



Advancement Plan Feedback Response

Foodservice Water Heating Systems

This document provides a comprehensive list of comments received from both the public and the Market Transformation Advisory Board (MTAB) on the draft Foodservice Water Heating Systems Market Transformation Initiative (MTI) Advancement Plan and CalMTA's response to those comments. The draft Advancement Plan was posted to the CPUC's PDA website for comment from July 8 - July 31, 2024. [Updated Advancement Plans will be posted on the CalMTA website.](#)

Source	Feedback Provided	CalMTA Response
MTAB (Fred Gordon, Evaluation Professional)	The argument is too broad, as restaurants represent many different markets with varied technology needs, ownership structures, and perspectives. These markets face challenges such as split incentives, limited interest in water heat, limited management time, marginal finances, and a short-term focus. The plan seems to aim at researching various distinct markets to find something that works, lacking a compelling market transformation idea.	Thank you for the feedback, we understand the concern about the broadness given the challenges you noted. We believe there is an opportunity to better understand the market segments you pointed out, the ongoing foodservice research and market maturity and readiness in California in Phase I, and then tailor our specific strategies to align and target the beachhead market.
	The targeting information is inconsistent. Initially, the focus is on small customers and café chains, which may not have long-term vision or significant water heating needs. While starting with chains is a good idea, choosing those with minimal food prep and water heating needs seems ineffective. Has MTAB seen interest from major chains? Even if so, simple installations of residential-style HWHPs won't save much energy or create a foundation for reaching markets needing more sophisticated solutions.	We believe that foodservice facilities with lower demand/ simpler water heating systems may be more feasible to transition to HPWHs and could serve as an entry point into the larger market that will require the more sophisticated solutions you mentioned. We also hypothesize that engaging with chains in their newly constructed establishment, can be an easier point of entry. In Phase II we will explore engaging with restaurant chains via water heater manufacturers to better understand their decision-making process. We updated the initial target market language to better capture this point.

	<p>Reforming water system sizing requirements is a good start, but many barriers remain. The most compelling opportunity is CARB air quality standards, which might mandate heat pump systems for new and replacement installations regardless of MTA's efforts. The document fails to make a compelling case that these standards need MTA's help. Early replacement of functional water heaters seems unlikely unless programs cover most costs, as busy and cash-strapped restaurant managers won't replace working systems.</p>	<p>From our current understanding CARB cannot mandate a technology, it can mandate zero emissions. While CARB is signaling its intent to implement NOx restrictions, their success in doing so depends heavily on market readiness. If the market is not prepared, CARB may face significant challenges in enforcing these new standards. CalMTA can play a significant role in readying the market for change. We updated Section 4.4 to make this point more compelling.</p>
	<p>Page 8. The strategy discusses using point of use instantaneous water heating to reduce distribution losses, while also discussing the potential for reducing peak load.</p>	<p>Agreed. These two can still co-exist. In a large distributed system, there may be opportunity for instantaneous water heaters for some end loads to reduce distribution loss, while still relying on a hot water tank for most of the hot water demand.</p>
	<p>Page 9. One of the arguments for addressing water heating systems in restaurants is that owners don't think much about them. Not a very strong argument for capital upgrades.</p>	<p>The opportunity described reflects preliminary thinking that owners are not attached to their water heaters and as long as they provide the water heating demand, they are agnostic of the technology. We expect that they may be more open to replacing it. That thinking will be explored during our research.</p>
	<p>Page 10. Doesn't explain why or how cafes are a strong leverage point. If there's no demand and no contractor interest, this becomes a daunting market to break in to. It seems that the best shot might be to target quick serve or sit-down chains where there is more capital invested but also more engineering and standardization. I'm not sure how that lines up with the café market where water heat needs may be a lesser part of business.</p>	<p>Thank you for the feedback, we added language in Section 4.2 that explains our preliminary reasoning for choosing cafes. We believe that a chain like Starbucks, where water heating load is low, but decisions for purchasing is still made at a centralized corporate level, would be a good entry point because we can learn how those corporate-level decisions are made and can be influenced.</p>
	<p>Page 12. Allows that Cal MTA doesn't know what benefits exist. Reads like a fishing expedition.</p>	<p>Based on previous research from CalNEXT and other programs, CalMTA is sure that benefits exist but believes there is a gap in knowledge/research related</p>

