Advancement Plan Feedback Response

Efficient Commercial Rooftop Heating, Ventilation, and Air Conditioning (HVAC)

This document provides a comprehensive list of comments received from both the public and the Market Transformation Advisory Board (MTAB) on the draft Efficient Commercial Rooftop HVAC (ERTU) 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 Dec. 6-20, 2023. Visit calmta.org to access updated Advancement Plans. Note: All feedback that appears in this document is presented verbatim as submitted, with no edits made by CalMTA.

Source	Feedback Provided	CalMTA Response
Public (Unknown)	Strongly in support of the ERTU initiative. The definition of ERTU is too narrow, "RTUs are defined as forced-air systems that package the evaporator, condenser coils, fans, and heating components into a single unit to serve a building's heating, cooling, and ventilation needs." Suggest expanding the definition to include/allow/encourage emerging technologies that may not use vapor compression components (evaporator, condenser coils) and specifically include/encourage load and demand flexibility measures such as load shifting.	Our final product definition will not be narrowly focused. CalMTA's planned work in early 2024 seeks to further define the product targeted by our MTI, leveraging and possibly aligning with the work currently being conducted by the Northwest Energy Efficiency Alliance (NEEA), Consortium for Energy Efficiency (CEE), and Center for Energy and Environment (Minnesota CEE). Our intent with the current definition is not to limit, but instead be illustrative by identifying potential components/features that may influence energy efficiency and provide the greatest value to California and the needs of its unique climates.
Public (Unknown)	Strongly in support of the ERTU initiative. Suggest a stronger emphasis on TSB - educate, inform, build awareness to develop TSB-based HVAC product features. Suggest replacing/enhancing the description	CalMTA agrees and recognizes that to measure benefits appropriately we cannot limit our assessment to kilowatt-hours (kWhs) saved. Phase 1 of this work will

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	of "energy savings," "energy saving features" "increased efficiency" with California's unique and critically important Total System Benefit and/or where appropriate the CEC Title-24 Time Dependent Valuation (TDV energy) approach. Generally, place the greatest emphasis on Flexible Efficiency/Demand Flexibility ERTU measures -- California is shifting away from kW and kWh to TSB. HVAC Original Equipment Manufacturers (OEM) do not understand, and likely can't comprehend and resolve the dynamic calculation of the time dependent valuation of energy efficiency with traditional DOE standards-driven HVAC related energy saving measures. We are concerned this could devolve into a mix of costly upgrades of standard components for "things that save electricity" which may not be beneficial to California ratepayers given the dynamic nature of its renewable generation dominant grid and GHG reduction goals. Emphasis: California has changed its approach to energy efficiency programs to better align with reducing greenhouse gas (GHG) emissions and support customer equity and long-term energy grid stability. This includes methodologies such as TSB (and TDV energy) which is calculated using the savings and load shape of an energy efficiency resource by applying the hourly values for energy, capacity, and GHG compliance costs over the life of the resource, to enable development of the total net system benefits from an initiative. This is a great forum and opportunity to change the HVAC product efficiency landscape to align with TSB.	include further refinement of the product description, including analysis to identify ERTU product features/components that offer the most beneficial path to maximizing Total System Benefits (TSB) and impacts to California.
Public (Southern California Gas Company)	External Program Review and Stakeholder Engagement: The draft Report identifies the California IOUs' local and statewide Comfortably CA as key coordination opportunities. The IOUs and other Program Administrators have several existing programs, such as the Statewide Workforce Education and Training program and the Statewide HVAC Quality Installation and Quality Maintenance Program. The Report should look at coordinating with all the utilities and Portfolio Administrators (PA) in California on future leveraging	CalMTA agrees that it is vitally important for CalMTA to maximize program alignment and leverage. We have facilitated multiple meetings with the Statewide Codes and Standards (C&S) Advocacy team and energy efficiency (EE) program directors at the investor-owned utilities (IOUs) to discuss the MTI development process and our Batch 1 Advancement Plans in particular. Moving forward, we will continue to meet with the C&S

