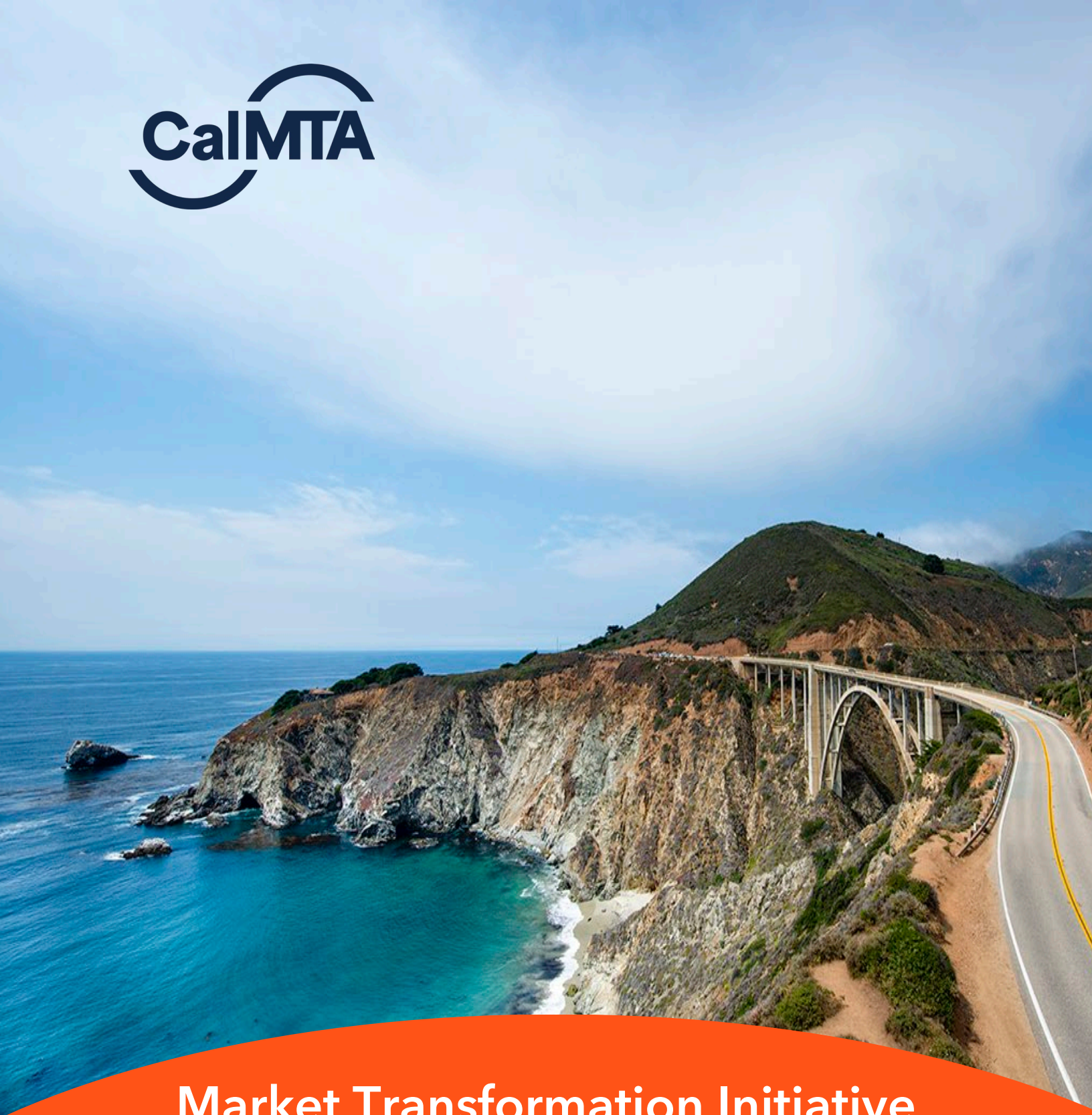

Market Transformation Initiative Evaluation Framework

April 2024

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

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Acronyms

BMA	Baseline market adoption
C&S	Codes and standards
CA SPM	California Standard Practice Manual
CAEECC	California Energy Efficiency Coordinating Committee
CalMTA	California Market Transformation Administrator
CPUC	California Public Utilities Commission
DEER	Database of Energy Efficiency Resources
EM&V	Evaluation, measurement, and verification
eTRM	Electronic Technical Reference Manual
EUL	Effective useful life
FR	Free rider
IRC	Independent review committee
MPI	Market progress indicator
MTAB	Market Transformation Advisory Board
MTI	Market transformation initiative
MTWG	Market Transformation Working Group
NEEA	Northwest Energy Efficiency Alliance
NTG	Net-to-gross
PAC	Program administrator cost
RA	Resource acquisition
RFP	Request for proposal
SO	Spillover
SPM	Standard Practice Manual
TBE	Theory-based evaluation
TMA	Total market adoption
TRC	Total resource cost
UEI	Unit energy impact

1 Introduction

CPUC Decision 19-12-021 (the Decision) authorized funding for and creation of a statewide Market Transformation Administrator (CalMTA) and adopted a framework for identifying and managing a portfolio of California market transformation initiatives (MTIs).[1] MTIs are designed to achieve sustained changes in the structure or functioning of a market by strategically capitalizing on market opportunities and reducing barriers to adoption of an identified technology or practice, thus resulting in greater and accelerated market adoption to the point where the technology or practice becomes standard practice.

1.1 Decision Guidance on Evaluation

The Decision includes guidance regarding evaluation of MTIs and the overall market transformation portfolio. It calls for setting clear savings goals and other MTI metrics at the time the California Public Utilities Commission (CPUC) initially approves the MTIs to ensure a high level of accountability, and ongoing evaluation to reduce program performance risk. The Decision also establishes roles for CalMTA, modeled after the successful approach created by the Northwest Energy Efficiency Alliance (NEEA), and calls for additional consideration regarding the specific approaches to be used for program attribution. Decision guidance is referenced throughout this document.

1.2 Evaluation Importance and Purpose

Evaluation is essential to the development and successful management of market transformation programs to ensure that these programs deliver reliable energy savings for California's ratepayers and incremental system benefits to California's electrical grid. CalMTA and the CPUC's Energy Division will oversee implementation of rigorous and strategically focused evaluation, measurement, and verification (EM&V) practices, which will enable CalMTA management and stakeholders to gauge the performance of CalMTA and MTIs, verify incremental impacts, and improve the design and success of future MTIs.

Evaluation informs effective evolution of initiatives and ongoing investment decisions and supports strong management accountability, which in turn can enhance stakeholder trust and collaboration. Figure 1 illustrates the importance and purpose of evaluation.

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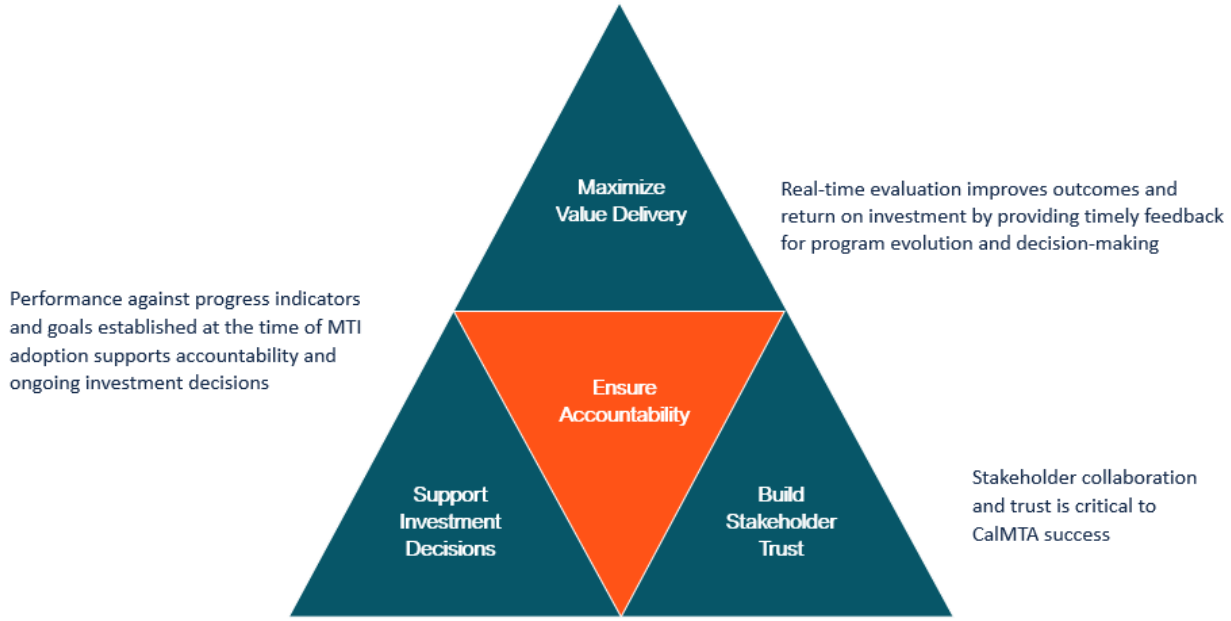
[1] California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. 321507615.PDF (ca.gov).

