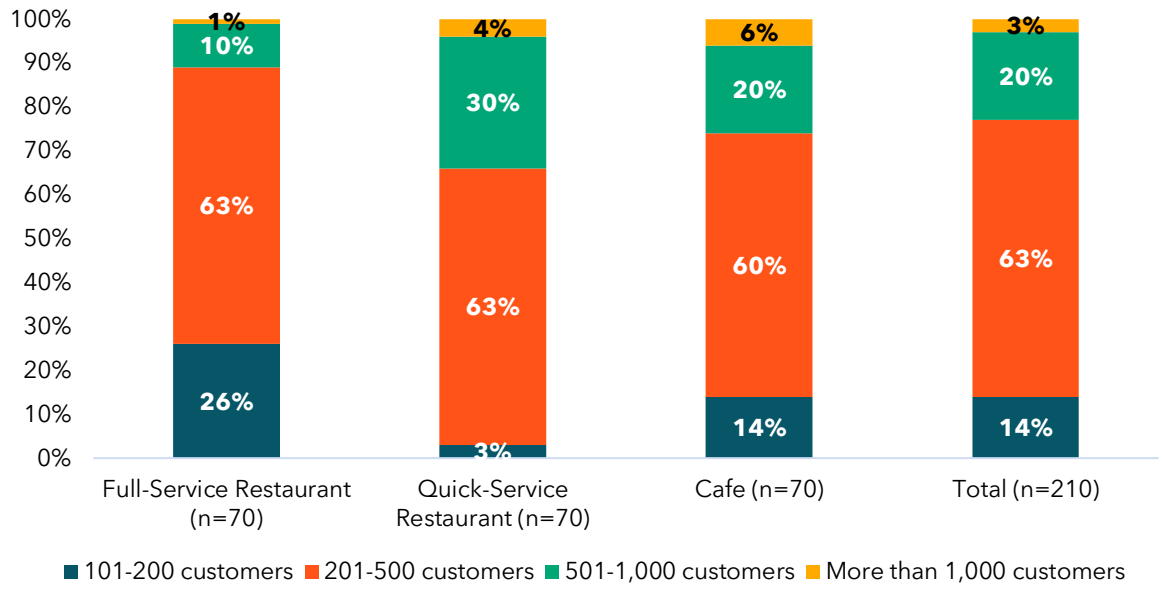
Interviewees also indicated that replacement decisions are influenced by the practical realities of existing site conditions, including available space, utility infrastructure, and the need to maintain adequate capacity during peak demand. In this context, established technologies such as gas storage systems are often viewed as lower-risk options, while newer technologies may be considered primarily when major upgrades, renovations, or incentive opportunities are already in play.

3.2.5 Factors Influencing Hot Water Demand

Around two-thirds of respondents to the survey reported daily customer volumes between 201 and 500 customers; very few restaurants serve more than 1,000 people per day. Full-service restaurants tended to serve fewer customers, and quick-service restaurants were most likely to see high volumes of customers (Figure 8).

[22] U.S. Department of Energy (DOE). (2022). *Technical Support Document: Energy Conservation Standards for Consumer Water Heaters.* https://downloads.regulations.gov/EERE-2021-BT-STD-0027-0038/content.pdf

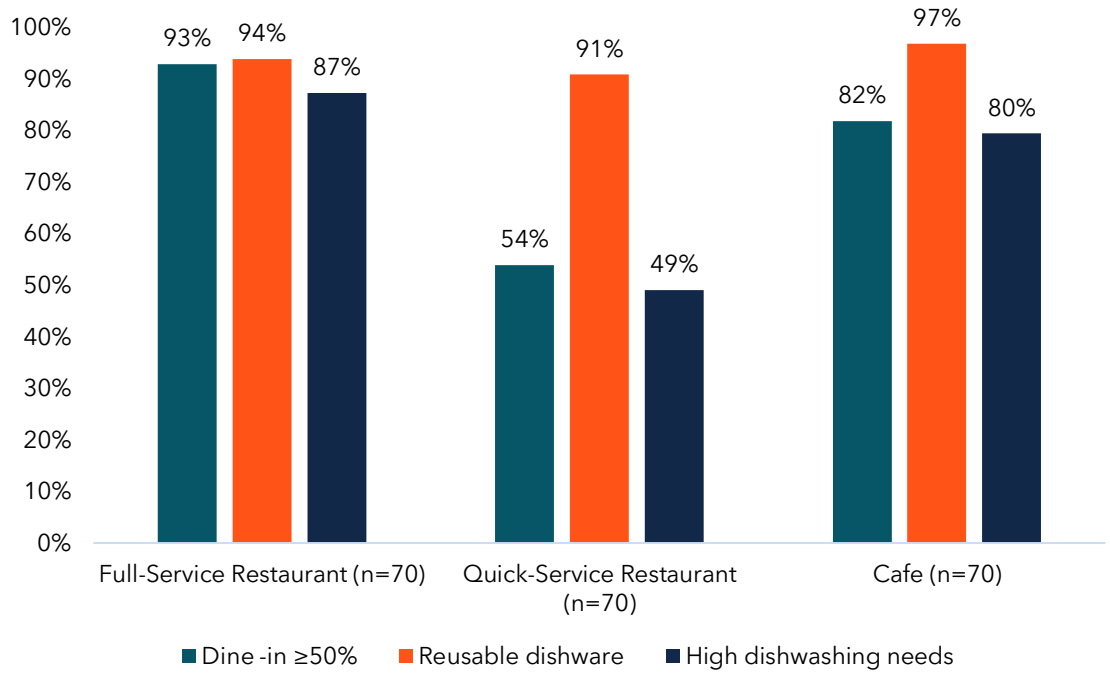
Figure 8. Daily Customer Volume by Restaurant Type



Source: CalMTA Foodservice Operator Survey. Q13: "On average, how many customers does the [establishment] serve on a typical day?"

Dine-in service and use of reusable dishware combine to drive hot water needs for dishwashing. As expected, dine-in service is most prevalent among full-service restaurants and cafes, with quick-service restaurants split between dine-in and takeout eating. The use of reusable dishware – either exclusively or in combination with disposable items – is widespread across all restaurant types, as shown in Figure 9.

Figure 9. Drivers of Dishwashing Demand by Restaurant Type (Dine-In and Reusable Dishware Use)



Source: CalMTA Foodservice Operator Survey. Q14: "Approximately what percentage of your customers eat their meals on-site versus take them to go?" and Q15: "Do your on-site customers typically use…?" and Q16: "How do you wash your reusable dishes and utensils?"

All restaurants have some dishwashing needs, so CalMTA's restaurant survey inquired about dishwashing practices. The majority of establishments (55%) report using a combination of dishwasher and hand washing, particularly among cafes (86%). Quick-service and full-service restaurants rely primarily on dishwashers more often, while exclusive reliance on hand washing is minimal across all establishment types (5% overall).

3.3 Logistical Factors Affecting Heat Pump Adoption Potential

Multiple logistical factors affect the ease with which an existing water heater could be replaced with a heat pump (or hybrid) variety:

- Location of the current water heater
- Current ownership and agency of restaurants to choose the new water heater upon replacement
- Existing replacement plans and intentions

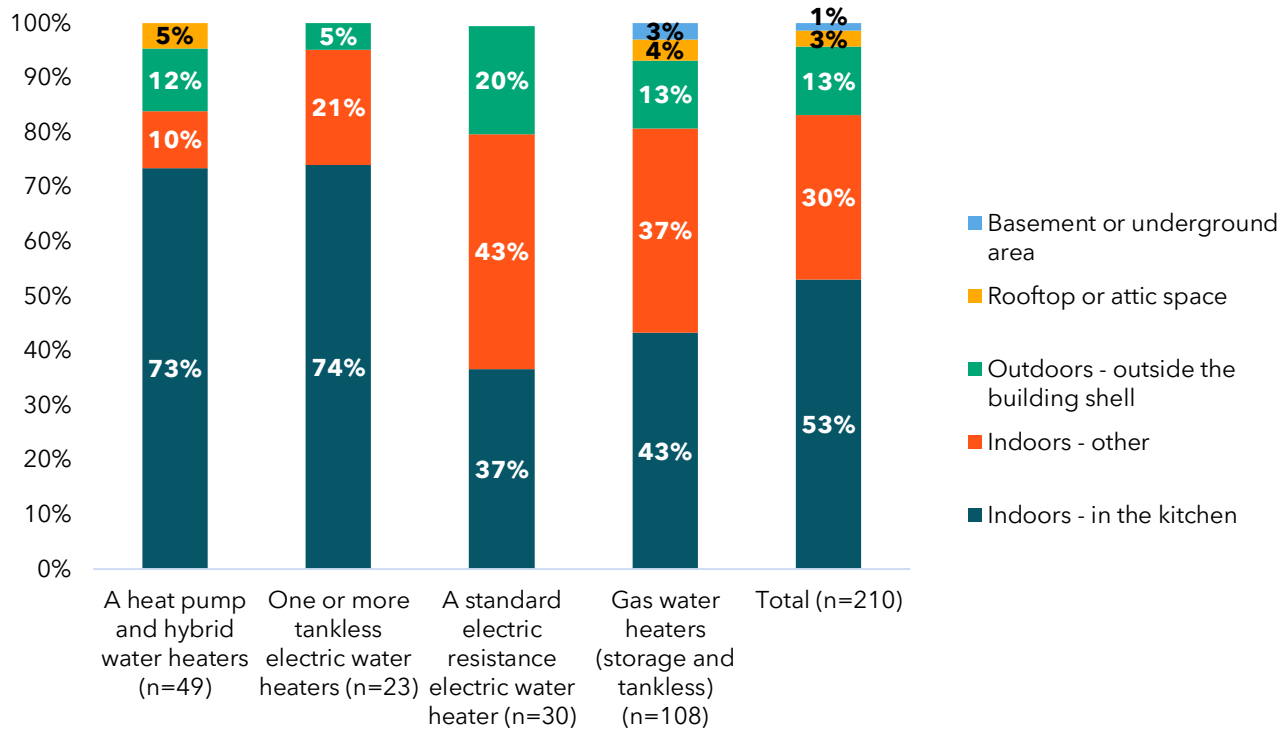
CalMTA explored these factors in our foodservice operator survey.

3.3.1 Location of Existing Water Heaters

Foodservice establishments reported water heaters variously located indoors and even outdoors, with placement generally concentrated near kitchen operations. As Figure 10 shows, indoor kitchen placement is most common (53%).

Location of existing water heaters matters because plumbing is already in place there, and ambient conditions, ventilation, and space availability are all relevant for heat pump units. Location of water heaters does appear to vary somewhat by technology.[23]

Figure 10. Water Heater Installation Location by Equipment Type



Source: CalMTA Foodservice Operator Survey. Q19: "Where is the water heater for this [establishment] located? (If you have multiple water heaters, please answer for the primary one.)"

3.3.2 Ownership, Control, and Replacement Authority

The ability of restaurants to influence water heater selections upon replacement depends on current water heater ownership and autonomy. Foodservice operator survey results suggest that most restaurants (or the organizations they are affiliated with) own the building space in which

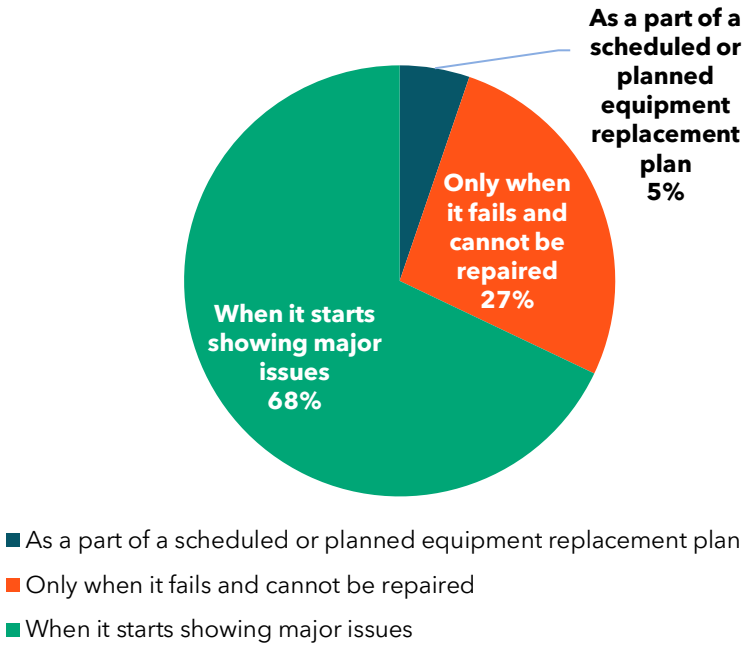
[23] Sample sizes are too small to be statistically meaningful for subgroup comparisons, however.

they are located. Specifically, 86% of respondents indicated that they (or their business) own the space, while 14% reported that the building is owned by a landlord. This proportion was higher than CalMTA expected. Of the 34 restaurant operators interviewed, 17 indicated that they own the building or space in which the establishment is located.

3.3.3 Replacement Plans and Outlook

Survey results and market actor interviews both confirmed that water heater replacements are triggered mostly by imminent or actual failure of an existing unit. In interviews, restaurant operators commonly described a reactive, run-to-failure approach, with systems replaced after breakdown or significant performance decline. In the CalMTA survey, two-thirds of foodservice operators reported that they intend to replace their water heater when the current one shows major issues. Most other respondents intended to replace upon actual failure. Only about 5% of respondents reported intentions of making pre-planned replacements (Figure 11). Though not statistically significant, survey results suggest that full-service restaurants may be slightly more likely to engage in planned replacements.

Figure 11. Triggers for Water Heater Replacement Decisions (n=210)



Source: CalMTA Foodservice Operator Survey. Q32: "Are you most likely to replace your current water heater?" and Q33: "Do you think your landlord or property management firm would be most likely to replace your current water heater?"

While some chain operators reported broader asset management practices that include informal replacement windows of approximately 7–10 years, proactive replacement remains limited.

High-level findings from interviews with full-service restaurant operators also indicated that upgrades are triggered by aging systems, efficiency decline, capacity expansion, or strategic improvements — not just failure. Some use preventive cycles (e.g., 3-5 years in heavy-use environments); others run-to-failure with strong warranty protection. Independent operators of full-service restaurants typically maintain existing systems and rely on trusted contractors to recommend replacement when performance declines or equipment fails. Operators of chain-affiliated restaurants indicated that multiple or backup heaters are common. Maintenance contracts and servicing every three to six months help prevent breakdowns and maintain performance.

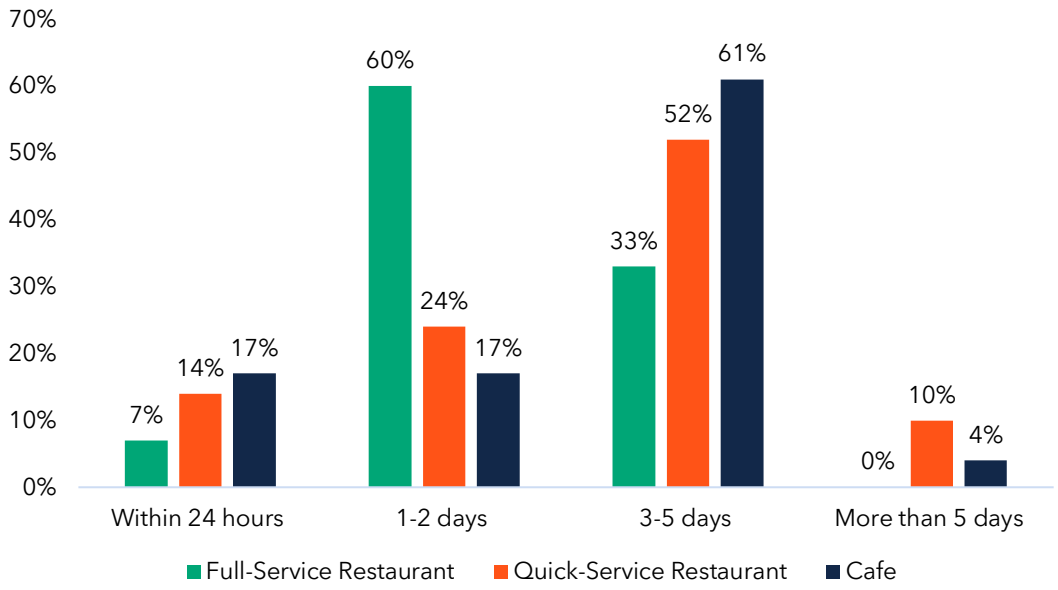
Among quick-service restaurants, independent restaurant operators maintain and repair existing systems as long as they remain functional, replacing them mainly after failure. In contrast, chains spoke more often of having multiple heaters or paired tankless units that provide backup capacity. Gas tankless is common because it saves space and supports continuous service. Chains also use standardized replacement procedures.

Because most restaurants follow a reactive replacement approach (Figure 11), water heater failures often require rapid equipment replacement. Among survey respondents who reported replacing systems only after failure, about half indicated that a new system must be installed within 3-5 days. An additional third reported requiring replacement within 1-2 days, while a smaller share of respondents indicated a need for replacement within 24 hours. These findings highlight the time-sensitive nature of water heater failures and the operational urgency associated with restoring service, but they may also hint at some ability to keep functioning with backup systems in some restaurants.

Replacement timelines vary by restaurant type, as shown in Figure 12. Cafes most frequently reported replacement within 3-5 days (61%). Interview findings suggest that some cafes maintain multiple tankless systems, which can provide backup capacity and allow for slightly greater flexibility in replacement timing. In contrast, full-service restaurants show a higher need for rapid replacement, with 60% reporting a required installation timeline of 1-2 days. Quick-service restaurants also operate under constrained timelines, with 52% reporting replacement within 3-5 days and 14% within 24 hours.

The findings suggest that operational urgency limits the feasibility of evaluating alternative technologies when water heaters fail, reinforcing reliance on familiar and readily available systems. During emergency water heater replacements, reactive operators face limited replacement options when the supply chain lacks HPWH models on its service vehicles and operators are unprepared to address electrical work.

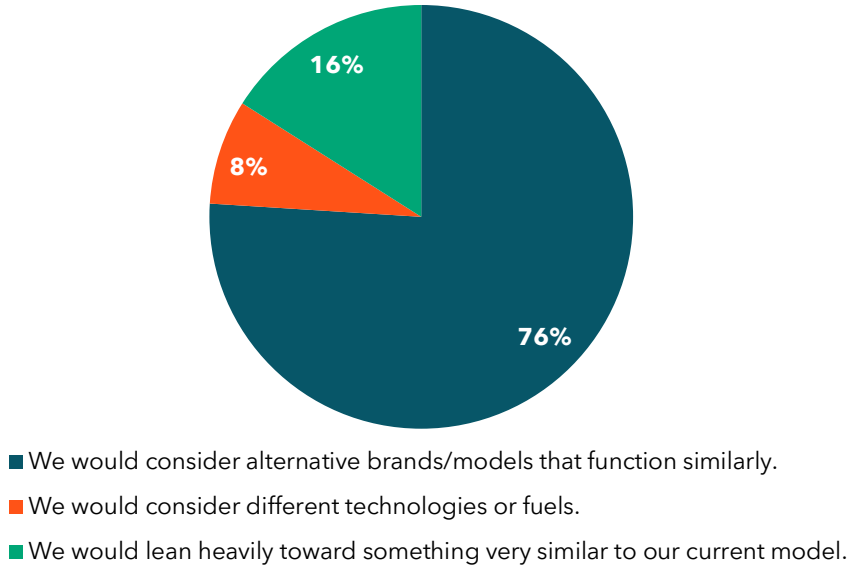
Figure 12. Urgency of Water Heater Replacement Following Equipment Failure (n=59)



Source: CalMTA Foodservice Operator Survey. Q34: "When your water heater needs to be replaced, how quickly would you need the new one installed and working?"

The foodservice operator survey also examined how restaurant operators approach equipment selection when replacing a water heater. Findings indicate a strong preference for maintaining the same type of technology. A majority of respondents (76%) reported that they would consider alternative brands or models with similar functionality, suggesting openness to manufacturer variation but not to changes in underlying system type. In contrast, only 8% of respondents indicated willingness to consider different technologies or fuel types, such as electrified or alternative-fuel systems. An additional 16% reported a preference for equipment closely matching their existing system, further reinforcing the importance of familiarity and perceived reliability in replacement decisions (Figure 13).

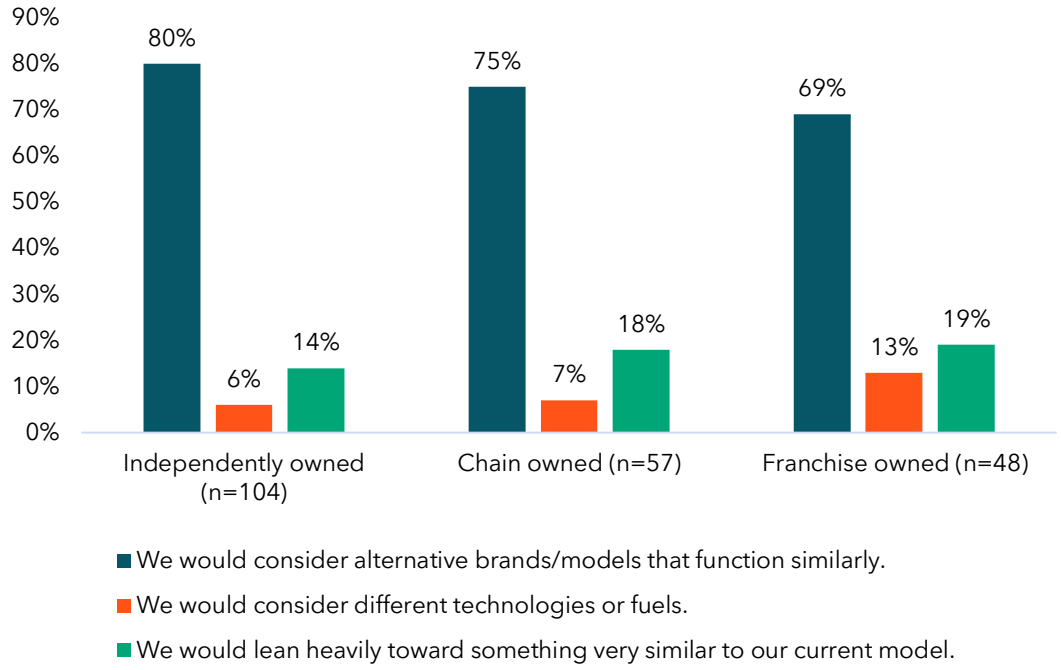
Figure 13. Preferences for Water Heater Replacement Technology (n=210)



Source: CalMTA Foodservice Operator Survey. Q35: "Which of the following best describes what kind of water heater you would end up selecting as a replacement?"

Replacement preferences are largely consistent across ownership types, with most operators favoring like-for-like replacements. Approximately 80% of independent, 75% of chain-owned, and 69% of franchise establishments prefer alternative brands or models that function similarly to existing systems, while only a small share (6–13%) are willing to switch technologies or fuel types (Figure 14).

Figure 14. Technology and Brand Preferences for Water Heater Replacement by Ownership Type



Source: California foodservice operator survey. Q35: "Which of the following best describes what kind of water heater you would end up selecting as a replacement?"

Table 6 below shows the same data by current water heater type. While the group sizes are too small to allow for identification of statistically significant differences, the results suggest a greater willingness by users of electric-resistance storage water heaters to shift to other technologies and seemingly high satisfaction with natural gas tankless systems.

Table 6. Technology and Brand Preferences for Water Heater Replacement by Ownership Type

Current Water Heater Type	We would consider alternative brands/models that function similarly.	We would consider different technologies for fuels.	We would lean heavily toward something very similar to our current model.
Storage tank gas water heater (n=85)	79%	4%	17%
One or more tankless/on-demand gas water heaters (n=23)	96%	0%	4%

Current Water Heater Type	We would consider alternative brands/models that function similarly.	We would consider different technologies for fuels.	We would lean heavily toward something very similar to our current model.
Standard electric-resistance water heater (n=30)	63%	15%	22%
One or more tankless electric water heaters	74%	5%	21%
HPWH (incl. hybrid and heat pump only) (n=49)	78%	9%	13%

Source: California foodservice operator survey. Q35: "Which of the following best describes what kind of water heater you would end up selecting as a replacement?"

Interview findings indicate that in chain and franchise systems, equipment selection is typically governed by corporate standards and approved equipment lists, which limit choices to a predefined set of manufacturers and models. This structure reinforces like-for-like replacement, with deviations occurring primarily when required by regulatory or operational needs. While standardization is more stringent for cooking equipment, operators have greater flexibility for non-food preparation systems, such as water heaters, provided performance requirements are met.

Although most replacements are reactive, some operators — particularly larger chains — report preventive maintenance practices that enable planned replacement decisions. Beyond failure, common replacement triggers include declining efficiency, capacity constraints during peak demand, and aging infrastructure. Many establishments continue to operate older gas storage systems (10–20 years), often viewed as durable "workhorse" units until performance declines.

Market actor interviewees suggested that additional factors, such as hard water calcification — particularly in high-demand cafe and quick-service settings — can accelerate equipment degradation and reduce performance. Other triggers include remodels, expansions, and code compliance requirements. In contrast, decarbonization is rarely a primary driver and is typically viewed as a policy-driven rather than operational priority.

