Opinion Dynamics

CALIFORNIA EMERGING TECHNOLOGY PROGRAM (ETP)

PROCESS AND EFFECTIVENESS EVALUATION REPORT

CALMAC STUDY ID: CPU0391.01
SEPTEMBER 13, 2024

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This study is covered under CPUC Contract 17PS5017 between Opinion Dynamics and the California Public Utilities Commission (CPUC or the Commission).

I. EXECUTIVE SUMMARY

A central pillar of California's energy efficiency portfolio includes resource acquisition programs that offer rebates to customers who adopt highly efficient technologies. Investor-owned utility (IOU) staff who administer these resource acquisition programs are continually seeking new, emerging technologies that can provide opportunities for energy savings to replace sunset measures and support California's energy and demand savings targets. California's Emerging Technologies Program (ETP) is a market support program designed to help California ratepayer-funded programs by identifying, vetting, and supporting innovative energy efficiency measures and strategies so they can be adopted into the energy efficiency portfolio.[1]

Since 2016, the California Public Utilities Commission (CPUC) has required program administrators (PAs) to shift the implementation of their programming to third-party (3P) implementers across their portfolios.[2] As part of this transition, the historical ETP became a statewide (SW) initiative that comprises two fuel-specific programs. The electric ETP (i.e., CalNEXT), implemented by Energy Solutions, was relaunched as a SW 3P program in 2022. The gas ETP (i.e., GET) was relaunched as a SW 3P program in 2021 and is implemented by ICF. Both ETPs follow the same overarching program process, as shown in Figure 1.

Figure 1. Key ETP Processes

I.I RESEARCH OBJECTIVES AND APPROACH

The CPUC hired Opinion Dynamics (i.e., the Evaluation Team) to evaluate the SW 3P ETPs. The overall goal of the evaluation was to assess program evaluability and the effectiveness of the 3P implementation model. The evaluation study objectives were to complete the following:

- Assess program evaluability and fidelity of implementation to program theory;
- Determine the effectiveness of 3P implementation in tracking and progress toward achieving program metrics;
- Assess scanning and scoring strategy and tactics;
- Evaluate a sample of technology research projects and technology-focused pilots;
- Evaluate new and updated Technology Priority Maps and prioritization processes;
- Evaluate technology transfer process and information dissemination for ETP-associated measures; and
- Assess the success of 3P implementers in driving process innovations.

To accomplish these objectives, the Evaluation Team utilized a mix of secondary data review and qualitative data collection and analysis activities, which included:

[1] Decision 21-05-031 states market support programs have a primary objective of supporting the long-term success of the energy efficiency market by educating customers, training contractors, building partnerships, or moving beneficial technologies towards greater cost-effectiveness.

[2] D.16-08-019. 166232537.PDF (ca.gov)

- **Materials and Data Review:** A review of ETP documents (e.g., implementation plans, process descriptions, project scoring criteria, outreach materials).
- **Program Theory Logic Model (PTLM) Review and Evaluability Assessment:** A review of the existing PTLMs and associated key performance indicators (KPIs) provided in the implementation plan of each of the two ETPs.
- **Program Staff Interviews:** Interviews with IOU PAs and 3P implementation staff for each of the two ETPs (four interviews total).
- **Stakeholder Interviews:** Interviews with eight key stakeholders involved with at least one of the two ETPs, as identified by program staff.
- **Project Reviews:** Technical review of four projects completed through one of the two ETPs, including two CalNEXT and two GET projects, to assess the projects' fidelity to the Project Plan and the reasonableness of project findings and recommendations. Projects were selected for review based on the diversity of end-uses and applications, alignment between the project description and recent technology and market trends, and the extent to which the experimental design and results could benefit from a technical review by engineering staff.

1.2 CONCLUSIONS AND RECOMMENDATIONS

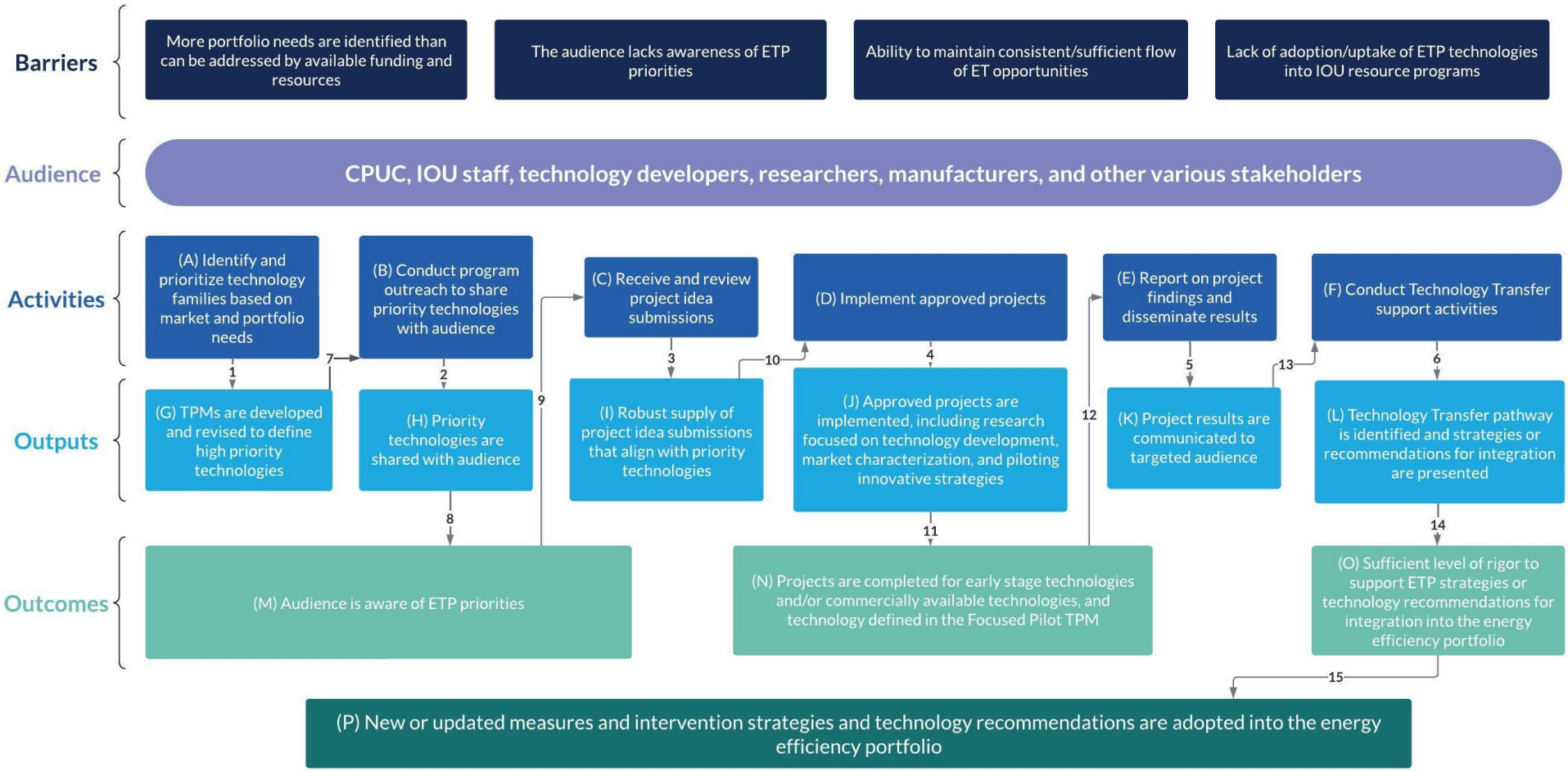
Below, we summarize the conclusions, key findings, and recommendations from this evaluation.

1.2.1 PROGRAM EVALUABILITY AND FIDELITY OF IMPLEMENTATION TO PROGRAM THEORY

Conclusion: Existing PTLMs for the ETPs do not follow PTLM design best practices. The original GET PTLM included in the program implementation plan did not provide explicit links between program activities, outputs, and associated outcomes. Including these elements in a PTLM is paramount to ensuring program activities lead to expected outcomes and KPIs can be established to measure program success. The original PTLM for CalNEXT followed some PTLM best practices, including linkages from program activities to outputs and outcomes; however, many of these connections are not plausible. The Evaluation Team updated the original PTLMs to follow PTLM design best practices as part of this evaluation study. CalNEXT and GET program implementation staff both reviewed and approved the revised PTLM.

Recommendation: Program staff should adopt the PTLM updates proposed by the Evaluation Team for the SW ETP, as shown in Figure 2.

Figure 2. New SW ETP PTLM



I.2.2 EFFECTIVENESS IN TRACKING AND PROGRESS TOWARD ACHIEVING PROGRAM METRICS

Conclusion: Many of the KPIs identified for the ETPs are not fully feasible to measure based on current data collection and tracking practices. The KPIs identified to measure program performance do not fully capture all intended outcomes from the program activities. The Evaluation Team identified many gaps in the existing KPIs where program performance is insufficiently tracked to accurately measure progress between activities and intended outputs and outcomes. A large proportion of KPIs and program metrics in the program implementation plans are either unable to be tracked (i.e., data tracking does not enable or KPI objective is not yet defined) or were identified as contractual metrics and did not relate to any activities grounded in ETP's core theory.