Figure 1. Importance and Purpose of Evaluation



The Decision calls for "real-time" market evaluation, which will provide MTI program managers and implementers with continual feedback, allowing them to pivot strategies as needed to maximize the value delivered to California ratepayers.[2] Tracking of proximate and longer-term market progress indicators (MPIs) that are tightly aligned with the MTI's market transformation theory will reduce MTI performance risk and support timely decisions regarding ongoing investment or termination of investment in MTIs.

1.3 Incremental Impact

MTIs seek to accelerate market adoption by deliberately inducing structural market changes that increase and accelerate market adoption and produce sustained market effects. CalMTA will adhere to the well-established approach to evaluating the impact of market transformation programs.

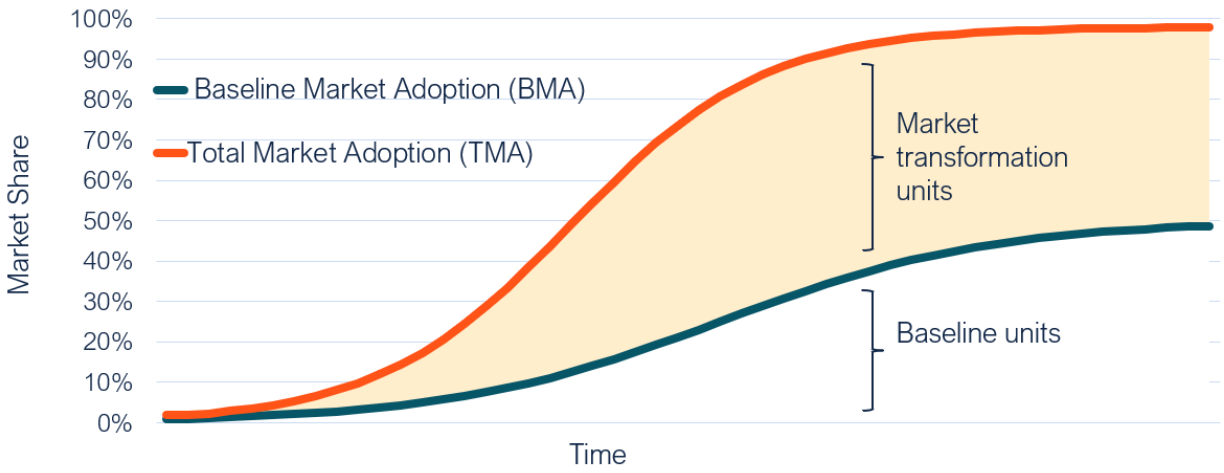
First, the approach requires forecasting baseline market adoption (BMA), the counterfactual market adoption likely to occur absent the MTI and related utility-funded interventions. Second, the approach requires tracking total market adoption (TMA), the actual market uptake that occurs over time. This approach also requires rigorous evaluation of the MTI program theory, including a

[2] The term "real-time" evaluation has been widely used in California and elsewhere to refer to ongoing program evaluation that provides timely feedback to support ongoing program decision-making, even if it is not delivered literally in "real time." This term encompasses all evaluation activities that provide timely insights to inform ongoing program management.

causality assessment, which is discussed in the *2.3 Theory Based Evaluation (TBE) and Logic Model Development* section of this Framework.

Figure 2 illustrates this market transformation impact: the difference between BMA and TMA. The area between these adoption curves represents MTI-induced market adoption—that is, the increase in market adoption above the baseline that results from the MTI, including other related utility-funded interventions.

Figure 2. MTI-Induced Market Adoption



The Decision included considerable discussion around the issue of incremental impact and program attribution. California stakeholders and the CPUC acknowledge the need for effective coordination and collaboration between CalMTA and other energy efficiency program administrators and implementers running programs in the same markets as MTIs. The CPUC embraces the concept of market transformation serving as an "umbrella" for all efforts in a particular market, with MTIs "wrapping around" existing activities and intended to enhance those efforts but not replace or disturb them.[3]

It will be in California stakeholders' best interests for CalMTA to collaborate and coordinate with these programs to achieve synergistic results and maximize MTI effectiveness and collective impact. With collaboration, however, comes questions about how to fairly determine the impact that will be attributed to each program that is investing in the market.

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[3] California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. P.73. 321507615.PDF (ca.gov).

The general approach to MTI attribution is described in the *Attribution and Incremental Impact* section of this Framework. The specific methods proposed to determine incremental impact for each MTI will be included in the MTI Plan developed during Phase II of the MTI lifecycle and will be vetted with the CalMTA Market Transformation Advisory Board (MTAB) to ensure alignment in advance of full-scale market deployment.

1.4 Equity

The Decision included several high-level principles for MTIs as part of the adopted Market Transformation Initiative Evaluation Framework. The first principle states that *MTIs must drive incremental savings that achieve the state's energy efficiency, equity, and GHG reduction goals*. The Decision also states that MTIs *should also meet* a set of principles including this equity-specific one: *Integrate strategies to maximize equity*.[4] These principles necessitate corresponding evaluation.

CalMTA has committed to apply an equity lens in its approach to developing a portfolio of MTIs that will be designed to maximize equity and deliver benefits to environmental and social justice communities, as defined by the CPUC.[5] To track performance on this front, each MTI Plan will include proposed equity metrics and a plan for assessing them.

1.5 Purpose of the MTI Evaluation Framework

This MTI Evaluation Framework summarizes the policies, principles, and high-level approaches CalMTA will use to assess its portfolio of MTIs. It is a living document and may evolve over time based on future CalMTA analysis and learning.[6] As further described in Section 2.4 Evaluation Plan Development, this Framework is the foundation upon which CalMTA will develop MTI-specific Evaluation Plans, which will be included in the MTI Plan for all MTIs that CalMTA recommends advancing to Phase III (Market Deployment). The approaches described in this document are consistent with the Decision and reference the substantial existing body of literature on the best practices and lessons learned for market transformation evaluation.

1.6 MTI Evaluation Framework Development

CalMTA developed this Framework based on the direction and guidance in the Decision. After creating a draft document, CalMTA shared the draft document with the MTAB and presented and

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4 California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. P.102. 321507615.PDF (ca.gov).

5 For more about CalMTA's commitment, see An equity lens – CalMTA.

6 CalMTA will vet proposed changes with the MTAB and CPUC Energy Division and notify the public if any updates are made to this document, at the time they are made.

discussed the Framework at two MTAB meetings.[7] Following the discussion at the MTAB meetings, CalMTA posted the draft Framework on pda.energydataweb.com for public comment. Subsequent MTAB discussions focused on reaching consensus on two key issues: MTI attribution approach; and oversight of third-party evaluation. This final MTI Evaluation Framework reflects the consensus on those topics and other input.[8]

2 Evaluation Approach

2.1 Foundational Principles

CalMTA's approach to MTI evaluation is grounded in these principles:

- **Unambiguous MTI progress and impact goals and metrics**, established at time of adoption, along with a data collection plan that substantiates MTI evaluability
- **Theory-based evaluation (TBE)**, which relies on clear program theory, logic models, and associated MPIs as the foundation upon which to establish the market influence, progress, and causal impact of MTI interventions
- **Data-driven, transparent analysis methods** to estimate market diffusion, cost-effectiveness, and incremental impact
- **Use of widely accepted best practices** to develop and refine the baseline market adoption forecast
- **Agreed-upon methodology to determine incremental impact of each MTI** that supports California's policy goals, optimal statewide collaboration, and decisions about future market transformation investments.