4 Decision-Makers' Perspectives and Practices Regarding Water Heating Decisions

Foodservice operators and the supply chain serving restaurants influence water heating-related decisions. Insights from interviews and the CalMTA survey of restaurant operators describe the water heater selection process, awareness and perceptions about water heater technologies, the

role of sustainability initiatives, and leasing practices. A subsequent chapter provides the supply chain structure and perspective.

4.1 How Water Heater Selections Happen

Water heater installations in foodservice establishments are generally triggered by routine failure (anticipated or actual) of the existing water heater, with scheduled replacements, remodels, and new construction serving as additional drivers. As noted in section 3.3.3, two-thirds of foodservice operators indicated that they replace their water heaters upon anticipated failure.

Because interviews with restaurant operators from independent establishments, franchises, and corporate chains indicate that decision-making varies across ownership types, we present survey and interview results about decision-making by type of establishment. Key decision-making factors:

- Decision-makers and roles
- Considerations for water heater selections
- Funding and financing

Due to small sample sizes across restaurant ownership subgroups, the results presented in this section (Figures 15-37) are based on unweighted responses from the CalMTA restaurant survey.

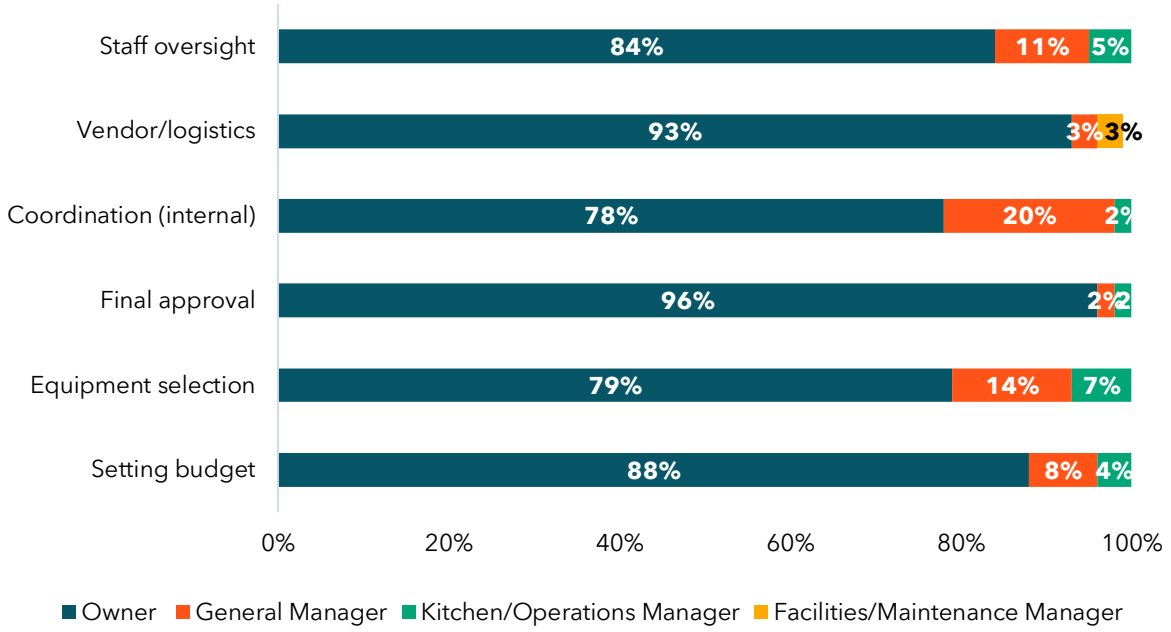
4.1.1 Decision-Makers and Roles

Decision-making authority for water heater replacements is generally concentrated among owners, though the structure varies across establishment types. Overall, 67% of surveyed restaurant operators identify the owner as the primary decision-maker involved in water heater replacement decisions, followed by general managers (20%). Smaller shares report involvement from kitchen or operations managers (6%), facilities or maintenance managers (6%), and corporate or regional decision-makers (1%).

Furthermore, in independent establishments, decision-making is highly centralized, with owners directly involved across all stages of replacement, including budgeting, equipment selection, approval, and coordination (Figure 15.

This is particularly true for owner-occupied sites. Operators who own their space typically have greater flexibility to align replacement decisions with capital planning. In contrast, operators in leased or landlord-controlled spaces face more constrained decision environments. Limited authority over infrastructure and capital investments, combined with split incentives – where tenants bear operating costs but do not control equipment upgrades – reinforces reactive replacements that focus on low first cost.

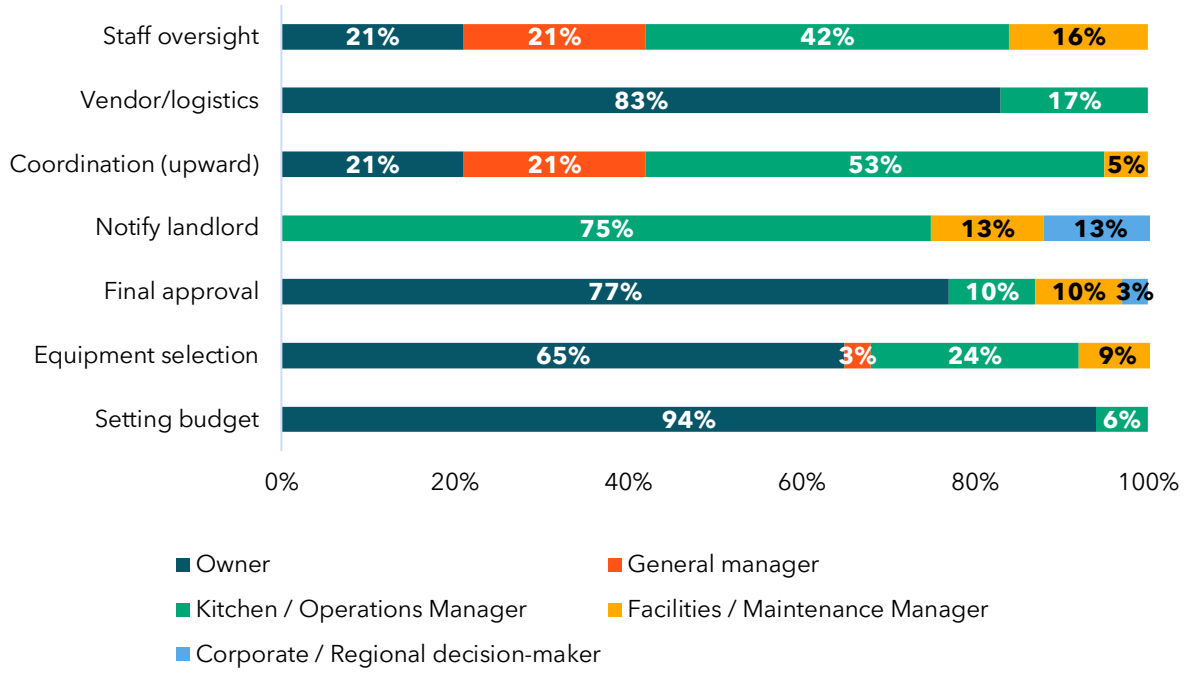
Figure 15. Responsibility for Water Heater Replacement Decisions by Role in Independent Establishments (n=105)



Source: CalMTA Foodservice Operator Survey. Q11: "Which of the following best describes your involvement if the [establishment] needed to replace some mechanical equipment, like a water heater? (Select all that apply.)"

In contrast, chain-owned establishments exhibit a more distributed structure. As shown in Figure 16, owners remain heavily involved in budget setting, equipment selection, vendor coordination, and final approval processes. Kitchen and operations managers demonstrate substantial involvement in coordination activities, staff oversight, and communication with landlords, reflecting the more operationally layered structure commonly found in chain establishments. Interviews further suggest that larger organizations often maintain asset management practices that track equipment condition and performance, enabling more predictable replacement cycles. However, water heaters are rarely prioritized for proactive upgrades, with capital investments typically directed toward higher-impact systems such as cooking equipment, refrigeration, and HVAC.

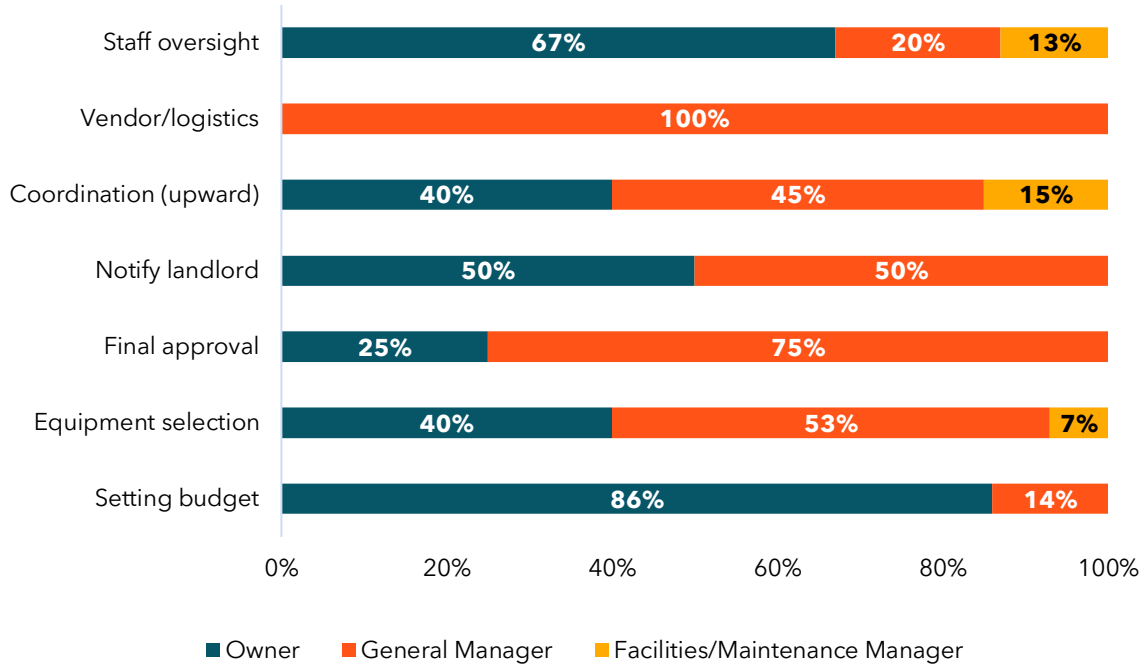
Figure 16. Responsibility for Water Heater Replacement Decisions by Role in Chain-Owned Establishments (n=57)



Source: CalMTA Foodservice Operator Survey. Q11: "Which of the following best describes your involvement if the [establishment] needed to replace some mechanical equipment, like a water heater? (Select all that apply.)"

Franchise establishments exhibit a similar but more balanced structure, with responsibilities shared primarily between owners and general managers. Owners typically retain control over financial decisions, while general managers are more directly involved in execution, including vendor coordination and equipment selection (Figure 17). Across both chain and franchise systems, corporate or regional roles have limited direct involvement.

Figure 17. Responsibility for Water Heater Replacement Decisions by Role in Franchises (n=48)



Source: CalMTA Foodservice Operator Survey. Q11: "Which of the following best describes your involvement if the [establishment] needed to replace some mechanical equipment, like a water heater? (Select all that apply.)"

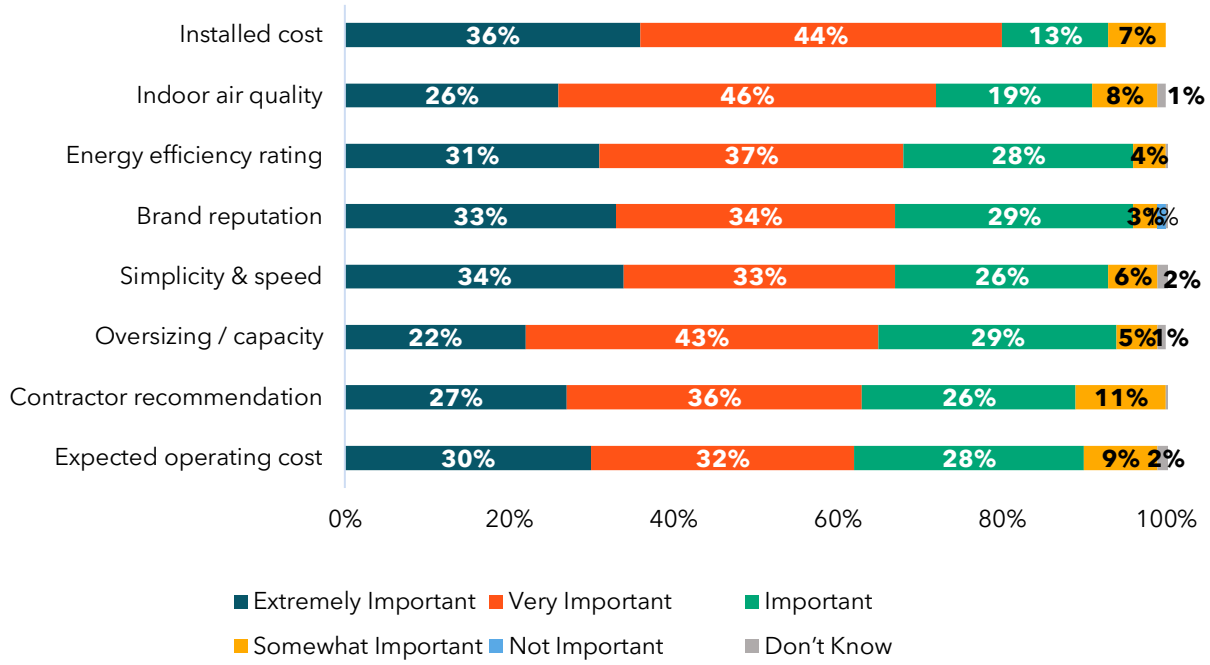
4.1.2 Considerations for Water Heater Selection

Foodservice operators reported that many considerations are important in equipment selections. We present results separately by restaurant type.

Independent Establishments

The CalMTA foodservice operator survey asked respondents to rate the importance of various factors in their water heater selection. Among these, installed cost took precedence and was rated as extremely or very important by 80% of independent foodservice operators, followed by indoor air quality, energy efficiency, simplicity and speed, brand reputation, capacity, the contractor's recommendation, and operating cost (Figure 18).

Figure 18. Importance of Factors in Water Heater Selection in Independent Establishments (n=105)

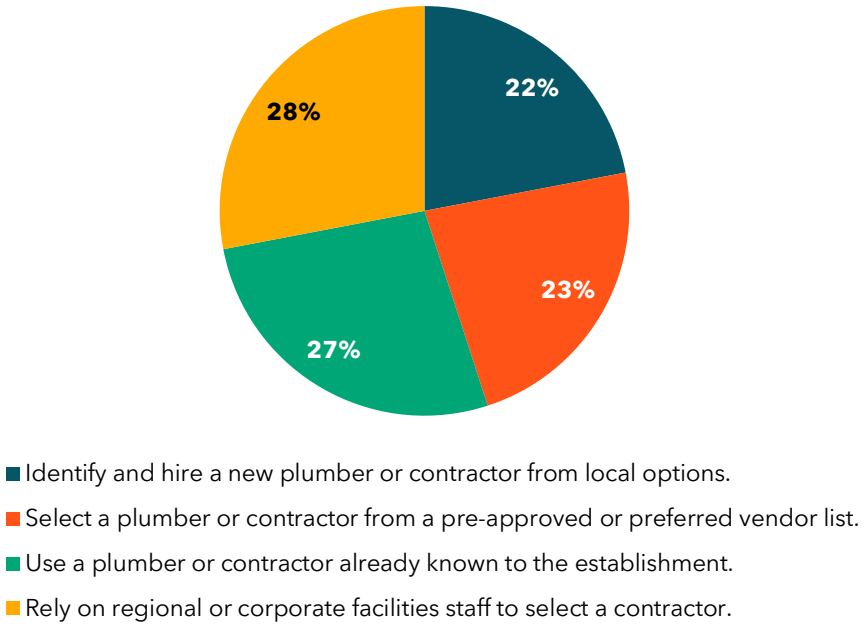


Source: CalMTA Foodservice Operator Survey. Q37: "Please rate the influence you would expect each factor below to play in the final selection of a replacement water heater?"

Among independent restaurant operators surveyed for this study, a small number of respondents indicated that they use a calculated payback period to evaluate whether energy efficiency improvements justify higher equipment costs. Of those respondents, most (4 of 5) reported an expected payback period of 3–5 years, while one respondent indicated a desired payback period of less than 2 years.

As shown in Figure 19, independent establishments use a combination of approaches when selecting contractors, including reliance on corporate or regional staff (28%), existing relationships (27%), pre-approved vendor lists (23%), and a local contractor search (22%).

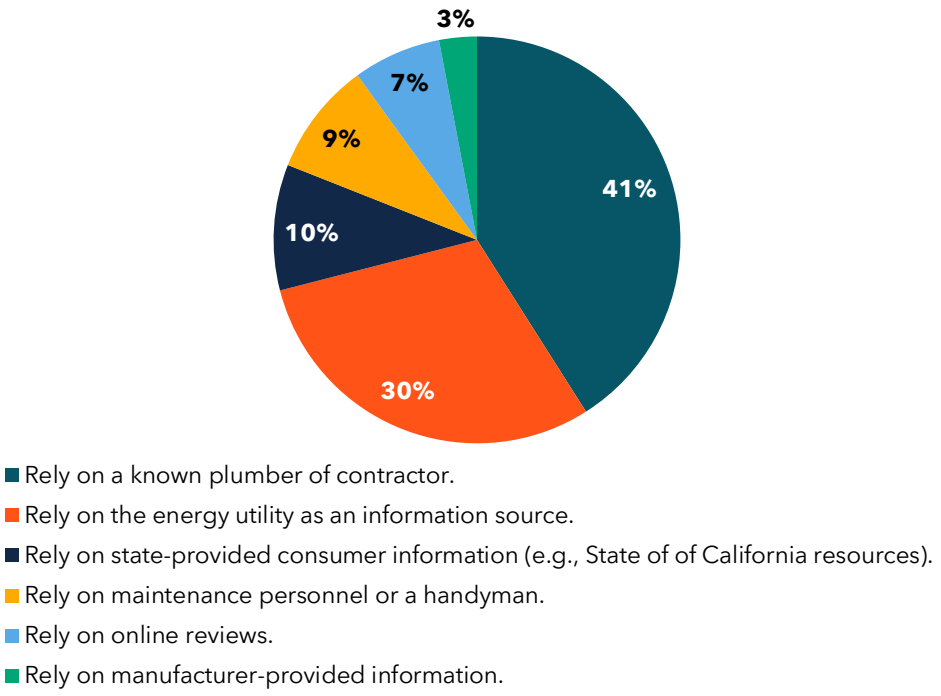
Figure 19. Methods for Selecting Plumbing and Contractor Services in Independent Establishments (n=98)



Source: CalMTA Foodservice Operator Survey. Q40: "How would you (or your colleagues) select a plumber or contractor if you needed one for a potential water heater replacement?"

Independent establishments rely heavily on technical professionals as trusted information sources about water heating. Figure 20 shows that 41% of respondents consider plumbers/contractors the most trusted source of information, followed by 30% who rely on information from energy utilities. Other sources, such as maintenance staff, online reviews, and manufacturer information, play a more limited role.

Figure 20. Trusted Information Sources for Water Heater Decision-Making in Independent Establishments (n=105)

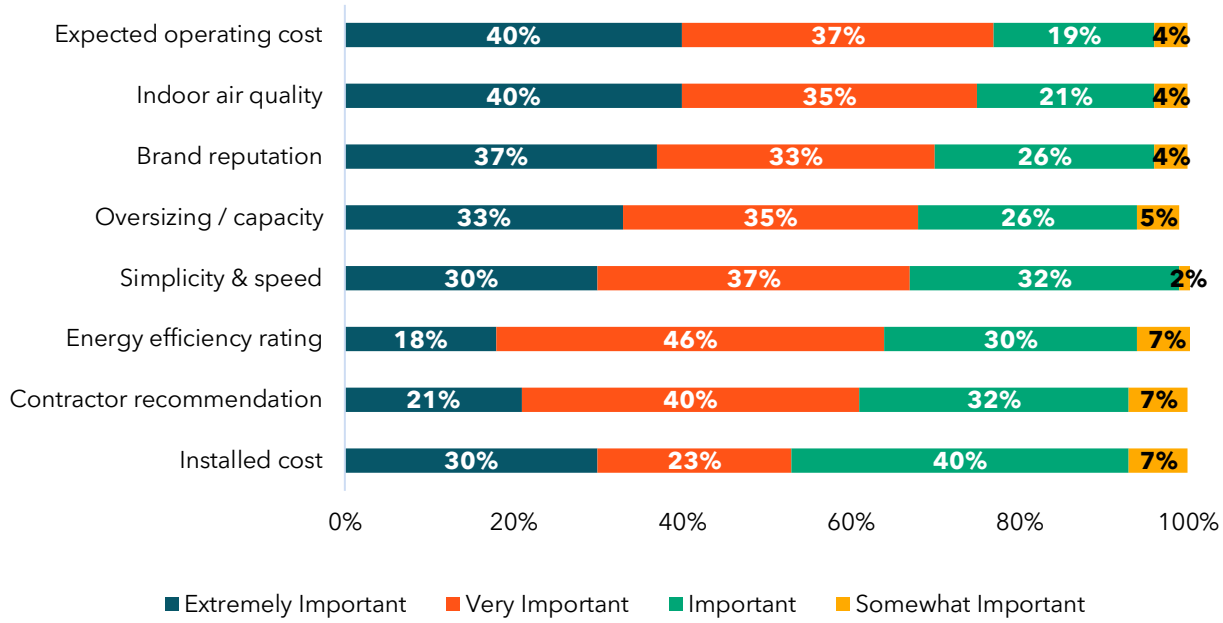


Source: CalMTA Foodservice Operator Survey. Q42: "Which of the following sources would you trust to give you honest and useful information about different types of water heaters that you might not know well, if you were to consider one for your […]?"

Chain-Owned Establishments

Chain-owned establishments place similarly strong emphasis on cost, but they are more influenced than independent establishments by operating costs (Figure 21). Performance-related factors, including energy efficiency, indoor air quality, and system capacity, are also widely prioritized, along with contractor recommendations and ease of installation, which support consistent operations across multiple locations.

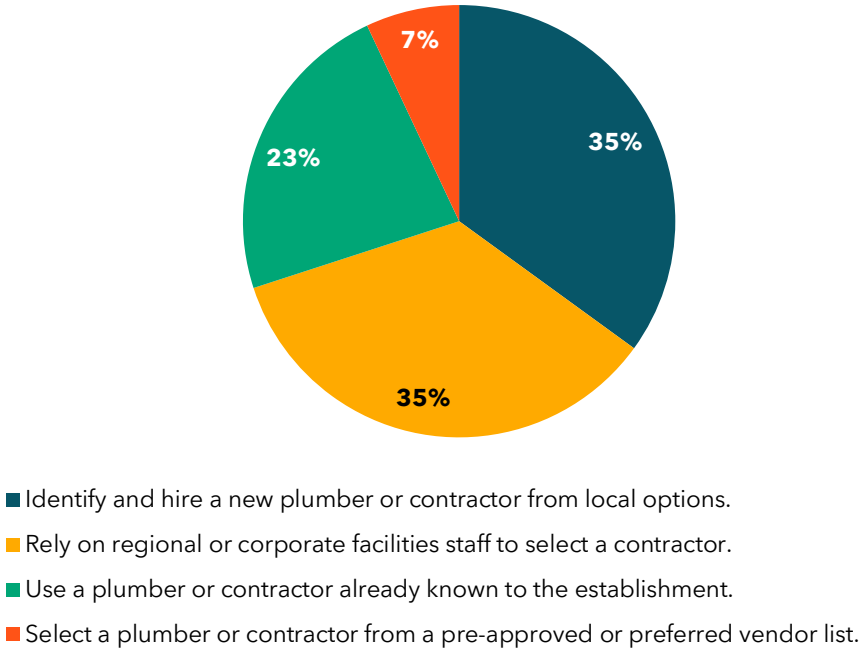
Figure 21. Importance of Factors in Water Heater Selection in Chain-Owned Establishments (n=57)



Source: CalMTA Foodservice Operator Survey. Q37: "Please rate the influence you would expect each factor below to play in the final selection of a replacement water heater?"

As shown in Figure 22., contractor selection is split between local sourcing (35%) and corporate or regional selection (35%), with additional reliance on existing relationships (23%). Only a small share (7%) reported using pre-approved vendor lists, which contrasts with observations from market actor interviews. It is possible that the use of vendor lists happens at the corporate or regional level and that their use is included as part of that response.