		to non-energy benefits of HPWH systems in foodservice facilities, which this research seeks to fill.
	Page 14- leverage points. I think the restaurant industry may subdivide into two groups with vastly different circumstances, with few in the middle: Heavily capitalized chains, franchises and large restaurants and the financially marginal everyone else. For everyone else, their available capital may be fully committed, or they business may be too risky for lending. Where does the idea of green financing or leasing fit in? It seems like something MTA fits in every plan without a case that it's on the critical path to success. The standard equipment leasing market may be interesting- there are HVAC and water heating leasing firms; I don't know how much business they do with restaurants.	Some of our early conversations found that green financing can be beneficial to independent business owners, but there is a need to understand this better in the next phase. We also think the leasing model may be an option for those restaurant owners who are leasing their space and cannot take the financial risk. Currently water heaters are not leased, but dishwashers are sometimes leased. In the next research phase we seek to understand these options better and how they might work for different owner/decisionmaker structure.
	Page 14. While heat pump water heaters will require new contractor training, it's unlikely to create many additional jobs. Air quality standards probably won't mandate early replacement of functioning water heaters, so contractors will just shift from installing gas to electric heaters. Complex replacements won't appeal to busy restaurant owners. Training minority contractors might help them gain a competitive edge in the established market. Large chains, with the capability for engineering analysis and minority franchisee groups, could be an early ESJ target market.	Agreed. There is an opportunity for further training to get contractors engaged with more complex heat pump installations and potentially benefit from higher pay.
	P 18. Before the progress indicator on share of contractors, etc., I suggest another one: "a small number of innovative mass market-focused contractors have proven profitable success with a business model for installing restaurant HPWHs." This would be in the first few years for 1:1 replacements and later for systems. This would provide the impetus for others to be trained.	Thank you for the feedback and we agree. We will update Table 1 to include a metric to capture the short-term progress as suggested.
	P. 18. I like that cost parity is one long term market progress indicator. Given the relative complexity of the heat pump systems compared to a gas tank and a blowtorch, is this a realistic goal?	This is a long-term Market Progress Indicator (MPI) that would be measured through regular evaluations. We have not organized these in "time frame" yet, but the logic model developed in the next phase will to do that.

	Getting very busy restaurant managers to pay attention to real time pricing or demand rates seems like a stretch.	
	Page 20. Given the barriers and considering the initial plans in this advancement plan, a goal of establishing parity in installations among ESJ markets seems very distant.	Agreed. This is a long-term outcome/indicator.
	Page 21: "We want to understand how these dynamics differ for independent foodservice establishments operating in low-income and disadvantaged communities (ESJ communities) compared to national chains operating in similar communities, and independent chains operating in non-ESJ communities." What about national chains operating in ESJ communities? See comments above.	We intended to include national chains operating in ESJ communities and will update the sentence you referenced in Section 5 to explicitly highlight the comparison.
	<p>Page 25. The research plan illustrates the need to learn practically everything about the technology and the market. Given the vastness of what we don't know, I wonder if there is a narrower critical path for this research plan, whereby MTA picks a submarket or two, engages in a limited number of activities tries to come up with a compelling case? This is in the interest of working in a high-risk area while committing funds only to the activities needed to assess whether there is any promise:</p> <ul style="list-style-type: none"> - Pick one or two most promising markets - Start by researching the technical barriers and characterization of water use specifically for that market. - If the barriers don't look insurmountable, identify if there is a compelling point of leverage. Can MTA get these owners to turn their approach upside down for equipment they are accustomed to not paying much attention to? - If things look good at that point, proceed with the other information gathering for the priority markets, and perhaps then start the process for the rest. 	Thank you for the feedback. We recognize the need to conduct a thorough assessment of the technology and market to understand the barriers and identify the best opportunities. Then dive deep on specific solutions and interventions in the key markets we identify.
	Page 29. Characterization of the size of the market should focus on submarkets, as described above. General findings may not be useful.	Thank you for the recommendation. We do plan to further segment the market as part of market characterization during Phase II research.