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	opportunities across their program portfolios. The Report should look not to duplicate efforts of any statewide offerings.	team, EE program directors, and identified subject matter experts (SMEs) for each target technology to support the MTI research phase. We will also continue identifying and reaching out to other energy efficiency programs and stakeholders in California to build collaborative relationships.
	Preliminary Estimate of TRC and PAC Tests: The draft report estimates preliminary TRC and PAC ratios of 4.12 and 61.24, respectively. The Report should provide a detailed showing of the assumptions supporting these estimates.	Appendix 1 of the Advancement Plan highlights key assumptions used to develop the preliminary (Phase I) TSB estimates. In response to comments/questions received, we will update the Appendix to clarify our methodology for calculating values using an approach consistent with the IOU EE requirements, with costs and benefits applied to develop a statewide value. We fully agree that CalMTA needs to provide complete, detailed documentation of all sources and methods for TSB estimates, as well as TRC and PAC ratios, and we are currently revising the Appendix format and content to provide that information more clearly and completely. During Phase II: Program Development, CalMTA will conduct additional market and technology research on ERTUs as described in the Advancement Plan. Based on that research, the team will refine TSB and cost-effectiveness estimates for the MTI. These refined estimates and their detailed methodology and assumptions will be included as part of the MTI Plan required for advancement from Phase II: Program Development to Phase III: Market Deployment. The MTI Plan will also include an evaluation plan and a data collection plan to support ongoing evaluation.

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Public (Pacific Gas & Electric Company)	Focus on incentives, workforce development and tools and training for efficiency roof top units is most useful: Multiple California Evaluation Measurement and Verification studies (DNV GL, 2025) have discussed efficient rooftop unit (ERTU) installation issues, which are challenging to address through resource acquisition programs. The MTA is uniquely qualified to address the workforce development and training issues found within the state. In collaboration with DOE consultants and ERTU manufacturers, NCSA is working on the test procedure and specification issues identified in the ERTU Advancement Plan. However, implementing the additional test procedures and specifications is challenging due to unaddressed regulatory matters. DOE regulations require manufacturers to use only the DOE-mandated test procedure and energy savings metric to market their equipment. When adopting a new efficiency standard, DOE identifies potential technological features that may assist in developing a new efficient product but does not mandate any technical features allowing for manufacturer innovation. MTI Advancement Plan suggests developing specific technological features; however, it is unknown whether they would provide additional efficiency benefits or if manufacturers used them to meet the current minimum efficiency standard. Manufacturers may only market the efficiency of these features by mentioning them in the product literature. Appendix X includes additional information to be discussed in future C&S and MTA coordination meetings.	CalMTA looks forward to continuing these discussions during our ongoing meeting with the program administrators.
Public (CalNEXT)	The Draft ERTU Advancement Plan, and the strategic interventions identified, align with the CalNEXT Supply Chain Engagement for Increasing Packaged Unitary Heat Pump System Adoption focused pilot currently in development. We recommend leveraging this and	CalMTA understands the importance of coordinating with the many teams conducting valuable energy efficiency research in California. Our Advancement Plan is designed to capture research needed to develop a full MTI Plan, but in cases where this research is already

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	other CalNEXT projects to support Market Transformation Initiative (MTI) research activities	being conducted, we will work with those entities to ensure no duplicative work is being conducted.
	We encourage CalMTA to take extra care in what measures they consider appropriate in defining "efficient" for California's multi-faceted market. While traditional gas fired RTUs are a ubiquitous system for the commercial market and are installed in many different market segments, those segments have differing needs and attributes which are worthy of unique considerations. Simple differences on ventilation rates, zone configuration, and climate have significant impacts on the cost-effectiveness, applicability, financial and technical feasibility, and societal impact in converting from the baseline technology to an efficient heat pump RTU. We encourage CalMTA to ensure that these differing dynamics are captured in their market characterization and market segmentation to inform the success of future activities.	We agree that the technology will likely be applied differently across California's multi-faceted market and climate, and our modeling and analysis will reflect that. Our MTI is designed to apply across all applications and climate zones. We would be pleased to discuss any specific concerns you have.
	We suggest validating compliance to RTUs minimal code requirements such as supply air temperature control, fan speed control, economizer control, etc. to provide definition to the baseline scenario. Controls are usually the most cost-effective way of improving energy efficiency. Most RTUs use manufacturer integrated controller. Many of them may not be compatible or are challenging for integration of some code minimal controls requirements such as demand controlled ventilation or heat recovery features. Designers and contractors may find it challenging to specify and configure the controllers to meet the design intent. Without proper controls, highly efficient equipment will deliver poor performance. These challenges can be magnified as both economizers and heat recovery devices can be field installed leading to integration challenges, certification challenges, and compliance testing challenges. The Draft Advancement Plan identifies upfront costs as one of the key market barriers. We encourage CalMTA to consider prioritize cost-benefit analysis using bill-impacts as a key activity to	We will incorporate minimum control requirements into our plans. We recognize the importance of capturing the need for high-quality installation as well as product cost and other financial impacts, and will ensure these needs are included in our MTI scope.