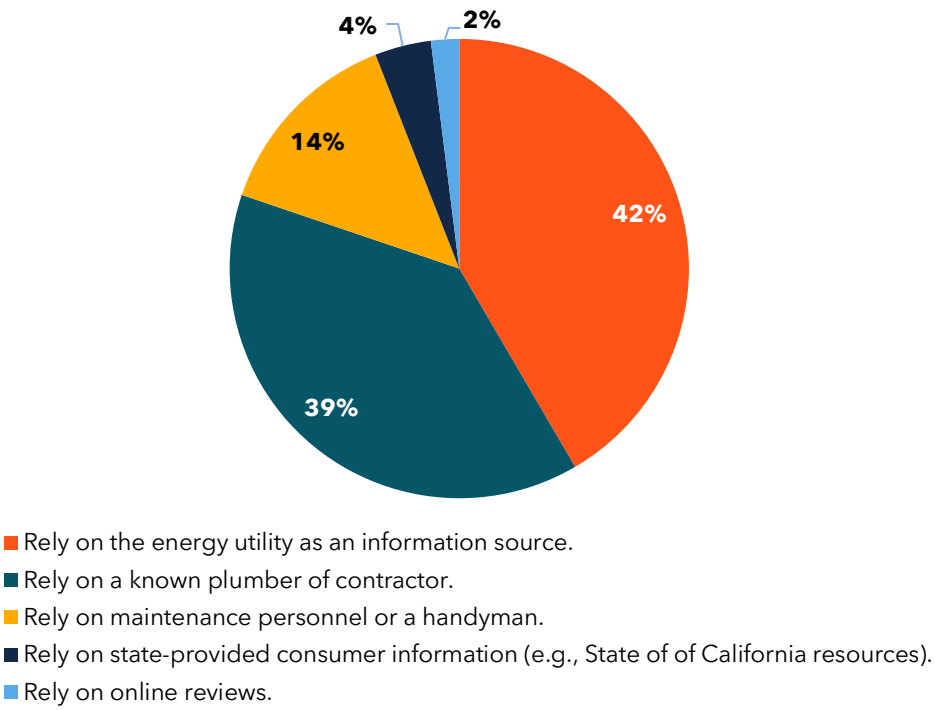
Figure 22. Methods for Selecting Plumbing and Contractor Services in Chain-Owned Establishments (n=57)



Source: CalMTA Foodservice Operator Survey. Q40: "How would you (or your colleagues) select a plumber or contractor if you needed one for a potential water heater replacement?"

Trusted information sources are split between utilities and contractors. Energy utilities (42%) and plumbers/contractors (39%) are the most commonly identified trusted sources. Maintenance staff play a secondary role (14%), while other sources such as online reviews (2%) and state information (4%) are minimally used (Figure 23).

Figure 23. Trusted Information Sources for Water Heater Decision-Making in Chain-Owned Establishments (n=57)

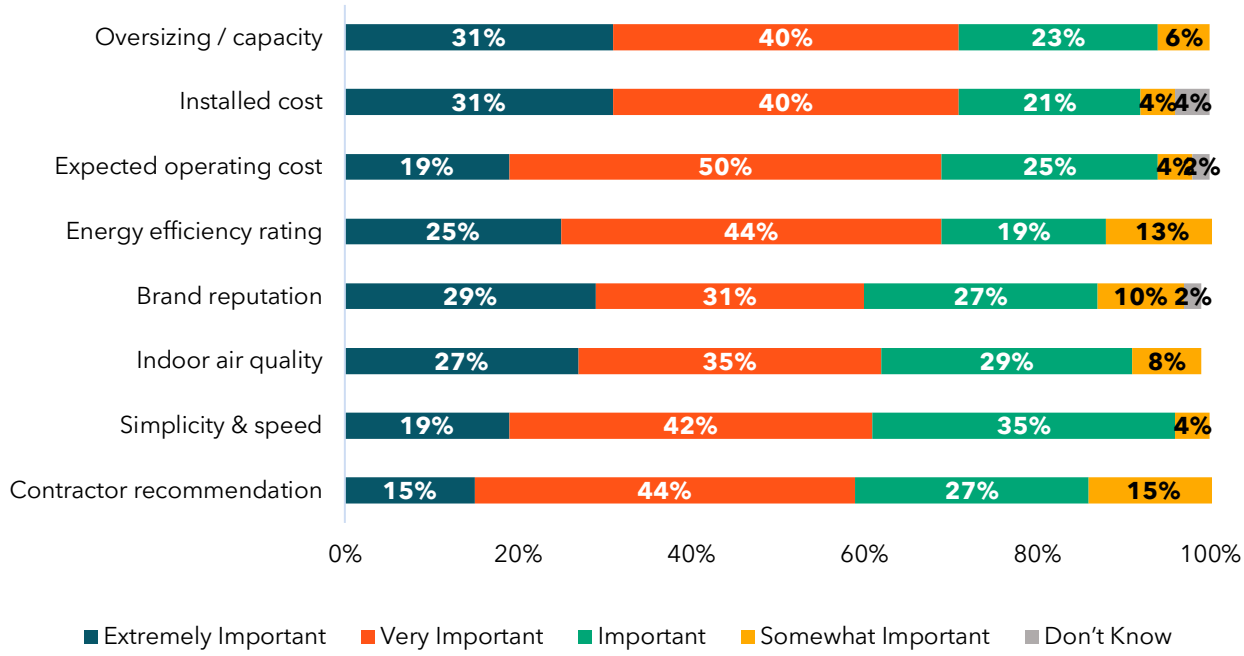


Source: CalMTA Foodservice Operator Survey. Q42: "Which of the following sources would you trust to give you honest and usefulinformation about different types of water heaters that you might not know well, if you were to consider one for your […]?"

Franchise Establishments

Franchise establishments emphasized both installed and operating cost, with energy efficiency and capacity also playing an important role in equipment selection (Figure 24).

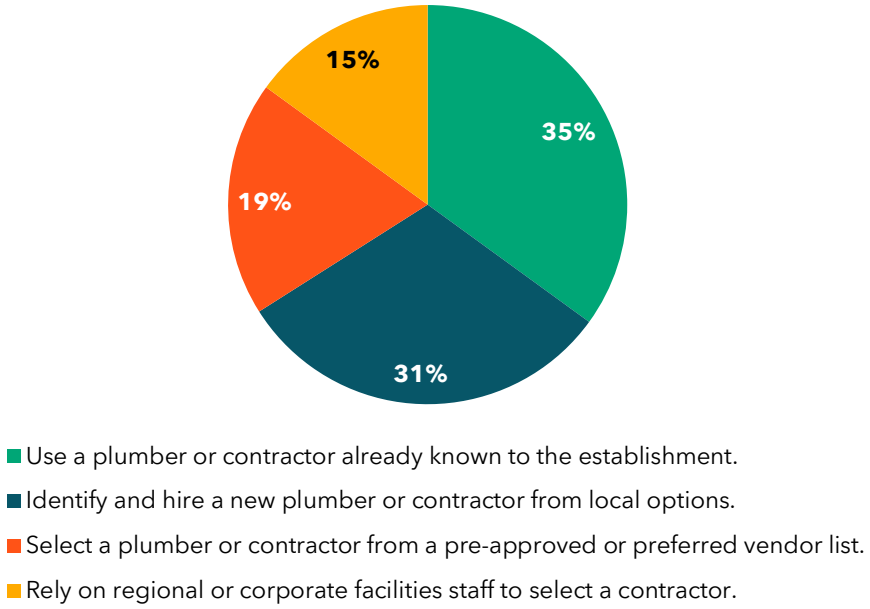
Figure 24. Importance of Factors in Water Heater Selection in Franchises (n=48)



Source: CalMTA Foodservice Operator Survey. Q37: "Please rate the influence you would expect each factor below to play in the final selection of a replacement water heater?"

As shown in Figure 25, franchise establishments rely primarily on known contractors (35%) or finding a plumber locally for the specific need at hand (31%). Fewer rely on pre-approved vendor lists (19%) and corporate selection (15%).

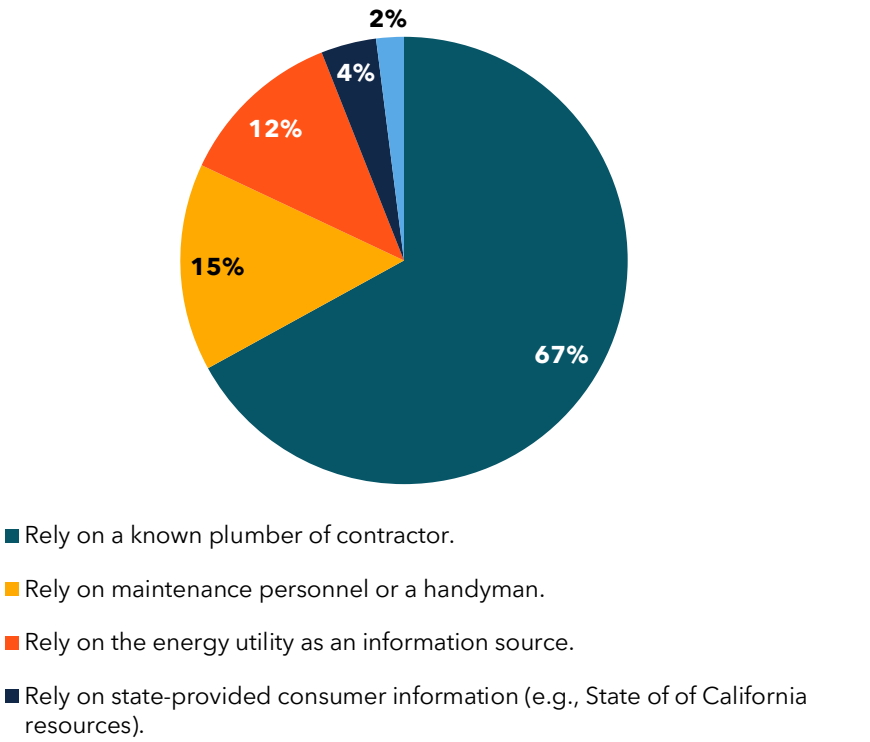
Figure 25. Methods for Selecting Plumbing and Contractor Services in franchises (n=48)



Source: CalMTA Foodservice Operator Survey. Q40: "How would you (or your colleagues) select a plumber or contractor if you needed one for a potential water heater replacement?"

Plumbers/contractors dominate as the most trusted source (67%), far exceeding other sources, such as maintenance staff (15%) and utilities (13%). Other channels, including online reviews (2%) and state information (4%), play a minimal role (Figure 26).

Figure 26. Trusted Information Sources for Water Heater Decision-Making in Franchises (n=48)



Source: CalMTA Foodservice Operator Survey. Q42: "Which of the following sources would you trust to give you honest and useful information about different types of water heaters that you might not know well, if you were to consider one for your […]?"

4.1.3 Leasing Practices

Equipment leasing can help overcome the first cost barriers of equipment by spreading out equipment costs over the duration of its use, but leasing of water heaters appears to be uncommon, based on research conducted for this study. CalMTA reviewed multiple sources to identify information on water heater leasing. The information reviewed included restaurant equipment leasing guides,[24,25,26] equipment financing resources, commercial water heater

[24] Texas Restaurant Supply. (n.d.). *Leasing vs. Buying Restaurant Equipment: Pros & Cons*. https://texrestaurantsupply.com/news/leasing-vs-buying-restaurant-equipment-pros-cons/

[25] Restaurant Equipment Solutions. (2022). *Lease vs. buy: What's best for your restaurant equipment needs?* https://www.restaurantequipmentsolutions.com/blog/lease-vs-buy.

[26] Alex, T., Bayo, A., Sherura, E., Lumu, B., Ikwe, L., and Ogwal, C.T. (2024). *The Bottom-Line Choice: Lease vs. Buy – A Business Owner's Guide*. International Journal of Current Science Research and Review, Vol. 7, Issue 1. 26-1201-2024.pdf

manufacturer, utility financing programs,[27] and other industry sources.[28] While these sources contained examples of financing and leasing options for restaurants, no evidence was found of a well-established leasing market for water heaters in foodservice establishments. Consistent with this lack of documentation, market actor interviews also suggest that restaurants rarely lease water heaters, and CalMTA's restaurant operator survey indicates that 100% of water heaters are owned by either the restaurant or the building owner.

In contrast, evidence of dishwasher leasing was identified through both secondary research and market actor interviews. Although only 7% of restaurant operator survey respondents reported leasing a dishwasher, interviews and secondary sources point to an established market for dishwasher leasing that includes maintenance and chemical supplies as part of bundled lease arrangements. The presence of documented leasing options for dishwashers, but not for water heaters, further suggests that water heater leasing is uncommon in the foodservice sector.

4.2 Awareness and Perceptions Among Decision-Makers

Awareness and perceived applicability are two requisites for adoption of any new technology. The CalMTA Foodservice Operator Survey explored both.

Awareness

We asked respondents to self-report their awareness of water heating technologies using a scale that comprised "never heard of it" (which we interpreted as no awareness), "heard of it" (low awareness), "have a vague sense of what it is" (medium awareness), and "know what this is" (high awareness).

Survey results pointed to moderate awareness by respondents of all water heater technology options available to them, with low variation between self-reported awareness of traditional and well-established technologies and newer, less common options like heat pump water heaters and tankless water heaters. This suggests that foodservice operators feel that they have a sense of all the water heating technologies but lack the knowledge needed to make informed choices about newer technologies like heat pump water heaters. As shown in Table 7, 42% of respondents report high awareness of both types of conventional storage tank systems, followed by heat pump and hybrid water heater systems (36%) and tankless systems (28%).

Interviews with restaurant operators suggest that self-reported familiarity with newer water heater technologies likely overstates true familiarity. Many respondents who reported awareness

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[27] Pacific Gas and Electric Company (PG&E). (2010). *Why are Commercial Foodservice Utility Incentives so Tasty?* ACEEE Summer Study on Energy Efficiency in Buildings. https://www.aceee.org/files/proceedings/2010/data/papers/2058.pdf

demonstrated limited understanding of system performance, installation requirements, and commercial applicability.

Table 7. Self-Reported Awareness of Water Heating Technologies (n=210)

Type of Water Heater	Know What It Is	Have a Vague Sense of What It Is	Heard of It	Never Heard of It
Electric/natural gas tank water heater	42%	19%	36%	3%
Heat pump water heater (HPWH)	36%	27%	36%	1%
Hybrid heat pump water heater	36%	20%	35%	8%
Electric/natural gas tankless water heater	28%	29%	42%	1%

Source: CalMTA Foodservice Operator Survey. Q36: "How aware are you of the following water heater technologies?" (Response choices: Never heard of it, heard of it, have a vague sense of what it is, know about it.)

Awareness across different ownership types varies in potentially meaningful ways. Overall, respondents from independent restaurants were more aware of all water heater types than respondents from franchises and chain-owned restaurants, most likely because they have greater responsibility and control over their restaurant's equipment. This greater self-reported awareness extends to heat pump and hybrid water heaters, too, where nearly half of respondents from independent restaurants showed high awareness, compared with a quarter to a third of those from franchises and chain-owned restaurants.

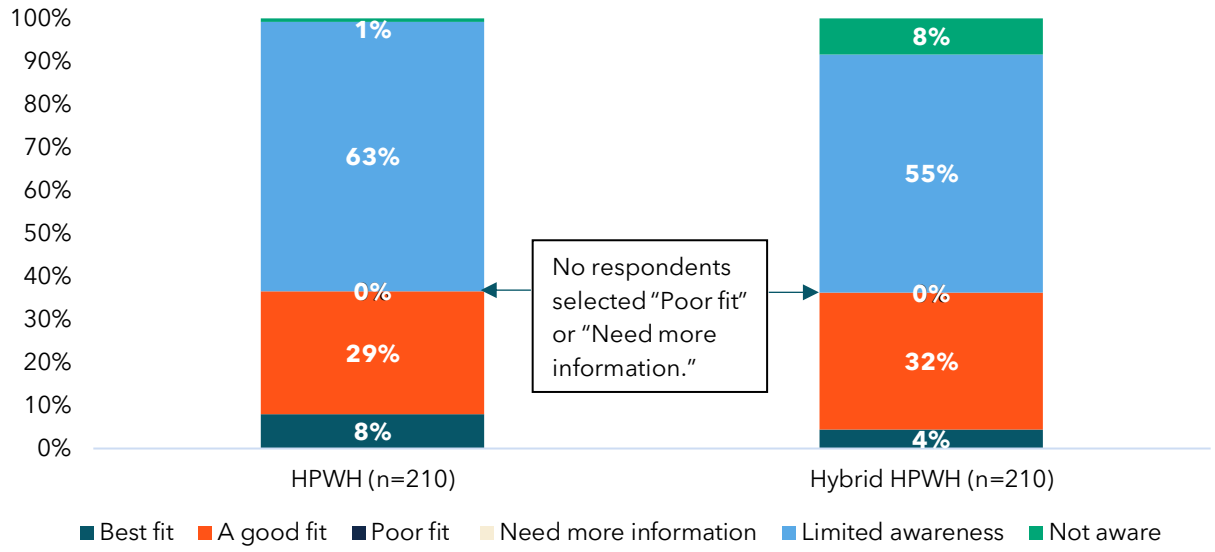
Perceived Suitability of HPWHs

Perceived suitability of HPWHs was evaluated using a two-step approach, beginning with responses to the awareness question. Respondents who indicated that they "know what this is" for either HPWH or hybrid HPWH technologies were subsequently asked how well the technology would fit their operational needs. For the combined analysis presented in Figure 27, respondents who reported "never heard of it" were categorized as Not Aware, while those who selected "heard of it" or "have a vague sense of what it is" were grouped into a Limited Awareness category. Respondents who indicated "know what this is" were categorized according to their assessment of technology fit (Best Fit, Good Fit, Poor Fit, or Need More Information). This approach provided a view of perceived fit across the full respondent population while accounting for varying levels of technology awareness.

Awareness and perceived suitability of HPWH technologies is generally positive among those familiar with the technologies. As shown in Figure 27, limited awareness remains the dominant response for both standard and hybrid HPWH systems, accounting for 63% and 55% of respondents, respectively. Approximately one-third of respondents identify the technologies as a

good fit for their operations, including 29% for standard HPWH systems and 32% for hybrid HPWH systems, while only a small share identify them as a best fit (8% and 4%, respectively). No respondents indicated that either technology was a poor fit or that additional information was needed.

Figure 27. Perceived Suitability of Heat Pump and Hybrid Water Heaters (by Food Service Operators Without Any Form of Heat Pump Water Heater)



Source: CalMTA Foodservice Operator Survey. Q36: "How aware are you of the following water heater technologies?" and Q41: "Based on what you know, how well would a heat pump water heater fit your needs?"

4.3 Sustainability Initiatives and Customer Expectations

The MTI team has hypothesized that restaurant sustainability initiatives may be a potential driver and entry point for promoting voluntary heat pump water heater adoption, particularly among corporately owned restaurants with formal sustainability initiatives. CalMTA's findings include the following:

- Sustainability initiatives are widely implemented across restaurants, with 97% of respondents reporting at least some level of informal engagement, indicating broad baseline adoption, though formal programs remain limited and more prevalent among chain-owned and franchise establishments.
- These initiatives tend to focus on common resource-saving practices, including water-saving equipment, energy-efficient upgrades, and waste reduction, with most efforts centered on discrete, low-disruption actions, rather than comprehensive or capital-intensive strategies.

- Customer expectations play a limited role in driving sustainability actions, with most respondents reporting only occasional customer interest (67%) and very few indicating strong or consistent demand.

- California decarbonization policies are widely recognized but primarily viewed as a longer-term consideration, with most operators saying they are monitoring potential impacts (54%) or expecting future relevance (11%), while few report immediate effects on operations.

4.3.1 Company Sustainability Practices and Initiatives

Across the restaurant sector, sustainability initiatives are primarily motivated by internal priorities such as cost reduction, operational efficiency, and regulatory compliance, rather than by customer-facing considerations. Secondary research indicates that sustainability practices in the foodservice sector are expanding, particularly in resource efficiency and waste reduction, which aligns with the findings of the CalMTA survey.[29]

In market actor interviews, representatives of chains and franchises and affiliated restaurants reported increasing adoption of electric cooking equipment to support company-specific decarbonization and greenhouse gas emissions reduction goals. While these efforts were generally described as part of broader corporate sustainability initiatives rather than responses to water heating needs, they reflect a growing interest in electrification among foodservice operators.

Similarly, the National Restaurant Association's "State of Sustainability Report" indicates that energy efficiency measures are becoming increasingly common across restaurants, particularly through adoption of LED lighting, programmable thermostats, and ENERGY STAR-rated appliances.[30]

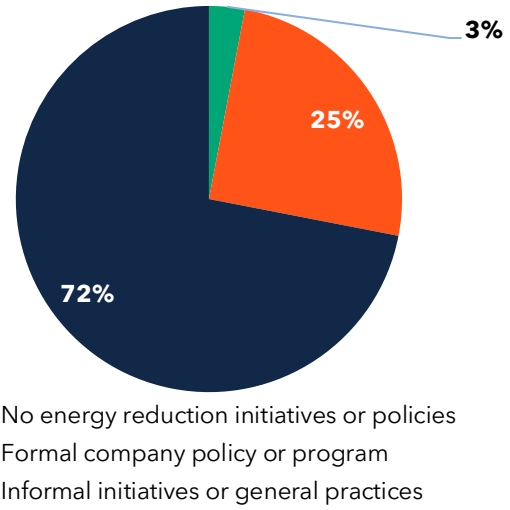
Most respondents to the CalMTA foodservice operator survey (72%) report implementing informal sustainability practices, while 25% have formal programs in place. Only 3% report no sustainability initiatives, suggesting near-universal baseline engagement (Figure 28). However, the uncommonness of formalized policies shows that sustainability efforts are not yet fully institutionalized within operations. Across these respondents, the survey followed up with questions about the nature of sustainability practices of those who reported doing "a lot" or "all we can think of," regardless of whether the practices are based on formal policies or done informally.

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[29] Jacobs, G., & Klosse, P. (2016). *Sustainable restaurants: A research agenda*. Research in Hospitality Management, 6(1), 33–36.

[30] National Restaurant Association. (2018). *The State of Restaurant Sustainability 2018*. https://restaurant.org/nra/media/downloads/pdfs/sustainability/restaurant_sustainability_research_report_2018.pdf

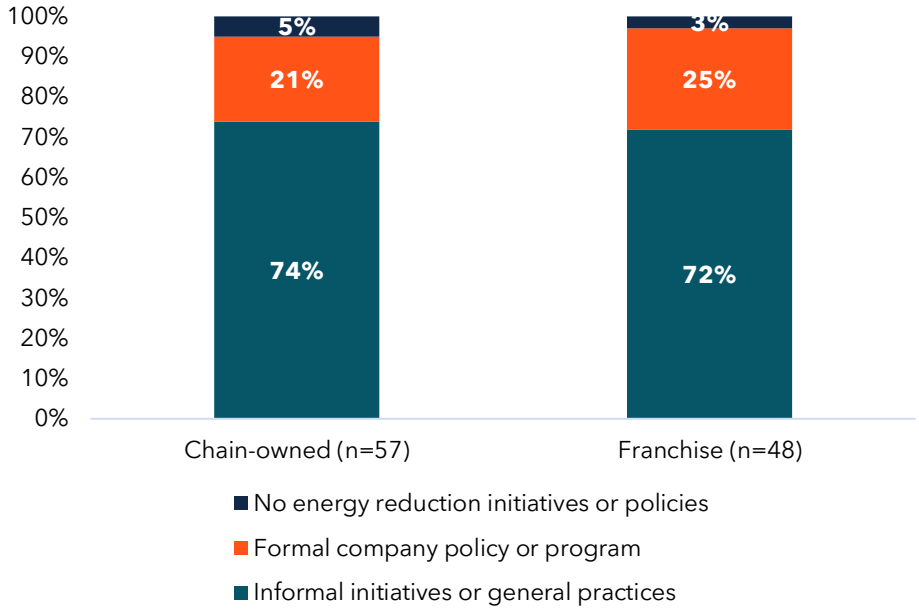
Figure 28. Prevalence of Sustainability Practices and Policies (n=210)



Source: CalMTA Foodservice Operator Survey. Q46: "Does your [establishment] have any formal or informal policies related to sustainability?"

Among chain-owned and franchise establishments, sustainability engagement is similarly widespread but primarily informal. The majority of chain-owned and franchise restaurants report informal initiatives (72-74%), while 21-25% have formal sustainability programs in place (Figure 29).

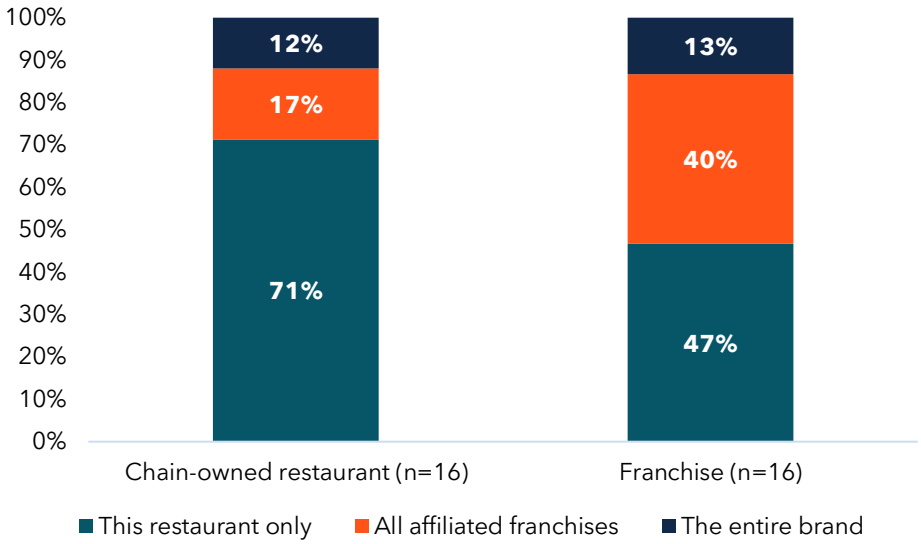
Figure 29. Sustainability Policies and Initiatives Across Chain and Franchise Establishments



Source: CalMTA Foodservice Operator Survey. Q46: "Does your [establishment] have any formal or informal policies related to sustainability?"