	<p>Page 35-6. I think the risk section needs to consider an additional risk. In their efforts to decarbonize, restaurant owners may prioritize other opportunities over water heating (e.g., HVAC, kitchen ventilation). Owners remain relatively indifferent to water heating, an opportunity where there is no economic driver.</p>	<p>Thank you for this recommendation. Section 8 of the Advancement Plan will be updated to include this risk.</p>
	<p>The forecasting appendix, for me, illustrated the issues described above. The forecast illustrates what MTA might achieve with a doubling or so of penetration of HPWHs in all markets, on average. But how could they do that?</p>	<p>The Stage 2 forecasting analysis in the Appendix of the Advancement Plan should be considered preliminary. In Phase II, the team will refine methods, assumptions, and data sources as suggested by the reviewer</p>
SoCalGas (Carlo Gavina)	<p>Given the long-term nature of expected market adoption (estimated by 2045) as well as the diverse nature of the food service business and the high initial cost for customers research should also focus on identifying near-term solutions for the customer's existing systems. To achieve this the proposed system-level perspective should identify upgrades to system components that can be immediately adopted to enhance energy efficiency and reduce carbon emissions of existing natural gas systems in the near term.</p>	<p>Thank you for this feedback. This proposed initiative does also intend to identify potential near-term solutions for foodservice water heating systems and we will add language to reflect this.</p>
	<p>The California State Water Resources Control Board has recently approved new regulations that impose water restrictions and conservation requirements on the state's largest water utilities. This regulation will compel over 400 California water agencies to actively pursue water conservation and efficiency opportunities. As part of the planned MTA Plan research activities should identify potential water conservation and efficiency opportunities.</p>	<p>Thank you for this recommendation. While the assessment of water conservation opportunities on its own is currently outside of the direct scope of work for CalMTA, we do expect that this proposed MTI will have water efficiency benefits.</p>
	<p>The Program Logic Model diagram should explain that the potential Market Transformation Initiative should leverage all applicable existing programs including EE Statewide programs such as the Statewide Food Service and Statewide Codes & Standards programs.</p>	<p>Thank you for this feedback. The current intervention "leverage existing programs" intends to capture this however we will update the logic model graphics to include the programs you listed.</p>
	<p>The Plan should investigate the feasibility and market acceptance of using natural gas water heating as a backup to address electric peak demand periods and system resiliency issues (e.g. dispatchable events).</p>	<p>Thank you for your feedback. In our technology assessment scope (Section 6 of the Advancement Plan) we have identified investigating hybrid systems (e.g. heat pump assist) as a potential practical bridge to all-</p>

		electric system design. Those systems can address concerns such as electric peak demand and system resiliency issues.
TRC Companies	<p>General comment: The ideas and proposed strategies developed in this draft document require more detail and information to be able to completely understand what the CalMTA approach is in this market transformation advancement plan. This is particularly important because there has been considerable research effort already completed by multiple groups focused on a variety of the topics included in this draft document and the value of this proposal and the CalMTA effort is to be leveraging all the previous and ongoing research activities to maximize the positive impact of the prior work and advancing the MT through precision, focused attention to knowledge that may be missing or insufficient, infrastructure that is required to hasten the adoption, and the supporting programs and financing structures that can be deployed to effect the HPWH changeover. This comment applies throughout the document, but is being mentioned once as an overall comment.</p>	CalMTA is committed to coordinating and aligning with existing programs and has an intentional focus to not duplicate efforts, but rather fill gaps that will accelerate market adoption of the technologies.
	<p>General comment: The strategies for MT in this space may require two different approaches that depend on the nature of the customer. Large foodservice chains that have a number of resources that they are able to bring to the process (national design standards, national purchasing agreements, design and engineering expertise, the resources to support this effort), can produce a very different set of measures/strategies and goals because of the scale of opportunities that are opened up by chain participation. This continues past individual California stores and could impact national design standards within the company and could also be a solid method to advance conversions beyond the electric WH target market. Individual foodservice stores, on the other hand, have a far more limited scope of expertise, resources, and knowledge and will require a host of additional support to accomplish conversions of any</p>	Thank you for the comment. The strategies and interventions will need to be tailored to the customer segment and therefore may vary between large restaurant chains and individual stores. CalMTA will be refining its assumptions and strategies during the next research phase of this MT idea.

