



15 September 2026

Foodservice Water Heating Systems Update

MTAB Meeting

CalMTA is a program of the
California Public Utilities
Commission and is administered
by Resource Innovations.

Today's goal: what we want to accomplish



1. Share relevant and key findings from our research
2. Share bill impact challenge and what we have looked at to date
3. Work together on what those findings mean for the direction of the initiative

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Discussion Questions



1. Given the evidence to date, how should CalMTA proceed?
 - *Should we pause and monitor the market?*
 - *Should we maintain a light-touch role focused on removing key barriers?*
 - *Should we pursue targeted opportunities where conditions are more favorable?*
 - *Or should we consider another path?*
2. What market conditions or evidence should determine when CalMTA changes course?

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Where we started: Vision



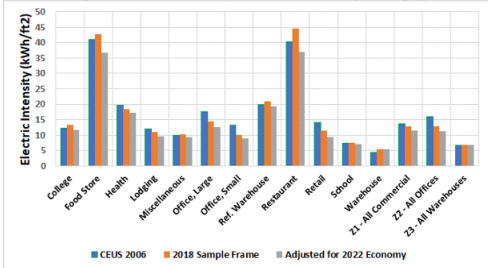
“ By 2045 efficient electric water heating systems capable of **minimizing peak demand** are the water heating system of choice in both **new construction and existing foodservice facilities**. Positive experiences with hot water electrification also leads to increasing the sector’s acceptance of full kitchen electrification.”

- Foodservice Water Heating Systems Advancement Plan,
December 2024

Restaurant EUI is high

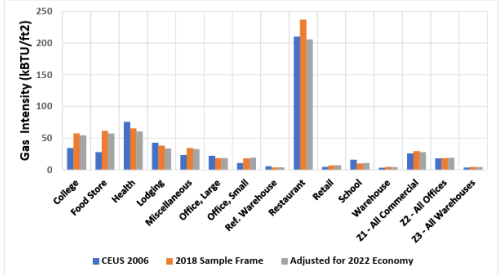


Figure 27: Cross-CEUS Comparison of Electric EI by Building-type



Source: 2022 CEUS and 2006 CEUS

Figure 28: Cross-CEUS Comparison of Gas EI by Building-type



Where we started: Product definition



HPWHs: Electric HPWHs designed for commercial applications, with features to minimize electrical demand during system peak hours, which are typically high-use periods in commercial kitchens.

Combined heat pump systems: Systems that improve overall HVAC and water heating efficiency by providing simultaneous space cooling and water heating.

Hot water distribution system: Optimized pipe sizing and layout methods to minimize heat loss during distribution. This could include integration of decentralized (point of use) water heaters and eliminating/reducing reliance on recirculation pumps.

End-use equipment: Water-using equipment that reduces overall hot water demand, potentially including low-temperature or ventless dish machines.

What we studied



Product assessment

- Lab testing and model validation
- Site surveys
- Field study with New Buildings Institute (NBI)
- Energy modeling
- Bill impact analysis
- Codes and standards review

Market characterization

- Foodservice operator survey
- Interviews with contractors, foodservice operators, foodservice associations and manufacturers
- Policy and regulatory landscape review

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This is a diverse market



Distribution of Foodservice Establishments in California by Type and Ownership

Ownership Type	Full Service	Quick Service	Café	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%)

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

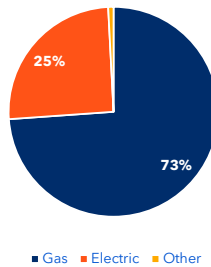
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Gas is the dominant restaurant water heating fuel source



Water Heating Fuel Source - 2022 CEUS
(n=2,899)¹



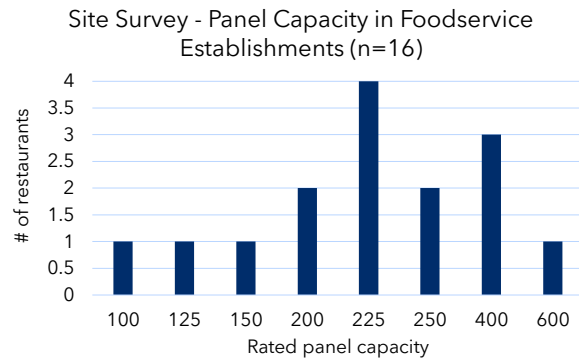
¹ Data collected 2018 - 2022, with most on-site data collection in 2019; majority of study data collected remotely or via survey.

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Gas-to-electric conversions bring additional infrastructure barriers



- Electrical capacity may remain a key infrastructure barrier
- Some space constraints exist for required ventilation, but less prevalent
- Recirculation pumps existed in 30-40% of the sites



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Source: CalMTA site survey

CCDEH barriers are real and addressable barrier



- The California Conference of Directors of Environmental Health (CCDEH) publishes Guidelines for Sizing Water Heaters in commercial foodservice facilities.
 - While the Guidelines are not mandatory statewide in California, they are adopted by many jurisdictions as part of their mandatory health and safety code.
- The CCDEH Guidelines use a simplified calculation that works well for gas or electric resistance
 - This calculation uses a fixed efficiency assumption for any electric water heater (heat pump or electric resistance) which leads to oversizing
 - Proposed updates have been made for the Guidelines which could be adopted as early as Fall 2026 which will address some of the issues.