Among chain-owned establishments with formal programs, initiatives are most commonly implemented at the individual restaurant level (71%), with a smaller share applied across affiliated locations (17%) or brand-wide (12%). Franchise operators show a somewhat higher share of initiatives implemented across affiliated locations (40%), suggesting greater potential for scaled adoption within franchise systems (Figure 30).

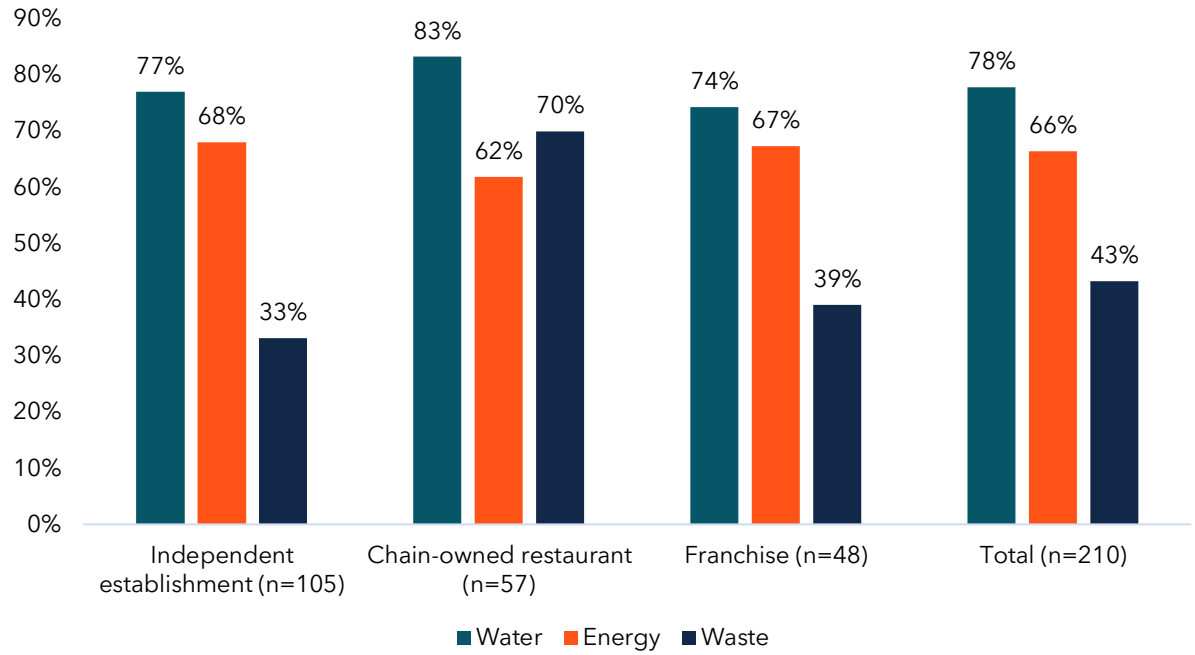
Figure 30. Scope of Sustainability Policy Implementation Across Chain and Franchise Establishments



Source: CalMTA Foodservice Operator Survey. Q47: "Does that policy cover …?"

Sustainability initiatives typically span multiple domains, with 53% of all restaurant operators reporting efforts across multiple areas. Overall, 78% of respondents indicated a focus on water conservation, 66% on energy efficiency, and 43% on waste reduction. Water and energy initiatives are prioritized across ownership types, while chain restaurants show more waste-reduction efforts than independent and franchise restaurants (Figure 31).

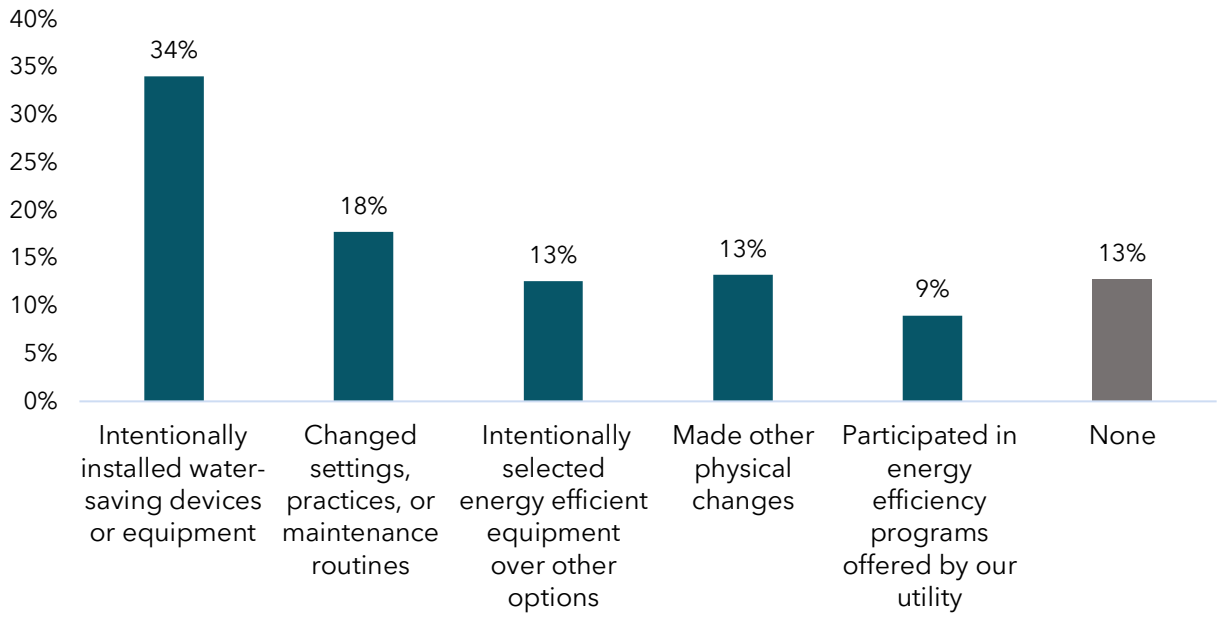
Figure 31. Focus Areas of Sustainability Initiatives by Ownership Type



Source: CalMTA Foodservice Operator Survey. Q48: "What areas do your sustainability policies or practices focus on? (Select all that apply.)"

As Figure 32 shows, common sustainability actions across all ownership types include installation of water-saving equipment (34%) and operational changes such as adjustments to settings or maintenance practices (18%). Selecting energy-efficient equipment (13%) and making physical upgrades (13%) are slightly less common. Notably, 13% of respondents report taking no action, and only 9% have participated in utility-led efficiency programs. Overall, findings indicate that while basic efficiency measures are common, more advanced actions and program participation remain untapped.

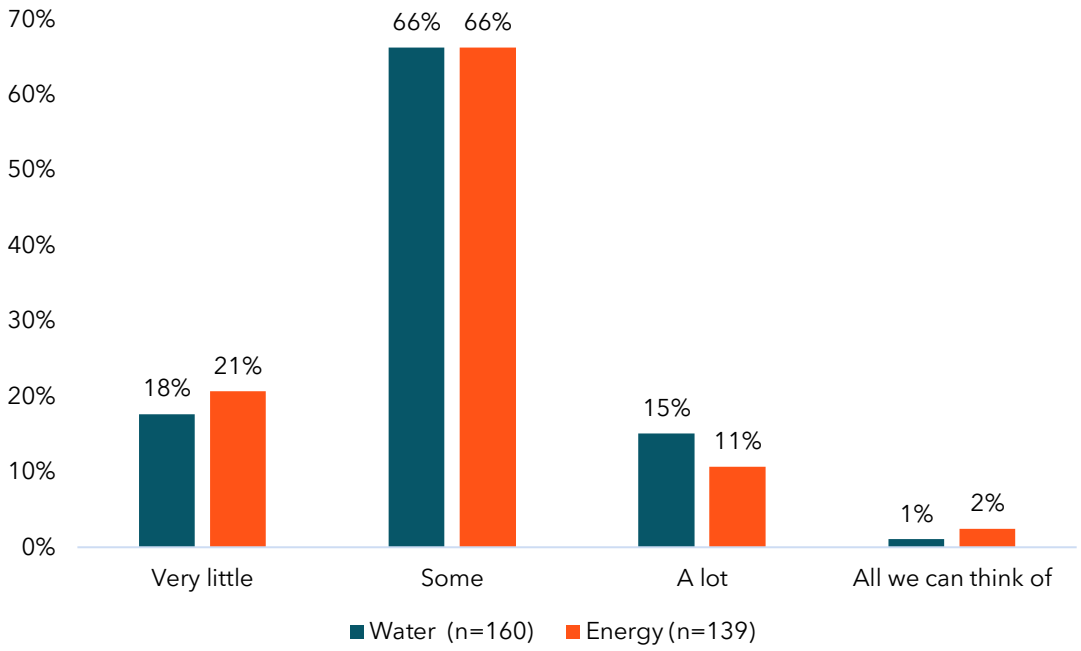
Figure 32. Types of Sustainability Actions Reported by Survey Respondents (n=53)



Source: CalMTA Foodservice Operator Survey. Q51: "Which of the following steps have you taken to save energy or water at this [establishment]? (Select all that apply.)" Asked of respondents who indicated they do "a lot" or "all we can think of."

The majority of respondents report putting in some effort to reduce water or energy usage (66%), with a smaller share reporting a high level of effort (15% water; 11% energy). Conversely, 18%-21% report taking little effort to reduce their water or energy usage. These findings indicate moderate engagement overall, with room to increase engagement with and adoption of sustainability practices (Figure 33).

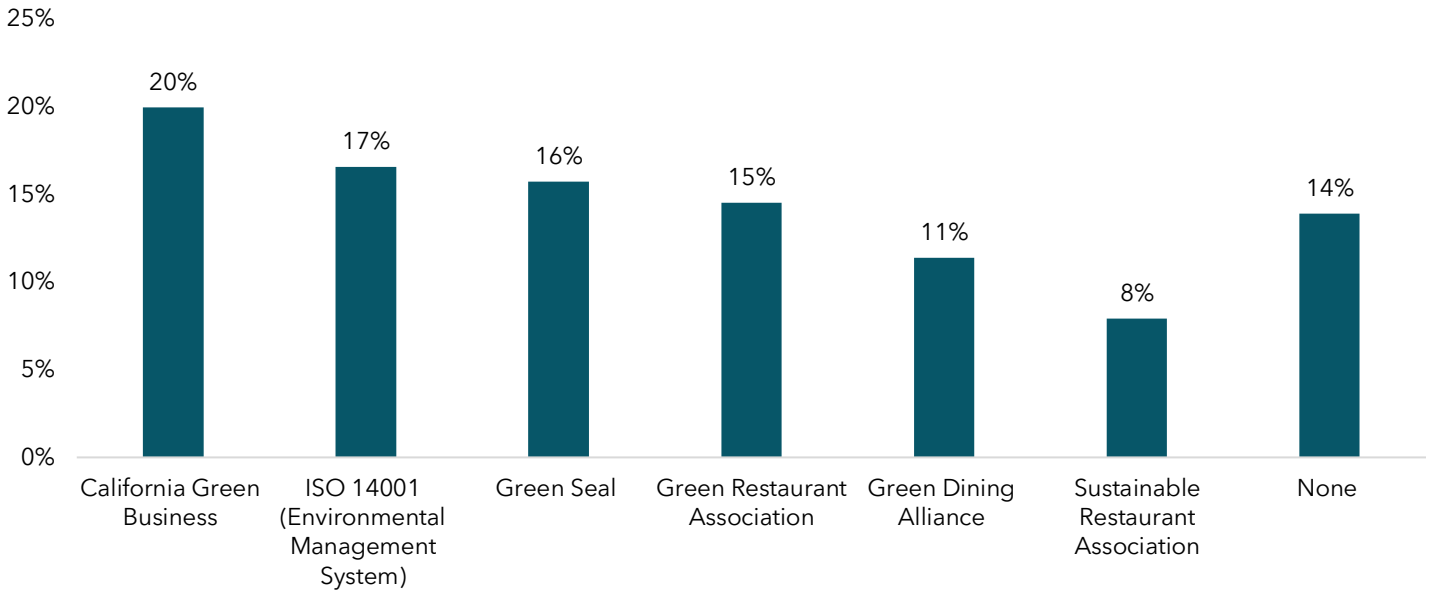
Figure 33. Water and Energy Usage Reduction Efforts



Source: CalMTA Foodservice Operator Survey. Q50: "How much have you already done to reduce your water and energy usage?"

Participation in formal sustainability certification programs is moderate, and California Green Business, ISO 14001, and Green Seal are the most commonly held certifications. Fourteen percent of respondents report having no certification (Figure 34)

Figure 34. Participation in Sustainability Certification Programs Among Restaurants (n=210)



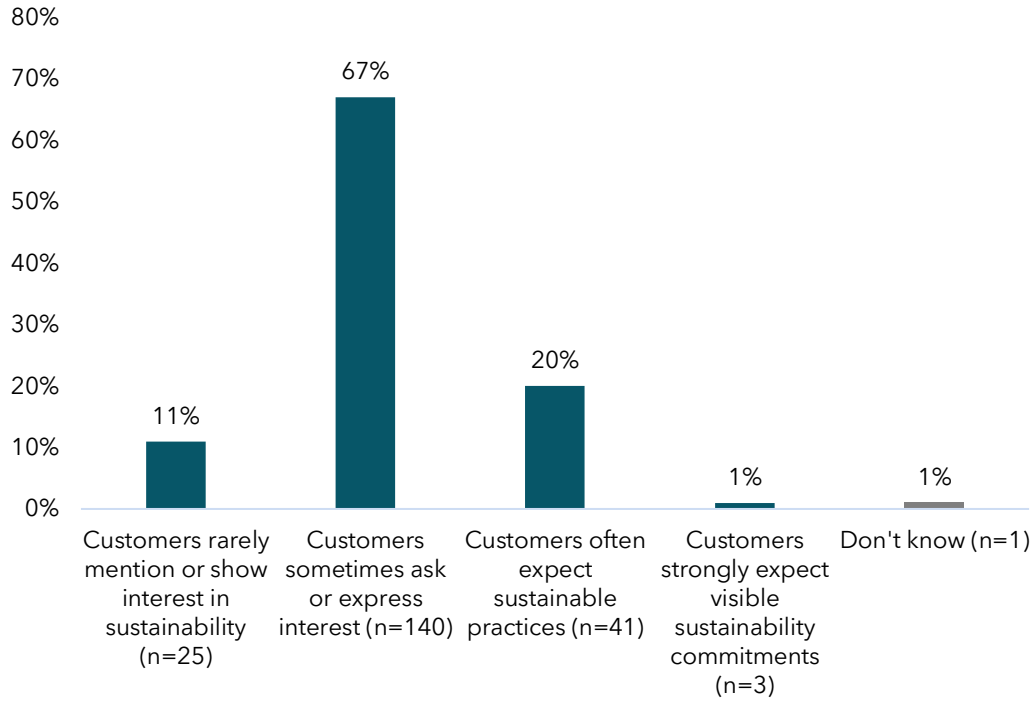
Source: CalMTA Foodservice Operator Survey. Q54: "Is your [establishment] certified or labeled by any of the following sustainability-oriented organizations or programs? (Select all that apply.)"

4.3.2 Customer Expectations

Interview findings indicate that customer demand for sustainability plays a limited role in operational and equipment decision-making across both chain and independent restaurants. Operators consistently report that customers prioritize core factors such as food quality, service, speed, and price; environmental practices rarely influence restaurant choice. While sustainability may be visible through signage, packaging, or recycling efforts, it is not perceived to drive measurable changes in customer behavior.

Survey results align with the interview findings. As shown in Figure 35, most respondents (67%) report that customers sometimes express interest in sustainability, while 12% indicate that customers rarely mention sustainability. Twenty percent report more frequent customer expectations of sustainability, while only 1%report strong or consistent expectations. Strong, consistent customer demand for sustainability remains limited across all restaurant types.

Figure 35. Customer Expectations Regarding Sustainability Practices in Restaurants (n=210)



Source: CalMTA Foodservice Operator Survey. Q55: "To what extent do your customers expect you to make efforts on sustainability?"

These findings correspond with secondary research, which suggests that although consumers increasingly express interest in sustainability, this interest does not consistently translate into purchasing behaviors that significantly influence restaurant operations or investment decisions.

[31,32,33] While sustainability certifications and visible practices can influence customer perception, their effectiveness is constrained by low awareness and the limited visibility of infrastructure-level improvements, such as water heating upgrades.

4.3.3 Alignment with California Decarbonization Policy

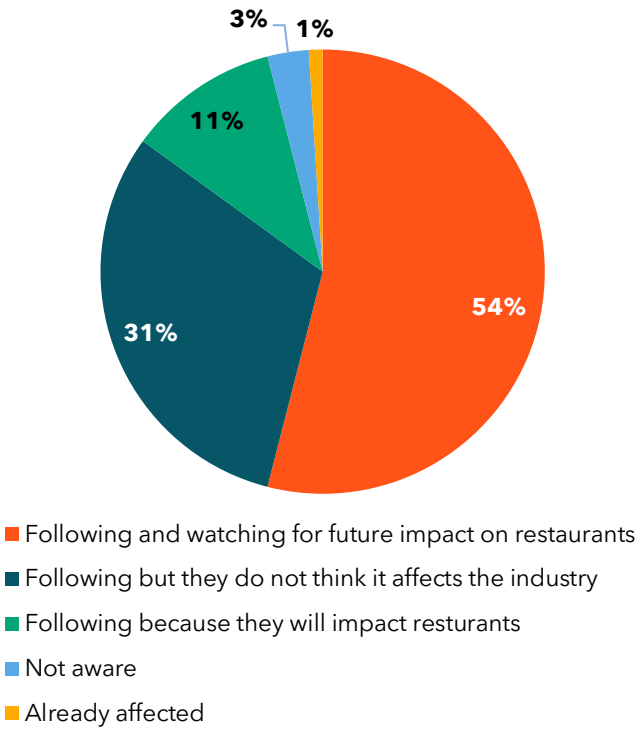
The MTI team tracks California decarbonization policy and its possible influence on restaurant practices. As shown in Figure 36, 54% of restaurant operators are actively monitoring potential future policy impacts, and an additional 11% expect these developments to affect their operations. At the same time, 31% are aware of regulations but do not perceive them as currently relevant, and no respondents indicate that policies have already affected their operations, suggesting that regulatory influence, while emerging, remains a longer-term consideration for most operators rather than an immediate driver of action.

[31] Kim, M. J., & Hall, C. M. (2020). *Can sustainable restaurant practices enhance customer loyalty? The roles of value theory and environmental concerns.* Journal of Hospitality and Tourism Management, 43. https://doi.org/10.1016/j.jhtm.2020.03.004

[32] Mai, K. N., Nhan, D. H., & Nguyen, P. T. M. (2023). *Empirical Study of Green Practices Fostering Customers' Willingness to Consume Via Customer Behaviors: The Case of Green Restaurants in Ho Chi Minh City of Vietnam*. Sustainability, 15(5). https://www.mdpi.com/2071-1050/15/5/4263

[33] Kwok, L., Huang, Y. K., & Hu, L. (2016). *Green attributes of restaurants: What really matters to consumers?* International Journal of Hospitality Management. https://psycnet.apa.org/doi/10.1016/j.ijhm.2016.03.002

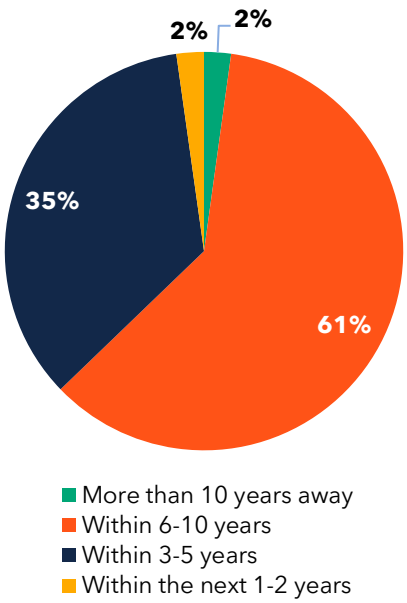
Figure 36. Awareness and Perceived Impact of California's Decarbonization Policies Among Restaurants (n=210)



Source: CalMTA Foodservice Operator Survey. Q56: "Which of the following statements best describes your [establishment]'s tracking of California's decarbonization goals and policies?"

Despite relatively high awareness, most respondents view decarbonization as a longer-term concern, with 61% expecting impacts within 6-10 years, while 35% anticipate effects within 3-5 years (Figure 37). Overall, the perception that decarbonization is a distant concern may contribute to slower adoption of more transformative sustainability measures.

Figure 37. Perceived Timeline for Expected Impacts of Decarbonization Policies (n=137)

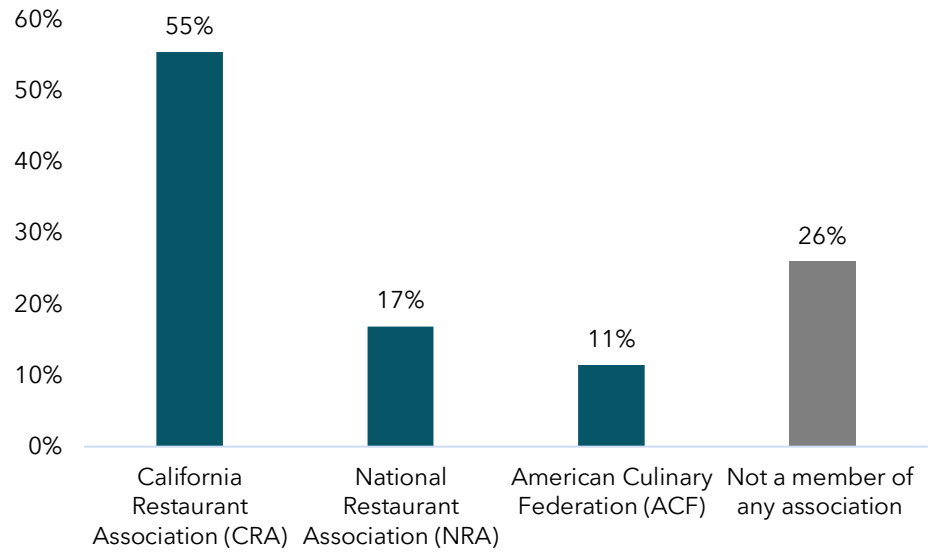


Source: CalMTA Foodservice Operator Survey. Q57: "When do you think decarbonization goals will affect restaurants?"

4.4 Association Memberships

Membership in industry associations is common among survey respondents. The California Restaurant Association (CRA) is the most frequently reported affiliation (Figure 38). Approximately 55% of respondents indicated membership in the CRA, compared with 17% for the National Restaurant Association (NRA) and 11% for the American Culinary Federation (ACF). Approximately 26% of respondents reported that they were not members of any association. Because respondents could select multiple associations, percentages do not sum to 100%.

Figure 38. Foodservice Operator Membership in Industry Associations



Source: CalMTA Foodservice Operator Survey. Q65: "Are you or your [establishment] currently a member of any of the following associations? (Select all that apply)."

5 Restaurants in ESJ and non-ESJ Areas

Equity is an important consideration for the FSWH MTI. For that reason, CalMTA examined how restaurants in and outside of ESJ communities[34] compare on key characteristics that would have implications for their ability and likelihood to adopt HPWHs or barriers to doing so. CalMTA included equity considerations in market actor interviews.

Because disadvantaged communities (DACs) established by CalEnviroScreen are the primary geographic definition of ESJ communities, we used ZIP code-based designations for DACs as a proxy for ESJ areas to assess how restaurants in ESJ areas and non-ESJ areas differ. For this assessment, we focused on key characteristics that affect heat pump water heater adoption, including suitability and barriers.

[34] For this comparison, we focused on ZIP codes associated with disadvantaged communities, as defined by CalEnviroScreen, as a proxy for ESJ-related geographies. DACs are a major component of the definition of ESJ communities and the one most easily quantified and included in geographically defined analyses. We recognize that this comparison does not include other aspects of ESJ definitions. Including tribal areas would not have affected the analysis materially, and other components of California's ESJ definition are not easily converted to geographic analysis but require more information about the restaurant, its owners, its employees, or its patrons than was available.

The survey results suggest few differences between restaurants in ESJ areas and non-ESJ areas. In fact, self-reported adoption rates from the restaurant operator survey suggest higher adoption rates of heat pump water heaters within ESJ areas than in non-ESJ locations. Self-reported adoption of hybrid water heaters is similar in both areas, as shown in Table 8.

Table 8. Self-Reported HPWH and Hybrid Water Heater Adoption Rates in ESJ and non-ESJ Locations

	HPWHs	Hybrid Water Heaters
ESJ (n=148)	11%	16%
Non-ESJ (n=62)	3%	13%

Source: CalMTA Foodservice Operator Survey. Q22: "What fuel does your primary water heater use?" and Q24: "Is the water heater a standard electric resistance water heater, one or more tankless electric water heaters, a heat pump water heater (HPWH), a hybrid heat pump water heater, or other?"