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	articulate the financial benefits to key market actors: building owners, installers, contractors, manufacturers, and distributors. While we recognize the importance of the Total System Benefit (TSB) as measure of societal impact, metrics like TSB do not align with the real-world financial impacts to a customer.	
MTAB (Southern California Edison)	Comments or questions regarding "Product, Service, or Practice Definition." a) In the Executive Summary: What does "as well as existing Title 24 requirements" mean in this sentence? "Utilizing California's potential new construction building code to require more efficient heat pump RTUs to become the new standard, as well as existing Title 24 requirements	The current version of Title 24 includes requirements for RTUs that, if followed, improve performance. These requirements include control sequences of operation like supply air temperature reset, minimum construction requirements for economizers, and fan power limits. We plan that through the MTI, the value of meeting those requirements for replacement units will be communicated to customers and taught to installers.
	Comments or questions regarding "Product, Service, or Practice Definition." b) The ERTU MTI idea as explained is a system that includes a federally regulated RTU as well as "add-ons" than can be regulated by building standards. However, a federally regulated RTU can be made more efficient with such improvements as higher cabinet insulation, variable speed motors, better dampers, improved controls, etc., and can be considered an ERTU as well. Progress is being made to develop metrics that will include the RTU with certain add-ons.	Early on in our research phase, CalMTA will conduct research to measure the benefit of possible "add-ons" like these. Based upon our findings, we will update the MTI product definition to reflect the add-on features most beneficial to California.
	Comments or questions regarding "Product, Service, or Practice Definition." c) Please define ERTUs and what is included (i.e., heating by gas, electric resistance, and/or heat pump? What is the baseline? Could it be a cooling only unit? Can the condenser be air cooled, water cooled, and/or evaporatively cooled?).	Our modeling included a mixed-fuel baseline RTU (cooling and gas furnace) as well as an all-electric heat pump baseline (heat pump cooling and heating with resistance backup heating). Although we did not model cooling-only RTUs with no heating, modeling included Climate Zone (CZ) 7 (San Diego), which has very low heating loads. Replacement of cooling-only RTUs is within scope for this MTI. The counterfactual baseline

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		(i.e., what *would have* happened, absent this MTI) energy model assumes that a building owner would have purchased a new, code-minimum heat pump or mixed fuel RTU to replace their existing unit at effective useful life (EUL). The MTI also includes efficiency measures that will save energy and reduce emissions associated with cooling as well as heating, regardless of heating fuel source.
	Comments or questions regarding "Product, Service, or Practice Definition." d) Economizers have been an area that has plagued RTUs with problems that may benefit from considerable improvements. The Advancement Plan should consider looking at the impacts of various economizer types: e.g., factory installed vs third-party supplied and installed by distributor or installer vs field-fabricated by installer, dry-bulb temperature-controlled vs enthalpy controlled, modulating vs 2-position, integrated vs non-integrated, high limit controls and low limit controls, and morning warm-up cycle.	Exploring improving installed economizer performance is included in our scope of proposed work. We will work to evaluate the impacts as we further refine our product definition.
	Comments or questions regarding "Market Transformation Theory and Opportunity." a) Describe if the metric for characterizing market size is based upon the number of buildings, square footage of buildings or the number of RTUs	As defined in the Advancement Plan, our MTI focuses on a target market of small-to-medium commercial buildings with single-zone RTUs (25 tons or less). Additional segmentation (e.g., by building class or fuel type) may be developed during Phase II of our process. The Total Market Adoption (TMA) forecast in Appendix 1 also uses number of small/medium buildings as the primary metric.
	Comments or questions regarding "Market Transformation Theory and Opportunity."	We agree that modeling with ASHRAE-205 formatted data would be ideal. However, there are two challenges to pursuing this approach:

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	b) The MTI Advancement Plan should leverage ASHRAE 205 for the energy modeling of ERTUs with add-ons.	1. No ASHRAE 205-formatted data is publicly available from manufacturers at this time. We do not know if that will change in the near future, but we will reach out to the Air-Conditioning, Heating and Refrigeration Institute (AHRI) and manufacturers to monitor the situation. 2. We cannot model based on a single manufacturer's data. We require generic data that reflects an amalgamation of several manufacturers' information for both baseline and high-efficiency equipment. This issue affects all code writing and program managing entities. We will consider whether we can partner with manufacturers and other research organizations, such as the Pacific Northwest National Lab (PNNL), to arrive at a solution.
	Comments or questions regarding "Market Transformation Theory and Opportunity." c) CA Title 24 cannot require higher efficiency heat pumps than the federal minimum regulations. However, it can require add-ons that are outside of the federal regulations for such things as economizers and demand response capabilities.	We agree that Title 24 cannot, by fiat, require a performance greater than allowed in ASHRAE 90.1. However, the Energy Policy and Conservation Act (EPCA) does allow tradeoffs, and these are widely employed in Title 24. That said, CalMTA will explore ways to achieve the MTI's goal without explicit requirements in Title 24.
	Comments or questions regarding "Market Transformation Theory and Opportunity." d) The MTI Advancement Plan should explain if the scope limited to single-zone equipment.	Our MTI scope is limited to single-zone equipment. We will review the Advancement Plan and identify opportunities to clarify the focus on single-zone equipment in future plans.
	Comments or questions regarding "Market Transformation Theory and Opportunity."	Standard industry practice uses the 25-ton limit to differentiate between light commercial and applied equipment. Most replacement units are light

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	e) The MTI Advancement Plan should explain why there a reason for the limit of 25 tons (300 KBtuh). This doesn't align with the limits of the ASHRAE 90.1 rating categories which are below 65 KBtuh, between 65 KBtuh and 135 KBtuh, between 135 KBtuh and 240 KBtuh, and between 240 KBtuh and 760 KBtuh.	commercial single-zone equipment. Adding complex applied equipment would greatly expand the scope of work. Larger units could be added if modeling shows it necessary or market conditions change.
	Comments or questions regarding "Market Transformation Theory and Opportunity." f) Points of leverage should include engineers, specifiers, distributors, and building managers in addition to contractors.	The identified points of leverage for the ERTU market and MTI will be further developed during 2024 based on the results of the identified market research.
	Comments or questions regarding "Market Transformation Theory and Opportunity." g) Another point of leverage is creating and communicating clear value propositions to the various target audiences.	The identified points of leverage for the ERTU market and MTI will be further developed during 2024 based on the results of the identified market research.
	Comments or questions regarding "Market Transformation Theory and Opportunity." h) One more point of leverage may be offering financing options that would help to address the issue of capital budgets being separate from the market barriers in the Executive Summary O&M budgets.	The identified points of leverage for the ERTU market and MTI will be further developed during 2024 based on the results of the identified market research.
	Comments or questions regarding "Market Transformation Theory and Opportunity." i) All of the Equity Metrics listed are "process" metrics (or they could be "proximal," or "near term," metrics for MT), but there needs to be "impact" metrics that estimate actual adoption and installation by ESJ customers.	Adding "Impact" metrics is currently under consideration as we develop our equity metrics for the MTI.
	Comments or questions regarding "Market Transformation Theory and Opportunity."	The possible equity metrics included in our Advancement Plans are intended for long-term market tracking.

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	j) Please see prior comments and suggestions about Equity metrics, including the confusion over whether these metrics are intended for long term market tracking, or whether they are intended to inform the MTI development.	
	Comments or questions regarding "Market Transformation Theory and Opportunity." k) Another Market Vision/End-State would be to have ERTUs installed with state-of-the-art QI/QC practices that would include commissioning, be right-sized, serve buildings with appropriate zoning, etc.	The desired end state will be further developed during 2024 based on the results of the identified market research.
	Comments or questions regarding "Research and Program Development Plan." a) The Pilot Design and Pilot Implementation projects are scheduled to be launched before the Market Research Decision Maker/SME/Manufacturer interviews. Design and launching the workforce development pilot should wait until after the market research is completed to ensure the pilot is optimized to be most impactful.	We will update the Advancement Plan timeline to include earlier market research efforts. The proposed ERTU pilot discussed in this Advancement Plan has been removed from consideration pending further market research.
	Comments or questions regarding "Research and Program Development Plan." b) We suggest the CalMTA consult with the IOU Workforce, Training, and Education programs for their expertise and recommended sources for further secondary research. The WE&T programs should also be listed as a Program Stakeholder.	CalMTA understands the importance of coordinating with and leveraging existing energy efficiency efforts in California. Throughout our research and MTI development process, we will engage Program Administrators and workforce, education, and training (WE&T) stakeholders to identify areas of potential collaboration and opportunities to complement existing work.
	Comments or questions regarding "Research and Program Development Plan."	The proposed ERTU pilot has been removed from consideration pending further market research.