Recommendation 1a: Program staff should adopt the KPIs proposed by the Evaluation Team for the ETPs, as shown in Table 1.[3] Each KPI was designed to measure the intended outcomes of each program activity. KPIs represented by a green dot (●) in Table 1 are KPIs recommended by the Evaluation Team that were not included in the program implementation plans, while a blue dot (●) represents KPIs that at least one ETP had already planned to track, at least partially, but that the Evaluation Team recommends additional details and/or revised tracking moving forward. A blank KPI status identifies KPIs that that at least one ETP already planned to track, and that the Evaluation Team recommends no additional revisions for tracking.

Table 1. Recommended KPIs Based on Revised SW ETP PTLM

PTLM Link	Key Performance Indicators	KPI Status
1	Number and type of technology families identified for prioritization	●
	Number of subject matter experts[a] consulted with for each technology family	●
2	Number of outreach attempts by channel with developers of energy efficiency products (in whole or in part) that are less than five (5) years from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs)	●
3	Percent of unique ideas that move to project scoring by technology family (Idea Evaluation Approval Rate)	●
	Number of total project idea submissions	●
	Number and percent of submissions that align with Technology Priority Map priorities	●
	Stakeholder satisfaction with the project submission process (Idea Submission Process Satisfaction)	
4	Number of projects initiated (broken out by Technology Support Research, Technology Development Research, and Focused Pilots)	●
	Number of Technology Focused Pilots initiated as part of the Technology Focused Pilot Technology Priority Map	
	Number of projects initiated with cooperation from other internal IOU programs associated with each Focused Pilot	
5	Number of outreach attempts by channel with developers of energy efficiency products (in whole or in part) that are less than five (5) years from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs)	●
6	Number of technology recommendations and intervention strategies provided	●
	Number and percent of codes and standards recommendations presented	●
	Number and percent of measure packages initiated	●
	Number and percent of measure packages developed[b]	●
7	Number of Technology Priority Maps initiated, including one Focused Pilot Technology Priority Map	
	Number of Technology Priority Maps updated	
8	Percent of project submitters aware of Technology Priority Map priorities	●
	Number of approved and discontinued projects (including the number of projects discontinued due to misalignment with Technology Priority Map priorities)	●
9	Number of total project submissions received	●
	Number and percent of submissions that align with Technology Priority Map priorities	●

[3] KPIs proposed by the Evaluation Team include new and existing metrics. Note that existing metrics were not previously linked to specific components of the PTLM.

PTLM Link	Key Performance Indicators	KPI Status
10	Number and percent of approved, deferred, and discontinued projects (broken out by Technology Support Research, Technology Development Research, and Focused Pilots)	●
11	Number and percent of completed projects (broken out by Technology Support Research, Technology Development Research, and Focused Pilots)	●
12	Number and percent of final reports completed (broken out by Technology Support Research, Technology Development Research, and Focused Pilots) (Technology Project Final Report)	●
13	Number of dissemination activities conducted by channel (i.e., webinars, conferences, LinkedIn posts, email campaigns)	●
	Number of final report downloads	●
14	Number and percent of completed projects that result in a Codes and Standards recommendation	●
	Number and percent of completed projects that result in measure package revisions or development of a new measure package	●
	Number of technologies and intervention strategies recommended for transfer compared to new measures adopted in the portfolio (Technology Transfer Rate)	●
Tracking these KPIs depends on the adoption of ETP-supported measures into the energy efficiency portfolio.		
15	Number of technologies and intervention strategies recommended for transfer compared to new measures adopted in the portfolio (Technology Transfer Rate)	●
	Number of savings of measures currently in the portfolio that were supported by emerging technologies programs, added since 2021. Annual ex-ante with gross and net for all measures, with ex-post where available	●

[a] According to interviews, a subject matter expert (SME) is an individual with expertise-level knowledge about the technology.

[b] A fully developed measure package includes all documentation required to support the integration and adoption of a technology into the IOU portfolio.

Recommendation 1b: Regarding the revised KPIs, program staff should collectively define what "five years from commercialization" means in terms of the state of a technology. This term was previously used as part of an ETP metric for measuring program performance, but not defined in program implementation plans. Program staff should work with the CPUC to ensure that all parties involved in data tracking and reporting on this metric agree on the definition.

Recommendation 1c: Program staff should coordinate an effort to establish targets for the proposed KPIs and consult the CPUC as needed for this process. Revisit these targets on a regular basis to determine whether they are viable targets for future years as the program evolves.

Recommendation 2: The lead PAs for the ETPs should update the existing program data collection and tracking practices to ensure all necessary data to measure the proposed KPIs are collected and tracked. The PAs should assign clear responsibilities to implementation staff to identify who is responsible for tracking which data and how these data will be reported to IOU and CPUC staff. The PAs should also ensure any issues or concerns with data privacy are addressed early on before data are transferred to evaluators.

I.2.3 SCANNING AND SCORING STRATEGY AND TACTICS

Conclusion: Scanning and scoring strategies in the 3P design have decreased potential biases but increased review procedures, ultimately causing projects to take longer to get results. The ETPs have processes in place for scanning and scoring project ideas submitted to the programs. Interviewees found the scanning and scoring process effective, and many highlighted how the process had removed unintended biases that were present when the IOUs implemented their ETPs. According to interviewees, project approval and funding were sometimes correlated with existing relationships with certain IOU staff under the historical program design, whereas this influence is removed in the 3P design. However, a few stakeholders called out the length of the project review process, sharing how the process has become increasingly extensive with the added layers of review in the 3P design (including scanning, scoring, and discussions

among stakeholders). One interviewee mentioned that although the review process for CalNEXT Fast Track projects is designed to be expedited, it has been particularly difficult to speed up the review for these projects.

Recommendation: Explore opportunities to shorten project review timelines, particularly for Fast Track projects under the CalNEXT program. Program staff should consider setting targets for review timelines so that all parties involved understand and can commit to timeline expectations. Setting specific targets will also help prevent potential delays in the process. Once defined, timeline standards should also be shared with project submitters to align expectations.

I.2.4 TECHNOLOGY RESEARCH PROJECTS AND TECHNOLOGY-FOCUSED PILOTS

Conclusion: Final project data may be insufficient to support integration into energy efficiency portfolios. The quality of project data and the formatting of findings pose potential challenges. The Evaluation Team identified data quality issues in three of the four reviewed projects that impact the reliability and scalability of the results. One project lacked information about the cost of the technology, hindering the ability to accurately calculate cost-effectiveness, while another referenced using a key value from a source that is no longer available. Another project that tested multifamily electric vehicle (EV) charging capabilities (1) used supplemental data from project sites where there were no or few EVs in use; (2) used charging data from a limited sample (as low as one EV per site) to support project findings; and (3) did not complete infrastructure upgrades required for the technology to function at its full capability. Each of these impacted the technology's results. The Evaluation Team also identified issues with how results were organized in the final report for two reviewed projects, particularly for non-technical audiences. In these cases, results were organized by technology name and type, whereas it would be helpful to organize information by sector and application to align with resource acquisition program design. Considering utility program staff are consistently a target audience for ETP, organizing final reports by sector or program would help facilitate transfer activities so that program staff understand the appropriate program application for emerging technologies.

Recommendation 1: Program staff should consider including parties involved in technology integration (e.g., CalTF measure committee, evaluator) in developing Project Plans for implementation. This will ensure projects are set up with the appropriate level of rigor to facilitate a timely experiment for emerging technologies and that sufficient data are collected to support recommendations for integration into the energy efficiency portfolios.

Recommendation 2: CalNEXT and GET staff should revise Project Plan templates to include instructions for ET experiments and necessary levels of rigor to ensure sufficient, reliable data are available to support integration into the energy efficiency portfolio. The template may include suggestions on appropriate sample sizes for experiments, recommended applicable sectors and programs for future integration of the technology, and appropriate timelines for experiments across technology families. For example, HVAC experiments may take longer because they require data collected during a heating and cooling season. Have parties involved in technology integration (e.g., CalTF, evaluator) review the Project Plan template to ensure it provides the appropriate level of detail for future integration into the energy efficiency portfolios.

I.2.5 TECHNOLOGY PRIORITY MAPS AND PRIORITIZATION PROCESSES

Conclusion: The Technology Priority Maps (TPM)[4] prioritization process effectively identifies key program priorities based on the needs of the market and portfolio. The ETPs have an annual TPM process by which they assess the needs of the market and energy efficiency portfolio and update the programs' technology priorities accordingly to help address identified gaps. During interviews, program staff and stakeholders indicated the TPM process effectively defines technology priorities for both CalNEXT and GET. Interviewees said the annual cadence of TPM revisions is appropriate to

[4] Technology Priority Maps (TPM) define ETP technology priorities based on market and energy efficiency portfolio needs.

stay on top of evolving portfolio needs. Interviewees stated the TPM process has been very effective in identifying high-priority technologies that are best fit to address portfolio needs and encourage relevant project submissions. As the program has progressed, interviewees observed stronger alignment between project submissions and program priorities, as defined by the TPMs, suggesting that ETP implementation staff outreach efforts have successfully reached project submitters and are effectively communicating program priorities.