	<p>type. This is especially true for systems that require ""sizing"" (professional design end engineering expertise) as this is commonly cited as a major barrier to cost effectiveness of measures</p>	
	<p>General comment: There are a number of details in the Appendix that seem surprising or inconsistent with other data sources that have been used in the past for this subject. Rather than commenting on specific details at this stage of the report, the reviewer suggests that all background data, methodologies, and assumptions that build the case for the MT efforts be carefully vetted to ensure a high level of supporting background research and data.</p>	<p>The Stage 2 analysis (Appendix of the Advancement Plan) should be considered preliminary. In Phase II, the team will refine methods, assumptions, and data sources as suggested by the reviewer</p>
	<p>Barriers: The barriers list may be missing several that may impact how the CalMTA strategies are developed or prioritized. Following is a brief list of these possible barriers that warrant consideration or attention:</p> <ul style="list-style-type: none"> Unfamiliarity with the technology (building and restaurant owners, kitchen designers, municipal agencies) utilized and how it heats water especially with indoor ventilation requirements Possible operating cost increases (not just energy). Additional space required for equipment. Electrical capacity limitations or costs to upgrade, (possibly even if the existing system is electric-based). 	<p>We have updated the Executive summary, Section 4.3 Key Market barriers and the Logic Model to include some of the additional barriers you listed. Please note that cost to upgrade electrical panel is nested under "Upfront Cost."</p>
	<p>Strategies: Working with industry on water heating sizing guidelines. This is a strategy that is being worked on by other groups, so please ensure that the CalMTA effort is non duplicative. In addition, since other parties are focused on this, ensure that any added attention from CalMTA is going to have a beneficial impact on the guideline technical details or the speed of the guideline changes. This is an important current barrier for HPWH, so if there is an opportunity for focused work to amplify and accelerate the current activities, it should be included in the strategies.</p>	<p>CalMTA acknowledges that there is work already happening on the water heating sizing guidelines and the potential risk of causing market confusion. Existing program coordination and alignment is a priority for this proposed initiative so that impact is amplified but work is not duplicated. Specific needs will be determined with input from industry experts during Phase II and detailed in the MTI Plan prior to approval and implementation. We will add language in the Executive Summary to emphasize this.</p>

	<p>Strategies: Engaging with leading manufacturers to develop affordable HP products and partner with national chains. This strategy appears to be an excellent approach to begin the transition to HP technology with new products tailored for foodservice applications, and can make a key contribution to market transformation by involving the national chains with both retrofit approaches and to develop new design standards for California properties.</p>	<p>Thank you for acknowledging the impact of this strategy. We look forward to further coordinating this work with you</p>
	<p>Strategies: Demonstrating non-energy benefits. This strategy also seems to be an excellent way to develop more compelling cases for food service HP water heating.</p>	<p>Thank you for acknowledging the impact of this strategy. We look forward to further coordinating this work with you.</p>
	<p>Strategies: Leveraging existing research. This strategy is fundamental to the technology adoption cycle and must be done as part of any tech-to-market activities. There has been a considerable amount of research into HPWH for food service facilities already so ensure that CalMTA has a complete understanding of the background research and resources before undertaking any additional research. Most importantly, CalMTA has the opportunity to identify gaps in the research coverage and focus additional resources to close those to hasten the market adoption process. Please ensure that the project plan is used to effectively develop a robust review and gap analysis in the context of market transformation as much of the prior research and analysis may not have focused on this context as much as the technology questions.</p>	<p>CalMTA will be conducting a thorough secondary research and gap analysis during the next phase of work. We will coordinate on any further research with key market actors in this area such a food service technology center, CalNEXT, etc.</p>
	<p>Strategies: Exploring financing options. The strategy to bundle solutions appears to be a good approach for program design because the HPWH systems are complex enough that a program may not be able to implement a HPWH measure in a single line without missing the complexity of the variety of how water needs in restaurants depending on the types of service offered and the range of size and hot water demands that restaurants may require. Bundling</p>	<p>Thank you for confirming this potential strategy. As noted in the Advancement Plan, we recognize that the complexity of water heating systems will make it challenging to resolve with a single measure and that bundling solutions may be a strategy to address this. We look forward to refining this approach further.</p>