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	c) Phase II of the proposed "pilot" seems a lot like an MTI implementation plan, and the Phase III Pilot Assessment does not identify quantitative baselines against which pilot performance could be measured. For each of the six activities in the Phase II pilot implementation, the MTI Advancement Plan should identify the gap to be filled, b) how the implementation tactic will fill it, c) (This would go in Phase III: Pilot Assessment) how you will know that a tactic is the best tactic for filling that gap and how you know it's a measurable and reliable improvement against existing tactics. It should also describe the baselines that will be used and how that baseline data will be collected.	
	Comments or questions regarding "Research and Program Development Plan." d) The plan to "leverage field testing as an opportunity to engage and assess manufacturers' installer networks and local in-house workforce development programs with education institutions" is not well defined and can potentially contaminate any field-testing results if the testing is carried out by partially trained technicians. The two objectives of field testing and engaging with workforce development entities should be separated.	The proposed ERTU pilot has been removed from consideration pending further market research.
	Comments or questions regarding "Research and Program Development Plan." e) Activities 4 through 6 appear to be more implementation than pilot. The MTI Advancement Plan should explain the questions to be answered and what is being pilot tested.	The proposed ERTU pilot has been removed from consideration pending further market research.
	Comments or questions regarding "Research and Program Development Plan."	The proposed ERTU pilot has been removed from consideration pending further market research.

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	f) In Phase III, the pilot assessment plan should discuss methodologies, criteria, and baselines, as mentioned above.	
	Comments or questions regarding "Research and Program Development Plan." g) The description of the ESJ WE&T training approach needs to describe what methods will be used during Phase II, that will inform the MTI plan to implement the training. The current description contains objectives, but no methodologies.	We appreciate the need for additional clarity in this section and will incorporate this feedback in updates to the Advancement Plan.
	Comments or questions regarding "Research and Program Development Plan." h) Table 3 should include the distribution of RTU size (physical dimensions, weight, tonnage), single speed vs variable speed, gas packs vs heat pumps vs cooling only.	We agree that research to characterize the existing installed baseline is needed and have included these activities in our research plan. Note that our research may be limited to information available through interviews, product specification sheets, and other external sources.
	Comments or questions regarding "Research and Program Development Plan." i) In 5.2.1, humidity control should be added as another area of performance improvement in addition to increasing performance across ventilation, cooling, heating, fan/controls, and connectivity/flexibility. Depending on the climate zone, higher heat ratios would be more appropriate for hotter drier climates where latent cooling is less important allowing cooling systems to operate with higher supply air temperatures thus increasing energy efficiency.	We agree that humidity control is important in several California climate zones, and that higher airflows are generally more efficient in dry climates. We will include these considerations in updates to our Advancement Plan.
	Comments or questions regarding "Research and Program Development Plan." j) In Section 5.4, the MTI Advancement plan should assess if there are opportunities to include Sheet Metal and Air Conditioning Contractors'	We will consider WE&T opportunities with the SMACNA Association as a component of our market research and external program review process.