2.2 Evaluation Process

Evaluation-related activities begin during MTI Concept Development (Phase I of the MTI decision framework) and continue throughout the MTI lifecycle.[9] After identifying the most promising MTIs in Stage 1, the CalMTA planning and analysis team will develop a preliminary estimate of the MTI's potential impact and cost-effectiveness. These preliminary estimates will be used to

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7 Recordings and materials from these meetings are available at On Demand: CalMTA Market Transformation Advisory Board meeting (9/8) – CalMTA; On Demand: CalMTA Market Transformation Advisory Board (MTAB) meeting (10/13) – CalMTA.

8 To access CalMTA's response to comments received on pda.energydataweb.com, visit: https://calmta.org/evaluating-market-transformation-progress/. Recordings and materials of subsequent meetings with MTAB are available at: On Demand: CalMTA Market Transformation Advisory Board (MTAB) meeting (11/30-12/1) – CalMTA; On Demand: CalMTA Evaluation Framework Follow-Up Discussion Webinar (1/8/24) – CalMTA.

9 For a summary of the MTI lifecycle phases, see "What's CalMTA's process for selecting MTIs?" on the CalMTA web site, FAQ: Market Transformation – CalMTA.

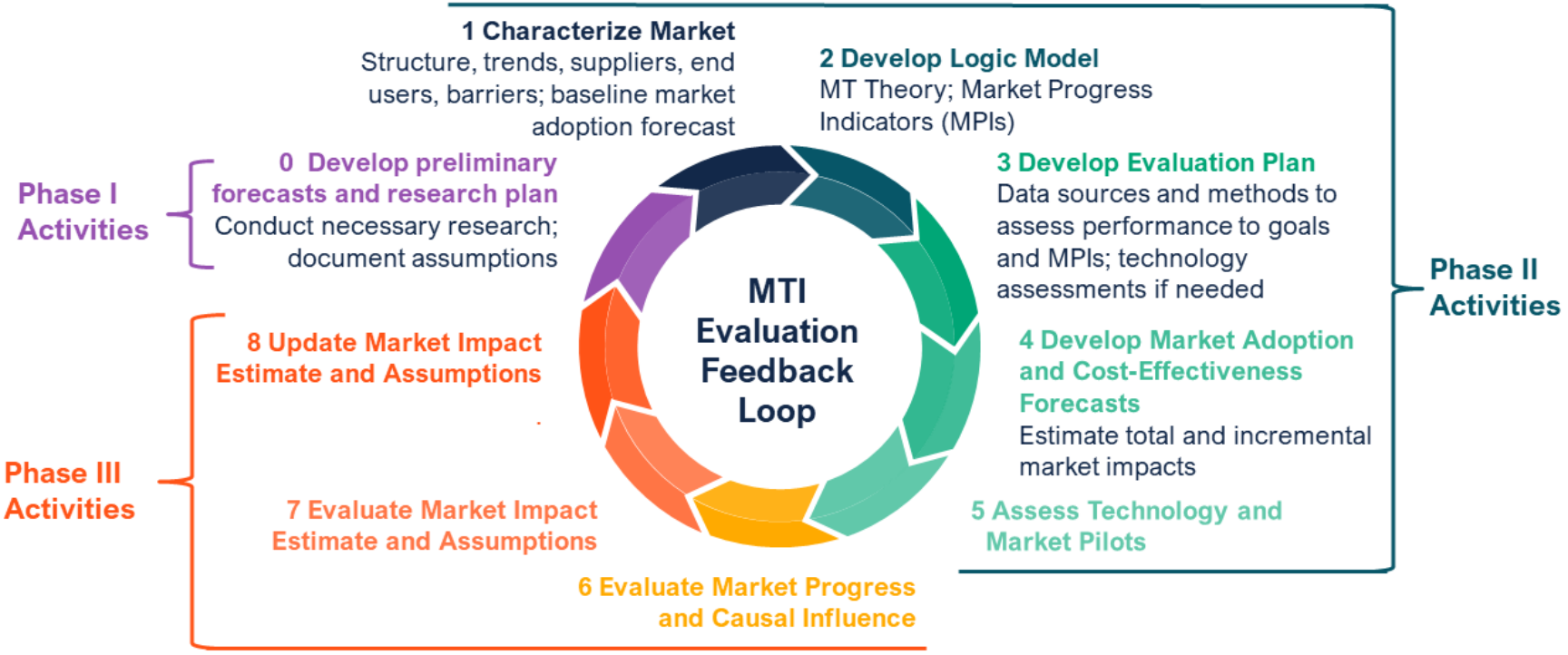
complete Stage 2 MTI scoring and inform the selection of MTIs proposed for advancement to Phase II.

Early in Phase II, a CalMTA market research and evaluation expert will conduct research to characterize the market targeted by the MTI for transformation. Market characterization research typically includes supply chain analysis, identification of perceptions and attitudes, and analysis of baseline market conditions. This research provides essential information necessary to confirm and identify market barriers and opportunities, refine the MTI strategy and logic model, and develop more robust forecasts of BMA, potential incremental impact, and cost-effectiveness than possible during Phase I.

Initial market characterization research is critical to the evaluation process because it provides foundational information for program design and development of metrics that will be evaluated over the life of the MTI.

Figure 3 depicts the CalMTA evaluation process, with key activities described in the sections that follow.

Figure 3. CalMTA Evaluation Process



2.3 Theory Based Evaluation and Logic Model Development

Theory-based evaluation (TBE) is widely accepted as a best practice for market transformation program evaluation.[10,11] TBE requires each MTI to have a program theory that clearly identifies the specific theorized market outcomes associated with the MTI strategic market interventions, along with their approximate timing. TBE also assesses causality between the market interventions and observed outcomes.

During MTI strategy development, the MTI team will create and refine a program theory of market transformation and a logic model, informed by the team's subject matter expertise and market characterization research. The program theory will describe how the planned strategic market interventions are expected to transform the market and accelerate market adoption of the targeted technology or practice. The logic model is a more detailed, graphic companion to the market transformation theory that specifies market barriers and opportunities, market interventions, and expected proximate and longer-term outcomes. As part of MTI strategy development, the MTI team will describe any strategies specifically designed to maximize equity.

2.3.1 MPIs

In tandem with preparing the logic model, the MTI team will work with an assigned CalMTA evaluation lead to identify MPIs for each theorized market outcome.[12] As part of the MTI Plan required for MTI advancement from Phase II (Program Development) to Phase III (Market Deployment), the team will map each outcome to an associated MPI, along with the data source(s) that will be used to track progress and the timing of associated evaluation activities. A set of clear, evaluable MPIs will be established at the time of MTI adoption and incorporated into the portfolio as one of the primary determinants of MTI performance.

Market transformation experience has taught us that well-chosen and vetted MPIs are critical to MTI risk management and success. Yet there has been a tendency to judge market progress primarily on units of adoption. This metric can be a misleading indicator of success for MTIs in their early years because market share and adoption typically increase slowly and accelerate only after addressing critical market barriers, such as product availability, quality and standardization,

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10 Prahl, Ralph, and Ken Keating. November 2011. *Planning and Evaluating Market Transformation: What the Industry has Learned, and Possible Implications for California.*

11 Rosenberg, Mitchell (KEMA, Inc.), and Lynn Hoefgen (Nexus Market Research). March 2009. *Market Effects and Market Transformation: Their Role in Energy Efficiency Program Design and Evaluation.* Prepared for California Institute for Energy and Environment Market Effects Program. Microsoft Word - Market Effects and Market Transformation White Paper.doc (escholarship.org).

12 Cadmus staff with extensive evaluation experience will serve as MTI evaluation leads under the current contract with Resource Innovations.

workforce capacity, and market perceptions. Therefore, to appropriately evaluate market progress and ensure accountability, the evaluation plan must include short- and medium-term MPIs that align with the logic model.

2.3.2 Equity Indicators

The MTI team together with the evaluation lead will also identify equity progress indicators, as appropriate to each MTI. Proposed equity metrics will be included in the MTI Plan required for MTI advancement from Phase II (Program Development) to Phase III (Market Deployment).