	<p>allows more than a single line item of measure incentive so these variables can be accommodated in the program more directly.</p>	
	<p>20-year lifecycle of the MT initiative. Twenty years may be too long of a market transformation adoption cycle. There are CARB and other AQD standards on the horizon that are going to impact this process and the transition to HPWH needs to be fully technically feasible and market-ready to support both the decarbonization goals and to ensure the air quality initiatives can move forward on the timescales that have been proposed by the various agencies.</p>	<p>The market adoption forecast is part of our Phase II activities and will be further refined.</p>
	<p>Page 8: Diversity in foodservice industry. The possible solution to this complexity is develop typology documentation for the key type categories that research has identified. Identify the types, develop most effective/efficient solutions with expert design teams, and create design best practice guidance to facilitate the most efficient program implementation of the solutions for the market. This would start before the market is adopting because it is needed for the design of programs measures before the activities are in the hands of contractors, and would also benefit pilot programs and final tech-to-market research.</p>	<p>Thank you for the idea. This suggestion may be appropriate to create and expand awareness of the technology and system-level design benefits. We will consider to further develop this concept during Phase II of the MT idea development.</p>
	<p>Page 8: Focus on existing electric WH and not including stoves. The goal of this work is to eliminate one source of carbon consumption but the belief that there are larger and more difficult barriers to replacing the NG stoves in kitchens should not be a reason to not include these goals and efforts in the work that is being done in foodservice facilities. This is an identification of a measure that has a larger list of MT potential and research opportunities. While this expands the focus beyond just HPWH in the kitchens, this appears to be a very good synergistic system that should continue to get attention and support to advance.</p>	<p>Thank you for the recommendation. While we understand your rationale, CalMTA was advised by MTAB to start with the focused scope of water heating for the foodservice sector. CalMTA believes this will help the transition full-scale decarbonization.</p>
	<p>Page 9: Set precedents for further advancement in other areas of foodservice industry. How will this be done? The best possible way to</p>	<p>CalMTA expects these learnings to appear during the next phase of work and will be tracking/monitoring additional opportunities. However for the purposes on</p>

	<p>set precedence for other aspects of the foodservice industry may be to push those advancements along with the HPWH initiative.</p>	<p>this MT idea, the primary focus will remain on water heating systems.</p>
	<p>Page 10: Initial target market. What does CalMTA intend to do in these target markets? Is the intent to just develop a program focused on electric WH for conversion? While this is likely the easiest section of the market, it is possibly the first opportunity to get programs into the kitchens and greater will come benefit from developing a strategy that accomplishes the initial goal and also looks to further advantage while the retrofitting is occurring, like stoves, for example.</p>	<p>This hypothesis needs further exploration during the next phase, but what we intend to work with café and quick service chains to explore this shift. The current scope of the program does not include stoves or kitchen equipment beyond water heating system.</p>
	<p>Page 11: Existing water heating guidelines. There has been field research on HPs in commercial kitchen applications by EPRI, and also a CalNEXT funded update to the Commercial kitchen DHW system technical design guide which may be useful to review and reference in this report.</p>	<p>Thank you for flagging these resources, CalMTA will review the EPRI research and will add a reference to the Technical Design Guide in Section 5 Gap Analysis, #4 technical feasibility.</p>
	<p>Page 12: Customer value proposition and awareness. The comment suggests that CalMTA doesn't yet understand the value of these; this may in part be a result of research that did not specifically attempt to detail these potential benefits. This should be considered a high priority for CalMTA research.</p>	<p>Thank you for your feedback. We recognize the importance of clearly understanding and communicating the customer value proposition and awareness. We agree that this is a high priority and will make it a key focus in our upcoming research efforts to ensure that these benefits are thoroughly explored and articulated.</p>
	<p>Page 12: Contractor knowledge. The lack of knowledge of HPWH systems is clearly a barrier, but there may also be a similar problem with NG based WH systems as well, so this may go beyond the heat pump aspect due to the potential complexity of these WH systems.</p>	<p>Thank you for the feedback. We will add language to clarify the water heating system-level complexity.</p>
	<p>Page 13 - CCDEH guidelines. As mentioned previously, it is important to understand how CalMTA intends to add to the current efforts to change the guidelines or possibly let that effort occur and focus on other aspects of MT while it occurs in parallel to CalMTA efforts.</p>	<p>In the next phase we will work with existing efforts to collectively identify if there is a role to support the ongoing work around CCDEH guidelines. If not, CalMTA will focus on other strategies.</p>