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	National Association (SMACNA) and their training centers for workforce development, education, and training.	
	Comments or questions regarding "Research and Program Development Plan." k) In Section 5.4, the MTI Advancement Plan should include a key outcome of knowledge of codes and standards including Title 24 energy standard, mechanical, electrical code, plumbing, etc., and codes.	In Phase II of our work, CalMTA will continue to refine and update our logic models and key outcomes.
	Comments or questions regarding "External Program Review and Stakeholder Engagement." a) Engagement with the Statewide Codes and Standards Advocacy programs will be critical to ensure coordination with ongoing work being done related to this MTI idea. Refer to separate comments submitted by PG&E, Lead Program Administrator representing the IOUs for the Statewide Codes and Standards Advocacy programs.	CalMTA is committed to coordinating productively with statewide programs and specifically with C&S team leading this important work. We have had several meetings with the C&S team to discuss our development of these market transformation ideas and have identified a cadence for regular future meetings with the C&S team and IOU EE program directors, as well as identified SMEs for each target technology, throughout the research phase of MTI development.
	Comments or questions regarding "External Program Review and Stakeholder Engagement." b) Engagement with the IOU statewide program lead for HVAC as well as other related programs should be made as well.	We will actively engage and coordinate with existing programs and activities in California that focus on this technology, including the statewide HVAC program administered by San Diego Gas & Electric and implemented by CLEAResult (Comfortably CA).
	Comments or questions regarding "External Program Review and Stakeholder Engagement." c) Various ASHRAE committees are working on standards related to this MTI including, but not limited to 90.1 and 205. The Advancement Plan should monitor these developments.	We will closely monitor ASHRAE 90.1. We believe that ASHRAE 205 has completed and published requirements for RTUs, but we will follow proceedings to monitor any changes made by Standing Standard Project Committee (SSPC) 205.
	Comments or questions regarding "Initial Cost Estimate, Timing and Expected Results."	We agree that manufacturers need to be involved early in the process and have included upfront engagement

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	a) Technology Assessment studies should wait until after thorough interviews with manufacturers about these challenges are completed.	in the research work described in the Advancement Plan.
	Comments or questions regarding "Initial Cost Estimate, Timing and Expected Results." b) The MTI Advancement Plans could do more to leverage IOU and other PA expertise in identifying what information already exists on each of the research topics. Further secondary research and coordination with the IOUs and other PAs, will help ensure that future costs estimates are accurate and that all studies in this Advancement plan are necessary.	CalMTA understands the vital importance of maximizing program alignment and leverage. We have conducted multiple meetings with the statewide C&S team and IOU EE directors to discuss our MTI development process and Batch 1 Advancement Plans. Moving forward, we will continue to meet with these critical stakeholders and identified SMEs for each target technology, including Program Administrators and implementers, to support the MTI research phase. We will also continue identifying and reaching out to other energy efficiency programs and stakeholders in California to build collaborative relationships.
	Comments or questions regarding "Initial Cost Estimate, Timing and Expected Results." c) The MT Adopted Framework included a 7 stage "stage-gate" model that describes the decision points at which stakeholders agreed they would like to have visibility and feedback. Now that Batch 1 has been identified, future MTI Advancement Plan development should establish an ongoing, sustainable process that more closely follows the suggested Stage Gate model.	CalMTA follows a CPUC-approved stage-gate process. The Advancement Plans are the last Stage 2 deliverables for Phase I, which describes the work that will occur in Phase II. As our research progresses in Phase II, we will use the CalMTA website, MTAB meetings, and stakeholder outreach meetings to share our findings and the ways in which they inform development of the MTI strategy.
	Comments or questions regarding Appendix 1: TSB Estimation Approach a) Please include a description of how TRC and TSB were calculated and whether or not this differs from the TSB inputs and calculations that are required from the IOU EE programs	TRC and TSB were calculated in line with IOU requirements for EE programs, with costs and benefits modified to accommodate a statewide value. Utility/climate zone avoided costs are averaged by the share of customers from each of the three largest IOUs and with average values applied to the remaining portion of California served by other utilities. TRC

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		includes all avoided cost categories, including electric/gas/greenhouse gas and refrigerant benefits, program costs, incremental measure costs, etc. The Avoided Cost Calculator and projected lifetimes savings were also used to generate TSB.
MTAB (CalPA)	Comments or questions regarding "Market Transformation Theory and Opportunity" 2 Table 8 of CalMTA's Stage 1 Disposition Report indicates that the ERTU MTI does not have a well-defined product definition & target market. CalMTA has also recognized that the ERTU MTI lacks clear research needs. Thus, it is concerning that CalMTA has selected this MTI as a frontrunner despite these glaring flaws. Instead, this MTI should be removed for lack of adequate definitions and for the reasons outlined below.	CalMTA proposed ERTUs as an opportunity to transition to Phase II: Program Development to MTAB at our Oct. 13 meeting. The on-demand recording of this meeting and surrounding discussion can be accessed on our website. Additional information about selection criteria and analysis of this MTI can be found in CalMTA's published Request for Ideas (RFI) Summary Memo.
	CalMTA identifies that the "product availability and adoption of [efficient rooftop] units remain low" and argues that this is a market primed for CalMTA's intervention. However, work is being done on a policy level, both inside and outside of California, to promote more efficient RTUs already. The Advancement Plan already highlights that "California has a potential new building code that will require more efficient heat pump RTUs as the new standard, as well as Title 24 requirements." Intervenors have worked with U.S. Department of Energy to increase efficiency standards for RTUs in 2018 and 2023 (see also US DOE's "Advanced Rooftop Unit (RTU) Campaign"). These new regulations and standards will inevitably induce demand for more efficient RTUs and consequently spur the production of them. At a policy level, this market is already transforming, and so this may	Although there are C&S activities happening related to RTU efficiency, CalMTA staff believes there is opportunity to go further and farther than current proposals, bringing more impact. It is important to note that transitioning an idea from Phase I: Concept Development to Phase II: Program Development allows CalMTA the opportunity to invest more resource to an opportunity so that the appropriate outreach and research can be conducted to better define the opportunity, impacts, and strategies. However, transitioning to Phase II does not ensure an opportunity will transition into Phase III.