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Heat pump water heaters carry a significant upfront cost



Unit Size	HPWH	Natural Gas Storage
50 gallons	~\$5,000	~ \$3,500
75 gallons	~\$7,000	~\$4,000
100 gallons (commercial grade @ 150 kBTU/hr)	~\$37,000	~\$17,000

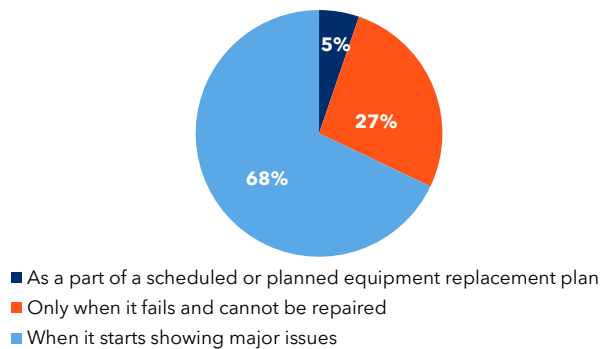
Note: Cost comparison does not include oversizing requirement to provide first hour rating

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/> and Large Heat Pump Water Heater, Commercial and Multifamily, Fuel Substitution, Accessed June 27, 2026. <https://www.caetrm.com/login/?next=/measure/SWWH028/08/>.

Water heater decisions happen under pressure



Restaurant Operator Survey -
Triggers for Water Heater Replacement Decisions
(n=210)



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Federal standards create an MTI limitation mainly within the electric consumer market



Beginning in 2029, DOE efficiency requirements will move many **consumer electric resistance storage** water heaters above 20 gallon to HPWHs

Consumer water heater	Residential-duty commercial	Commercial
Clear 2029 federal standards will change the market	2029 Rule has no effect	2029 Rule has no effect
Electric Storage or Instantaneous $\leq 12\text{kW}$	- Electric Instantaneous $> 12\text{kW}$ to $\leq 56.6\text{ kW}$, storage $\leq 2\text{ gal}$ - No electric storage category	- Commercial HPWHs are generally $>24\text{A}$ or $>250\text{V}$ - No min UEF change - Electric storage is regulated on standby loss only - no UEF-like minimum efficiency
Very small near-term HPWH opportunity and impact on BMA	No current federal efficiency push	Future opportunity to drive standards

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New federal standards, effective May 6, 2029, will require consumer grade electric storage water heaters to meet a UEF at 2.3 (for 20 gallons – 55 gallons) and 2.5 (for 55 gallons – 120 gallons). These efficiency levels are only achievable with HPWHs. Gas water heaters will also need to meet higher efficiency targets but required efficiency improvements are minimal. DOE also introduced a definition for effective storage volume to prevent circumvention of these standards.

Future landscape of foodservice will change - Solar and battery requirements



2025 CA Title 24 Prescriptive solar and battery requirements

- Increased prescriptive requirements for Restaurants compared to 2022 CA Title 24

Impacts the future energy consumption profiles and would change bill impact story - based on today's commercial rates



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Geography matters



Distribution of Foodservice Establishments in California by Region

Region	Residents	Full-service	Quick-Service	Café	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	8,705	7,962	2,879	19,902 (25%)
Total	39.5 million	34,651	34,075	12,600	81,326 (100%)

Sources: U.S. Census Bureau. 2022. County Business Patterns (CBP) Survey for restaurant populations; U.S. Census Bureau. 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>).

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Air quality regulations moving slower than expected



- **Statewide (CARB):** Draft rules would phase in zero-emission water heater sales starting in 2030. Not yet finalized.
- **Bay Area AQMD (Rule 9-6):** Adopted zero-NOx requirements – 2027 for small units (under 75,000 Btu/hr) and 2031 for units from 75,000 Btu/hr to 2 million Btu/hr. A delay for the small units to 2028, plus added exemptions and flexibility, is under consideration.
- **South Coast AQMD (Rule 1146.2):** Requires zero-NOx in new buildings from Jan 1, 2026 for units up to 400,000 Btu/hr, excluding smaller units. Existing buildings follow on Jan 1, 2029.

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Higher efficiency does not always translate into lower bills



- Heat pump water heaters can be ~4 times more efficient
- In the California commercial electricity can cost substantially more than gas (5-8 times more)
- Replacing electric resistance with HPWHs in foodservice lowers bills
- Replacing gas with HPWHs produces mixed bill impacts that vary by utility and location

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Bill impact vary substantially by utility and restaurant type

≈75% of California restaurants are in electric IOU territories

Weighted average annual bill impact across IOU territory



Negative = savings | Positive = increase

Bill impacts are calculated based on the simulated energy models of various baseline gas water heaters being replaced with integrated and split-system HPWHs.