	<p>Page 13- Available product capabilities. New products need to have ducting options and controls to ensure they can work well with recirculation systems.</p>	<p>We specifically call out ventilation and recirculation as a technical barrier under #4 of the Gap Analysis. We agree these are aspects that need to be considered and evaluated in existing and new products and plan to address the knowledge gap as described in Section 6.1, technical assessment objective #1.</p>
	<p>Engage national restaurant chains. National chains need to developing a path towards HPWH systems to help meet thermal comfort and air quality regulations that may/will occur in the near future. This process provides a process to help accomplish this for the chains and should be a valuable point for recruitment.</p>	<p>We will add this recommendation as a potential engagement strategy with chains in Section 4.4.</p>
	<p>Page 17 - Figure 1. This figure shows all the possible avenues for research, but it seems likely that CalMTA will need to refine this process and focus on key areas for market intervention, at which point this logic model should be redeveloped to show more detailed information on what and how the identified goals will be accomplished.</p>	<p>Once the next phase of research is done, the conceptual logic model will be updated and expanded to provide more detail and focus.</p>
	<p>Page 24 - Lifecycle costs. Review the Technical Design Guide (https://caenergywise.com/design-guides/Technical_Design_Guide.pdf) that does factor in bundled rates and the rates are updated and more representative of the present rates.</p>	<p>Thank you for your comment and for identifying this resource. We have added a reference to the Technical Design Guide in Section 5 Gap Analysis per a previous comment and will assess how we can use it in our analysis.</p>
	<p>Page 36 - Table 10. Technology Assessment Energy Modeling, Site visits/survey and Laboratory testing sections need additional info such as goals, justification and scope and define the gaps that need to be answered that prior or existing work is not addressing. Without a detailed understanding of the goals and activities for each of the tasks, it is premature to set or assess the estimated project budget.</p>	<p>CalMTA will be developing the detailed technology assessment goals and scope during the next phase of work and, if needed, will update the budget to provide the appropriate financial support.</p>
	<p>Page 39 - Table 11. Initiative Timeline of greater than 10 years doesn't align with air quality regulations that will require electric water heaters in major districts and statewide with CARB regulations all to be completed 2026-2031. Additionally, code readiness</p>	<p>The market adoption forecast is part of our Phase II activities and will be further refined.</p>

	activities relating to T24 and T20 is targeting 2028 and 2031 for C&S regulations that will impact restaurants and all of non-residential buildings.	
SoCal Edison Foodservice Technology Center	Water heating sizing guidelines are outdated and prevent foodservice facilities from adopting HPWHs.2 and Note: There is a part 2 of this report, for filed study to support and educate the Health Depts to help sizing the HPHW systems for FS segment, I think this is already happening. will send over some info on the project as it will be presented in the ET summit in Oct.	Thank you for letting us know about this research. We will review this report when it becomes available and determine how we can integrate it into our Phase II research and initiative development.
	Working with industry leaders and regulatory bodies to update water heating sizing guidelines to ensure they reflect modern water fixture efficiencies and allow for use of HPWHs. and Note: same thing , project is moving forward with 2050 partners, Both sce and Frontier are working the local health depts on submittals currently.	As mentioned in response to a previous comment, CalMTA understands that there is work already happening on the water heating sizing guidelines. Existing program coordination and alignment is a priority for this proposed initiative so that impact is amplified but work is not duplicated. Specific needs will be determined with input from industry experts during Phase II and detailed in the MTI Plan prior to approval and implementation.
	Target market: most cafes, and sandwich shops like starbucks and subway have electric resistance water heaters already, usually rated for 9kW. Moving to HPWH will be an issue due to their size, most of these 9kW are short boys, up in a closet on a shelf. Recent EPRI HP symposium , most manufactures agreed this size is very difficult to engineer for HPWH.	This is very helpful information. CalMTA seeks to better understand the target market's water heater make up and we will adjust strategies accordingly based on our market characterization research during Phase II. We will update the key market barriers to include the potential space barrier.
	Target market: Cafés: These establishments primarily serve coffee and other non-alcoholic beverages, along with light snacks and pastries. This definition also includes doughnut shops	Thank you, this definition of "cafes" is also provided on page 10.