Similar comparisons for various potential drivers and barriers to HPWH adoption reveal no systematically meaningful differences between restaurants in ESJ and non-ESJ areas for the following variables:

- Ownership of their space
- Building age
- Electrical system upgrades
- Water heater replacement practices
- Awareness of heat pump-based water heaters
- Share of operating costs attributed to energy

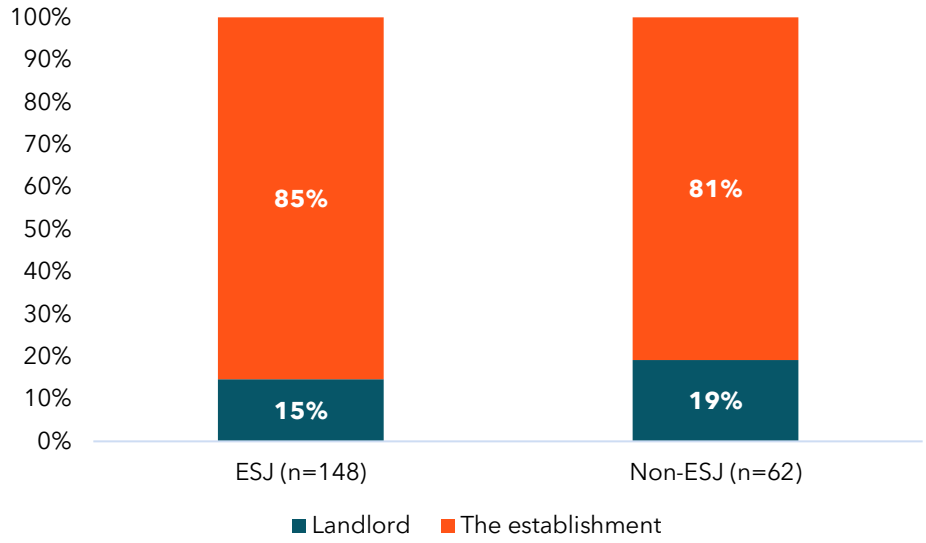
Establishments in ESJ and non-ESJ areas demonstrate similar operational and building characteristics across the foodservice sector. These results suggest that key technical barriers to water heating electrification are consistent across both groups. This study did not explore differences in implications or consequences of these barriers for ESJ versus non-ESJ communities. Nor did this research explore the ability of restaurants in and outside ESJ communities to overcome barriers.

5.1.1 Building Space Ownership

Figure 39 shows that restaurant operators are the primary owners of restaurant spaces across both ESJ and non-ESJ communities. Approximately 85% of establishments in ESJ communities

and 81% in non-ESJ communities report owning the establishment space and thus having control over its appliances and equipment.

Figure 39. Ownership of Space

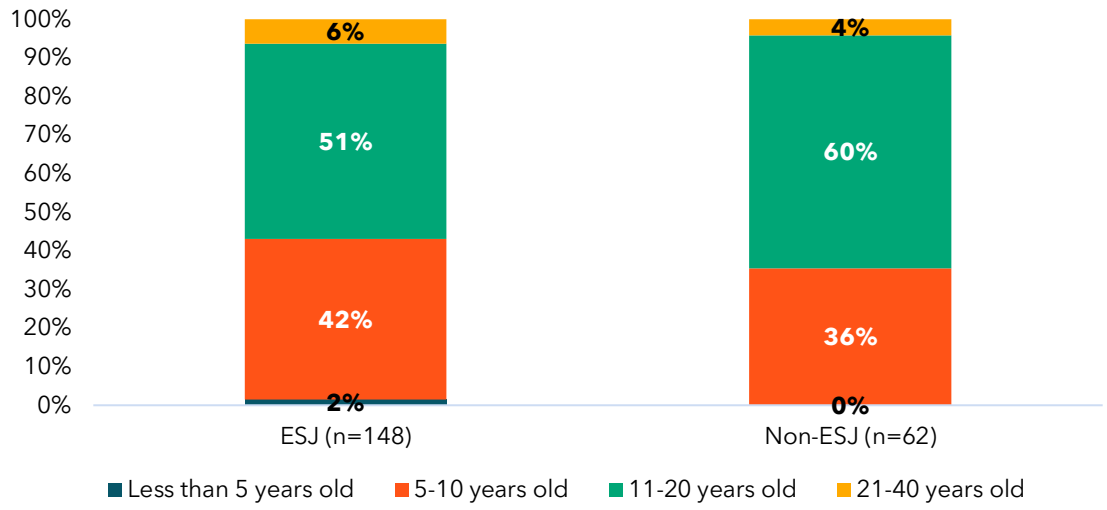


Source: CalMTA Foodservice Operator Survey. Q8: "Who owns the building space the [establishment] occupies?"

5.1.2 Building Age, Electrical Readiness, and Replacement Practices

Figure 40 indicates that most restaurant buildings in both ESJ and non-ESJ communities are in the 11- to 20-year age range. This age category accounts for 51% of establishments in ESJ communities and 60% in non-ESJ communities.

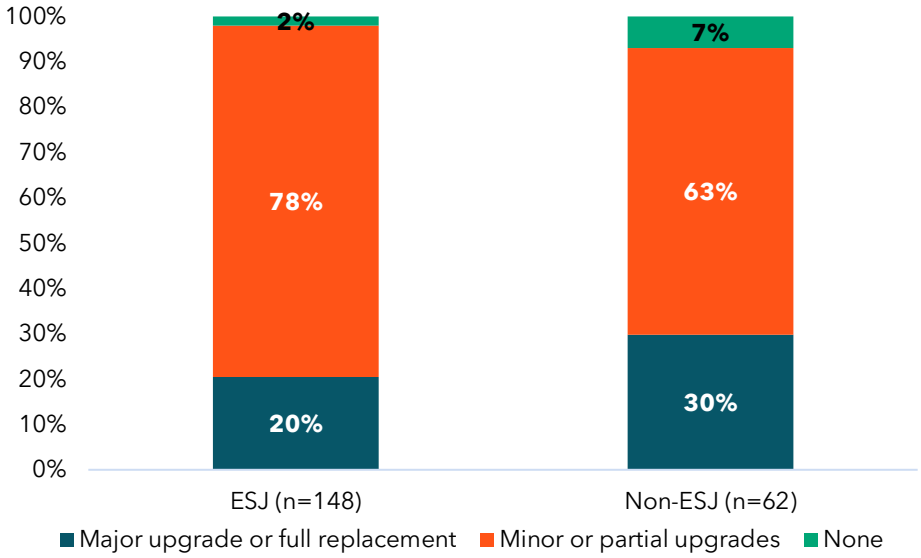
Figure 40. Building Age Distribution of Foodservice Establishments



Source: CalMTA Foodservice Operator Survey. Q61: "Approximately how old is the building where your [establishment] is located?"

Figure 41 shows that most establishments in both ESJ and non-ESJ communities report having completed minor or partial electrical system upgrades rather than major renovations. Minor or partial upgrades account for 78% of establishments in ESJ communities and 63% in non-ESJ communities. Major upgrades or full replacements are more common among non-ESJ establishments (30%) compared with ESJ establishments (20%), while only a small share of establishments in either group report no upgrades. These findings suggest that in both communities, incremental facility improvements are more common than large-scale renovations.

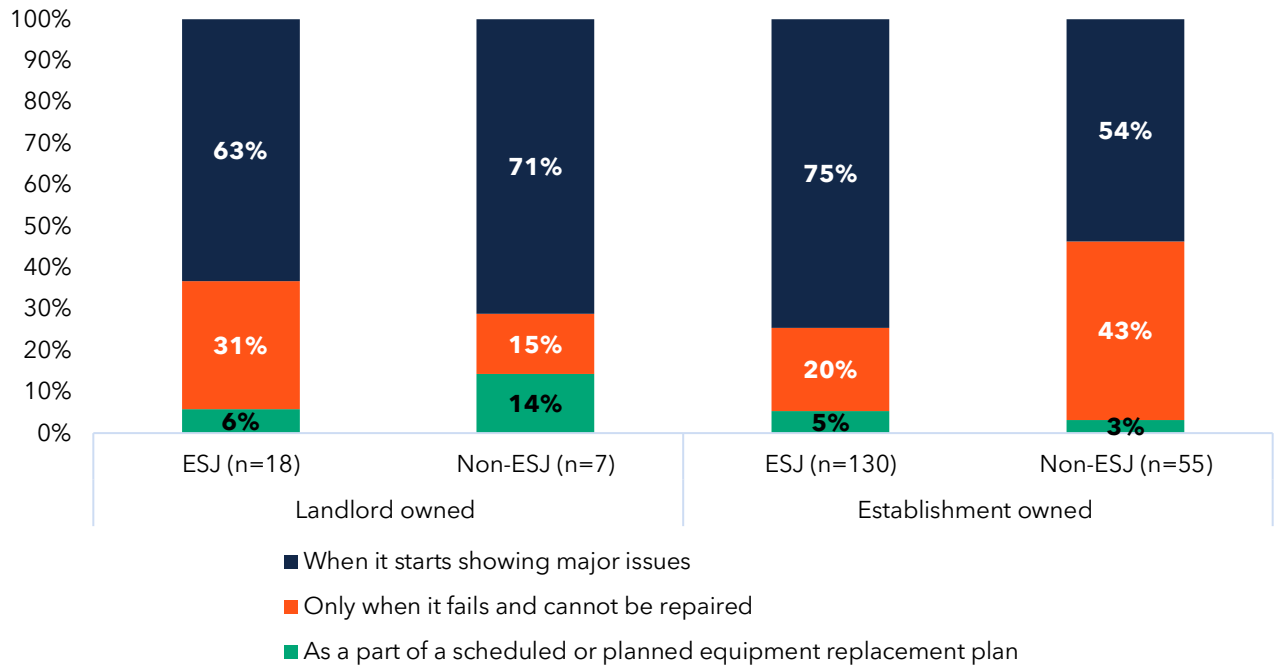
Figure 41. Status of Electrical System Upgrade Status in Foodservice Establishments



Source: CalMTA Foodservice Operator Survey. Q62: "To your knowledge, have there been any upgrades or improvements to the building's electrical system (e.g., wiring, electrical panel, circuits) since your business began operating here?"

Figure 42 shows that reactive replacement practices dominate both landlord-owned and establishment-owned properties in ESJ and non-ESJ communities. Most respondents report replacing water heating equipment only when systems begin showing major issues, rather than through planned replacement cycles or when the system has already failed.

Figure 42. Water Heater Replacement Behavior in Foodservice Establishments

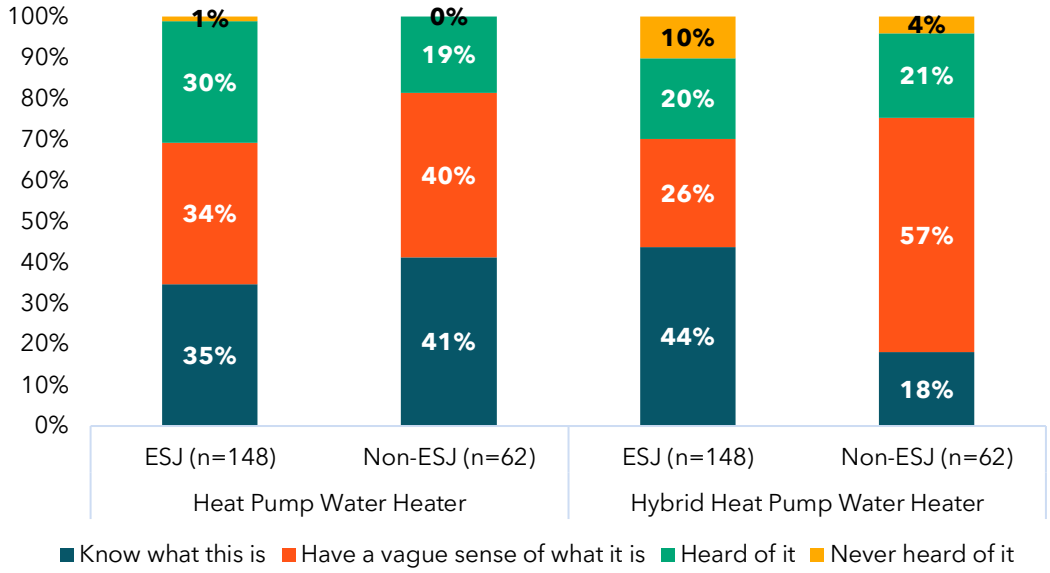


Source: CalMTA Foodservice Operator Survey, Q32: "Are you most likely to replace your current water heater…?" and Q33: "Do you think your landlord or property management firm would be most likely to replace your current water heater…?"

5.1.3 Awareness of Heat Pump Water Heaters (HPWH)

Figure 43 shows that awareness of standard heat pump water heaters is higher than awareness of hybrid heat pump water heaters across both ESJ and non-ESJ communities. For standard HPWH systems, approximately one-third to two-fifths of respondents report knowing what the technology is, while most remaining respondents report either having heard of it or having a vague understanding. Awareness of hybrid HPWH systems is lower overall, particularly among non-ESJ establishments, of which only 18% report knowledge of the technology.

Figure 43. Self-Reported Awareness of HPWHs

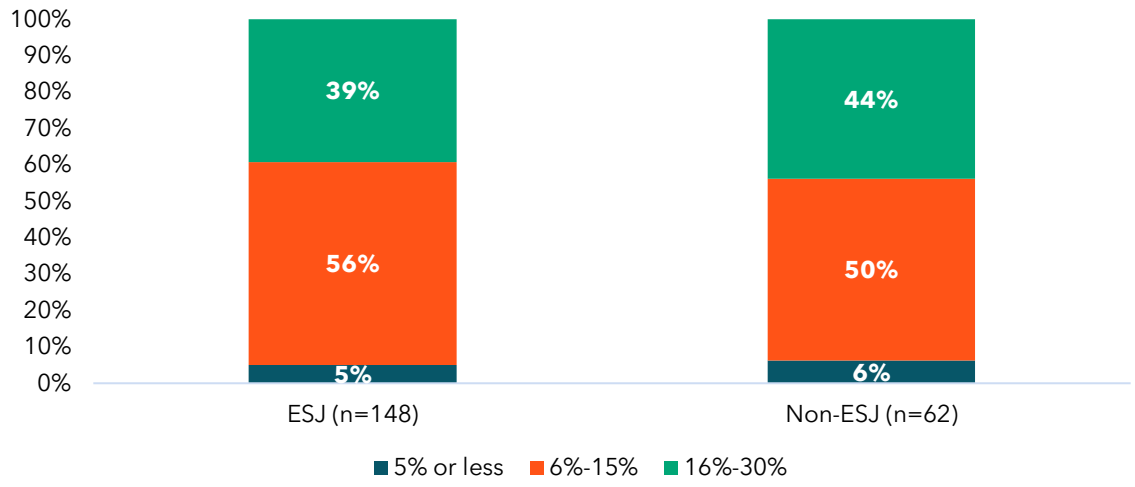


Source: CalMTA Foodservice Operator Survey. Q36: "How aware are you of the following water heater technologies?"

5.1.4 Energy Cost Burden Across Regions

Figure 44 shows that energy costs account for a similar share of operating expenses across ESJ and non-ESJ areas. The majority of respondents in both groups report energy costs representing between 6% and 15% of total operating costs, accounting for 56% of ESJ establishments and 50% of non-ESJ establishments.

Figure 44. Share of Operating Costs Attributed to Energy Among Establishments



Source: CalMTA Foodservice Operator Survey. Q45: "What share of your total operating costs go to energy bills?"

In contrast, interviews conducted with six restaurant owners and operators representing environmental and social justice communities spoke of combined financial, informational, structural, and behavioral constraints that shape equipment decision-making and limit adoption of advanced technologies. Interview findings indicate that restaurant owners with limited English proficiency may have difficulty finding and understanding information about available programs, incentives, and equipment options, particularly when outreach and assistance are unavailable in their preferred language. As a result, they often rely on contractors they already know and trust for information and guidance.

These constraints influence not only whether adoption occurs, but also the timing, feasibility, and conditions under which investments are made. It is unclear whether these comments reflect an acknowledgment of barriers to technology adoption that may apply to all restaurant operators or a higher level of barriers within immigrant communities, with which several of these interviewees are associated.

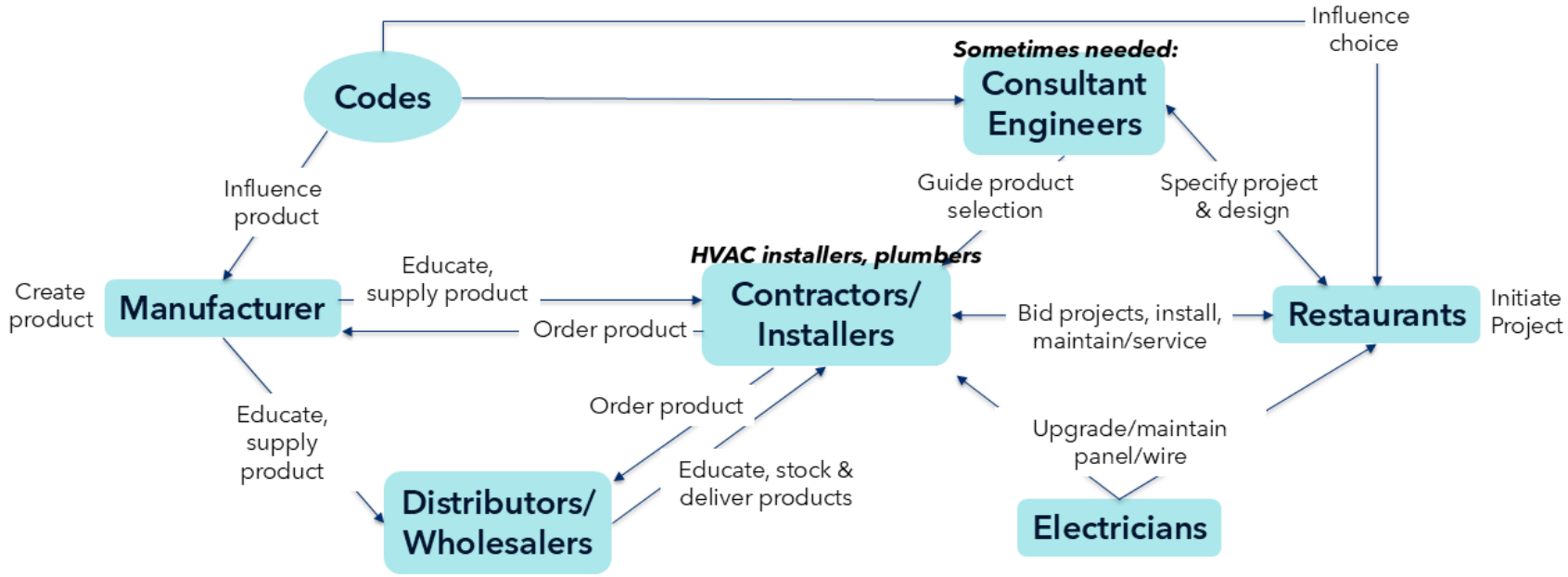
6 Supply Chain Structure and Perspectives

To characterize the supply chain for water heating and obtain its participants' perspectives on HPWHs, CalMTA interviewed California contractors with experience installing water heaters in commercial kitchens and manufacturers who sell water heaters in the state.

6.1 Supply Chain Map

When combined, the interviews described a supply chain that provides multiple potential paths from manufacturers to restaurants. Figure 45 describes the supply chain visually. The supply chain for HPWH resembles that for water heaters: plumbers or general contractors provide the equipment to restaurants and install it. They may obtain water heaters directly from manufacturers or via distributors. For more complicated systems and some new construction, consulting engineers may become involved. The primary difference between HPWHs and other water heaters is the potential involvement of electricians in installation or upgrades.

Figure 45. Supply Chain Map



Note: Figure 45 summarizes the MTI team's understanding of the supply chain based on interviews conducted by CalMTA.

Further, as noted in the figure, manufacturers serve as a key source of education, and sometimes technical support or information, for contractors and installers who are still becoming familiar with HPWHs and for distributors and wholesalers whose relationship with contractors and installers also carries weight.

6.2 Contractor Characteristics

Although the 20 contractors interviewed for this study are not a statistically representative sample of the market, their characteristics provide a sense of the characteristics of contractors who install HPWHs or would be called upon to install them in the future if their share of the market grows. The interviewees were split almost evenly between those serving just the commercial sector and those working in both the commercial and residential sectors. Similarly, half work only on existing buildings, while half also serve new construction. Their median tenure in the industry was approximately 15 years, although they were evenly distributed among the range of new contractors (1-5 years of experience) to highly experienced (21+ years). Contractors' companies ranged in size but tended to be either small (45% had 1-15 employees) or large (35% had more than 60 employees).

Thirteen of the 20 contractors' companies identified themselves as diversity suppliers, including eight veteran-owned companies, five minority-owned, one LGBT+ owned, and one women-owned. Because some contractors were recruited based on warm leads and known contacts from the MTI team, there could be self-selection bias in this distribution.

6.2.1 Licensing

The installation of heat pump water heaters does not require licenses that are not already required of plumbers or electricians. Installers need only a standard contractor license, available through the California Contractors State License Board, required for plumbing projects exceeding $500 in labor and material costs (or $1,000 if no permit is required). If electrical work is required, the installer needs a C-10 electrical contractor license or must engage a licensed electrician.

6.2.2 Water Heater Decision-Making and Installation

Contractors noted that, in their experience, most commercial kitchens have water heaters with 70- to 100-gallon storage capacity, but they had varying experiences with the fuel source they encounter most often. Fifteen contractors reported seeing natural gas water heaters most often, but three reported seeing more electric units. Two contractors reported encountering a was a mix of both. Collectively, they sensed a trend toward increased use of electric water heaters — an observation volunteered by eight of the contractors who thought natural gas water heating was still primary.

Water Heater Replacement Process

Decision-Making

Contractors indicated that they are typically called to replace a water heater upon failure, with the

water heaters usually around 10 years old. They stated that the restaurant decision-maker varied based on restaurant type:

- Decision-making in chain restaurants was reported to be a more corporate process with more people involved (e.g., financial executive or regional manager). This process often involves the restaurant collecting bids from multiple contractors before selecting one for the job.
- Decision-making in independent restaurants falls completely onto the restaurant owner. Contractors stated that it is a more straightforward and quicker process, though they noted that independent restaurants focus on budget more than chains do.

Independent restaurants want to hear about their options, whereas chains often tell contractors what they want installed. Lastly, contractors noted that, in leased spaces, the landlord has to approve the replacement, which can result in extra hurdles to approval. One contractor stated that landlords prefer like-for-like replacements.

Factors to Consider

Contractors described a process of assessing the restaurant's needs in which they consider the following before recommending a replacement unit:

- The water heater's current fuel
- The restaurant's maximum hot water demand, for which they examine the number of sinks and dishwashers in the foodservice establishment and conduct load calculations based on these factors
- Current codes and efficiency standard

Contractors described requirements such as electrical upgrades, replumbing, condensate drainage, ventilation clearance, and layout modifications when transitioning from gas to electric systems. HPWHs also require larger storage tanks and longer recovery times, which can be difficult to accommodate in compact back-of-house areas, utility closets, and older buildings.

The market actor interviews suggest that these challenges are most pronounced in small-format quick-service restaurants, older facilities, and leased properties, where space and infrastructure flexibility are limited.

Contractor Process for Replacing Natural Gas Water Heaters with HPWHs

Contractors were asked about the process to replace a natural gas water heating system with an electric heat pump water heater. Key differences between the two systems include the fuel source, venting, electrical requirements, and space/environmental needs. Contractors spoke of the same process, which includes a site assessment, upgrades to electrical capacity, setting up the

space, preparing the utility connections, conducting pre-tests, completing the installation, and making a return visit.

Contractors elaborated on the factors that impact the complexity of an installation project and the types of contractors who need to be present.

- Electric water heater-to-electric HPWH system installations tend to be easier, with unitary systems the easiest and split systems requiring more labor and space. These replacements may not require additional contractors and take less time to complete, resulting in lower labor costs.
- Natural gas water heater-to-electric HPWH system replacements are moderately challenging in areas with adequate space. Typically, these projects require electricians.
- Natural gas-to-electric HPWH system replacements are challenging when they require space reconfigurations for proper ventilation or room for the system or involve recirculation. These efforts require additional contractors besides electricians, including engineers, carpenters, drywall installers, and general contractors, depending on the scale of the project.

Attitudes About the Fit of Heat Pump Water Heaters for Restaurants

As noted, contractors indicated that most replacements occur upon failure, which creates urgency and usually makes like-for-like replacements the preferred option. Installing a heat pump water heater, particularly in a restaurant whose current water heating system is natural gas, requires extensive preparation and coordination between trades.

Contractors are currently equipped to do like-for-like replacements but generally do not carry less common technologies like HPWHs on their service vehicles or stock them to the same degree. Contractors also lack arrangements to accommodate electrical work needed for HPWHs during emergency replacements. Furthermore, many contractors noted that distributors do not stock more specialized equipment such as HPWHs. Contractors have to order specialized equipment on a per-job basis, which increases the wait time.

Nevertheless, 10 out of 12 contractors who commented on a question about the fit of heat pump water heaters for restaurants assessed them to be a good fit, while two specifically suggested that HPWHs would not be a suitable option. Rationales for the positive assessments included their environmental performance, the availability of rebates, and long-term savings. Cost drove the negative assessments, which also included space requirements and slower recovery rate.