2.3.3 Causality Assessment

In addition to rigorous assessment of MPIs by a third-party evaluator, TBE also requires an assessment of the causal influence of the MTI interventions on observed outcomes. Causality assessment for market transformation programs is generally qualitative but can nonetheless be designed to provide reliable evaluation and verification of an MTI's incremental impact.

Best practices for causality assessment are based on a "preponderance of evidence" approach and are well-established in the market transformation evaluation literature, with methods typically including document review, in-depth interviews with market actors, decision makers and stakeholders, and historical tracing.[13] Effective causality assessment depends upon an Evaluation Plan that anticipates the data and documentary sources that will be needed for this critical part of the evaluation.

2.4 Evaluation Plan Development

CalMTA will develop an Evaluation Plan for each MTI during Phase II of the MTI lifecycle and prior to any significant market intervention. Each Evaluation Plan will include clearly defined MPIs and equity indicators, along with the expected timeframe for realizing market transformation progress. The Evaluation Plan will specify the methodology for estimating incremental impacts attributable to the MTI and plans to verify the effectiveness of market strategies and the accuracy of the program logic model.

The Evaluation Plan will include proposed market research, data collection, and analysis activities to accomplish these objectives:

- Monitor market dynamics and characteristics over time, to provide non-biased evaluation data for decision-making.
- Track total market adoption.
- Assess MPIs and equity indicators.

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[13] TecMarket Works. April 2006. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. Prepared for California Public Utilities Commission. http://www.calmac.org/publications/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf.

- Assess the theory of market change per the MTI logic model.
- Assess MTI causality.
- Assess MTI incremental impact.

The plan for each MTI will also include the proposed approach for attributing incremental impacts to the MTI versus other programs that target the same market.

2.5 Estimating Incremental Impacts and Cost-Effectiveness

CalMTA will develop *ex ante* estimates of incremental MTI impacts by establishing forecasts for BMA and TMA, along with measure unit energy savings. During Phase I of the MTI lifecycle, the CalMTA planning and analysis team will develop a preliminary market diffusion model—a key input for estimating long-term incremental energy impacts, which in turn will feed into total system benefit and cost-effectiveness estimates for each MTI. Research conducted in Phase II will provide the additional information required to develop more robust forecasts of MTI incremental impacts and cost-effectiveness.

CalMTA will develop these forecasts using a data-driven analytics platform that employs a variety of market data sources and analytical tools. These estimates will be fully transparent, with clear documentation of assumptions and data sources. CalMTA will update model assumptions when updated market data become available, and third-party impact evaluation activities in Phase III may include data collection activities and model review to inform and improve these estimates.[14]

[14] CalMTA will make regular updates to forecasted market adoption when new sales and/or research data become available. We will also update unit energy impacts when new performance data or white papers become available. Revision of the BMA forecast, however, will only be considered under certain circumstances, due to the risks and uncertainty associated with revising a counterfactual forecast. The circumstances and guidelines that warrant possible revision are discussed in Guidelines for Considering BMA Revision.

2.5.1 BMA Forecasting Approach

The BMA forecast is critical to MTI performance assessment because impacts associated with BMA are subtracted from total market impacts to determine incremental impacts.[15] CalMTA will develop an objective BMA forecast for each MTI in accordance with market transformation evaluation best practices. These best practices may include using published industry forecasts, econometric modeling such as the Bass Diffusion Model, and structured expert judging such as the Delphi technique.[16]

Given the significant implications of the BMA forecast, CalMTA will document the specific BMA forecasting sources and methods it used for each MTI that is recommended for advancement from Phase II to Phase III, as part of the MTI Plan.

2.5.2 TMA Forecasting Approach

Forecasting *ex ante* energy savings requires forecasting total market adoption over the MTI lifecycle. CalMTA will develop a data-driven model to forecast TMA based on a variety of sources, including the California Potential and Goals Study, industry association data and publications, research reports developed for other program administrators working in the same market, and technical and market subject matter experts. Once an MTI advances to full-scale market deployment, a third-party evaluator will use sales and market data to assess actual market adoption and CalMTA will update the model accordingly.

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[15] The Decision directs CalMTA and its evaluators to include potential savings from overlapping resource acquisition programs in the BMA, whenever applicable. (D. 19-12-021. p. 131). There may be two categories of savings from "overlapping" programs: those that would have occurred absent the MTI; and those that occurred as part of collaborative efforts. The Decision concurs with the concept of market transformation as the umbrella under which all the energy efficiency activities are taking place, with the MTIs designed to "wrap around," in many cases, existing interventions in particular markets, in order to fill gaps and form a complete approach to transforming that particular market (D.19-12-021, pg. 73). In this context, we expect "whenever applicable" to refer to resource programs that are already well-established and generating predictable energy impacts in the market the MTI seeks to transform at the time the MTI is adopted. Note that because of CalMTA's commitment to effectively coordinate, collaborate, and avoid duplication of effort, we generally expect adopted MTIs to create synergistic impacts, with the implication that future resource program savings would be improved as a result of the MTI. CalMTA will include previously established savings in the BMA forecast because they would have occurred absent the MTI. Savings associated with collaborative efforts under the umbrella of the MTI, however, will be excluded from the BMA forecast.

[16] TecMarket Works. June 2004. *The California Evaluation Framework*. Prepared for California Public Utilities Commission and the Project Advisory Group. Chapter 10. TecMarket Works, 2006. FINAL California Evaluation Framework (calmac.org).

2.5.3 Unit Energy Impacts Estimation

Measure savings will be based on values from the Database of Energy Efficiency Resources (DEER) or the California Electronic Technical Reference Manual (eTRM) if available; otherwise, CalMTA may use secondary research or energy modeling to develop hourly kWh and Therm consumption and savings estimates for preliminary savings estimates in Phase I. During Phase II, CalMTA will use available technology assessments to refine preliminary savings estimates as part of Phase II research and/or pilots. CalMTA will also identify any gaps in technology assessment that need to be addressed for the development of a measure package.

2.5.4 Estimating Cost-Effectiveness

The Decision specifies that each MTI proposed by CalMTA shall report its expected costs and benefits according to the total resource cost (TRC) and program administrator cost (PAC) tests and shall include costs and benefits associated with related development and implementation of building codes and appliance standards, if applicable.

Per Attachment A to the Decision, there will not be an individual threshold benefit-cost ratio that MTIs must pass initially; rather, the expected cost-effectiveness of each MTI will be considered in selection of the MTI portfolio. CalMTA must manage the cost-effectiveness of the market transformation portfolio, with an eye toward increasing cost-effectiveness of the entire portfolio over the long term.[17]

Cost-effectiveness calculations will be based on the framework in the California Standard Practice Manual (CA SPM),[18] with modifications appropriate to market transformation programs, including to these areas: counting codes and standards (C&S) savings, timeframe of costs and benefits, and the net-to-gross (NTG) methodology—as summarized in Table 1.[19]

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[17] California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. P.131. 321507615.PDF (ca.gov).

[18] California Public Utilities Commission. 2001. *Standard Practice Manual.* cpuc-standard-practice-manual.pdf (ca.gov).

[19] These modifications are noted in the Decision, which references the discussion in Prahl, Ralph, and Ken Keating. December 9, 2014. *Building a Policy Framework to Support Energy Efficiency Market Transformation in California*. MT_Policy_White_Paper_final_Dec 9 2014.doc (live.com).

Table 1. Comparison of Cost-Effectiveness Calculation for Resource Acquisition Programs vs. MTIs

Cost-Effectiveness Calculation Elements	CA SPM Approach for Resource Acquisition Programs	Approach for MTIs
Codes & Standards Savings	Excluded	Included for MTIs that are proposed to lead to a code or standard [20]
Timeframe of Forecasted Costs and Benefits (to support adoption decision)	Program funding period	Lifetime of MTI [a]
Net-to-Gross Methodology (Incremental Impact)	Net impacts = (Total units * unit energy impacts [UEI]) * NTG ratio [NTG Ratio = 1 – FR ratio + SO ratio + ME ratio]	Net Incremental MTI impacts = [(TMA units – BMA units) * UEI] – utility verified impacts
Incremental Costs	Typically remain static	Typically decline over time

[a] CalMTA will forecast 20 years forward from the current period and will continue accruing costs and savings from the date of inception for the MTI.