I.2.6 TECHNOLOGY TRANSFER PROCESS AND INFORMATION DISSEMINATION

Conclusion: Minimal technology transfer activities have occurred as part of the 3P program design, making the process somewhat unclear to program staff and stakeholders. Program staff indicated during interviews that more conversations between PAs and 3P implementers are necessary to clarify the extent to which each party is responsible for technology transfer activities. Under the historical design, IOU engineering teams developed and revised measure packages; ETP staff were not involved in this task. In the 3P design, CalNEXT and GET staff are available to support measure package activities as needed, although engineering teams are still the primary source. Project implementers may also help draft measure packages if they have the required skill set among internal staff. Implementation staff expressed uncertainty about where their support ends in the process and is fully handed off to other involved entities (e.g., CalTF, IOU engineering teams). Most stakeholders and staff hesitated to provide details about the transfer process during interviews, as few had seen the process executed as part of the 3P program design. At the time of the interviews, no gas projects had undergone transfer, and only one electric project had gone through the transfer process since the inception of the 3P design. The electric transfer resulted in the development of a new measure package (for a high-efficiency window measure for residential applications), which was still ongoing at the time of the interviews.

Recommendation: Program implementers and PAs should work together to collectively define the extent to which program staff are responsible for technology transfer activities. Clarifying ETP staff's involvement in the process will help ensure the program operates appropriately to support the transfer process. The CPUC should consider a supplemental evaluation that includes interviews with program staff and key stakeholders when more projects have been completed, and more opportunities for technology transfer activities have occurred to assess the effectiveness of this process and any revisions to the activities' roles and responsibilities.

I.2.7 SUCCESS OF THIRD-PARTY IMPLEMENTERS IN DRIVING PROCESS INNOVATIONS

Conclusion: The 3P program design has introduced many innovative improvements from the historical design, but challenges still exist. Despite some early challenges, PA staff are happy with the performance of program implementers, sharing that they have successfully evolved into their role with time and experience. The processes of scanning and scoring, project submissions, and TPM prioritization have each improved under the 3P design. Additionally, implementer-affiliated stakeholders appreciate the more comprehensive approach to addressing portfolio needs under the 3P design. This includes not only technology-focused research but also market characterization studies that support the best-suited application for a technology. Another implementer-affiliated stakeholder indicated the 3P model offers a more holistic approach as a SW program so that multiple measure packages are not initiated by different IOUs for the same technology (minimizing duplicative efforts). Implementation staff also indicated an expansion of interested stakeholders in ETP activities.

Despite these improvements imposed by the 3P design, ETP continues to face challenges as it is a highly complex program. Administrative challenges in shifting to the 3P design (such as the expansion of project implementer roles and responsibilities into participant recruitment), a complex regulatory and stakeholder environment (including competing technology priorities among stakeholders), and uncertainty about the program's future (such as the emphasis on decarbonization technologies and shorter-term 3P contracts) introduce challenges to managing the program. Many of these challenges are regulatory-driven and, as such, may be difficult and timely to address. Administrative challenges

related to program roles and responsibilities present the best opportunity for program staff to begin addressing the identified issues.

Recommendation 1: Program staff should develop a responsibility assignment matrix for each party and task involved with each ETP process. This will ensure all parties know where their responsibilities begin and end so that the program does not experience delays or duplicative efforts.

Recommendation 2: Parties included in the responsibility assignment matrix should be included in any data-sharing necessities for their task implementation. This includes sharing customer contact data if participant recruitment is required for a task. Include all program parties in non-disclosure agreements to facilitate timely and secure data transfer. Improving the recruitment process will promote sufficient sample sizes and, subsequently, enhance the quality of project data.

Recommendation 3: The CPUC should consider merging the two ETPs to function as a true, unified SW program. The GET program faces challenges and uncertainty on how to prioritize funding for emerging gas technologies as the focus on decarbonization at the state level continues to increase. Merging the two programs and discussing the TPMs from a dual fuel point of view will help identify opportunities for gas emerging technologies to strategically fill gaps where decarbonization technologies are not available or viable. In considering this change, the CPUC and program administrators should discuss the costs and benefits that may be associated with consolidating the programs, and ensure these potential implications are weighed into the decision.

2. INTRODUCTION

The California Public Utilities Commission (CPUC) authorizes investor-owned utilities (IOUs) to fund a portfolio of customer programs encouraging the adoption of energy-efficient technologies. One pillar of the IOUs' energy efficiency portfolio is resource acquisition programs that offer rebates and incentives to customers who adopt high-efficiency technologies (referred to as measures).[5] The IOUs are continually seeking new, emerging technologies that can provide opportunities for energy savings to replace sunset measures and continue to support California's energy and demand savings targets. California's Emerging Technologies Program (ETP) serves as a pipeline to identify and deliver emerging technologies to energy efficiency incentive programs to support the continuously evolving needs of the market and portfolio. ETP is a market support program designed to help California ratepayer-funded programs by identifying, vetting, and supporting innovative energy efficiency measures that deliver reliable energy savings to be adopted into the energy efficiency portfolio and utilized by utility resource acquisition programs.[6]

Historically, ETP was administered and implemented by IOU staff. Each IOU implemented its own ETP (for purposes of this report, this implementation design will be referred to as the historical program design). However, beginning in 2021, ETP became a SW program designed and implemented by a third-party (3P) organization on behalf of the IOUs, based on Decision 16-08-019.[7] The CPUC Decision defines a SW program as "a program or subprogram that is designed to be delivered uniformly throughout the four large IOU service territories by a single lead program implementer under contract to a single lead program administrator." This program design intends to leverage uniform opportunities for customers or market actors across California that do not significantly differ by region and lower transaction costs for administrators and implementers.

The overarching SW design comprises two separate ETPs: one focused on emerging electric technologies and one for gas technologies. A single IOU acts as the lead program administrator (PA) for each ETP. Southern California Edison (SCE) is the PA for the electric ETP, while Southern California Gas (SoCalGas) is the PA for the gas ETP. As ruled in Decision 16-08-019, each IOU PA contracts with a 3P organization for program implementation. The electric ETP (referred to in the program implementation plan as SWEETP) is implemented by Energy Solutions under the rebranded "CALNEXT" name and was launched as a SW 3P program in 2022. ICF implements the gas ETP (referred to in the program implementation plan as GET) and was relaunched as a SW 3P program in 2021. The current 3P ETP contracts end in 2027.

ETP projects address targeted data and research needs identified for the energy efficiency portfolio. Project results intend to support the development of measure work papers (now called measure packages) and guide resource acquisition program managers on marketing strategies, incentive structures, and other program design elements. The central goal of the ETP is to identify and recommend successful emerging technologies and intervention strategies for integration into the energy efficiency portfolio to achieve savings. Notably, the actual adoption of technologies or strategies into programs is out of ETP staff control and is contingent upon IOU program staff utilizing ETP-supported measures and strategies as they become available.

Figure 3 highlights the ETPs' key processes. Both ETPs follow the same overarching program process, although the implementation of these processes may differ. Since decarbonization is a primary focus in California and the energy industry, CalNEXT receives significantly more funding than GET and is a leading cause of differences in implementation methods.

[5] In 2021, Decision 21-05-031 required program administrators to segment their energy efficiency portfolios into programs whose primary purpose is resource acquisition, market support, or equity.

[6] Decision 21-05-031 states market support programs have a primary objective of supporting the long-term success of the energy efficiency market by educating customers, training contractors, building partnerships, or moving beneficial technologies towards greater cost-effectiveness.

[7] Decision 16-08-019, Issued August 25, 2016, required IOUs to transition ETP implementation to a third-party organization.

Figure 3. Key ETP Processes

- **Technology Priority Map (TPM) Prioritization and Revisions**: ETP staff review portfolio and market needs to identify high-priority technologies for each program year.
- **Project Submissions**: ETP staff communicate priority technologies to project submitters (e.g., technology developers, researchers, manufacturers) through email campaigns, the ETP websites, webinars, and other various modes of outreach. Project submitters offer project ideas via the CalNEXT or GET websites.
- **Project Scanning and Scoring**: Project submissions are scanned and scored by program staff and subject matter experts (SMEs) knowledgeable about the project technology.
- **Project Implementation**: Approved projects are executed to test hypotheses and verify technology impacts. Methods for implementation can range from lab testing to building simulations or real-world applications that require customer participation. ETP project types include Technology Development Research (TDR) and Technology Support Research (TSR), considered standard project types, and Focused Pilots, which are larger, more comprehensive projects that typically require a longer timeline to execute and formal approval from the CPUC for implementation. CalNEXT also implements Fast Track projects for urgent portfolio needs that follow an expedited timeline.[8] The ETPs implement multiple projects simultaneously throughout each program year.
- **Reporting and Dissemination**: After implementation is completed, the project implementer analyzes the data and drafts results in a final report that is shared with a target audience of relevant stakeholders. The target audience can include manufacturers, technology developers, utility program design teams, or others who may have a specific interest in the findings and can potentially assist with technology transfer activities.
- **Technology Transfer Activities**: As the last stage of an ETP project, project implementers and program staff work with the necessary stakeholders (e.g., California Technical Forum staff, IOU staff) to identify and recommend the best handoff pathway for project results. The objective of this process is to support the integration of technology recommendations and intervention strategies into the IOUs' energy efficiency portfolios.

This report discusses findings from the Process and Effectiveness Evaluation of the SW 3P electric and gas ETPs. The key objectives of the evaluation were to assess the effectiveness of the 3P program design, particularly in comparison to the historical design, and to better understand the process by which the ETPs are implemented. The CPUC hired Opinion Dynamics (the Evaluation Team) to conduct the evaluation.