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	possibly be the reason that CalMTA is having difficulty in defining or identifying a target market. Therefore, this MTI should be removed from consideration.	
	Of the non-policy focused points of leverage, CalMTA's descriptions (see ERTU Advancement Plan at 5) are remarkedly similar to those of Resource Acquisition and Market Support Energy Efficiency programs in D.21-05-031. In addition, the strategic interventions relating to marketing, training, and education mirror the descriptions of Behavioral programs and Workforce Education and Training programs in the Market Support segment. The promotion of adoption rates to transition consumers to more efficient RTUs through incentives or installations fits squarely within the realm of Resource Acquisition programs. This MTI's points-of-leverage are too similar to the goals and methods of existing Energy Efficiency programs. When also considering that this MTI lacks a well-defined product definition, this MTI does not adequately reflect the purpose of market transformation. Given that the ERTU MTI would pursue a technology already being evaluated by DOE and is eligible for substantial subsidies that do not require ratepayer funding, CalMTA should not pursue this MTI.	Based on research to date, CalMTA continues to believe ERTUs represent a strong opportunity for market transformation in California. While some current IOU programs and other energy efficiency activities are addressing RTUs, CalMTA sees an opportunity to further advance the efficiency of RTU equipment and accelerate the rate of market change and adoption across the supply chain, and ultimately with end-users. A coordinated market-wide effort that unites existing programs and other energy efficiency and market transformation efforts nationally would increase our leverage throughout the supply chain and accelerate the pace of technology advancements and supply chain acceptance. Working in close alignment with program administrators we can soften the market and support greater participation in energy efficiency programs. It is important to note that transitioning an opportunity from Phase I: Concept Development to Phase II: Program Development allows CalMTA the opportunity to validate these assumptions and invest more resources so that the appropriate outreach and research can be conducted to better define the opportunity, impacts, and strategies. Transitioning to Phase II does not ensure an opportunity will transition into Phase III: Market Deployment.
MTAB	Comments or questions regarding "Market Transformation Theory and Opportunity" 2	CalMTA staff will consider this input as we further develop our program logic and intervention strategies.

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(Fred Gordon)	I wonder what the merits and shortcomings are of including gas equipment in this program. I understand that California is planning to move away from gas for policy reasons. However, it's impossible to convert the entire RTU market to electric immediately for market, inertia, and supply chain reasons. It would be beneficial for new gas RTUs to also be efficient. NEEA is developing an RTU program for gas equipment, so there's something to build on. It has some of the same components as the proposed electric initiative. The only danger I see in this approach is that it provides an efficiency badge for gas equipment. This may to some degree impede conversion. The question is whether that's going to be a significant enough issue to justify ignoring the inevitable residual gas equipment market.	
	Comments or questions regarding "Market Transformation Theory and Opportunity" 2 My second strategic question is whether the workforce training element really belongs in this initiative. Energy Trust worked hard to create a rooftop tune-up workforce and program some years ago. There were a number of reasons why this didn't stick. Primary is the culture of workforce sales and service, and the business models, which seem to strongly resist change. This is one of many failures I've witnessed. At this point I wonder if the only way to deal with rooftop effective installation and/or tune-up effectively is to push forward on networked remote diagnostics and control, working entirely around the existing installation and maintenance labor force. I recognize the complexity of this idea, but my own frustration with the install/service industry.	CalMTA staff will consider this input as we further develop our program logic and intervention strategies.