This modified approach is consistent with NEEA's approach to cost-effectiveness, as well as the white paper entitled "Building a Policy Framework to Support Energy Efficiency Market Transformation in California," prepared by Ralph Prahl and Ken Keating for the CPUC.[21]

CalMTA will develop preliminary estimates for TRC and PAC tests, as well as Total System Benefit (TSB), during Phase I of the MTI lifecycle and will develop more robust estimates during Phase II. Third-party evaluators will periodically review the forecasting model and documentation of assumptions, sources, and methods during Phase III.

2.6 Ongoing Evaluation

Once MTIs have been adopted into the CalMTA portfolio for full-scale market deployment (Phase III), CalMTA will use a competitive request for proposal (RFP) process to contract with third-party evaluators to perform ongoing evaluation for each MTI. EM&V activities will focus on market progress evaluation per agreed-upon MPIs, assessing MTI causality, identifying adaptive management opportunities, and refining estimates of total and net (incremental) market impacts.

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20 CalMTA will work closely with the C&S teams during the process of selecting and developing MTIs to ensure the work is additive to existing efforts.

21 CPUC Energy Data Web Access to "Building a Policy Framework to Support Energy Efficiency Market Transformation in California," December 9, 2014. Prepared by Ralph Prahl and Ken Keating. MT_Policy_White_Paper_final_Dec 9 2014.doc (live.com).

Modeled after the successful approach employed by NEEA, CalMTA will designate a staff evaluation lead responsible for project management of ongoing EM&V activities for each MTI. The role will include the following:

- Serve as an integral member of the MTI management team.
- Manage a transparent, competitive third-party EM&V solicitation and selection process.
- Oversee the EM&V contractor to ensure adherence to the final evaluation plan, budget, and timely evaluation and reporting.
- Ensure that the third-party evaluator has access to available initiative data and market contacts.
- Ensure that evaluation findings and recommendations are actionable, and that the MTI program manager incorporates lessons learned from the evaluation.

2.6.1 Market Progress Evaluation

CalMTA will employ TBE as the basis for third-party evaluators to assess what happens versus what was expected, using the MTI program theory as the point of reference. Evaluations will assess market progress using agreed-upon MPIs and MTI causality, using a preponderance of evidence approach.

The third-party evaluator will produce annual evaluation reports that may include but not be limited to these activities:

- Measure market progress per MPIs.
- Assess performance to equity metrics.
- Assess market developments.
- Review/assess MTI logic model and program theory.
- Assess MTI causality per the logic model, using evidence-based assessments that use a "preponderance of evidence" approach and established market transformation evaluation best practices[22].
- Identify opportunities to improve MTI effectiveness.

2.6.2 Impact Evaluation

As described earlier in the *2.5 Estimating Incremental Impacts and Cost-Effectiveness* section, CalMTA will develop data-driven market adoption and cost-effectiveness estimates that include BMA, TMA, and MTI impacts. As part of ongoing evaluation efforts, the third-party evaluator will review model inputs, assumptions, data sources, and structure and will identify recommended revisions to improve the accuracy of impact estimates.

The third-party evaluator will also identify any evidence from its market progress evaluation research that could suggest the need to refine the original BMA forecast. For example, if the MTI

[22] TecMarket Works, April 2006.

causality assessment were to identify a previously unknown significant market influence that preceded or was otherwise wholly independent of MTI market deployment activities, it could indicate the need to re-estimate BMA or otherwise reconsider program attribution and calculation of incremental market impacts.

The BMA forecast is a major determinant of the estimated savings attributable to the program. Given the challenges inherent in forecasting a counterfactual scenario, the BMA forecast may constitute the most significant source of uncertainty surrounding estimated savings. As such, under certain circumstances it could make sense to consider revising the BMA forecast.

However, it can be counterproductive to revise the baseline forecast unless it is truly warranted. The data most readily available to the evaluator are the efficient units appearing in the market over time, and those may well reflect effects caused by the MT program itself. There is a risk, therefore, that evaluators may attribute observed acceleration in efficient market units to an acceleration in the BMA when it is really a result of MTI market interventions. Revising the baseline upward in such a case would lead to underestimation of the program's accomplishments.

Guidelines for Considering BMA Revision

Recommending a revision to the BMA forecast requires the evaluator to balance the desirability of incorporating relevant new information with the risk of mis-attributing MTI market effects to extrinsic market changes. To serve the best interests of California, the BMA forecast should be revised only when evaluators have a high level of confidence that one or more initial assumptions were incorrect, and that the MTI did not significantly contribute to an observed change in market adoption. CalMTA identified three scenarios that warrant consideration of revising the BMA forecast and two guidelines for whether the revision should be made. These scenarios are described in Table 2. Guidelines for whether to revise the BMA are discussed below.

Table 2. Scenarios Warranting BMA Review and Possible Revision

Scenario	Description
Incorrect BMA assumption discovered	New information reveals an incorrect BMA assumption with a high degree of certainty. For example: • New data on the market adoption prior to MTI intervention reveals that it was over- or under-stated. • An assumed code or standard is delayed from when it was assumed to occur. • An assumed code or standard is accelerated from when it was assumed to occur, without influence by the MTI.
Unanticipated exogenous event occurs	An exogenous event causes an increase in market adoption that could have occurred absent the MTI intervention. For example, if a substantial change in public policy resulting from an unanticipated electoral outcome or economic shock were to result in a substantial change in assumed market adoption. Note, however, that the evaluator must assess whether the change in market adoption could have occurred absent MTI intervention.
Unanticipated Product/ Technology Advancement	An unanticipated new product or technology becomes competitive with or subsumes the MTI for which the BMA forecast was developed. For example, early in the lifecycle of efficient high-definition LED televisions, inefficient plasma technology experienced a surge in popularity. If the original BMA forecast for efficient LED televisions did not anticipate the advent of plasma technology, the naturally occurring market adoption may have been estimated substantially higher than it would have been if that foreknowledge had existed.

If one of these scenarios indicates that the BMA should be reviewed, it still may be inappropriate to revise the baseline forecast. The evaluator should first consider these questions: Would the revision result in a material change? Is it possible that the MTI significantly contributed to the observed change?

Guideline 1: Materiality

Because the BMA represents a counterfactual forecast, it will always have a high degree of uncertainty. For that reason, it would not make sense to revise the BMA forecast—under any of the circumstances described in Table 2—unless the revision would materially change MTI impacts. We define "materiality" here to mean that the change would lead the CPUC and California stakeholders to draw a different conclusion about continued MTI investment. The evaluator should work with CalMTA planning staff to analyze the impacts if different values are used for the BMA forecast.

Guideline 2: Causality

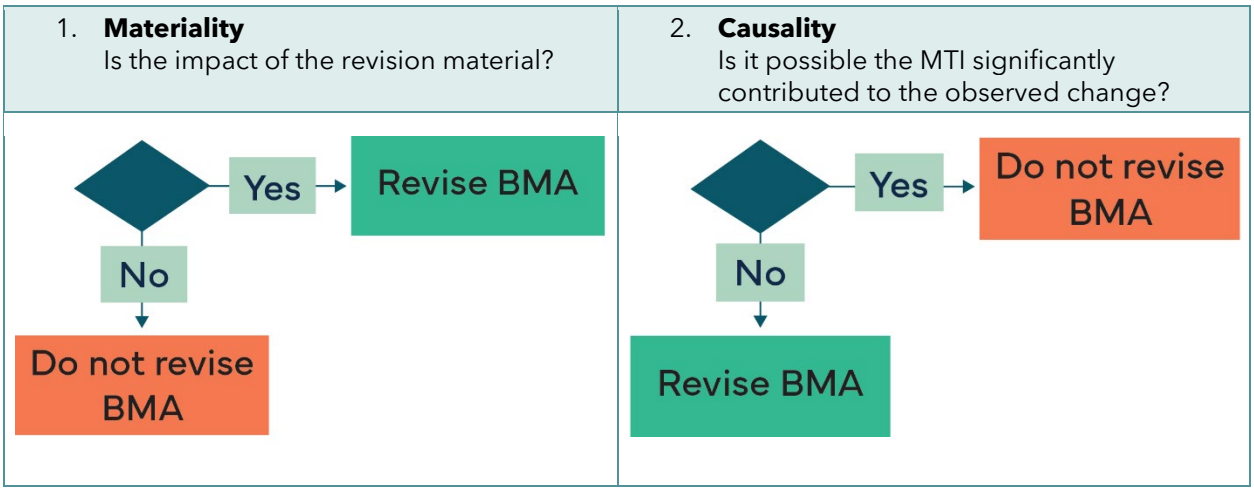
To mitigate the risk that evaluators may attribute observed acceleration in efficient market units to an acceleration in the BMA when it is a result of MTI market interventions, the evaluator must assess whether the observed change in market adoption could have occurred or is likely to have occurred absent the MTI market interventions. A defining characteristic of MTIs is that they are designed to produce lasting structural market changes. Once structural market changes such as increased product availability have occurred, it becomes challenging—if not impossible—to separate the impact of an economic or political shock from the MTI impact. NEEA's experience with its compact fluorescent lamp (CFL) initiative, described below, provides an illustrative example of why it is critical to consider whether the MTI significantly contributed to what may otherwise appear to be the result of an unanticipated market shock.