6.3 Manufacturer Perspectives

CalMTA interviewed three international water heating manufacturers who could speak to the California market specifically, and identified these relevant findings:

- All three manufacturers could scale up production of HPWHs if needed; two mentioned they have active split systems available in other countries, which would facilitate quick scaling up in production.
- All three manufacturers see HPWHs as an emerging technology that can "future-proof" the California market and be a growth opportunity for them, but they noted that regulatory mandates are typically a strong driver and that voluntary adoption has been low. States with regulatory support have seen the highest adoption. One manufacturer pointed to high HPWH sales in southern California metropolitan areas and the Bay Area and low adoption in the rest of the state (i.e., north of the Bay Area and in the Central Valley).
- Manufacturers noted that the biggest players in the commercial water heating space were (in no particular order) A.O. Smith, Rheem, and Bradford White. Other manufacturers mentioned include Mitsubishi, SanCo (Sanden), Colmac, Nyle, and Laars.

6.4 Product Equipment, Installation, and Operating Costs

Contractors and manufacturers provided little specificity on product costs. When asked about the cost to install a HPWH in a restaurant, contractors gave an extremely wide range of job costs from the low thousands to (according to one contractor) more than $100,000. This range reflects various complexities and sizes of water heating systems in restaurants. Contractors agreed that HPWHs have a higher upfront cost than natural gas water heaters and that cost was dependent on factors such as complexity of the job, brand, and capacity.

As noted in Section 3.2.3, restaurants can use either consumer-grade or commercial water heating systems, but the proportion of each currently installed in restaurants is unclear. For that reason, we present product cost information for heat pump water heaters and common equivalents for both classes of water heaters in this section. Table 9 summarizes the likely tendencies toward consumer- or commercial-grade equipment by restaurant type.

Table 9. Water Heater Class Tendencies by Restaurant Type

Restaurant Type	Share of Establishments	Tendency	Notes
Cafe	15%	Consumer	Based on CalNEXT's indication of typical storage sizes and energy inputs
Quick Service	42%	Consumer or Commercial (including residential-duty commercial)	Based on CalNEXT's indication of typical storage sizes and input sizes that fall within the residential duty commercial class, but allowing for variation in both directions
Full Service	43%	Commercial	Based on CalNEXT's indications of typical storage sizes and energy inputs, although

Restaurant Type	Share of Establishments	Tendency	Notes
			the CalMTA survey suggests smaller storage capacities

Sources: U.S. Census Bureau. (2022). *County Business Patterns (CBP) Survey*; TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf; CalMTA. (2026). *Foodservice Operator Survey*.

6.4.1 Product Costs

The installed equipment cost premium for heat pump water heaters is roughly 50% to 100% compared with natural gas storage equipment costs, which generally fall in the $3,000 to $17,000 range depending on system size and energy inputs. These ranges correspond to consumer water heaters and commercial-grade systems with energy inputs of up to 150 kBtu per hour paired with a storage tank of 100 gallons. [35]

Table 10 lists price comparisons from California's Electronic Technical Reference Manual (eTRM) for residential and commercial fuel substitution measures for heat pump water heaters. These cost estimates are based on regressions of product cost information with inflation adjustments. They include equipment costs, 40% markups (commonly assumed by the U.S. Department of Energy), and installation costs. These values suggest installed cost premiums for heat pump water heaters in the 44% to 79% range when compared with natural gas storage units of equivalent sizes for systems with 50- and 75-gallon storage tanks, and potentially more than double the cost for larger systems. Accounting for oversizing to provide equivalent first-hour ratings further increases the cost premiums.

Table 10. Water Heater Installed Costs by Water Heater Type

Unit Size	HPWH[a] (Similar Size)	HPWH[a] (Oversized[b])	Natural Gas Storage	Natural Gas Tankless (High Draw)
50 gallons (consumer-grade)	$5,148	$6,149 - $7,170	$2,876	$3,138
50 gallons (commercial-grade)	$4,927	$5,773 - $6,651	$3,426	$3,608
75 gallons (commercial-grade)	$6,651	$23,551	$4,140	
100 gallons (consumer-grade)	$23,551		$10,753	

[35] Costs can be higher for larger and more complex commercial units, too. We show an upper range in the table based on 100-gallon tank sizes and a 150 kBTU/hour-energy input.

100 gallons (commercial-grade at 150 kBtu/hour)	$36,960[d]	$17,040[e]	$7,193[f]

Sources: California Technical Forum. Measure Characterization: Heat Pump Water Heater, Commercial, Fuel Substitution. Accessed June 27, 2026. https://www.caetrm.com/login/?next=/measure/SWWH027/07/; Large Heat Pump Water Heater, Commercial and Multifamily, Fuel Substitution, Accessed June 27, 2026. https://www.caetrm.com/login/?next=/measure/SWWH028/08/; California Technical Forum. Measure Characterization: Heat Pump Water Heater, Residential. Accessed August 4, 2026. https://www.caetrm.com/measure/SWWH014/08/.

[a] *Using UEF equivalents of 3.50, which are the middle efficiency option shown in the California eTRM.*

[bc] *Showing the cost ranges for 75- and 100-gallon sizes as equivalent to the 50-gallon non-heat pump storage water heaters. Showing >= 100-gallon sizes as equivalents for both 75-gallon and 100-gallon non-heat pump storage water heaters.*

[d] *Based on unit costs of $246 per kBtu/hour.*

[e] *Based on unit costs of $114 per kBtu/hour.*

[f] *Based on unit costs of $48 per kBtu/hour.*

6.4.2 Energy Costs to Operate

Heat pump water heaters are more energy efficient than traditional water heaters because they draw heat from the ambient air. Heat pump water heaters use between a third and half of the delivered Btus of either electric-resistance or natural gas water heaters.

According to the MTI's technical assessment research team, these energy savings can be expected to result in the following bill impacts:

- Establishments that replace electric-resistance tank water heaters with heat pump water heaters typically experience decreases in full building-level energy costs in the 5% to 8% range.
- Establishments that replace natural gas tank water heaters with heat pump water heaters can expect impacts on energy costs ranging from 2 percent in bill savings to 12 percent in bill increases.

Separately, a CalNEXT study team estimated water heating-related energy costs for full-service and quick-service restaurants in each of California's climate zones for heat pump water heaters and several alternate options.[36] Full results for two restaurant types in various climate zones are available in that report's appendix. For illustrative purposes, we present results for full-service restaurants in the climate zone that serves the Bay Area. For such restaurants, a heat pump water

[36] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

heater is estimated to generate water heating costs of $4,895 annually. This would result in the following annual water heating savings and cost increases:

- Energy cost savings of $8,242 compared with electric-resistance storage units (compared with an annual cost of $13,137 for electric-resistance storage water heaters)
- Energy cost increase of $1,396 compared with natural gas storage water heating (compared with an annual cost of $3,499)
- Energy cost increase of $1,566 compared with natural gas tankless water heating (compared with annual costs of $3,329)

The report discusses why actual heat pump water heating costs could be lower than the authors' own estimates due to factors such as higher COP assumptions in some cases, as well as time of use rates, load shifting, recirculating systems, and heating plant design. The report noted that natural gas is more cost-effective to operate because electricity rates for foodservice establishments are multiple times higher per unit of energy than natural gas rates in California (by a factor of four for Southern California Edison customers, a factor of seven for San Diego Gas and Electric customers, and a factor of four-and-a-half for Pacific Gas and Electric customers).

Our MTI technical assessment team is also assessing the bill impacts in various scenarios for each of the electric investor-owned utilities.

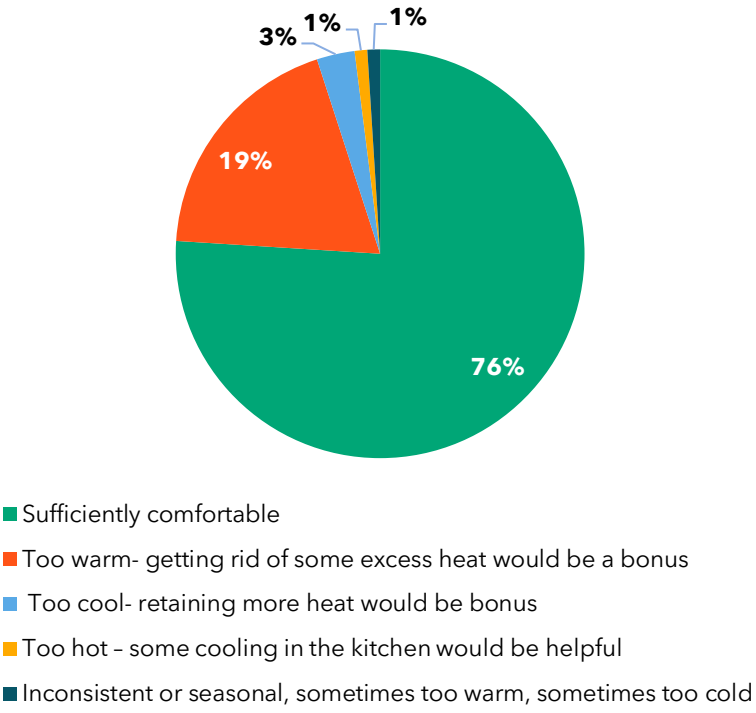
Cost Saving Opportunities from Shifting Load or Tapping into Space Cooling Benefits

Separately, the CalMTA foodservice operator survey explored the degree to which two potential cost-saving strategies may apply to restaurants. The first is intentional load shifting, whereby water heating is timed to precede the 4 p.m. start of typical peak load and higher time-of-use rates. The second is the interactive effect of heat pump water heating's space-cooling effect with HVAC systems, which could provide additional comfort or lower cooling needs near the water heater.

The foodservice operator survey findings suggest that operational flexibility for shifting hot water usage is limited across most establishments without additional storage. Most respondents reported a limited ability to shift usage outside peak periods. This MTI's technical assessment has been addressing these topics in parallel to this market characterization study.

A potential driver for HPWH adoption in the foodservice sector is the space cooling benefit that these systems can provide. The CalMTA Advancement Plan identifies space cooling as a potential non-energy benefit that could strengthen the customer value proposition for HPWHs, particularly in kitchens where excess heat is common. Survey findings support this opportunity (Figure 46): 20% of respondents reported that their kitchens are either too warm (19%) or too hot (1%) during peak business hours, indicating that reducing excess heat could improve comfort. While most respondents (76%) described their kitchens as sufficiently comfortable, the cooling effect associated with HPWH operation may provide an additional benefit for a meaningful subset of foodservice establishments, particularly those with heat-intensive kitchen environments.

Figure 46. Restaurant Operator Assessment of Kitchen Comfort During Peak Business Hours



Source: CalMTA Foodservice Operator Survey. Q18: "How would you describe the comfort in the kitchen at this [establishment] during the peak business hours?"

7 Regulatory and Program Landscape

CalMTA conducted a review of major regulatory and program activities at the federal and state levels relevant to understanding drivers and barriers to heat pump water heater adoption in California restaurants.

7.1 Regulatory Landscape

Water heating in California foodservice facilities is shaped by several overlapping regulatory systems. Federal and California appliance standards determine which water heaters and foodservice appliances may be manufactured and sold. The California Energy Code governs how water-heating systems are designed and installed in covered construction projects. Food-safety requirements establish minimum hot-water temperature and capacity expectations. California Air Resources Board and local air districts separately regulate, or are developing regulations for, emissions from combustion equipment.

The requirements generally attach to the equipment's regulatory classification, fuel, input rating, storage volume, manufacture date, installation location, and project scope — not simply to its use in a restaurant. Foodservice facilities may use water heaters classified under federal regulations as consumer water heaters, residential-duty commercial water heaters, or commercial water heaters, including storage or instantaneous units and multiple-system configurations. The future market will be shaped by the interaction of equipment availability, building-system design, food-safety approval, air quality restrictions, and changing hot-water loads. Table 5 in Section 3.2.3 lists these in detail.

7.1.1 Federal Appliance Efficiency Standards

In April 2024, the U.S. Department of Energy (DOE) finalized new standards that will phase out the manufacture of consumer-grade electric resistance storage water heaters with tank sizes above 35 gallons beginning May 6, 2029,[37] regardless of whether these systems are installed for residential or commercial use. By that date, all newly manufactured consumer-grade electric-resistance storage units in sizes typically found in restaurants will require uniform energy factors that exceed one, which requires the use of heat pump technology. Electric tankless systems will continue to be allowed, however. For consumer-grade storage water heaters with tank sizes of 55 gallons

[37] Federal Register. (2024). *Energy and water conservation standards and their compliance dates*. 10 C.F.R. Section 430.32. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-C/section-430.32#p-430.32(d)(2)

through 120 gallons, the current federal standards already require uniform energy factors exceeding a value of one (and, thus, the use of heat pump technology or tankless systems).[38]

For commercial water heaters, however, electric-resistance storage units may continue to be available. These water heaters have a rated input both greater than 12 kW and less than 4,000 Btu/h per gallon of stored water.[39] Commercial electric storage water heaters must meet federal efficiency standards that are defined by standby losses rather than heating efficiency. These standards have not changed in over 20 years.

Both consumer- and commercial-grade tankless electric water heaters may continue to be manufactured and available in the market. Consumer tankless units will require uniform energy factors below one, which makes electric-resistance heating possible; uniform energy factors account for heat transfer as well as first-hour ratings and standby losses. Commercial tankless units will require a uniform energy factor (UEF) between 0.77 and 0.80, which also allows for electric resistance.[40]

These standards matter because they affect the water heater types that will be available to restaurants from the supply chains under business-as-usual conditions (without market intervention). As noted in Section 3.2.3, restaurants use a mix of consumer-grade systems and commercial units (including residential duty), so different standards apply to different units. The federal standard that becomes effective in 2029 will eliminate the option of like-for-like replacements for consumer-grade electric-resistance storage water heaters.

7.1.2 California Appliance Efficiency Standards[41]

California's Appliance Efficiency Regulations are contained in Title 20, Sections 1601-1609. For federally regulated water heaters, Title 20 generally incorporates or aligns with the applicable federal requirements while adding California certification, marking, and sale requirements. A covered model must be certified by its manufacturer and listed as approved by the California

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[38] Ibid.

[39] Federal Register. (2024). *Commercial Water Heaters, Hot Water Supply Boilers and Unfired Hot Water Storage Tanks*. 10 C.F.R. Section 431. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-431/subpart-G

[40] Thermal efficiency is the ratio of energy input to the heated water to the total energy used.

[41] Water heater classifications, efficiency requirements, and certification requirements are based on California's Title 20 Appliance Efficiency Regulations. Sections 1606 and 1608 address manufacturer certification, MAEDbS listing, and sale requirements; Section 1605.1(f) establishes applicable standards for federally regulated water heaters. The CEC's MAEDbS guidance identifies the residential, commercial, and residential-duty commercial water heater categories and explains the classification of booster heaters, storage water heaters below 20 gallons, and hot-water dispensers.

Energy Commission (CEC) in the Modernized Appliance Efficiency Database System (MAEDbS) before it may be sold or offered for sale in California.[42]

MAEDbS includes separate appliance categories for residential water heaters, commercial water heaters, and residential-duty commercial water heaters. Some products commonly used in foodservice applications – including booster heaters, storage water heaters below 20 gallons, and hot-water dispensers – must be certified in the residential water heater category.[43]

Title 20 does not impose a general requirement that restaurants use heat pump water heaters. Commercial electric-resistance storage equipment may continue to be sold if it complies with federal and California requirements[44] and is properly certified in MAEDbS.

7.1.3 California Building Energy Efficiency Standards

The 2025 California Building Energy Efficiency Standards, Title 24, Part 6, apply to permit applications submitted on or after January 1, 2026. They govern newly constructed buildings and specified additions and alterations. Unlike Title 20, which governs the sale of individual appliances, Title 24 regulates the design and installation of the water-heating system within a covered building project.

Requirements apply to equipment compliance with the Appliance Efficiency Regulations, temperature controls, hot-water piping and tank insulation, recirculation-system controls, and related installation documentation. For systems with a total capacity greater than 167,000 Btu per hour, outlets requiring temperatures above the normal service-water temperature must be served through an appropriate separate heater, heat exchanger, or booster arrangement. This provision is particularly relevant to high-temperature dishwashing because it allows the elevated-temperature load to be addressed near the point of use, rather than requiring the entire distribution system to operate at that temperature.[45]

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[42] California Energy Commission. (2026). *Appliance Efficiency Regulations-Title 20*. California Code of Regulations, Title 20, Sections 1601-1609, particularly Sections 1606 and 1608. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=ID0318F505CCE11EC9220000D3A7C4BC3&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)

[43] California Energy Commission. (2019). *Modernized Appliance Efficiency Database System Enhancements: Water Heater Products*. https://www.energy.ca.gov/programs-and-topics/programs/appliance-efficiency-program-outreach-and-education/modernized

[44] California Energy Commission. (2026). *Federal and State Standards for Federally Regulated Appliances*. California Code of Regulations, Title 20, Section 1605.1(f). https://govt.westlaw.com/calregs/Document/I270DCA634B4011EFA8F7F119BAF97AD6

[45] California Energy Commission. (2025). *2025 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. California Code of Regulations, Title 24, Part 6, Section110.3, pp. 181-183. https://www.energy.ca.gov/sites/default/files/2025-07/CEC-400-2025-010-F_0.pdf

Restaurants and most other foodservice facilities are treated as "all other occupancies" under Section 140.5. They must meet the applicable mandatory and high-capacity service-water heating provisions. [46, 47]

Gas service-water heating systems with a total installed gas input of at least 1 million Btu per hour must achieve a minimum thermal efficiency of 90%, through individual equipment or an input-capacity-weighted system average.[48]

7.1.4 Food Safety Standards

Foodservice businesses in California also need to meet standards intended to protect food and employee safety. These standards affect hot water systems and directly impact water heating sizing in ways that pose barriers to the installation of heat pump water heaters.

Foodservice establishments require local licenses and inspections by environmental health agencies, which enforce state and local health and safety regulations. For example, the California Health and Safety Code mandates that water heaters provide hot water (at least 120 degrees Fahrenheit) at the faucet at all times.[49] Further, water heater recovery rate must equal or surpass 100% of the computed hourly hot water demand (in GPH) in facilities that use reusable eating and drinking utensils (or 80% in those that use either single-service utensils or no utensils).[50]

More importantly for this MTI, the nonprofit California Conference of Directors of Environmental Health establishes guidelines for the computation of water heater sizes that allow temperature requirements to be met. Nearly all environmental health agencies have adopted these guidelines, according to CalMTA collaborators tracking this topic (six counties have shown some flexibility). These guidelines provide a formula that computes minimum water heater sizes for electric units, assuming that the unit's efficiency level is 98%; this does not account for the heat pumps' ability to achieve comparable efficiency of three times these levels or for their slower recovery rates.

7.1.5 Air Quality Regulations

The California Air Resources Board (CARB) and Air Quality Management Districts (AQMDs) have been working on various regulatory requirements that could limit the share of natural gas water heaters available in the market or preclude the sale and installation of different classes of natural

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[46] A current prescriptive HPWH requirement applies to specified school applications; it is not a general requirement that standalone restaurants install HPWHs.
[47] California Energy Commission. (2025). *2025 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. California Code of Regulations, Title 24, Part 6, Section140.5(a), p. 329. https://www.energy.ca.gov/sites/default/files/2025-07/CEC-400-2025-010-F_0.pdf
[48] Ibid.
[49] California Health and Safety Code. (2025). Division 104, Part 7, Chapter 5. *Cleaning and Sanitizing of Equipment and Utensils* (114095 - 114125)
[50] Also in California Health and Safety Code, Division 104, Part 7.

gas water heaters in commercial buildings, including foodservice operations. CalMTA has been monitoring these potential mandates, and manufacturers cited them as a potentially substantial driver for HPWH adoption.

These regulations are a patchwork in flux, however, and final dispositions are uncertain while CARB finalizes proposals and AQMD regulations are under litigation. Under some scenarios, regulations to reduce or eliminate NOx emissions from on-site combustion could leave electric water heaters as the only viable option for new installations and replacements. If this happens, the available options would be HPWHs, electric tankless, and electric-resistance tank water heaters (until federal efficiency standards limit their availability). We note that current regulatory barriers constrain the adoption of HPWHs. For example, agencies that regulate and license foodservice establishments impose sizing requirements see Section 8.1).

As summarized in Table 11, CARB is considering a State Implementation Plan to meet California climate goals that would, beginning in 2030, impose limits on GHG-emitting water heaters sold by manufacturers, while new commercial buildings would need to meet zero emission standards by 2029.

Three AQMDs have various proceedings in place that would restrict or preclude nitrogen oxide emissions:

- The San Joaquin Valley Air Pollution Control District already limits the sale of smaller natural gas-fired water heaters to those with lower NOx emissions.
- The Bay Area Air Quality Management District's zero NOx rules are expected to ban the replacement of existing water heaters with those that have NOx emissions beginning in 2027. This rule would preclude the use of natural gas units, unless the resulting shift to electric water heating is covered by exemptions due to costs. A phase-in based on water heater energy ratings raises the possibility that market actors will shift to tankless units rather than heat pump water heaters between 2027 and 2031, because tankless natural gas units have higher Btu ratings than tank-based units and will be regulated later.
- A related no-NOx rule by the South Coast Air Quality Management District was intended to prevent the sale and installation of water heaters with NOx emissions on a phased schedule from 2026 to 2033, but rules for smaller water heaters were previously struck down, and further litigation has put the 2026 phase-in on hold.

The NOx rules target water heaters based on their specifications rather than whether they are installed in residential or commercial settings.

Table 11. Summary of Active and Potential Air Quality Regulations with Implications for Heat Pump Water Heating Adoption

	California Air Resources Board	South Coast Air Quality Management District	Bay Area Air Quality Management District	San Joaquin Valley Air Pollution Control District
Rule	State Implementation Plan[a]	Rule 1146.2 (Regulation XI)[b]	Regulation 9, Rule 4[c] and Rule 6[d]	Rule 4902[e]
Status	Under consideration	On hold due to litigation	Slated to take effect beginning in 2027	In effect
What it does	Limits sale of water heaters with GHG emissions to 60% of units sold in 2030 and 50% in 2045. New construction would be held to a zero emissions standard by 2029.	Prevents the sale and installation of water heaters with NOx emissions on a phased schedule from 2026 to 2033	Prevents the new installation or replacement of existing water heaters with NOx-emitting models except when required building upgrades are too costly	Limits the sale of natural gas-fired water heaters to those with NOx emissions below 10 ng/J (14 ng/J for tankless units)
Affected water heaters	Water heaters sold in California by manufacturers	Commercial-grade water heaters rated between 75,000 and 2 million Btu/hour The inclusion of smaller water heaters was previously struck in litigation.	Water heaters rated up to 75,000 Btu/hour in 2027 and larger units in 2031 Residential-grade equipment initially and then also commercial-grade equipment	Residential-grade natural gas water heaters rated up to 75,000 Btu/hour

Sources: [a] California Air Resources Board. (2026). Clean Space and Water Heaters: Frequently Asked Questions. https://ww2.arb.ca.gov/our-work/programs/building-decarbonization/clean-space-and-water-heater-standards/faq
[b] South Coast Air Quality Management District. (2024). Rule 1146.2: Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters. Amended June 7, 2024. https://www.aqmd.gov/docs/default-source/rule-book/recent-rules/r1146_2x-060724.pdf

[c] Bay Area Air Quality Management District. (2023a). Regulation 9, Rule 4: Nitrogen Oxides from Natural Gas-Fired Furnaces. Amended March 15, 2023. https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20230315_rg0904-pdf.pdf

[d] *Bay Area Air Quality Management District. (2023b). Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters. Amended March 15, 2023. https://www.baaqmd.gov/en/rules-and-compliance/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces*
[e] *San Joaquin Valley Unified Air Pollution Control District. (2009). Rule 4902: Residential Water Heaters. Amended March 19, 2009. https://www.valleyair.org/media/3tml3hrf/rule-4902.pdf*

7.1.6 Combined Effect of Regulations

Taken together, federal efficiency standards, California foodservice health and safety standards, and proposed and planned California air quality standards will affect the availability of water heaters in the market and foodservice establishments' options in coming years.

- Statewide air quality regulations under consideration may reduce the availability of natural gas water heaters beginning in 2030, while existing regional air quality regulations may eliminate natural gas water heating as an option in various parts of the state. The type of water heater affected (consumer- or commercial-class equipment) varies by air quality management district, however. Implementation of established and proposed standards is still uncertain, but any enforcement of these standards would shift the market toward electric water heating and present a potential opportunity for this MTI.
- Federal efficiency standards will eliminate manufacturing of new consumer-grade electric-resistance water heaters, used by some foodservice establishments, by 2029, preventing the usual like-for-like replacements for such systems.
- Current foodservice health and safety standards present barriers to the adoption of heat pump water heaters by requiring oversizing of heat pump water heaters or justification of appropriately sized units through engineering calculations that are not required for other technologies.

Further tracking of these regulations will be needed, as well as more research on the degree to which foodservice establishments use consumer-grade, residential-duty commercial, or commercial-grade equipment.

The practical implications of the CCDEH water heater sizing guidelines need to be investigated further as well. While the guidelines appear to pose a substantial barrier to heat pump water heater adoption, there have been successful installations of heat pump water heaters in restaurants. Additional research is needed to understand how the guidelines were applied and what was required for HPWH installations.

Table 12 summarizes the timelines, geography, and applicability of key regulations.