2.1 EVALUATION OBJECTIVES

To assess the overall effectiveness of the SW electric and gas ETPs, the evaluation addressed the following objectives:

- Assess program evaluability and fidelity of implementation to program theory;
- Determine the effectiveness of 3P implementation in tracking and progress toward achieving program metrics;
- Assess scanning and scoring strategy and tactics;

[8] By design, GET does not implement Fast Track projects.

- Evaluate a sample of technology research projects and technology-focused pilots;
- Evaluate new and updated Technology Priority Maps and prioritization processes;
- Evaluate technology transfer process and information dissemination for ETP-associated measures; and
- Assess the success of 3P implementers in driving process innovations.

3. EVALUATION METHODOLOGY

The Evaluation Team leveraged results from multiple research activities, including a comprehensive secondary materials and data review, a review of the current program theory logic model (PTLM) and evaluability assessment of program metrics and key performance indicators (KPIs), interviews with ETP staff and other relevant stakeholders, and detailed reviews of technology research projects. The evaluation tasks were conducted by the Evaluation Team for both CalNEXT and GET. Table 2 summarizes the methodology the Evaluation Team used to meet each evaluation objective.

Table 2. Evaluation Methodology by Study Objective

Evaluation Objective	Materials and Data Review	PTLM Review and Evaluability Assessment	ETP Staff Interviews	Stakeholder Interviews	Project Reviews
Assess program evaluability and fidelity of implementation to program theory	✓	✓	✓	✓	✓
Determine the effectiveness of 3P implementation in tracking and achieving program metrics	✓		✓		
Assess scanning and scoring strategy and tactics	✓		✓	✓	
Review a sample of technology research projects and technology-focused pilots	✓		✓		✓
Evaluate new and updated Technology Priority Maps and prioritization processes	✓		✓	✓	
Evaluate technology transfer of and information dissemination on ETP-associated measure	✓		✓	✓	
Assess the success of 3P implementers in driving process innovations	✓		✓	✓	

3.1 MATERIALS AND DATA REVIEW

As a first step in this evaluation, the Evaluation Team reviewed extensive program materials for the electric and gas ETPs. This included reviewing implementation plans, outreach and marketing materials, process models, PTLMs, TPMs, and materials supporting process activities such as project scanning and scoring criteria. This task was critical for the Evaluation Team's understanding of the program theory and overarching goals of the ETPs. The Team also used information learned during this task to develop the program staff interview guide.

3.2 PROGRAM THEORY LOGIC MODEL REVIEW AND EVALUABILITY ASSESSMENT

Following an initial review of the documents, the Evaluation Team began a more focused examination of the plausibility of the electric and gas ETPs' PTLMs. The Evaluation Team examined whether each relationship within the models could be logically connected. This began by examining the overarching barriers and whether the activities addressed these barriers such that the intended outputs and outcomes could reasonably be expected.

Evaluability involves the plausibility of expecting—and the feasibility of measuring—the program's intended outcomes. Although there were separate PTLMs for the electric and gas ETPs, the Evaluation Team synthesized data from its research to develop a revised, unified PTLM and refine the list of associated KPIs for the SW ETP (dual fuel). The PLTM includes the outputs and outcomes the Evaluation Team determined plausible based on the criteria listed in Table 3.

The Evaluation Team assessed the feasibility of measuring each program's existing metrics and KPIs using the criteria presented in Table 4. The Team then identified KPIs that would be feasible to measure each program's performance and the links throughout the revised PTLM.

Table 3. Plausibility Criteria

Plausibility	Criteria
Plausible	▪ There is sufficient evidence to suggest that the output or outcome is or could be occurring *or* ▪ It is logical to expect an activity/output to result in theoretical outputs/outcomes.
Not Plausible	▪ The linkage does not satisfy either of the criteria listed above.

Table 4. Feasibility Criteria

Feasibility	Criteria
Feasible	▪ Current data tracking practices are sufficient to support measurement for *all* KPIs associated with a specific output or outcome. ▪ No additional data or data tracking/reporting practices are required to measure performance toward an output or outcome.
Not Currently Feasible	▪ Current data tracking practices do not support the measurement of *all* KPIs associated with a specific output or outcome. ▪ Additional data collection and tracking/reporting practices are necessary for measurement to be feasible.

3.3 PROGRAM STAFF INTERVIEWS

The Evaluation Team conducted four interviews with program staff, including the lead PA and 3P implementer of CalNEXT and GET. The Team used information gathered through these interviews to better understand the implementation structure of the SW program in the 3P design beyond what could be gleaned from available program documentation. Specifically, interviews focused on the following objectives:

- Understanding the current program design and implementation process, including ideation, prioritization (including TPMs), and technology evaluation, as well as technology handoff and information dissemination
- Understanding coordination between the two ETPs and between ETPs and external stakeholders, including the Emerging Technology Coordination Council (ETCC) and California Energy Commission (CEC) Electric Program Investment Charge (EPIC) program
- Identifying key emerging technology stakeholders to include in future interviews
- Identifying key internal performance metrics used by program managers beyond those identified in the program implementation plans
- Exploring how program managers think about innovation and progress on the innovations proposed in the program implementation plans
- Ensuring a complete understanding of the lifecycle of an ETP measure in the 3P implementation model and how this model differs from the historical delivery approach
- Collecting any additional data or information needed to determine progress toward program metric goals

Program staff interviews were completed in April 2024. The staff interview guide is available in Appendix A.

3.4 STAKEHOLDER INTERVIEWS

In addition to program staff interviews, the Evaluation Team completed eight interviews with other key emerging technology stakeholders. The Team used the information gathered through these interviews to better understand stakeholder involvement in various program processes and explore differences between the current 3P implementation design and the historical implementation model. Specifically, the interviews focused on:

- Understanding how each stakeholder interfaces with the current program design and implementation process, including ideation, prioritization (including TPMs), technology evaluation, technology handoff, and information dissemination.
- Leveraging stakeholder experience with the historical ETP program design, the Evaluation Team explored stakeholders' opinions about the transition to a 3P implementation model, including potential improvements and challenges posed by the design.

The Evaluation Team recruited interviewees from a list provided by program staff that identified key stakeholders involved in at least one of the ETPs. When conducting outreach, the Evaluation Team purposely targeted stakeholders from organizations with varying roles in the ETPs and interviewed only one contact per organization. This approach helped ensure that collected input came from multiple perspectives from individuals involved in a wide range of ETP activities. Because the nature of this research focused on documenting program processes and evaluating the effectiveness of those processes, we focused our interviews on highly engaged stakeholders very familiar with the ETP. Interviewed stakeholders spanned across a variety of organizations, from state-level councils and utilities to research laboratories and consulting firms. Table 5 lists the interviewed organizations. The stakeholder interview guide is available in Appendix A.

Table 5. Interviewed Stakeholders' Organizations

Stakeholder Organizations	Type of Stakeholder
Energy Transition Coordination Council (ETCC)	Non-implementer-affiliated
San Diego Gas and Electric (SDG&E)	Non-implementer-affiliated
The California Technical Forum (CalTF)	Non-implementer-affiliated
Lincus	Implementer-affiliated
National Renewable Energy Laboratory (NREL)	Implementer-affiliated
The Research Corporation (TRC)	Implementer-affiliated
University of California Davis (UC Davis)	Implementer-affiliated
Vermont Energy Investment Corporation (VEIC)	Implementer-affiliated

3.5 PROJECT REVIEWS

ETP technology research projects can take many forms based on the market readiness of the technology and the needs identified to help support market adoption. Still, they follow a similar high-level project lifecycle. Each technology research project begins with the development of a Project Plan, which includes the objectives of the project, the overall scope, budget, timeline, and methods (e.g., lab test, scaled-field placement). Once approved, the project implementer executes the plan and drafts a final report documenting project findings and calculations.

As part of this evaluation, the Team conducted a technical review of four completed ETP projects, including two CalNEXT and two GET projects. When selecting projects for review, the Evaluation Team considered the diversity of end uses and sector applications, the overall breadth of the project application, and the alignment between the project description and recent trends and priorities in technology and market development. One additional factor was the extent to which a

project's experimental design and results could benefit from a technical review. The Evaluation Team worked with the CPUC to select projects for review.

For each of the four selected projects, the Team reviewed the Project Plan, which outlined the scope, budget, and other implementation details, as well as the final report, which included final calculations and results. Key objectives for the project reviews were to assess (1) project alignment with ETP priorities, (2) the Project Plan's efficacy in meeting the technology review's objectives, and (3) fidelity to the Project Plan and the reasonableness of project findings and recommendations.

4. DETAILED FINDINGS

4.1 PTLM REVIEW AND EVALUABILITY ASSESSMENT

The purpose of the PTLM review and subsequent evaluability assessment was to examine the extent to which the program theory of the SW ETP, including both CalNEXT and GET, can be evaluated reliably and credibly. There are two main considerations in conducting an evaluability assessment: plausibility and feasibility. Therefore, the goal of this task was to address the following two questions:

- **Is it plausible to expect intended outcomes?** Are there logical connections between program activities and intended outcomes?
- **Is it feasible to measure the intended outcomes?** Is it possible to measure the intended outcomes, given the collected data and resources available?

The Evaluation Team conducted evaluability assessments of each ETP. We reviewed the plausibility and feasibility of program activities, outputs, and outcomes as they appeared in the original PTLMs provided by program teams. Table 6 and Table 7 summarize the findings of each ETP's evaluability assessment. For CalNEXT specifically, most intended outcomes deemed not feasible were based on the lack of project completion tracking within the current KPIs and metrics.