In the late 1990s, NEEA invested in an initiative to transform the residential lighting market, focused on working with supply-side market actors to increase the market availability of high-quality CFLs at an affordable price. After several years of working toward those goals, product availability and quality had increased substantially, but CFL market saturation remained low. In 2002, however, the West Coast energy crisis prompted a spike in CFL sales. Following this dramatic increase, stakeholders questioned the high proportion of market adoption that was being attributed to the MTI. Without historical context and evidence of NEEA's influence on manufacturers, retailers, and product quality, it appeared that the increase in market adoption was attributable to the energy crisis. However, detailed documentation and evaluation of the initiative's logic model revealed that the CFLs would not have been available for purchase during the energy crisis if not for NEEA's extensive market interventions.[23]

These guidelines for BMA revision are summarized in Figure 4.

[23] NEEA's CFL and other initiative market progress evaluations are well-documented and publicly available on the NEEA website: www.neea.org.

Figure 4. BMA Revision Guidelines



2.6.3 Attribution and Incremental Impact

The Decision is clear that CalMTA investments must deliver incremental benefits; MTIs must demonstrably increase and/or accelerate market adoption beyond what it would have been absent the market transformation initiative.

As discussed in the preceding section, CalMTA will adhere to the well-established approaches to evaluating the total incremental impact of MTIs (that is, [TMA units – BMA units] * UEI), as well as rigorous TBE to assess MTI causality.

However, when an MTI is intervening in the same market as other California ratepayer-funded programs, such as utility resource or market support programs or statewide programs such as the Codes and Standards program, questions about program attribution arise. For example, *how much of the total incremental impact in the market being targeted by the MTI should be attributed to CalMTA versus other programs that may have contributed to that incremental impact*? *How can California avoid double counting the impacts of "overlapping" programs when reporting aggregated savings across the state?*

Attribution was discussed in the California Energy Efficiency Coordinating Committee (CAEECC) Market Transformation Working Group (MTWG) proceedings and final report and referenced by the Decision, which indicated concern that attribution remained unresolved and required further consideration. The Decision asked that the CAEECC MTWG reconvene to begin addressing these issues and directed CalMTA, once in place, to formalize the approach(es) it will take. The MTWG reconvened between August 2020 and February 2021, at the behest of the CPUC, and produced

a MTWG Phase II final report.[24] To arrive at an MTI attribution policy, CalMTA began by reviewing this report.

CAEECC MTWG Attribution Discussion

The MTWG Phase II report considered savings attribution in two parts: first, for MTIs and resource acquisition programs and, second, for MTIs and the California Codes and Standards (C&S) program. The MTWG's stated purpose was to recommend a method to prevent double counting of market transformation and resource acquisition program savings and of market transformation and C&S savings when programs are operating in the same market or targeting the same measure.

The MTWG Phase II Report considered two options to avoid double-counting of savings from MTIs and resource acquisition programs and reported that stakeholders were unable to reach consensus on the recommended approach:

- **Option A.** Subtract Verified Resource Acquisition Savings from Net MTI Savings
- **Option B.** An independent review committee (IRC) should conduct a technical review of the proposed methodology for distinguishing market effects included in the MTI Plan. It is premature to make a blanket decision on how to remove other program savings without knowing the nature of the MTI, the purpose of the calculation, and other information.[25]

On the second question of attribution for MTIs versus the Codes and Standards program, the Phase II report reached consensus recommendations on these points:

- There should be close cooperation and collaboration between the MTA and C&S teams.
- In addition to the initial planning forecast of total MTI/C&S savings, as specified by the Decision, the MTA should also forecast, in collaboration with the Codes and Standards program administrator, savings for individual MTIs separate from savings achieved by the Codes and Standards program administrator, which will *de facto* result in relative forecasted shares.[26]

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[24] CAEECC-Hosted Market Transformation Working Group – Phase II. February 1, 2021. *Report and Recommendations to the California Public Utilities Commission.* 849f65_fbc2ed9084ba4c5fb1c309651e52229c.pdf (caeecc.org).

[25] Ibid. The report notes that option B proponents are not suggesting that market effects evaluations are necessarily the best option or that they be conducted every year, but that the MTA and impacted PA's work collaboratively to determine whether it is necessary, feasible, and useful to estimate these market effects. It acknowledges that the MTA and evaluators must strike a balance between the benefits and costs of data collection to evaluate market effects.

[26] Ibid.

The MTWG Phase II report also considered these topics:

- Addition of MTI-related attribution factors to the existing C&S program evaluation methodology (MTWG members were divided on whether to specify additional factors, with most members believing it was premature to do so);[27]
- Adjustments to the weighting of attribution factors in the existing C&S program evaluation protocol (MTWG members were also divided on whether to make specific adjustments to attribution factor weighting, with most members believing it was premature to do so); and
- Pre-allocation of savings to MTIs and the C&S program for the C&S to which they both contributed (MTWG members reached a consensus recommendation against doing this).

Attribution Guiding Principles

The question of attributing incremental impact to MTI investments versus other California investments is complex and consequential, as recognized in the Decision and evidenced by the MTWG's lack of consensus on the approach. To assist in determining the best approach for California, CalMTA assembled the following five guiding principles, which it and MTAB believe capture the intent of the Decision and stakeholder discussions to date.

These principles are referenced in the assessment of attribution approaches in the following sections:

- **Principle 1 (P1)** - Supports California's policy goals.
- **Principle 2 (P2)** - Is consistent with good stewardship of ratepayer funds.
- **Principle 3 (P3)** - Encourages and does not discourage collaboration between MTIs and other programs (important because collaboration will result in more cost-effective investments with greater benefits to California stakeholders).
- **Principle 4 (P4)** - Recognizes the contribution of MTI investments to collaborative impacts (important because such recognition is essential to accurately assess California's return on investment in market transformation).
- **Principle 5 (P5)** - Avoids crediting MTI investments with market transformation impacts from other programs.

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[27] For current C&S evaluation methodology, see Opinion Dynamics. April 2023. *PY 2016-18 Building Codes Advocacy Program Evaluation*. Prepared for California Public Utilities Commission. Sections 1.2 and 3.3. Report Template v2017.0521 (calmac.org).

Attribution Approaches: Resource Programs and MTIs

CalMTA assessed the two attribution options raised in the MTWG Phase II Report (Options A and B noted above) as well as a third approach that relies upon MTWG Option A to determine net incremental impacts attributable to an MTI and cost-effectiveness and also reports the total combined impacts, of programs collaborating on the MTI.[28]

Table 3 summarizes the advantages and disadvantages of the three approaches.

[28] NEEA uses the term "co-created" to describe the total impacts (including utility-reported savings) influenced by the MTI and focuses regionally on maximizing these impacts via coordinated MTIs and resource acquisition programs. It reports both net impacts and co-created impacts, and calculates cost-effectiveness based on co-created impacts. CalMTA initially considered NEEA's approach of using co-created impacts to calculate cost-effectiveness but determined it was not appropriate for California.

