



FACT SHEET

Foodservice Water Heating Systems



Restaurants are highly energy-intensive, using five to seven times more energy than other commercial buildings, with water heating alone accounting for up to 20% of that demand.^{1,2} In California, the foodservice industry predominantly relies on gas for heating water, with 75% of establishments using it as their primary fuel source.³ This results in a staggering 340 million therms of gas consumption annually, emitting 4.8 million tons of carbon dioxide.⁴

CalMTA is pursuing a potential market transformation initiative (MTI) that seeks to transform the market for more efficient, greenhouse gas (GHG) emission reducing water heating technologies in the foodservice industry.

The opportunity

California's statewide decarbonization goals and regulatory focus, such as the zero-emission space and water heater standards being considered by the California Air Resources Board (CARB), are expected to drive higher requirements for electrification and efficiency in the coming years. The foodservice sector's significant energy use presents both a need

¹US Energy Use Intensity by Property Type. Energy Star Portfolio Manager: Technical Reference. August 2023. <https://portfoliomanager.energystar.gov/pdf/reference/US%20National%20Median%20Table.pdf>.

²Delagah, A. and Fisher, D. Energy Efficiency Potential of Gas-Fired Commercial Water Heating Equipment in Foodservice Facilities. Report prepared by Fisher Nickel Inc. for the CEC, CEC-500-2013-050. 2013.

³Energy Information Administration. Commercial buildings energy consumption survey (CBECS). 2018.

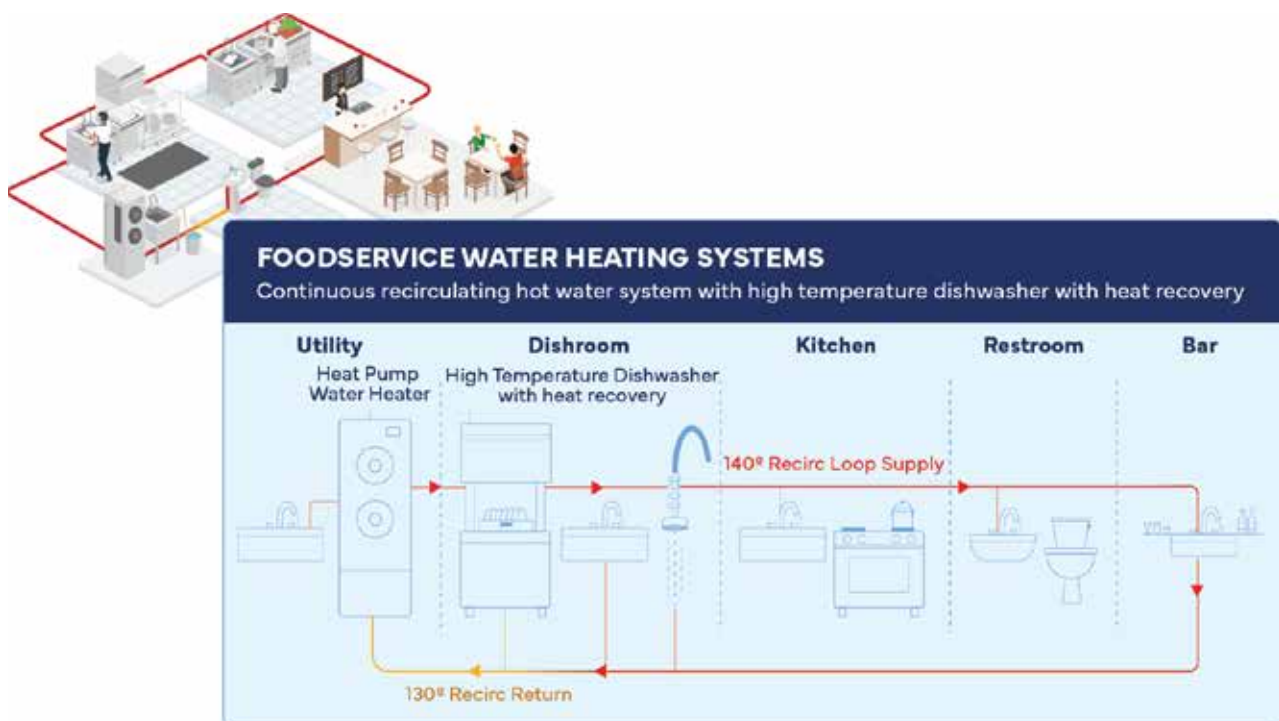
⁴Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities: Final Report. ET22SWE0019. CalNEXT. April 23, 2023. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf.

and an opportunity to establish a cohesive pathway for accelerating market transformation in foodservice efficiency and decarbonization.