Table 12. Summary of Applicability and Timelines of Regulatory Requirements Noted in this Section

	Statewide Requirements					South Coast Requirements	Bay Area Requirements	San Joaquin Valley Requirements	County-Level Requirements
Type	Federal Efficiency Standards		California Appliance Efficiency Standards	California Building Efficiency Standards	Climate/GHG	Air quality (NOx) - SCAQMD	Air quality (NOx) - BAAQMD	Air quality (NOx) - SJVAPCD	Food safety
Rule	10 CFR Section 430.32 (d)	10 CFR Section 431.110 (a) and (c)	Title 20	Title 24	CARB State Implementation Plan	Rule 1146.2 (Regulation XI)	Regulation 9, Rule 4 and Rule 9	Rule 4902	CCDEH water heater sizing guidelines
Affected Water Heater Classes	Consumer-grade	Commercial-grade (including residential-duty)	Consumer, residential-duty commercial, and commercial water heaters	Water heating systems, including water heaters, dishwashers, booster heaters, recirculation, controls, and other components	All	Commercial-grade (including residential-duty)	All (starting with consumer-grade)	Consumer-grade	All
Affected Water Heaters	All consumer-grade water heaters manufactured after the effective date	All commercial and residentialduty commercial water heaters manufactured after the effective date	All federally regulated water heaters sold in California	Water heating systems included in a covered building project	Water heaters sold in California by manufacturers	Water heaters rated between 75,000 and 2 million Btu/hour	Water heaters rated up to 75,000 Btu/hour in 2027 and larger units in 2031	Natural gas water heaters rated up to 75,000 Btu/hour	All water heaters in foodservice businesses
Status	Begins May 6, 2029	In effect	In effect	In effect	Under consideration	On hold due to litigation	Slated to take effect beginning 2027	In effect	In effect

	Statewide Requirements					South Coast Requirements	Bay Area Requirements	San Joaquin Valley Requirements	County-Level Requirements
What It Does	Requires efficiency levels for electric storage water heaters above a uniform efficiency factor of one, thereby requiring them to use heat pump technology. Electric-resistance tankless systems will continue to be allowed, as will natural gas water heaters of all types that meet efficiency requirements.	Commercial: Sets efficiency requirements that allow electric-resistance storage with specified standby efficiency levels Residential-duty: Does not provide for any permitted efficiency levels for electric-resistance storage water heaters Both: Allows for electric-resistance tankless water heaters, as well as natural gas water heaters of all types that meet efficiency requirements	Adopts federal efficiency standards and requires that models be approved and listed in CEC's Modernized Appliance Efficiency Database System	Requires equipment compliance with appliance efficiency regulations, temperature controls, hot-water piping and tank insulation, and recirculation-system controls. Systems with capacity beyond 167,000 Btu/hour must be served by a separate heater, heat exchanger, or booster arrangement.	Limits sale of water heaters with GHG emissions to 60% of units sold in 2030 and 50% in 2045. New construction would be held to a zero-emissions standard by 2029.	Prevents the sale and installation of water heaters with NOx emissions on a phased schedule from 2026 to 2033	Prevents the new installation or replacement of existing water heaters with NOx-emitting units unless required building upgrades are too costly	Limits the sale of natural gas-fired water heaters to those with NOx emissions below 10 ng/J (14 ng/J for tankless units)	Establishes minimum Btu input for electric water heaters based on electric-resistance efficiency levels or alternative engineering calculations to determine system capacity

Sources: See individual subsections above. This table is a summary of information provided and cited there.

7.2 Program Landscape

California foodservice establishments have access to a range of statewide, utility-specific, and local programs that support energy efficiency, electrification, and water heating upgrades (Table 13). These offerings include direct equipment rebates, point-of sales incentives, technical assistance, and financing mechanisms designed to reduce upfront costs and accelerate adoption of high-efficiency technologies. Some programs specifically target commercial water heating, while others support broader foodservice and hospitality efficiency improvements that may complement water heating system upgrades. We identified some programs that focus specifically on heat pump water heaters for commercial applications, but most programs offer support for this technology as part of a fuller set of offerings.

Incentive levels vary by technology type, system size, efficiency rating, and project characteristics; the table shows them for programs where they are publicly available. In addition to incentive programs, California utilities and state agencies offer financing options such as on-bill financing, low-interest loans, and Property Assessed Clean Energy (PACE) financing. These mechanisms may help address capital constraints that are often cited as barriers to equipment replacement. Together, these programs provide multiple potential pathways for foodservice operators to pursue energy-efficient and low-emission water heating technologies. However, based on publicly available information, program-related adoption of heat pump water heaters by restaurants has been limited.

Table 13. Programs and Financing Mechanisms Relevant for California Foodservice Hot Water System Efficiency Improvements

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
Statewide						
GoGreen Business Energy Financing	State of California	X			X	Loans, leases, and financing for energy-efficiency projects. Eligible water-heating technologies include ENERGY STAR-certified heat pump, storage tank, tankless, and solar water heaters, as well as central gas water-heating systems.
Property Assessed Clean Energy (PACE)	Local program administrators; statewide coverage	X				Long-term property-assessed financing for eligible energy-efficiency and electrification projects
Statewide Midstream Water Heating Program	California IOUs; statewide coverage	X			X	Point-of-sale rebates for high-efficiency commercial water-heating equipment. The program offers incentives for qualifying HPWHs, ranging from approximately $700 to $1,700 per unit for smaller-capacity systems and up to $7,000 for larger-capacity HPWH installations. It also provides enhanced incentives for fuel-switching projects that replace gas-fired water heating equipment with electric HPWH technologies.[51] The program has experienced limited HPWH uptake, with most incentives claimed for natural gas water-heating equipment. In 2022, the program served 1,074 commercial customers. The majority of customers received

[51] Statewide Water Heating Program. (n.d.). *Eligibility. Statewide Water Heating Program*. https://www.statewide-waterheating.com/eligibility/

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
						tankless water heaters (70%), followed by storage tank water heaters (25%), while fewer than 1% received HPWHs.[52]
IOUs						
California Energy Design Assistance (CEDA)	California investor-owned utilities (IOUs); implemented by Willdan	X	X			No-cost decarbonization analysis and potential incentives for commercial new construction and major renovations
Commercial Energy Efficiency Program (CEEP)	Southern California Edison; implemented by Willdan	X			X	Rebates for qualifying commercial HPWHs that replace existing gas-fired water heaters, boilers, or tankless systems. The program also supports other energy efficiency measures, including HVAC upgrades, variable frequency drives (VFDs),high-efficiency motors, demand-controlled kitchen ventilation, and refrigeration case door improvements. In 2024, SCE's Commercial Energy Efficiency Program completed 396 projects, of which 71% involved HPWHs.[53] In 2025, the program completed 278 projects, of which 97% were HPWHs and most of the savings were from hotels, motels, commercial offices, medical buildings, grocery stores, recreational centers, and civic and religious organizations.[54]

[52] Opinion Dynamics. (2024). *PY2022 Statewide Midstream Commercial Water Heating Program Impact Evaluation.* California Public Utilities Commission. September 2024. https://www.calmac.org/publications/PY2022_SW_Midstream_Commercial_Water_Heating_Program_Impact_Evaluation_Report-FINAL.pdf

[53] California Public Utilities Commission. (2025). *Southern California Edison Company's 2024 Annual Report for Energy Efficiency Programs*. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M567/K932/567932845.PDF

[54] California Public Utilities Commission. (2026). *Southern California Edison Company's 2025 Annual Report for Energy Efficiency Programs*

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
SDG&E Groceries, Restaurants, and Food Storage Program	SDG&E	X				Energy-efficiency incentives for food-related businesses. Launched in 2025, by end of the year two aggregators submitted a total of six deemed rebate projects.[55]
Utility Financing Programs (PG&E, SCE, SoCalGas, and SDG&E)	California IOUs	X				On-bill financing, rebates, and energy efficiency assistance for qualifying commercial customers and projects
Local						
BayREN Business Program	Bay Area Regional Energy Network	X	X			Technical assistance and incentives for small and medium-sized businesses. Eligible measures include HVAC, refrigeration, lighting, water heating, building-envelope improvements, and other efficiency upgrades. In 2024 the program received 259 project applications and completed 218 hard-to-reach (HTR) projects, including 74 projects located in disadvantaged communities (DACs). These completed projects are estimated to generate 1,453,012 kWh in energy savings and reserve approximately $3.29 million in incentives. More than 40% of project applications came from restaurants and bars, while grocery stores,

[55] San Diego Gas & Electric Company. (2026). *San Diego Gas & Electric Company Energy Efficiency Programs 2025 Annual Report*. sdge.com/node/34211

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
						markets, and liquor stores accounted for over one-quarter of all applications.
San Francisco Green Business Program	City and County of San Francisco		X			Sustainability assistance, operational guidance, and public recognition for businesses that meet program standards
Business Customer Rebates/Commercial Advantage Program	City of Palo Alto Utilities	X			X	Prescriptive commercial HPWH rebates generally ranging from $2,500 to $3,500 for eligible customers
Business Rebate Program	Silicon Valley Clean Energy	X			X	Rebates for commercial HPWHs, heat pump HVAC, induction cooking, related electrical infrastructure, and prewiring. Businesses may receive up to $40,000 per project, with an additional allowance available to nonprofit organizations and schools.
Food Desert Energy Efficiency Equity Program	SoCalREN	X	X		X	No-cost efficiency upgrades and technical assistance through the Business Energy Advisor Program for small restaurants and food retailers in hard-to-reach and underserved communities. Services include refrigeration, lighting, and water-heating measures designed to lower energy costs, improve access to healthy food, and support small businesses. Started in 2025, the program secured commitments for 22 projects across convenience stores, restaurants, and retail businesses, with installations expected to be completed in early 2026.[56]

[56] SoCalREN. (2026). *SoCalRen's Annual Report for 2025 Program Year*

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
Complete Energy Solutions	SMUD	X	X		X	Free energy assessments, project assistance, and incentives for commercial HPWH installations
Commercial Direct Install Program	Los Angeles Department of Water and Power; implemented by Willdan	X			X	No-cost HPWH equipment and installation for qualifying small and medium-sized commercial customers replacing aging gas or electric water heaters
Zero by Design Express	Los Angeles Department of Water and Power	X	X		X	Incentives for the purchase and installation of high-efficiency equipment in new construction or major renovation projects, including commercial all-electric heat pump water heaters and large commercial heat pump water heaters in commercial new construction, retrofits, or renovation projects Commercial heat pump water heaters qualify for $1,800-$2,850 per unit, while large-capacity systems receive $30-$50 per kBtu/hour of output capacity, depending on equipment specifications. [57]
3C-REN Commercial Energy Savings Program	3C-REN; serving San Luis Obispo, Santa Barbara, and Ventura counties	X			X	Performance-based incentives for small and medium-sized commercial energy upgrades. Gas-to-electric replacements receive enhanced incentives; replacing a commercial gas water heater with an HPWH may earn approximately $5,800, depending on modeled savings and project characteristics.

[57] Los Angeles Department of Water & Power. (n.d.). *Zero By Design*. https://www.ladwp.com/construction-services/zero-design

Program Name	Administrator	Areas of Focus			Description of Support Provided (Including Program Statistics Where Available)	
		Primarily Financial Incentives	Primarily (or Includes Substantial) Non-Financial Components	ESJ-Focused	Specific Commercial HPWH Support	
						Of the 53 total projects installed in 2025, 16 were heat pump water heater projects that leveraged incentives from both the primary program and the TECH Clean California Program. These stacked HPWH projects represented approximately 84% of all heat pump water heater installations and received a combined incentive amount of $52,700.

Source: Program websites and utility program documentation were reviewed for this study.

8 Barriers, Drivers, and Opportunities

8.1 Barriers to HPWH Adoption

Key barriers to heat pump water heater adoption include a regulatory requirement concerning water heater sizing, higher installed costs compared with other technologies, higher operating cost compared with gas water heaters, technical infrastructure that may require upgrades for heat pump water heater installation, and technology adoption barriers related to unawareness of and discomfort with unfamiliar technology.

Table 14 below lists key barriers identified through this study's secondary research and market interviews. The table also presents restaurant operator survey results that indicate the scale and applicability of some of these barriers.

Below the table, we provide cross-references to sections that provide more information about these barriers. Where applicable, we also provide syntheses of information gathered about the barrier.

Table 14. Barriers to Heat Pump Water Heater Adoption

	Sources and Insights	
Barriers	**Secondary Research and Market Actor Interviews**	**Additional Restaurant Operator Survey**
HPHWs carry **higher installation costs** than competing technologies and **higher operating costs** than natural gas alternatives.	HPWH equipment costs more than traditional equivalents and can introduce higher installation costs due to infrastructure upgrades. HWPHs also cost more to operate than existing natural gas options at current California energy prices. Awareness is low regarding the comparative operating costs of heat pump water heaters and commonly used natural gas water heaters.	No survey information
Foodservice regulations i may require HPWH system sizes that exceed actual needs.	HPWH meet jurisdictions' size requirements only if regulatory engineering calculations or oversizing are implemented.	No survey information
Infrastructure needs for HPWHs may force building adjustments.	Secondary research suggests that four-fifths[h] of restaurants could need electrical panel upgrades to handle new load if HPWHs replace natural gas water heating;[58] other physical adjustments may be needed to accommodate HWPH requirements for airflow and space.	Survey responses hint at moderate levels of infrastructure barriers, but survey precision on the pertinent questions is low. • 96% of survey respondents have had an upgrade to their electrical system, and 23% have had a major upgrade. • Nearly all respondents have their water heaters in rooms that provide 700 cubic feet of air volume (rooms with 100

[58] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

	Sources and Insights	
Barriers	**Secondary Research and Market Actor Interviews**	**Additional Restaurant Operator Survey**
		square feet of floor space), but only half are in rooms with double that volume. • Most water heating equipment has limited accessibility and clearance around it, but only 6% of survey respondents indicated that the space is tight and in a constrained location. • 17% of survey respondents have water heaters in locations that could prove challenging for HPWHs, such as outdoor locations, rooftops, attics, and basements.
Restaurant operators who **lease space** may be unable to own or select water heating equipment.	Landlords are less likely to opt for higher cost equipment that can be justified by operating cost savings where they exist (from replacements of electric-resistance water heaters).	Survey respondents predominately own their space and water heater. Only a fraction of respondents were located in landlord-owned buildings (14%, although there is a possibility of sampling bias), and 40% of restaurant operators who rent their space indicated that they own the water heater. Of the 86% of survey respondents who own their restaurant's building or space, 92% own the water heater, and the remainder appear to share a water heater with others.
Supply chain market actors are equipped to accommodate reactive replacement practices based on like-for-like equipment change-outs and cannot address the work required to shift to HPWHs easily in the time frame needed.	The vast majority of restaurants replace water heaters upon sign of failure. Required infrastructure upgrades and the supply chain's focus on other technologies impede quick replacements. Lack of immediate availability of heat pump water heaters precludes the technology from being an option.	Two-thirds of survey respondents (67%) indicated that they replace water heaters when they begin to show major issues, while 28% wait until the water heater has failed. Only 5% follow a planned replacement strategy. Like-for-like replacements are the norm.

	Sources and Insights	
Barriers	**Secondary Research and Market Actor Interviews**	**Additional Restaurant Operator Survey**
	Supply chain market actors are equipped to perform like-for-like replacements but cannot address conversions to HPWHs nearly as easily or quickly when needed as emergency replacements.	
Corporate- and franchise-level requirements can preclude HWPH installation until appropriate vendors and equipment are added to approved lists.	Franchises and chain-owned restaurants often are guided by vendor lists, approved equipment lists, and performance specifications. Until HPWH-friendly updates are made, HPWHs may not be feasible in some restaurants.	No survey information
Insufficient awareness and performance uncertainties among restaurant operators preclude consideration.	Restaurant operators have mixed awareness of HPWH and low understanding or confidence in their reliability and performance. Contractors expressed widespread awareness of HPWHs, but manufacturers indicated a need for additional awareness- and confidence-building within the supply chain.	• 36% of restaurant owners and operators claim high awareness of heat pump water heaters, and another 27% claim a medium level of awareness. • Based on their current knowledge, 37% of restaurant owners perceive heat pump water heaters as a good fit for their needs. Just 8% consider them the best fit.

Foodservice Regulatory Requirements for Hot Water

See Section 7.1.4.

While more clarity is needed on CCDEH's path forward as federal efficiency standards change, the MTI could explore these near-term strategies the MTI:

- Continue engagement with collaborators to promote updated guidelines by the CCDEH or increased flexibility by California environment health agencies before an extensive market push to grow the adoption of heat pump water heaters by foodservice establishments.
- Facilitate the increased effort needed to obtain approval of appropriately sized heat pump water heaters in foodservice establishments with support of market actors willing to pursue them under current regulatory standards.
- Focus initially on geographies in which environmental health agencies are willing to work with the MTI to offer flexibility, and provide evidence to environmental health agencies and directors throughout the state of heat pump water heater sizes that comply with water heater temperature requirements.
- Time the MTI's entry into the market to follow efforts in other commercial sectors that are less heavily regulated on water heating choices, such as office buildings, and await a more mature heat pump water heater market, along with more field data on actual performance and hot water sufficiency at different sizes.

Higher Installation and Operating Costs

See Section 6.4, which shows installation costs of heat pump water heaters as higher than those of other technologies and operating costs higher than those of natural gas water heating options.

Contractors and manufacturers identified the cost premium of HPWHs as the biggest barrier to their adoption by a sector they consider cost-conscious and cost-constrained. Restaurant operator interviews suggest that cost barriers are most pronounced among independent quick-service operators, small franchisees, and establishments in ESJ communities, where access to capital is limited and risk tolerance is low.

Infrastructure Needs for HPWHs

See Section 6.2.2.

HPWH systems typically require greater electrical capacity, additional physical space, and different installation conditions compared with gas systems. Secondary research suggests that

fewer than a fifth of foodservice facilities have spare electrical panel capacity; most replacements of natural gas systems with HPWHs would require panel upgrades.[59]

Leased Space Decision Authority

See Sections 4.1.1 and 6.2.2.

When restaurants lease their space, landlords often (but not always) own the water heater and have responsibility for its maintenance and replacement,[60] but restaurants typically pay the energy costs. These situations reduce incentives to replace electric-resistance water heaters with heat pump versions and give the primary control over replacement decisions to the landlord. Even when tenants own the equipment, landlord approval is often required for electrical or structural modifications, which can delay or prevent upgrades.

Reactive Replacement Practices

See Sections 3.3.3 ***and*** 6.2.2.

Corporate- and Franchise-Level Requirements

See Sections 3.3.3 and 4.1.2.

Interviews with representatives of restaurant chain and franchise systems highlighted the use of approved equipment and vendor lists, performance standards, and capital approval processes, all of which establish organizational barriers and drivers. New technologies and options face adoption barriers until they are added to approved lists and processes. Once they are added, their use is facilitated. Even when capital is available, adoption requires a clear business case and low implementation risk.

Interviewees identified the maturity of the service ecosystem as a key concern and emphasized the importance of the following factors:

- Trained technicians
- Availability of spare parts
- Reliable maintenance infrastructure
- Long-term manufacturer support

Chains and franchises are particularly cautious about adopting technologies that may be difficult to service at scale.

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[59] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

[60] Cafe owners mentioned such scenarios when they operate in strip malls, for example.

Limited Awareness and Performance Uncertainties

See Sections 4.2 and 6.2.2.

Secondary research highlighted a lack of restaurant decision-maker awareness and information gaps about HPWH performance.[61] Many restaurant operators — particularly independent and non-technical decision-makers — lack familiarity with commercial HPWH applications or confidence in system performance. Without clear case studies, contractor guidance, and peer validation, projected energy savings are often perceived as uncertain.

Restaurant operator interviews confirmed that the lack of information about operational reliability constrains HPWH adoption. Hot water is essential for sanitation, dishwashing, food preparation, and regulatory compliance, and system failures can result in service disruptions or shutdowns.

Restaurant operators expressed uncertainty and concerns about the following aspects of HPWH performance:

- Recovery speed during peak demand
- System reliability
- Maintenance complexity
- Downtime risk

These concerns are especially pronounced in quick-service and high-volume kitchens, where demand is continuous and recovery rates are critical.

Secondary research also highlights concerns related to noise, maintenance burden, and vulnerability during power outages, which further reinforce operator hesitation.[62]

Contractors expressed widespread awareness of HPWHs, but manufacturers indicated a need for additional awareness- and confidence-building within the supply chain.

8.2 Drivers and Opportunities for HPWH Adoption

Potential drivers and market transformation opportunities for HPWH adoption include regulatory mandates that may push the market toward electrification, restaurants' efforts to increase sustainability to meet company or establishment goals, and potential points of market leverage, such as the California Restaurant Association.

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[61] CalNEXT. (2025). *Water Heating Technology Priority Map Preliminary Findings Report*. CalNEXT-2025-Water-Heating-TPM-Final-Report.pdf

[62] TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*.https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf

Table 14 below lists these drivers and opportunities along with relevant insights from this study's secondary and qualitative interviews. As in Table 14 we present restaurant operator survey results that indicate the scale and applicability of drivers and opportunities.

Below the table, we provide cross-references to the report sections in which readers can find more information about these drivers and opportunities. Where applicable, we also provide syntheses or additional information about the drivers and opportunities gathered during the study.

Table 15. Potential Drivers for Heat Pump Water Heater Adoption

	Sources and Insights	
Drivers and Opportunities	**Secondary Research & Market Actor Interviews**	**Foodservice Operator Survey**
Regulatory mandates from the California Air Resources Board or Air Quality Management Districts that limit or prohibit sales of natural gas or propane water heaters	Air quality regulations at the state and district levels could mandate or limit the availability of natural gas water heaters in the market statewide and determine whether they can continue to be installed in commercial buildings in some parts of the state. However, these regulations are in flux, and ultimate outcomes are uncertain. Manufacturers stressed these regulatory mandates as an important potential driver for HPWH adoption.	• 54% of restaurant operators are actively monitoring California's decarbonization policies. • 11% anticipated that the policies would affect their operations in the future.
Statewide restaurant association, as a conduit for reaching restaurants	The California Restaurant Association has opposed prior local regulatory efforts to reduce the availability or allowed uses of natural gas.	55% of restaurant operators reported an association with the California Restaurant Association.
Bill saving opportunities from replacing electric-resistance storage water heaters and from space cooling side benefits that could offset HVAC use	Derived from cost analysis	• 21% of restaurant operators thought they could easily shift hot water usage to occur before 4 p.m., 78% thought they could "somewhat" do so, and 2% thought they could not do so. • 20% of restaurant operators said their kitchens can be too warm or too hot.
Corporate- and franchise-level requirements that facilitate and encourage HWPH installation if appropriate vendors and equipment are added to approved lists	Franchises and brand-owned restaurants often are guided by vendor lists, approved equipment lists, and performance specifications. Once HPWH-friendly updates are made, some restaurants could prefer HPWHs.	No survey information

Sustainability initiatives **that include decarbonization or energy reduction goals**	Chain-owned establishments reported shifting toward electric cooking applications to support decarbonization and emissions reduction goals. Restaurant operators reported the inclusion of shifts toward energy-efficient equipment among their sustainability practices. The more common energy measures are LED lighting, programmable thermostats, and ENERGY STAR-rated appliances.	• About a quarter of chain and franchise establishments reported having a formal energy reduction policy or program. • Of those that have implemented energy-saving measures, only 13% report selecting efficient equipment; the most commonly cited actions were installation of LED lighting and selection of efficient appliances.

Regulatory Mandates

See Sections 6.3 and 7.1.5.

Sustainability Initiatives

See Section 4.3.1.

California Restaurant Association

See Section 4.4.

High membership rates in the California Restaurant Association (CRA) could provide a point of market leverage where goals of the MTI and the CRA align.

Bill Saving Opportunities from Shifting Energy Usage and Space Cooling Side Benefits

As noted in Section 6.4, operating cost savings of heat pump water heaters can be substantial when replacing storage electric-resistance units, providing savings of 63% in one representative scenario. Replacements of commercial-grade electric-resistance water heaters and early replacements of consumer-grade electric-resistance water heaters offer potential MTI opportunities.

Replacements of natural gas water heaters with heat pump water heaters would generally increase operating costs, compared with other technologies. This MTI's technical assessment has estimated these impacts. They could be mitigated by electrification-friendly rates and intentional shifts in the timing of water heating to take advantage of time-specific rates or reduce demand charges.

Restaurants have a limited ability to shift water heating to occur before system peak. However, they can benefit from the increased comfort of space cooling in the kitchen or reduced cooling need.

9 Methodology

The foodservice water heater market characterization summarizes findings from a variety of secondary and primary research. This section provides details about CalMTA's sources and research methods

9.1 Secondary Research

CalMTA reviewed studies related to the foodservice water heater market, examining industry reports, regulatory frameworks, market data, and academic studies in California and across the United States. Sources reviewed to understand technology adoption, market characteristics, and decarbonization opportunities for commercial water heating systems, included the following:

U.S. Census Bureau (2022): Data was used to quantify the number, distribution, and employment characteristics of foodservice establishments across California, including segmentation by restaurant type and geographic location.

Dun & Bradstreet (D&B): Business-level data was used to characterize the commercial foodservice market, including establishment size, ownership type (chain vs. independent), and regional distribution.

California Commercial End-Use Survey (CEUS): This comprehensive study of commercial sector energy use provides insights into building characteristics, end-use consumption, and equipment saturation across commercial building types.