Although the ETPs were not evaluable based on the initial PTLMs and metrics provided to the Evaluation Team, this report includes a revised PTLM and KPI table that will make the programs evaluable in the future.

Table 6. CalNEXT Evaluability Assessment Summary

Intended Outcomes	Plausibility Based on Preceding Activities and Outputs	Feasibility to Measure based on Current Data Tracking Practices
Tightly integrated understanding of market and portfolio development cycles and market state for prioritized technology families	Not plausible	Not feasible
Declared, realistic program priorities that incorporate portfolio needs across multiple time horizons	Plausible	Feasible
A well-defined pathway for a high-potential, low-adoption technology to scale through the portfolio framework	Plausible	Feasible
Technology recommendations and intervention strategies integrated into the portfolio for energy efficiency program use	Not plausible	Not feasible
New measures available for portfolio inclusion	Plausible	Not feasible
A robust supply of submitted project ideas with a high probability to be accepted and become executed projects	Not plausible	Not feasible
Initial Program Design is Not Currently Evaluable; Recommendations Support Future Evaluability		

Table 7. GET Evaluability Assessment Summary

Intended Outcomes	Plausibility Based on Preceding Activities and Outputs	Feasibility to Measure based on Current Data Tracking Practices
Results of technology projects documented and made available to the public	Not plausible	Not feasible
Technologies with energy savings potential adopted into energy efficiency programs	Not plausible	Not feasible

Intended Outcomes	Plausibility Based on Preceding Activities and Outputs	Feasibility to Measure based on Current Data Tracking Practices
Increased savings contribution by new technologies	Not plausible	Not feasible
Initial Program Design is Not Currently Evaluable; Recommendations Support Future Evaluability		

In this section of the report, we provide the detailed findings of our assessment of the plausibility of the theory segments and the feasibility of linking activities and outcomes in the ETPs' original PTLMs, provided by Energy Solutions and ICF. Although neither ETP was evaluable based on the original PTLM and metrics provided by program staff, the Evaluation Team proposes a revised PTLM and KPI table that will make the ETPs evaluable in the future.

4.1.1 PLAUSIBILITY TO EXPECT INTENDED OUTCOMES OF ETP

The Evaluation Team completed a review of all available program data related to program theory, program design, and implementation as provided by CalNEXT and GET PAs and implementation staff, including implementation plans, program descriptions, program metrics and key performance indicators, process models, and existing PTLMs. The Evaluation Team used the information from this review to develop a single, unified PTLM for CalNEXT and GET under the SW ETP (Figure 6). The Team then reviewed the revised PTLM with program implementers and CPUC staff for feedback. All parties agreed that the updated PTLM accurately illustrated the program theory.

The Evaluation Team compared the CalNEXT and GET PTLMs and identified similarities. Key similarities between the PTLMs included the following:

- **Overall program theory and objectives**, such that both prioritize technology families based on IOU portfolio needs, identify technologies' technical and market potential, and support the adoption or uptake of verified intervention strategies and technology recommendations into the energy efficiency portfolios;
- **Barriers** such as the lack of adoption or uptake of emerging technologies into energy efficiency resource acquisition programs and the lack of awareness of ETP priorities among project submitters;
- **Program activities** like the prioritization of technologies, scanning and scoring of project submissions, the validation of emerging technologies' potential energy savings, and dissemination of information to engage technology developers and the broader market; and
- **Outputs and outcomes,** such as new or revised TPMs and Project Plans and recommendations for adopting ETP-supported technologies into energy efficiency resource acquisition programs.

In addition to the observed similarities between original PTLMs, the Evaluation Team also identified potential issues and opportunities to enhance the individual ETPs' PTLMs, including:

- **Lack of organization per program theory.** For example, in the original CalNEXT model, according to program theory, the TPM prioritization activity, where program priorities are identified, should link to the output "Portfolio priorities articulated to the market along with feedback to technology developers of rejected project ideas" and thus the outcome "A robust supply of submitted project ideas with a high probability to be accepted and become executed projects" as it is an essential first stage activity that drives this sequence.
- **Missing or unclear linkages between barriers, activities, outputs, and outcomes.** The original GET PTLM (Figure 5) does not have arrows denoting how each output links to specific program outcomes. Rather, the model suggests that only one output (i.e., Business Model Canvas) links to one outcome (i.e., Results of technology projects documented and made available to the public) that leads directly to the other program outcomes. The missing links make it unclear how the other activities and outputs lead to specific outcomes.

- **Lack of clarity or detail regarding outputs.** The Evaluation Team identified cases where the original GET PTLM lacks sufficient detail when describing the output of an activity. For example, the output of the Dissemination activity in the original GET PTLM is a Distribution Report. Although a primary step of Dissemination involves circulating the final report of a project to stakeholders, the report itself is not the overall output of this activity. In this case, the output should refer to the result of Dissemination activities, such that the results of the project are communicated to the target audience (component (K) in Figure 6).

Figure 4 shows the original CalNEXT PTLM provided by Energy Solutions and Figure 5 shows the original GET PTLM provided by ICF.

Figure 4. CalNEXT PTLM

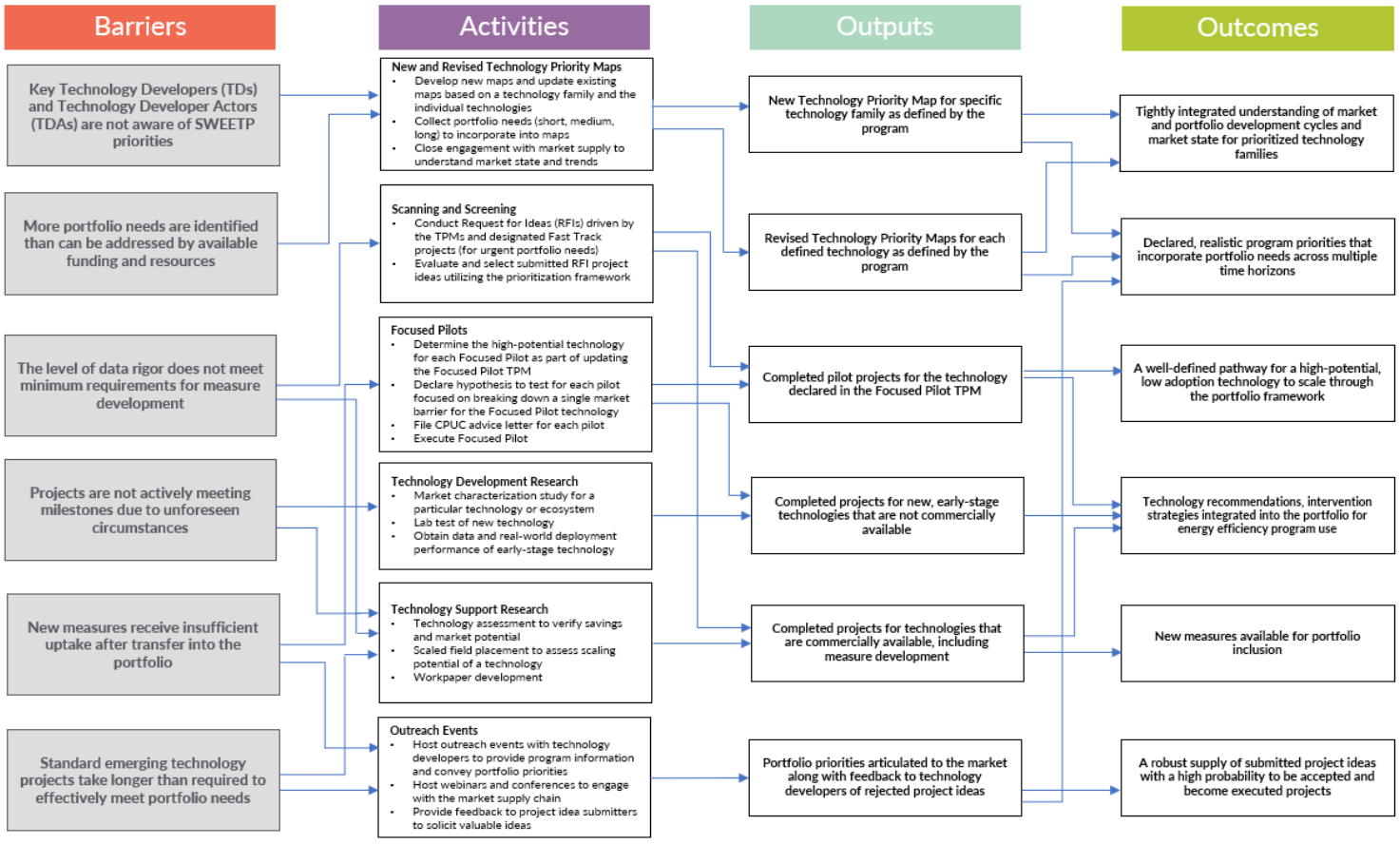
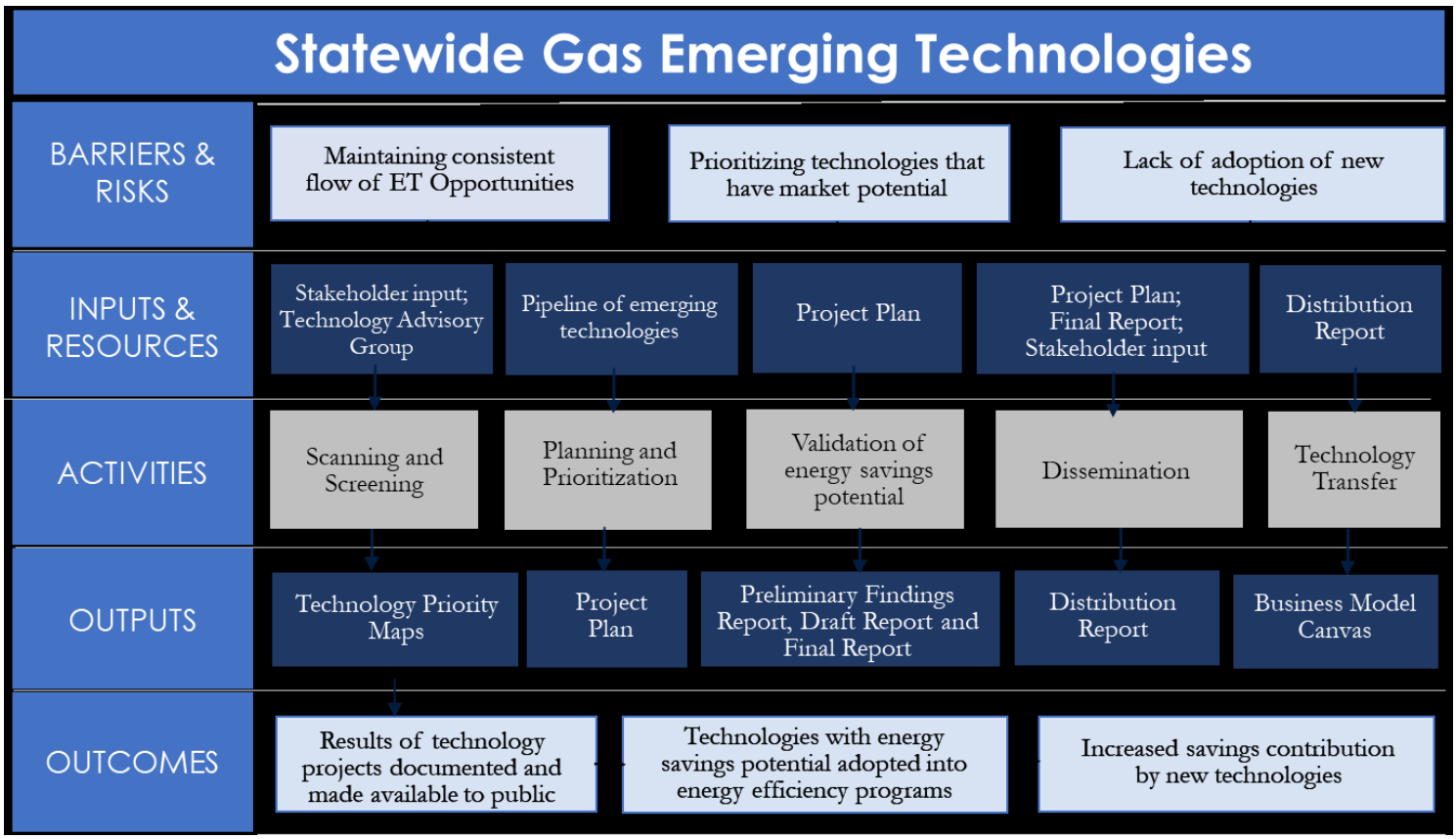