The CalMTA team believes that foodservice water heating systems are a strategic entry point into this market shift for two key reasons. First, unlike cooking equipment, water heating systems do not evoke a strong emotional attachment among chefs and decision makers. As long as these systems function well and meet practical kitchen demands and regulations, they are not a focal point and will face less resistance in a market shift. Secondly, there is a high potential for reduced GHG emissions. Pacific Gas and Electric's (PG&E) Foodservice Technology Center (FSTC) has estimated that water heating in foodservice establishments represents 16% of commercial gas usage in California.⁵

The technology

Different types of restaurants have unique hot water usage patterns influenced by their menus, dishwashing needs, and space availability, all of which impact the choice of system components. This MTI would focus on four technologies. First, electric heat pump water heaters (HPWHs) designed for commercial applications; second, combined heat pump systems that provide space conditioning along with water heating; third, hot water distribution systems that optimize pipe sizing for minimal heat loss during distribution; and fourth, end-use equipment that reduces overall hot water demand, such as low-temperature or ventless dish machines.



⁵ Delagah, A. and Fisher, D. (2013) Energy Efficiency Potential of Gas-Fired Commercial Water Heating Equipment in Foodservice Facilities. Report prepared by FNI for the CEC, CEC-500-2013-050.

MT strategy

By targeting the foodservice industry's water heating systems, this initiative can make meaningful strides toward achieving California's decarbonization goals. Focusing on water heating now will not only contribute to significant energy savings but also set a precedent for further advancements in other areas of the foodservice industry and pave the way for long-term strategic engagement towards full kitchen decarbonization.

Identified market barriers

- High first cost of efficient electric water heating systems include equipment purchase and installation expenses, as well as potential costs associated with electric panel upgrades
- Outdated California Conference of Directors of Environmental Health (CCDEH) sizing guidelines that do not reflect present-day efficiencies, leading to requirements two to four times oversized⁶
- Product maturity/system complexity that requires a holistic approach to system design to avoid oversizing or misalignments
- Low customer value proposition and awareness for low-margin foodservice businesses

Market interventions and leverage opportunities

- Engage with leading manufacturers, supply chains, and key active market partners to ensure affordable, tailored product availability for adoption of a system-level approach
- Partner on installer training through collaborations with manufacturers, supply chain partners, and local workforce development organizations
- Work with industry leaders to update the CCDEH sizing guidelines and leverage work that the Food Service Technology Center, CalNEXT, and others building the case for water heating sizing adjustment
- Align initiative work with California codes and regulations, including the State's zero-emission appliance regulations and those adopted by the Bay Area Air Quality Management District and under consideration by the California Air Resources Board⁷
- As needed, support efforts underway in California's codes and standards, including Title 20 and Title 24

The research planned for the next phase will play a critical role in further shaping our strategy by deepening our understanding of the variations in foodservice technology and identifying

⁶Market Potential for Heat Pump Assisted Hot Water Systems in Foodservice Facilities. CalNEXT. April 23, 2023. https://calnext.com/wp-content/uploads/2023/07/ET22SWE0019_Final_Report.pdf.

⁷Zero-emission Space and Water Heaters - Frequently Asked Questions (FAQs). CARB. May 30, 2023. <https://ww2.arb.ca.gov/our-work/programs/building-decarbonization/zero-emission-space-and-water-heater-standards/faq>.



common barriers across all sub-sectors of the market. By uncovering these shared challenges, we can target intervention strategies that maximize market impact and ensure the adoption of the most efficient and cost-effective solutions across the foodservice industry.

Applying an equity lens

CalMTA will seek specific strategies focused on environmental and social justice (ESJ) communities, including identifying means for reducing upfront costs, partnering with electric panel upgrade programs, and collaborations with manufacturers, vocational schools, and community colleges to influence workforce development initiatives that could empower ESJ communities to engage in high-quality jobs in this market.



About CalMTA

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations. We are creating a market transformation (MT) portfolio for California that will deliver cost-effective energy efficiency and decarbonization. Market transformation is the strategic process of intervening in a market to create lasting change by removing market barriers or exploiting opportunities, accelerating the adoption of identified technologies or practices.



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