Table 3. Advantages and Disadvantages of Attribution Approaches for Resource Acquisition (RA) Programs and MTIs

Approach	Description	Advantages	Disadvantages
1) Subtract RA savings from Net MTI Savings (MTWG Option A)	Subtract verified RA savings	• Simple to implement • Expedient • Avoids uncertainty over who gets credit for what, which should facilitate collaboration **(P3)**	• Could understate MTI impacts on increasing resource program results **(P4)** • Could overstate MTI impacts by crediting all non-RA claimable impacts, including those that resulted from other non-RA programs **(P5)**
2) Customize approach for each MTI (MTWG Option B)	Develop proposed approach in collaboration with program administrators; include in each MTI plan, to be reviewed with IRC	• Offers option to quantify impacts of different program efforts	• Could delay MTI advancement • Parses credit for synergistically achieved results • Potentially resource-intensive **(P2)** • Could hinder collaboration due to uncertainty about who will get credit **(P3)**
3) MTWG Option A + co-created impacts reporting	Same as first approach above; adds reporting of co-created impacts	• Simple and expedient solution to avoid double-counting • Avoids uncertainty over who gets credit for what, which should facilitate collaboration **(P3)** • Recognizes synergistic impacts of coordinated RA and market transformation approaches • Encourages RA programs to collaborate since their claimed savings is unaffected and their contributions to market transformation will be recognized **(P3)**	
Note: Advantages and disadvantages reference the five guiding principles in the previous section (P1-P5), using **green** to denote advantages and **red** to denote disadvantages.			

Attribution Approach - RA Programs and MTIs

CalMTA and MTAB reached consensus on the third option (MTWG Option A with "co-created impacts" reporting) because we believe it best supports the guiding principle of encouraging collaboration, while using the rule-based approach (Option A) favored by a majority of MTWG members to avoid double-counting/reporting of savings.

This approach, combined with rigorous theory-based analysis, allows California to assess incremental impacts anticipated in each MTI Plan without arousing conflicts that could diminish market transformation success. Reporting co-created MTI impacts alongside net MTI impacts also provides visibility into collaborative results.

CalMTA Attribution Discussion: Codes and Standards Program and MTIs

The Decision—in section 14.2.1, Inclusion of C&S into the CE Methodology—states that an MTI may receive credit for savings achieved following the adoption of a code or standard as follows:

> *If the MTI results in the adoption of a code or standard, the savings credit afforded the MTI for the years following code adoption shall be equal to three times the savings claim made in the final year of MTI operations prior to the code or standard adoption. An MTI CE calculation may include projected C&S savings in accordance with the above approach for C&S savings recognition.* [29]

However, the Decision also asked CAEECC to continue working on attribution issues and noted that "once the MTA is in place, that entity should formalize these coordination approaches and issues."[30] To ensure consistency with Decision guidance, CalMTA reviewed the Phase II MTWG proceedings and final report on the topic of Codes and Standards attribution.

The MTWG considered how the evaluation approach currently used for the California Codes and Standards program could be adapted to include MTIs in cases where an MTI is expected to

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[29] California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. P.130. 321507615.PDF (ca.gov).

[30] California Public Utilities Commission. Decision 19-12-021 December 5, 2019. "Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues." Date of issuance December 12, 2019. P.74. 321507615.PDF (ca.gov).

advance a code or standard.[31] Though the MTWG did not reach consensus on the best way to adapt the C&S attribution rubric, it did recommend that CalMTA collaborate with the Codes and Standards program administrator to forecast MTI savings separate from those achieved by the Codes and Standards program administrator, which would result in *de facto* relative forecasted shares, to be updated as necessary, per the Decision.

CalMTA considered three options for assessing attribution for MTIs that lead to a code or standard, with the benefits and drawbacks summarized in Table 4.[32]

[31] The method used to evaluate and attribute savings to California's statewide Codes and Standards program is distinct from that used for resource programs. Similar to the established approach for market transformation evaluation, codes and standards evaluation relies upon developing a counterfactual BMA forecast. After subtracting BMA from TMA, a third-party evaluator assembles an attribution panel that reviews all available data and research and determines a program attribution factor. For example, in the most recent evaluation, the attribution factor for the Building Codes Advocacy Program was determined to be 0.59, with the implication that other factors were responsible for the other 41% of the increased market adoption.

[32] This Framework does not address the question of modifying codes and standards attribution factors; we believe changes to the codes and standards scoring rubric would be more appropriately proposed by independent third-party evaluators and assessed by CPUC in an evaluation solicitation.

Table 4. Advantages and Disadvantages of Codes and Standards Attribution Approaches

Option	Description	Advantages	Disadvantages
1) 3X Rule	Per Decision (see above)	Expedient	• Could understate MTI impacts from new codes or standards **(P4)** • Could overstate MTI impacts **(P5)** • Does not address share of impact from MTI vs. C&S **(P3)** • May conflict with MTWG consensus that impact shares should not be predetermined **(P3)** • May conflict with future C&S program evaluation that include the same codes or standards
2) Forecast Adoption with *Ex Post* Evaluation True-Up	Develop collaborative forecast per MTWG Phase II Report recommendations; adapt C&S Statewide Program evaluation to include MTIs	• Requires alignment between CalMTA and C&S program on incremental benefit as a precondition of Phase III MTI adoption **(P3)** • Consistent with established C&S evaluation approach	• Not consistent with decision guidance • Alignment on forecast results and shares could delay MTIs **(P1)**
3) 3X Rule with *Ex Post* Evaluation True-Up	• Short-term: Apply 3X Rule, per Decision • Long-term: Adapt C&S Statewide Program evaluation to include MTIs	• Expedient • Consistent with established C&S evaluation approach	• Lack of CalMTA and C&S program alignment on forecast results and shares could inhibit collaboration **(P3)**
Note: Advantages and disadvantages reference the five guiding principles in the previous section (P1-P5), using **green** to denote advantages and **red** to denote disadvantages			

Attribution Approach – Codes and Standards Program and MTIs

After considering stakeholder feedback, CalMTA and MTAB reached consensus on provisionally moving forward with Option 1, pending additional research and analysis that provides insight on how this approach could be improved. We recognize the advantages of using this broad rule-based approach, particularly for initial forecasting. We are concerned, however, about the potential disadvantages associated with the 3X rule, noted in Table 4. To better understand the possible implications of using this rule, CalMTA will conduct and share additional research and analysis during Phase II of the MTI lifecycle: we will refine the MTI market adoption and baseline forecasts, estimate TSB and cost effectiveness using the 3X rule, and conduct sensitivity analyses to understand the implications associated with different market adoption curves.

We concur with the MTWG that CalMTA and C&S program staff should collaborate on the forecast for market adoption with, and in the absence of, the MTI. We believe this collaboration, which will occur during Phase II of the MTI lifecycle, will ensure that the CalMTA and the C&S program administrator agree that the MTI is likely to produce incremental impacts.

It is worth noting that the current statewide C&S Program evaluation approach—which has been in use since 2005—would, when it occurs, assess how much influence MTI activities had on total impacts associated with C&S being evaluated. A C&S program evaluation that includes a code or standard addressed by an MTI is unlikely to occur for 10 years, however, which will allow time to further assess the current approach.

2.7 CalMTA Roles and Oversight of Third-Party Evaluators

The Decision offers direction regarding the roles of the CalMTA and independent third-party evaluators. As the lead for program development, CalMTA will conduct market research and develop preliminary estimates of MTI incremental impact and cost-effectiveness to support effective MTI prioritization, selection, and design in Phases I and II of the MTI lifecycle.

During those phases, CalMTA will oversee any product and market testing needed, identification of the market adoption baseline, creation of the logic model, and establishment of MPIs. During Phase II, CalMTA will develop an Evaluation Plan, an element of the MTI Plan that is required for an MTI to advance from Phase II (Program Development) to Phase III (Market Deployment). The Evaluation Plan will specify the methodology to be used to evaluate MTI energy impacts and to verify the effectiveness of strategies and the accuracy of the initial program logic model.