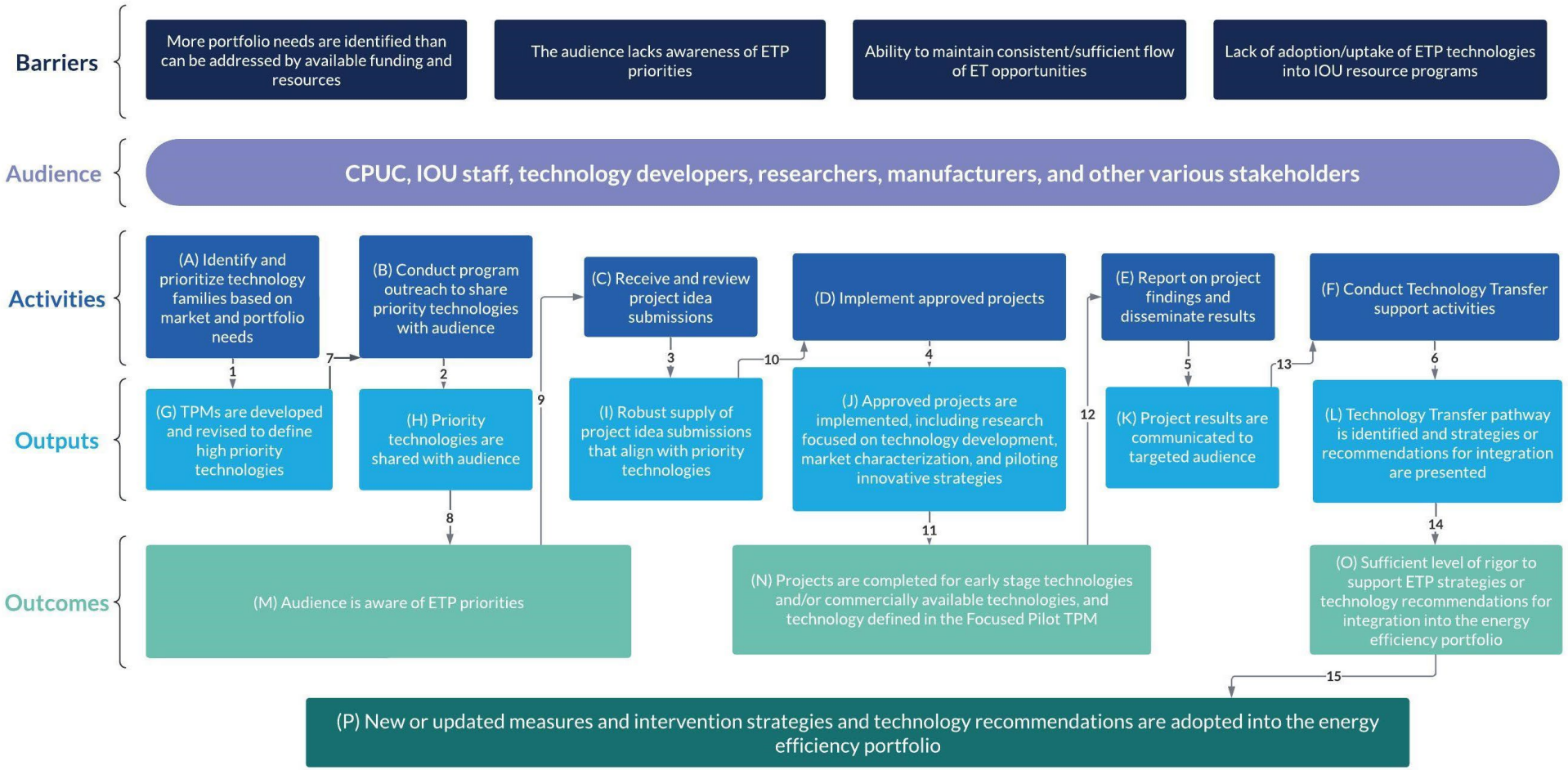
Figure 5. GET PTLM



In reviewing program materials and input gathered during program staff interviews, the Evaluation Team observed that although CalNEXT and GET have different implementation processes, both programs are based on the same core theory. As such, in the interest of streamlining materials and presenting a more uniform model for the SW Program, the Team developed a revised PTLM that combines similar information from the individual models. The revised model, shown in Figure 6, captures the core theory behind both ETPs, including key activities, their outputs, and the intended outcomes. The PTLM activities are listed from left to right, and the outputs and outcomes are listed chronologically from top to bottom. The revised PTLM features arrows labeled with numbers, which represent linkages.

According to the revised PTLM developed by the Evaluation Team, the program theory and linkages of program activities to outcomes are plausible. However, the Team does recommend program implementers work with PAs to clarify to what extent they are responsible for carrying out technology transfer activities versus providing support to handoff staff (e.g., IOU engineering teams or other stakeholders project results are handed off to for transfer). ETP staff have little to no control over outcomes and KPIs related to the adoption of intervention strategies and technology recommendations, as well as the subsequent savings achieved by adopted technologies. Rather, these KPIs are contingent upon utility resource acquisition program teams utilizing new measure information to be adopted into the energy efficiency portfolios. One example of this is the broader outcome represented in Figure 6, "(P) New or updated measures and intervention strategies and technology recommendations are adopted into the energy efficiency portfolio." This outcome is dependent on resource acquisition program teams adopting measures into their programs for real-world applications rather than a direct result of ETP implementation.

Figure 6. New SW ETP PTLM[9]



Note: Common technology transfer pathways (L) include developing or revising measure packages, intervention strategy recommendations, and codes and standards recommendations.

[9] Notably, as indicated in the **Audience** box, the program is focused on reaching key stakeholders such as CPUC staff, IOU staff, technology developers, researchers, and manufacturers. However, due to its purpose and goals, the program is also open to the public ("various stakeholders") as new technology may be developed and proposed by anyone who has project ideas.