Commercial utility rates for the three electric IOUs are overlaid onto the energy models to determine the range of possible utility bill impacts. Each IOU has multiple rate structures that are applicable to quick-service and full-service restaurants, and each IOU has territory in associated California climate zones. These are further weighted by the number of quick-service and full-service restaurants in each climate zone within each IOU, as well as based on the published distribution of commercial customers across commercial IOU rate structures.

The summarized results provide an annual weighted bill impact for each restaurant type within each IOU territory. Weighted values include occurrences of both positive and negative bill impacts at the facility level. Percentages of favorable scenarios reflect an estimate of the number of facilities that show favorable bill impacts, again based on the modeled scenarios. Actual utility bills and results will vary. These results are provided for directional discussion and to support understanding of the impact of various rate structures.

Rates lead to bill impact diversity



Compare small commercial, simple rate structures as example

Utility	Fuel	Rate Name	Summer Average (\$/kWh)	Winter Average (\$/kWh)	Annual Average (\$/kWh)	Lowest Price (\$/kWh)	Highest Price (\$/kWh)	Relative Spark Ratio
PG&E	Electricity	B1	\$0.41	\$0.37	\$0.39	\$0.36	\$0.47	7.45
SCE	Electricity	TOU-GS-1-E	\$0.31	\$0.27	\$0.29	\$0.19	\$0.65	3.95
SDG&E	Electricity	TOUA-P_S	\$0.41	\$0.38	\$0.39	\$0.32	\$0.58	7.88
Utility	Fuel	Rate Name	Summer (\$/therm)	Winter (\$/therm)	Annual (\$/therm)	Notes		
PG&E	Gas	G-NR1	\$1.75	\$1.98	\$1.85	Tier 1 up to 4,000 therms/month		
SoCal Gas	Gas	G-10/GN-10	N/A	N/A	\$2.15	First 250 therms/month		
SDG&E	Gas	GN-3	N/A	N/A	\$1.45	Tier 1 up to 1,000 therms/month		

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This table summarizes a comparison of similar commercial rates across the three electric IOUs to reflect the diversity that leads to differences in weighted bill impacts. This table compares three similar small commercial rates from PG&E, SCE and SDG&E. All rates exclude demand charges to simplify the comparison and discussion, but it is important to understand that many commercial rates also include demand charges that add complexity. All TOU rates are not displayed in their entirety in this summary table but have been included to calculate time-based averages for summer, winter, and annual values. This information compare the rates only, and does not overlay a facility consumption profile. The relative spark ratio compares each electric rate with its corresponding gas.

Can load shifting mitigate bill impact?



- Bill impacts are not only due to electricity consumption during peak periods
- Hot water systems can provide some amount of load shifting; however, leveraging load shifting to mitigate bill impacts will have limited value

Utility	Percent of Bill Impact in Peak Period
PG&E	38%
SCE	61%
SDG&E	8%

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A hypothesized bill impact mitigation strategy during the Advancement Plan phase was load shifting. Lab testing results demonstrated that some degree of load shifting is achievable with quick service and full service hot water draws volumes with HPWH equipment. The impact that load shifting has on annual bill impacts though is limited.

A time-based analysis was performed on the modeled scenarios and utility rates discussed previously. The purpose was to uncover how much of the modeled overall bill impact was coming from electricity consumed during the primary peak period of 4pm- 9pm, which reflects the peak pricing window for CA electric IOUs.

The table summarizes our findings. This represents the portion of the overall annual bill impact that is due to an increase in electricity consumption during the peak pricing window with the modeled scenarios where gas equipment is replaced with HPWHs.

Incremental impact estimated to be smaller than initial forecast



Item	FSWH Advancement Plan	Post - Research Estimates
Incremental Measure Cost	\$3,288	IMCs range from the value assumed in the advancement plan (for 50-gallon gas to 50-gallon HPWHs) to \$6,000 for replacement of 100-gallon gas tanks and more than double that for replacement of 75-gallon gas tanks with upsized HPWHs.
Bill Impacts	Not explicitly considered	Bill increases in most cases; range from \$1,000 to \$5,000/year
Incremental MTI Lifetime Units	30,400	Likely substantially lower due to customer economics. If air quality regulations are implemented and enforced, associated market adoption would be counted as BMA.
TSB	\$216M • \$7M Energy • \$79M) Grid • \$288M GHG	Phase II modeling not completed due to above findings, but it's reasonable to assume much lower incremental adoption and TSB.
TRC	2.04	TRC will be lower due to higher IMCs and lower incremental adoption resulting from higher first costs and energy operating costs.

NOTE: CalMTA put forecasting on hold based on product and market research findings; this slide is a qualitative analysis of likely impacts. Would require additional MTI investment to develop reliable, updated TSB and cost-effectiveness estimates
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