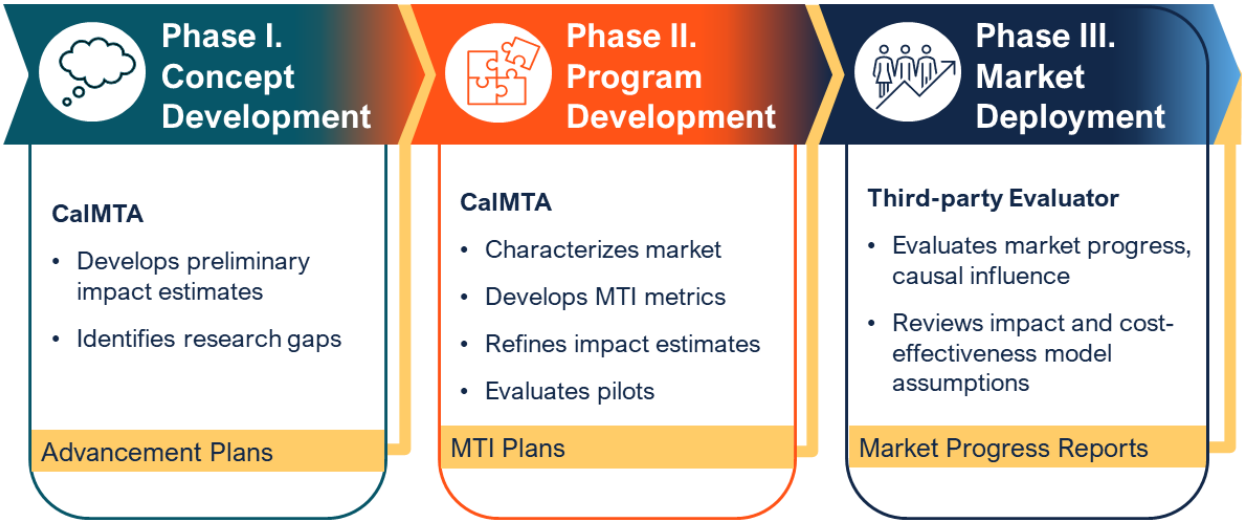
In Phase III, MTIs will be implemented in accordance with the MTI Plan and evaluated by an independent third-party evaluator selected through a competitive bidding process.

The Decision states that the EM&V Plan should be developed with the support of an independent EM&V subject matter expert (evaluator) that is not financially interested or otherwise involved in

program implementation.[33] It also states that during Phase III, the MTA will actively administer each MTI and will provide real-time evaluation and feedback (as NEEA does for its programs) to the implementers.

Figure 5 depicts the evaluation-related activities and roles, by phase of the MTI lifecycle.

Figure 5. Evaluation-Related Activities, Deliverables, and Roles, by MTI Lifecycle Stage



Third-Party Evaluation Management and Oversight

Per D.19-12-021, CalMTA will bid out the planned EM&V activities described in *2.6 Ongoing Evaluation* to third-party evaluators via competitive solicitations. CalMTA and the MTAB had extensive discussion regarding the appropriate roles of CalMTA versus CPUC Energy Division staff in MTI third-party evaluations, which are different than those established for IOU impact evaluations, as delineated in D.05-01-055. Specifically, Decision 19-12-021 recognizes the value of timely, ongoing evaluation to the success of market transformation programs and calls for CalMTA to administer third-party market progress evaluations, which include assessment of outcomes.

CalMTA and MTAB concurred on these points:

- D.19-12-021 authorizes CalMTA to administer third-party evaluations

[33] During Phase II CalMTA will develop an Evaluation Plan, the contents of which are described in 2.4 Evaluation Plan Development, as part of the MTI Plan required for an MTI to advance from Phase II to Phase III. The RFP for an independent third-party evaluator will include a request for bidders to identify any recommended improvements to the evaluation plan. The selected evaluator will also have the opportunity to refine the evaluation plan as part of its scope.

- It is vitally important to establish a management and oversight structure that ensures credibility and appropriate independence, avoids any potential conflict of interest, and ensures timely evaluation that can effectively inform decision-making.

Toward that end, CalMTA will adopt the approach to management and oversight of third-party evaluation activities summarized in Table 5 and further described below.

Table 5. Management and Oversight of Third-Party Evaluations

	Members	Roles
Evaluation Management Team	Energy Division Representative CalMTA Evaluation Lead	• Day-to-day management of third-party MTI evaluations • Energy Division Representative has final decision authority on all related matters • Seeks advice of Evaluation Advisory Group, as needed
Evaluation Advisory Group	Evaluation Management Team and three additional members	• Review RFPs for third-party MTI evaluators • Review and score third-party MTI evaluator proposals • Review evaluation deliverables • Advise Evaluation Management Team, as requested

A management team comprising the CalMTA evaluation lead and a designated Energy Division representative will be responsible for ongoing day-to-day management of third-party evaluations. Prior to Phase III (Market Deployment), CalMTA will form an evaluation advisory group that includes the CalMTA management team and three other independent evaluation experts with relevant evaluation experience.[34] Evaluation advisory group members will review RFP solicitations before they are finalized and score proposals according to an agreed upon set of criteria. Once MTI third-party evaluators are selected, based on advisory group scoring, the CalMTA evaluation lead will include the Energy Division representative in all communications and meetings with the third-party evaluator including, but not limited to, discussion of evaluation findings, analysis, and conclusions.

Evaluation advisory group members will review all third-party evaluation deliverables including, but not limited to, work plans, interim findings, and draft and final reports. Third-party evaluators will determine the ultimate contents of final evaluation reports. CalMTA will ensure that all final evaluation reports are publicly available on its website and in the CALMAC database.

[34] Once finalized, details on the selection, compensation, and charter for evaluation advisory group members will be posted on calmta.org. Evaluation advisory group members will be subject to the same conflict of interest policies documented on page 7 of the Market Transformation Advisory Board member COI requirements.

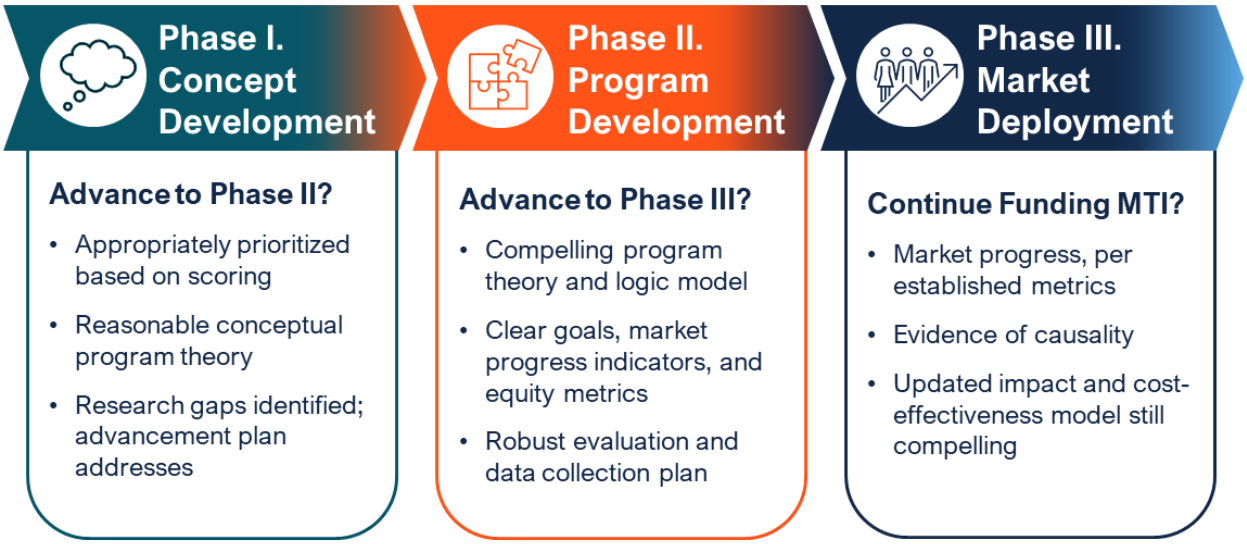
CalMTA, together with MTI implementers and evaluators, will assess and adjust the MTI as needed to achieve success. CalMTA will document its response to all recommendations included in each evaluation report and will make that response publicly available within three months of posting the final evaluation report.

3 Conclusion

Ultimately, the evaluation processes, activities, and methods described in this Evaluation Framework enable well-informed, data-driven investment decisions regarding individual MTIs as well as continued investment in market transformation. These methods are consistent with well-established approaches for market transformation evaluation, but they differ from California's established approaches for evaluating resource acquisition programs.

Figure 6 summarizes the evaluation-related activities presented in this Framework that will support California's decisions about ongoing market transformation investments.

Figure 6. Stage-Gate Decisions and Supporting Evaluation Activities/Analyses



About CalMTA

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations. We work to deliver cost-effective energy efficiency and decarbonization benefits to Californians through a unique approach called market transformation. 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. CalMTA-developed market transformation initiatives also aim to advance state goals on demand flexibility, workforce development and equity. Learn more at www.calmta.org.