4.1.2 FEASIBILITY TO MEASURE THE INTENDED OUTCOMES OF ETP

Appendix B lists the KPIs and metrics planned to be tracked by the ETPs according to the program implementation plans. Some contractual KPIs are listed in the implementation plans that do not monitor program performance according to the current program theory. Instead, these KPIs are intended to measure 3P implementation success based on targets not directly tied to the PTLM, many of which refer to budgetary and spending targets (e.g., Budget Utilization: Commit full budget for each Program year, Diverse Business Enterprises Spend: Aggregate amount paid to Diverse Business Enterprises).

Some of the existing KPIs listed in the program implementation plans pose data limitations for tracking, particularly for program years prior to 2021.[10] According to interviewed program staff, at the time of the evaluation activities, one CalNEXT KPI (ETP-T8: Number of SWEETP projects and technologies aligned with specific statewide goals)[11] was unable to be tracked as the statewide goals it references were yet to be defined by the CPUC's Energy Division (ED).

Below, the Evaluation Team recommends a comprehensive list of KPIs that are tied to each of the links in the revised PTLM (Table 8).

UPDATED KPIS FOR TRACKING ETP PERFORMANCE

Table 8 lists KPIs the Evaluation Team recommends the ETPs adopt to ensure both programs can feasibly track progress toward common goals and objectives according to the program theory characterized in the revised PTLM. The table is organized by the links identified in the revised PTLM (Figure 6) that demonstrate how the activities, outputs, and outcomes are connected.

The KPIs in Table 8 are color-coded using the following logic:

- **Black** indicates existing KPIs that were planned to be tracked by at least one of the ETPs' implementation staff and require no changes for future tracking;
- **Green** represents KPIs recommended by the Evaluation Team that were not included in the program implementation plans but should be collected by implementation staff moving forward; and
- **Blue** denotes KPIs that at least one ETP had already planned to track, at least partially, but the Evaluation Team recommends additional details and/or revised tracking moving forward.

When a column indicating ETP-specific recommendations is blank, the associated ETP already tracks the KPI, and the Evaluation Team has no further recommendations.

Table 8. Recommended KPIs Based on Revised SW ETP PTLM

PTLM Link	Key Performance Indicators	Recommended for CalNEXT	Recommended for GET	Reasoning for Recommendation
1	Number and type of technology families identified for prioritization	•	•	Track to ensure programs identify the range of technology priorities.

[10] Most data limitations were persisting issues previously identified in the Emerging Technologies Program Technology to Portfolio Evaluation Report: https://www.calmac.org/publications/CPUC_ETP-2_Technology_to_Portfolio_Report_Addendum_Final_2024-05-15.pdf

[11] The KPIs listed in the electric ETP implementation plan continues to reference the historical program design (SWEETP) rather than the updated branding of CalNEXT.

PTLM Link	Key Performance Indicators	Recommended for CalNEXT	Recommended for GET	Reasoning for Recommendation
	Number of SMEs[a] consulted with for each technology family	●	●	Track to ensure stakeholders provide input on each prioritized technology.
2	Number of outreach attempts by channel with developers of energy efficiency products (in whole or in part) that are less than five (5) years from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs) (ETP-M5)	●	●	Track the reach of outreach efforts by channel.
3	Percent of unique ideas that move to project scoring by technology family (Idea Evaluation Approval Rate)	●	●	Track the technologies in project submissions and assess the rate at which projects focused on different technology families are approved. Align terms with descriptions used by program staff.
	Number of total project idea submissions	●	●	Together, these KPIs enable tracking of the rate of project submissions that align with identified program priorities.
	Number and percent of submissions that align with Technology Priority Map priorities	●	●	
	Stakeholder satisfaction with the project submission process (Idea Submission Process Satisfaction)*		●	Add to GET to track changes in stakeholder satisfaction with the project submission process.
4	Number of projects[b] initiated (broken out by Technology Support Research, Technology Development Research, and Focused Pilots) (ETP-M3)	●	●	KPI revisions will enable tracking of the number of projects initiated by project type.
	Number of Technology Focused Pilots initiated as part of the Technology Focused Pilot Technology Priority Map (ETP-M7)			No new metrics suggested for tracking.
	Number of projects[a] initiated with cooperation from other internal IOU programs associated with each Focused Pilot (ETP-M6)			No new metrics suggested for tracking.
5	Number of outreach attempts by channel with developers of energy efficiency products (in whole or in part) that are less than five (5) years from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs) (ETP-M5)	●	●	To track dissemination outreach efforts by channel.
6	Number of technology recommendations and intervention strategies provided	●	●	Together, these KPIs enable tracking of the rate at which project results support different technology transfer activities.
	Number and percent of codes and standards recommendations presented	●	●	
	Number and percent of measure packages initiated	●	●	
	Number and percent of measure packages developed[c]	●	●	
7	Number of Technology Priority Maps initiated, including one Focused Pilot Technology Priority Map (ETP-M1)			No new metrics suggested for tracking.
	Number of Technology Priority Maps updated (ETP-M2)			No new metrics suggested for tracking.

PTLM Link	Key Performance Indicators	Recommended for CalNEXT	Recommended for GET	Reasoning for Recommendation
8	Percent of project submitters aware of Technology Priority Map priorities*	●	●	To track efforts to communicate priority technologies to the audience.
	Number of approved and discontinued project submissions (including the number of projects discontinued due to misalignment with Technology Priority Map priorities)	●	●	Assess alignment of projects with program priorities and track rate of approved vs. discontinued projects.
9	Number of total project submissions received	●	●	To track rate of project submissions.
	Number and percent of project submissions that align with Technology Priority Map priorities	●	●	Track to determine the percent of project submissions that align with TPM priorities. This will also enable monitoring the reach of program outreach efforts.
10	Number and percent of approved, deferred, and discontinued project submissions (broken out by Technology Support Research, Technology Development Research, and Focused Pilots)[d] (Technology Projects Discontinued)	●	●	Revising the existing KPI will enable CalNEXT to monitor the rate of all project review outcomes by project type. Tracking this KPI will allow GET to monitor the outcomes of project reviews by project type.
11	Number and percent of completed projects[a] (broken out by Technology Support Research, Technology Development Research, and Focused Pilots)	●	●	To track the rate at which different project types are implemented.
12	Number and percent of final reports completed (broken out by Technology Support Research, Technology Development Research, and Focused Pilots) (Technology Project Final Reports)	●	●	To track the rate at which different project types are completed, and results are reported.
13	Number of dissemination activities conducted by channel (i.e., webinars, conferences, LinkedIn posts, email campaigns)	●	●	To monitor dissemination efforts and track prevalence of different dissemination modes.
	Number of final report downloads	●	●	Tracking enables the ability to assess effectiveness of dissemination activities and monitor audience interest in project results.
14	Number and percent of completed projects[a] that result in a Codes and Standards recommendation	●	●	Track to determine the rate at which ETP projects result in readiness for a Codes and Standards update and are recommended as such.
	Number and percent of completed projects[a] that result in measure package revisions or development of a new measure package	●	●	Track to determine the rate at which ETP projects result in a new or revised measure package.
	Number of technologies and intervention strategies recommended for transfer compared to new measures adopted in the portfolio (Technology Transfer Rate)	●	●	Revise CalNEXT KPI to enable tracking the transfer rate for both technology and intervention strategy recommendations. Monitor the extent to which technology transfer is occurring for

PTLM Link	Key Performance Indicators	Recommended for CalNEXT	Recommended for GET	Reasoning for Recommendation
				each recommendation supported by a GET project.
Tracking KPIs associated with link 15 (including the KPI that also applies to link 14) is dependent on the adoption of ETP-supported measures into the energy efficiency portfolio.				
15	Number of technologies and intervention strategies recommended for transfer compared to new measures adopted in the portfolio (Technology Transfer Rate)	●	●	Revise CalNEXT KPI to enable tracking the transfer rate for both technology and intervention strategy recommendations. Monitor the extent to which technology transfer is occurring for each recommendation supported by a GET project.
	Number of savings of measures currently in the portfolio that were supported by emerging technologies programs, added since 2021. Annual ex-ante with gross and net for all measures, with ex-post where available (ETP-T5)	●	●	In 2021, CalTF added flags to the eTRM and/or CEDARS to help identify ETP-supported measures, but not retroactively. Revise KPI to reflect tracking capabilities.

Note: KPIs that involve additional data collection activities such as surveys or interviews are indicated with an asterisk (*).

[a] According to interviews, a subject matter expert (SME) is an individual with expertise-level knowledge about the technology.

[b] ETP projects are defined as one ETP study, demonstration, or test that may include one or more energy-efficient measures/technologies.

[c] A fully developed measure package includes all documentation required to support the integration and adoption of a technology into the IOU portfolio.

[d] Although CalNEXT planned to partially track this information, the full KPI is coded with blue text due to the extent of revisions.