California Electronic Technical Reference Manual (eTRM): California's guide to energy, cost, and applicability assumptions for energy-efficient technology also provides its comparative base cases.

California Energy Data and Reporting System (CEDARS): The California Public Utilities Commission provides this platform for energy efficiency program data reported to the Commission by investor-owned utilities, regional energy networks, and some community choice aggregators.

National Restaurant Association Reports (2025): Industry reports and forecasts were used to understand economic trends, operational challenges, and future outlooks for the restaurant sector, including growth, workforce, and cost pressures.

California Senate and Assembly Bills Establishing Decarbonization and Energy Efficiency Targets: State policies and emissions reduction targets were used to understand regulatory drivers for decarbonization and their implications for commercial water heating systems.

- California Air Resources Board. (2018). *AB 32: Global Warming Solutions Act of 2006*. September 28, 2018. https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006

- California Legislative Information. (2016). *SB 32: California Global Warming Solutions Act of 2006: Emissions Limit*. September 8, 2016. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32
- California Air Resources Board. (2025). *Information Regarding Cap-and-Invest Regulation Update*. September 19, 2025. https://ww2.arb.ca.gov/sites/default/files/2025-09/nc-CT_Notice_Sep2025_0.pdf
- Federal Register. (2026a). *Energy and Water Conservation Standards and Their Compliance Dates*. 10 C.F.R. Section 430.32. https://www.ecfr.gov/current/title-10/part-430/section-430.32
- Federal Register. (2026b). *Commercial Water Heaters, Hot Water Supply Boilers and Unfired Hot Water Storage Tanks*. 10 C.F.R. Part 431, Subpart G. https://www.ecfr.gov/current/title-10/part-431/subpart-G
- California Energy Commission. (2026). *Appliance Efficiency Regulations - Title 20*. California Code of Regulations, Title 20, Sections 1601-1609, particularly Sections 1606 and 1608. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=ID0318F505CCE11EC9220000D3A7C4BC3&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)
- California Energy Commission. (2019). *Modernized Appliance Efficiency Database System Enhancements: Water Heater Products*. https://www.energy.ca.gov/programs-and-topics/programs/appliance-efficiency-program-outreach-and-education/modernized
- California Energy Commission. (2026). *Federal and State Standards for Federally Regulated Appliances*. California Code of Regulations, Title 20, Section 1605.1(f). https://govt.westlaw.com/calregs/Document/I270DCA634B4011EFA8F7F119BAF97AD6
- California Energy Commission. (2025). *2025 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. California Code of Regulations, Title 24, Part 6, Section 110.3, pp. 181–183. https://www.energy.ca.gov/sites/default/files/2025-07/CEC-400-2025-010-F_0.pdf
- California Energy Commission. (2025). *2025 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. California Code of Regulations, Title 24, Part 6, Section 140.5(a), p. 329. https://www.energy.ca.gov/sites/default/files/2025-07/CEC-400-2025-010-F_0.pdf

Air Quality Regulations: Regional regulations governing emissions from gas-fired water heaters were used to assess compliance requirements and future constraints on conventional systems.

- South Coast Air Quality Management District. (2024). *Rule 1146.2: Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters*. Amended June 7,

2024. https://www.aqmd.gov/docs/default-source/rule-book/recent-rules/r1146_2x-060724.pdf

- Bay Area Air Quality Management District. (2023a). *Regulation 9, Rule 4: Nitrogen Oxides from Natural Gas-Fired Furnaces*. Amended March 15, 2023. https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20230315_rg0904-pdf.pdf
- Bay Area Air Quality Management District. (2023b). *Regulation 9, Rule 6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters*. Amended March 15, 2023. https://www.baaqmd.gov/en/rules-and-compliance/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces
- San Joaquin Valley Unified Air Pollution Control District. (2009). *Rule 4902: Residential Water Heaters*. Amended March 19, 2009. https://www.valleyair.org/media/3tml3hrf/rule-4902.pdf

•California Retail Food Code and CCDEH Guidance: Health and safety regulations were used to understand sizing, installation, and permitting requirements for water heating systems in commercial kitchens, including constraints affecting heat pump adoption.

- California Conference of Directors of Environmental Health. (2020). *Guidelines for Sizing Water Heaters.* Food Policy Committee. Approved February 2020. https://www.ochealthinfo.com/sites/hca/files/2021-06/Water_Heater_Guidelines_Updated_2-6-2020.pdf
- San Francisco Environment Department and San Francisco Department of Public Health. (2025). *Heat Pump Plan Review for Food Facilities.* Technical Bulletin. January 2025. https://media.api.sf.gov/documents/HPWH_Food_Facility_Tech_Bulletin_Jan_2025.pdf
- California Legislative Information. (n.d.). California Health and Safety Code. *Cleaning and Sanitizing of Equipment and Utensils.* Division 104, Part 7, Chapter 5, Sections 114095-114125.

Technical and Market Studies on Heat Pump Water Heaters: These studies examine the technical feasibility, economic viability, and market potential of heat pump water heating technologies in foodservice and related sectors.

- CalMTA. (2026). *Market Characterization Report for Residential Heat Pump Water Heaters*. January 27, 2026. https://calmta.org/resourcereport/residential-heat-pump-water-heating-market-characterization-report/
- TRC Advanced Energy. (2023). *Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities*. Prepared for CalNEXT. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf
- U.S. Department of Energy. (2023). *TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT:*

COMMERCIAL WATER HEATING EQUIPMENT. https://downloads.regulations.gov/EERE-2021-BT-STD-0027-0038/content.pdf

- CalMTA. (2026). *Market Characterization Report for Residential Heat Pump Water Heaters*. January 27, 2026. https://calmta.org/resourcereport/residential-heat-pump-water-heating-market-characterization-report/
- Opinion Dynamics. (2022). *Attachment C: Excerpts from the California Heat Pump Market Characterization and Baseline Study*, April 4, 2022. https://docs.cpuc.ca.gov/PublishedDocs/SupDoc/A2112009/5608/497866884.pdf
- 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
- Barnet Plumbing and Water Heaters. Accessed January 15, 2025. *How Much Do Water Heaters Cost in California?* https://philbarnettplumbing.com/water-heater-cost

Industry and Academic Literature on Sustainability and Consumer Behavior: Research examines sustainability adoption in restaurants and customer perceptions of green practices.

- Jacobs, G., & Klosse, P. (2016). *Sustainable restaurants: A research agenda.* Research in Hospitality Management, 6(1), 33–36.
- National Restaurant Association. (2018). *The State of Restaurant Sustainability 2018*. https://restaurant.org/nra/media/downloads/pdfs/sustainability/restaurant_sustainability_research_report_2018.pdf
- Kim, M. J., & Hall, C. M. (2020). *Can sustainable restaurant practices enhance customer loyalty? The roles of value theory and environmental concerns*. Journal of Hospitality and Tourism Management, 43. https://doi.org/10.1016/j.jhtm.2020.03.004
- Mai, K. N., Nhan, D. H., & Nguyen, P. T. M. (2023). *Empirical Study of Green Practices Fostering Customers' Willingness to Consume Via Customer Behaviors: The Case of Green Restaurants in Ho Chi Minh City of Vietnam*. Sustainability, 15(5). https://www.mdpi.com/2071-1050/15/5/4263
- Kwok, L., Huang, Y. K., & Hu, L. (2016). *Green attributes of restaurants: What really matters to consumers?* International Journal of Hospitality Management. https://psycnet.apa.org/doi/10.1016/j.ijhm.2016.03.002

Equipment Financing and Leasing Literature: Sources were used to understand how restaurants make capital investment decisions, including trade-offs between leasing and purchasing equipment and implications for technology adoption.

- Rheem. (n.d.). KwikComfort Commercial. https://www.rheem.com/kwikcomfort-commercial/

- GreenSky. (n.d.). GreenSky Financial Program. NAWT-GreenSky-Info-Sheet.pdf
- Reliable Water Services. (n.d.). Rental Service Plans. https://reliablewater247.com/rental-service-plans/
- Thermal InMotion. (n.d.). Mobile Hot Water Boiler Rentals. https://thermalinmotion.com/rentals/commercial-boiler-rentals/mobile-hot-water-boiler-rentals/
- Rinnai. (n.d.). Commercial Leasing Program. https://staging.rinnai.us/commercial/leasing-program
- Daikin Applied. (n.d.). Commercial Heating: Rental Chillers. https://www.daikinapplied.com/products/rental-chillers/commercial-heating
- Pacific Gas & Electric. (2010). Why are commercial foodservice utility incentives so tasty? https://www.aceee.org/files/proceedings/2010/data/papers/2058.pdf
- Texas Restaurant Supply. (n.d.). Leasing vs. Buying Restaurant Equipment: Pros and Cons. https://texrestaurantsupply.com/news/leasing-vs-buying-restaurant-equipment-pros-cons/
- Restaurant Equipment Solutions. (2022). Lease vs. buy: What's best for your restaurant equipment needs? https://www.restaurantequipmentsolutions.com/blog/lease-vs-buy
- Alex, T., Bayo, A., Sherura, E., Lumu, B., Ikwe, L., and Ogwal, C.T. (2024). The Bottom-Line Choice: Lease vs. Buy – A Business Owner's Guide. International Journal of Current Science Research and Review, Vol. 7, Issue 1. 26-1201-2024.pdf

Program Landscape Review: Utility, regional energy network (REN), local government, and financing program documentation were reviewed to identify programs that may support energy efficiency, electrification, and water heating upgrades in the California foodservice sector. Utility program documentation, program websites, and financing mechanism were reviewed to assess available incentives and technical assistance that may influence adoption of energy-efficient water heating technologies.

- Statewide Water Heating Program. (n.d.). *Eligibility. Statewide Water Heating Program*. https://www.statewide-waterheating.com/eligibility/
- California Public Utilities Commission. (2025). *Southern California Edison Company's 2024 Annual Report for Energy Efficiency Programs*. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M567/K932/567932845.PDF
- Opinion Dynamics. (2024). *PY2022 Statewide Midstream Commercial Water Heating Program Impact Evaluation*. California Public Utilities Commission. September 2024. https://www.calmac.org/publications/PY2022_SW_Midstream_Commercial_Water_Heating_Program_Impact_Evaluation_Report-FINAL.pdf

- Los Angeles Department of Water and Power. (n.d.). *Zero By Design*. https://www.ladwp.com/construction-services/zero-design
- Southern California Regional Energy Network. (n.d.). *Food Desert Energy Efficiency Equity Program*. Food Desert Energy Efficiency Equity Program. https://socalren.org/commercial/food-desert-energy-efficiency-equity-program
- GoGreen Financing. (n.d.). *Eligible financing projects*. https://www.gogreenfinancing.com/energy-efficiency-home-loans-california/eligible-financing-projects/

Manufacturer Offerings: Water heater manufacturer websites were examined to assess current offerings for commercial application.

- Patrick, G. (2023). *Top 10 Water Heater Manufacturers Paving Way For Sustainable And Eco-Friendly Solutions*. Verified Market Research (blog). March 2023. https://www.verifiedmarketresearch.com/blog/top-water-heater-manufacturers/
- Nyle Water Heating Systems. (n.d.). *About Nyle Water Heating Systems*. https://heatwater.com/about-nyle/
- A.O. Smith. (n.d.). *Heat Pump Water Heaters: Hybrid Electric Models*. https://www.hotwater.com/info-center/electric-water-heaters/hybrid-electric-heat-pump.html
- Bosch. (n.d.). *Hybrid Electric Water Heaters*. https://www.bosch-homecomfort.com/us/en/ocs/residential/hybrid-electric-water-heaters-20419253-c/
- Rheem. (n.d.). *Water Heating*. https://www.rheem.com/products/commercial/water-heating/products-and-specs/
- Rinnai. (n.d.). *REHP Series: Electric Heat Pump Water Heater*. https://www.rinnai.us/rehp-electric-heat-pump-water-heater
- Bradford White. (n.d.). *Hybrid Electric Heat Pump Water Heaters*. https://www.bradfordwhite.com/heat-pump-water-heaters/

Contractor Information: Sources were used to understand the relevant trades (e.g., HVAC technician, plumber) of the commercial water heating industry, including like-for-like water heater replacements to the conversion of natural gas water heaters to electric HPWHs.

- Department of Consumer Affairs Contractors State License Board. (n.d.). *C-4 - Boiler, Hot Water Heating and Steam Fitting Contractor*. https://www.cslb.ca.gov/about_us/library/licensing_classifications/Licensing_Classifications_Detail.aspx?Class=C-4
- California Code of Regulations. (2025). *Class C-36-Plumbing Contractor.* Section 832.36. https://regulations.justia.com/states/california/title-16/division-8/article-3/section-832-36/

- Department of Consumer Affairs Contractors State License Board. (n.d.). *C-10 - Electrical Contractor*. https://www.cslb.ca.gov/about_us/library/licensing_classifications/Licensing_Classifications_Detail.aspx?Class=C10

9.2 Interviews

CalMTA initiated primary market research by conducting interviews with foodservice operators and other market actors, including contractors, manufacturers, and representatives from a commercial foodservice energy research and education facility and the National Restaurant Association. CalMTA conducted interviews from September to December 2025 as detailed in Table 16. The purpose of these interviews was twofold: (1) to understand current water heating practices, equipment decision-making processes, operational challenges and sustainability practices in foodservice establishments, and (2) to identify barriers and opportunities for adopting high-efficiency and electric water heating technologies, including heat pump water heaters.

Table 16. Interviews Conducted

Type	Number Completed	Purpose
Foodservice Operators	33 interviews with restaurant owners and managers at these types of establishments: • Independent restaurants • Franchise-owned restaurants • Chain-owned restaurants Across these restaurant formats: • Full-service restaurants • Quick-service restaurants • Cafes	Understand current water heating practices and decision-making among foodservice operators, assess barriers and drivers of equipment replacement and technology adoption, and identify opportunities to support efficient and decarbonized systems.
Contractors	20 interviews with contractors who identified as a plumber, HVAC technician, and/or consultant engineer for commercial water heater projects	Understand the role and perspective of contractors who install water heaters in commercial kitchens, including their understanding of market opportunities, market barriers, cost, and current market trends.
Manufacturers	3 interviews with international water heater manufacturing companies who could speak to the California market specifically	Understand the manufacturer's perspective on the supply chain and decision-making in commercial kitchens, current market offerings, policy impacting the manufacturing

Type	Number Completed	Purpose
		of water heaters, and HPWH utilization including market barriers.
Workforce Interviews	One interview with a commercial foodservice energy research and education facility.	Understand awareness and adoption of water heating technologies in the foodservice sector, assess market barriers and decision-making processes, and identify opportunities to support the adoption of efficient water heating systems.
Association	One interview with a member of the National Restaurant Association	Understand awareness and adoption of water heating technologies in the foodservice sector, assess market barriers and decision-making processes, and identify opportunities to support the adoption of efficient water heating systems.

9.2.1 Interview Sampling

The operator interviews focused on restaurant owners and managers across a range of establishment types and ownership structures to capture real-world experiences with water heating systems, replacement behaviors, and financing considerations. Initial outreach for operator interviews leveraged Dun & Bradstreet data; however, due to low response rates, CalMTA supplemented recruitment using a panel-based interview provider to achieve the target sample.

In parallel, CalMTA conducted interviews with a foodservice association to gather broader industry perspectives on market trends, stakeholder dynamics, policy engagement, and emerging decarbonization efforts. The initial goal was to complete up to 10 association interviews; however, due to limited participation, only one interview was completed.

Additionally, CalMTA interviewed contractors involved in the installation of water heaters in commercial kitchens. The goal was to complete 20 interviews. Warm leads produced a small number of interviews, and outreach efforts via email were unsuccessful in recruiting participants. Therefore, the team worked with a panel-based interview provider to recruit the remaining contractors.

To understand the manufacturer perspective, CalMTA set an initial goal to interview five manufacturers. Relying on warm leads, three interviews were completed with international water

heater manufacturers. Based on the information gathered from the three interviews along with timeline and budgetary considerations, CalMTA decided not to pursue two additional manufacturer interviews that had been planned.

9.2.2 Interviews Not Conducted

CalMTA initially sought to conduct interviews with financing or leasing stakeholders, including commercial lenders, equipment financing companies, and entities supporting kitchen equipment investments. These interviews were intended to provide insights into financing mechanisms, leasing practices, and market dynamics influencing equipment adoption. However, interviews indicated that water heating equipment is not commonly leased, and response rates from financing and leasing stakeholders were limited. As a result, only one interview was completed with a workforce-related organization, which provided insights into technology adoption and operational considerations within the commercial foodservice environment.

CalMTA originally intended to interview five key regulators to understand their experience with existing policies and programs mandating or supporting decarbonization in the foodservice industry in California, with a specific focus on the California Air Resources Board, local Air Quality Management Districts, and the California Conference of Directors of Environmental Health. However, as the initiative progressed, CalMTA discovered that the information it sought from regulator interviews had already been collected through other avenues, such as conferences, previous informal conversations with regulators, policy reviews, and lab studies. As a result, CalMTA did not interview key regulators; rather, the team condensed and reviewed the information gathered from all sources to ensure that there were no gaps.

9.3 Foodservice Operator Survey

CalMTA surveyed foodservice operators in California, including restaurant owners and managers responsible for water heating equipment decisions in their establishments. The survey addressed the following research objectives:

- Understand current water heating practices and replacement behaviors.
- Identify barriers to adopting high-efficiency and electric water heating technologies.
- Assess decision-making processes and key factors influencing equipment selection.
- Understand current sustainability practices and customer preferences for sustainability.
- Evaluate awareness and perceptions of heat pump water heaters.

Between January and mid-February of 2026, CalMTA conducted an online survey of foodservice operators across California, targeting respondents involved in equipment purchasing, maintenance, or operational decision-making for their establishments.

9.3.1 Survey Administration

To recruit respondents, the survey team leveraged Qualtrics' existing business-to-business panel, which includes foodservice operators across California. After the challenges encountered during earlier outreach efforts, panel-based recruitment enabled access to a broader and more diverse pool of qualified respondents. Respondents were invited to participate based on screening criteria to ensure that they were knowledgeable about water heating systems and involved in equipment decision-making. The survey targeted a balanced sample across restaurant types (full-service, quick-service, and cafes), ownership structures (independent and chain/franchise), and geographic regions.

The survey was administered as a web-based instrument and designed to take approximately 20 minutes to complete. CalMTA collected 210 completed responses. Quotas were established to ensure representation across key segments of the California restaurant market. Table 17 provides detailed descriptions of the survey sample.

Table 17. Overview of Survey Sample by Restaurant Type and Ownership Structure

Category	Segment	Sample Size
Type of Establishment	Full-service	70
	Quick-service	70
	Cafe	70
Ownership	Independent	Minimum 70 (more allowed)
	Chain or Franchise	Minimum 70 (more allowed)
Total Surveys		**210**

9.3.2 Screening and Quality Assurance

CalMTA's restaurant survey included a structured screening process to ensure that respondents were relevant to the study population and knowledgeable about water heating equipment in foodservice establishments.

First, respondents were required to confirm that their establishment was located in California. Responses associated with non-California ZIP codes were screened out. Second, respondents were required to identify their restaurant type (cafe, quick-service, or full-service) and confirm that their establishment had a dedicated water heater. Respondents who indicated that their establishment did not have a dedicated water heater or were unsure were not eligible to proceed. Finally, respondents were required to demonstrate involvement in equipment-related decision-making processes, including purchasing, maintenance, or replacement of water heating systems.

During the initial soft launch, CalMTA observed that respondents had difficulty accurately identifying heat pump water heaters (HPWHs). Some respondents indicating uncertainty or misclassification of equipment types. For example, several respondents reported having HPWHs that were 6-10 years old. This result highlighted the need for an additional verification question to confirm HPWH ownership. After refining the survey instrument, CalMTA conducted a second soft launch that included a photo of a HPWH to help respondents identify the equipment more accurately. Many respondents confirmed that the equipment shown in the image resembled their water heater; however, responses to other questions suggest that respondents may have mistaken a standard storage tank water heater for a HPWH.

Based on these early findings, CalMTA implemented several adjustments prior to full survey deployment. These included adding clarifying descriptions of water heater technologies, incorporating follow-up validation questions for respondents who indicated having HPWHs or hybrid HPWHs, and refining screening logic to improve response accuracy. A photo upload option was also introduced for respondents reporting HPWH ownership to support validation; however, no usable photo responses were provided by respondents.

Validation questions varied between the soft launch and the full implementation. Forty-five of 49 respondents explained why they believed their water heater used heat pump technology. Among these 45 respondents, the most commonly cited indicators were seeing or hearing the compressor (43%), involvement in the installation (39%), and information provided by a service professional (31%). A smaller number reported relying on staff referral or equipment labeling (6% each). These responses provided additional confidence in the self-reported identification of heat pump water heating technologies. Of the remaining four respondents, only one changed their answer from hybrid to heat pump.

CalMTA implemented the following quality assurance and quality control measures during survey administration:

- **Soft launch:** Approximately 10% of the target sample was collected during a soft launch phase. Results were reviewed to identify issues with question clarity, respondent understanding, and data quality. Minor revisions were made to the foodservice operator survey instrument prior to full deployment.
- **Attention checks:** Respondents were required to correctly answer embedded quality control questions to ensure attentiveness and engagement.
- **Speeding checks:** Responses completed in less than half of the median survey duration were flagged as low quality and removed from the dataset.
- **Response review:** CalMTA conducted a manual review of responses to identify inconsistencies, straight-lining (selecting the same answer repeatedly), and other indicators of low-quality data. Responses flagged for quality concerns were replaced.

9.3.3 Foodservice Operator Survey Sample Characteristics

The survey sample consisted of 210 foodservice operators across California, including restaurant owners and managers. Respondents represented a mix of establishment types — full-service, quick-service, and cafes — as well as a range of ownership structures, including independent and chain or franchise-operated restaurants. Table 18 describes the survey sample.

Table 18. Distribution of Survey Respondents by Establishment Type and Ownership

Type Of Establishment	Independent Establishment	Chain-Owned Restaurant	Franchise	Total
Cafe	30	28	12	70
Full-service restaurant	57	12	1	70
Quick-service restaurant	18	17	35	70
Grand total	105	57	48	210

9.3.4 Weighting Approach for Restaurant Types

We applied sampling weights for all analyses that combined restaurant types, unless otherwise noted. This weighting was necessary because the survey sample was designed to include equal representation across cafes, full-service restaurants, and quick-service restaurants (70 responses each). Responses were weighted to reflect the statewide proportion of each restaurant type to ensure results reflect the actual composition of the California restaurant market.

According to population data, cafes represent approximately 15% of establishments, while full-service and quick-service restaurants account for 42% and 43%, respectively. Because cafes were overrepresented in the sample (33% in the sample vs. 15% in the population), their responses were weighted using a factor of 0.45. In contrast, full-service and quick-service restaurants were underrepresented relative to their true population shares, and their responses were weighted using factors of 1.26 and 1.29, respectively. These weights were calculated as the ratio of the population share to the sample share for each restaurant type.

To assess sample representativeness across other population variables, CalMTA compared the distribution of survey respondents by geographic region, electric utility service territory, and ESJ-related ZIP codes (Table 19).[63]

Table 19. Comparisons of Survey Responses to Population Distributions

	Survey Responses	Population of California Foodservice Establishments
Geographic Region		
Greater Bay Area	19%	24%
Metropolitan LA and San Diego	65%	56%
Rest of California	16%	20%
ESJ vs. Non-ESJ ZIP Codes		
ESJ	70%	32%
Non-ESJ	30%	68%
Utility Service Territories[a]		
PG&E	10%	39%
SCE	10%	37%
SDG&E	6%	9%
LADWP	47%	10%
SMUD	9%	4%
Other POUs	19%	2%

[a]*Percentages do not add to 100% due to rounding*

We also applied post-stratification weights to self-reported use of water heating technologies to adjust for survey overrepresentation of respondents in ESJ zip codes because this was the single instance where there was a significant difference between ESJ and non-ESJ responses. Analyses of differences between restaurants in ESJ and non-ESJ ZIP codes are based on classifying survey respondents into ZIP codes that CalEnviroScreen version 4.0 identifies as disadvantaged

[63] CalMTA also sought to compare survey responses to population data on building space ownership, but this information was not available in CEUS, and national data in the Commercial Building Energy Consumption Survey (CBECS) used buildings, rather than establishments, as the unit of analysis. With that caveat, it is notable that CBECS suggests a higher level of rental space among restaurants than reported in the CalMTA survey.

communities or not disadvantaged. Restaurants in disadvantaged communities were analyzed as "ESJ," and those not in disadvantaged communities were analyzed as "non-ESJ."

Analyses based on ownership structure – such as independent, chain-owned, and franchise establishments – particularly those related to decision-making roles and organizational practices in Section 4, are presented as unweighted results due to smaller subgroup sample sizes and the exploratory nature of those comparisons.

9.4 Research Instruments

CalMTA FSWH Restaurant Operator Survey.pdf

CALMTA FSWH Interview Guides:

- CalMTA FSWH Restaurant Operator IDI guide.pdf
- CalMTA FSWH Chain Leadership IDI Guide.pdf
- CalMTA FSWH Association IDI guide.pdf
- CalMTA FSWH Contractor IDI Guide.pdf
- CalMTA FSWH Manufacturer IDI Guide.pdf