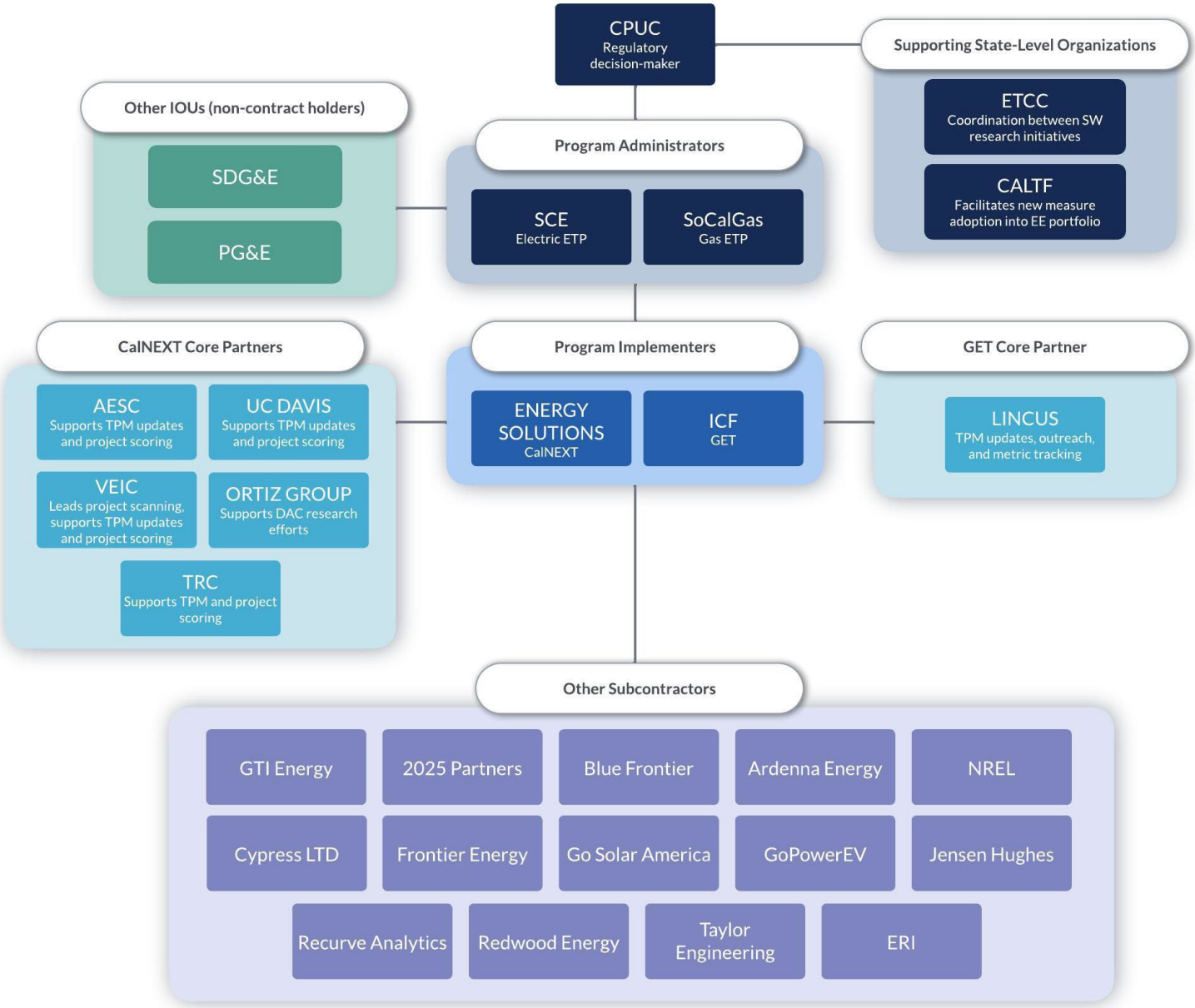
4.2 PROGRAM STAFF AND STAKEHOLDER INTERVIEWS

The following sections describe ETP processes and how stakeholder organizations are involved in the 3P implementation program design. The Evaluation Team also assesses the effectiveness of the program under the 3P design.

4.2.1 PROGRAM COORDINATION

Based on the Evaluation Team's review of program materials and interviews with program staff and stakeholders, Figure 7 illustrates the roles various organizations play in the SW ETPs.

Figure 7. Organizations Involved with SW ETP



PROGRAM ADMINISTRATORS AND IMPLEMENTERS

As ETP PAs, SCE and SoCalGas work with implementation staff on high-level issues, such as program budgets and regulatory reporting, and ensure implementation adheres to contract guidelines. PA staff meet with program implementers biweekly to monthly, although other ad hoc communication commonly occurs between these meetings. Both PAs extend their support to implementation staff as needed but generally take a more hands-off approach with day-to-day activities to allow the 3P implementers to deliver the program according to design.

Energy Solutions and ICF, as the implementers of the ETPs, take on the primary responsibility of managing the programs and ensuring contract guidelines are followed and requirements are met. Both program implementers work with multiple subcontractors for project coordination and implementation. Program implementation staff identify and select subcontractors for project implementation based on the subcontractor's expertise in specific areas or the ability

to perform required tests or simulations. According to interviews, if the program implementer has internal staff with the necessary skill sets and availability, they may implement a project themselves.

The gas and electric program implementers engage with one another through bimonthly meetings and attend webinars presented by the alternate ETP to stay current on the type of projects being implemented. During interviews, the two implementation teams indicated they have agreed to cobrand presentations and other program materials to present a united front as an SW program, although these changes have not yet been implemented. Despite the two programs operating independently, the implementation teams look for opportunities for the programs to collaborate on dual-fuel projects. However, implementation staff indicated that due to the differences in technology priorities and focus areas between the two ETPs, a dual-fuel project may be unlikely and has yet to occur.

OTHER IOUS

IOUs that do not contract as an ETP PA, Pacific Gas and Electric (PG&E) and San Diego Gas and Electric (SDG&E), play a supportive program oversight role. Staff from PG&E and SDG&E attend regulatory meetings where ETP updates are shared (i.e., ETCC meetings) and quarterly webinars held by ETP implementers that showcase ongoing or recently completed projects. Outside of these instances, implementation staff indicated they typically interact with PG&E and SDG&E staff directly on a case-by-case basis. Both IOUs have ETP staff who liaise between the ETPs and their organization to help ensure the appropriate IOU staff are aware of program updates; this includes disseminating project results to IOU program design teams and other relevant internal staff. IOU staff are involved in the TPM process and annual reporting for both ETPs but are not involved in the scanning and scoring of project submissions or project implementation; however, during interviews, they expressed willingness to provide support on this if needed.

SUPPORTING STATE-LEVEL ORGANIZATIONS

To help achieve the state's energy savings goals, California's IOUs and the CEC created the ETCC. The ETCC provides a collaborative forum for its members (including the Sacramento Municipal Utility District and Los Angeles Department of Water and Power, as well as the IOUs and CEC) to exchange information on opportunities and results from their emerging technologies activities.[12] According to interviews, the ETCC plays a vital role in California's energy future as a key coordinator and facilitator of research conducted across various innovative programs, including ETP. The ETCC meets monthly and primarily comprises IOU, Codes and Standards staff,[13] CEC, and Demand Response Emerging Technologies (DRET) staff members. Program implementers do not attend ETCC meetings. As a council, the ETCC is not directly involved in TPM prioritization or project scoring for ETP. Individual council members may engage in these activities on a case-by-case basis at the request of ETP staff, depending on their expertise in certain technology focus areas. As the organization at the center of emerging energy research, the ETCC website houses all final reports for ETP projects to provide stakeholders and the public access to results. In addition to this, the ETCC supports project dissemination through its annual Summit. Both ETP PAs and program implementers have had the opportunity to provide input on the 2024 ETCC Summit activities. Early in the 3P program design, ETCC assisted the ETPs with email outreach using their established contact list. GET staff shared that they no longer receive this assistance and are unsure about the reason for the change, although they do not have any concerns.

The California Technical Forum (CalTF) is a collaborative of experts who use independent professional judgment and a transparent, technically robust process to review and issue technical information related to California's energy efficiency portfolios.[14] CalTF is a key stakeholder involved in the technology transfer process at the end of an ETP

[12] https://www.etcc-ca.com/about/about-etcc

[13] Codes and Standards staff may include IOU staff or members of other industry organizations who contribute to codes and standards updates through the energy efficiency portfolios.

[14] https://www.caltf.org/what-we-do

project. CalTF facilitates the transfer by helping project teams identify the best pathway for integration into the IOUs' portfolios and connecting project teams with the appropriate parties to carry out these activities.

CORE & PRIMARY PARTNERS

CalNEXT and GET implementation staff have at least one subcontractor they rely on more heavily to support program processes; these organizations are considered core program partners. CalNEXT has five core partners involved in project implementation, dissemination, and technology transfer activities. Each partner has its own contract with Energy Solutions, and different budgets are allocated to teams depending on the projects they can implement and the extent of their involvement with other administrative activities. Each of the core partners engages in the TPM prioritization and project scoring processes and is considered an equal partner in terms of the weight of their input. Context around how each core partner uniquely supports CalNEXT is provided below:

- **Vermont Energy Investment Corporation (VEIC)**: With experience designing and implementing energy programs, VEIC supports energy sector efforts focused on decarbonization.[15] VEIC leads the initial scanning of project ideas submitted to the CalNEXT portal. VEIC conducts an initial review of submissions to check that (1) the project form is complete, such that all the required information has been filled out, and (2) the idea aligns with program priorities. This initial scanning helps ensure the time core partners spend on scoring project submissions is well spent on focused, relevant research with all the necessary information for review.
- **The Research Corporation (TRC)**: TRC provides engineering and consulting services with a commitment to environmentally focused and sustainable solutions.[16] Due to the size and variety of internal skill sets available, TRC is one of the only partners able to support measure package development, updates, and code readiness during the technology transfer process.
- **Alternative Energy Systems Consulting (AESC)**: AESC focuses on developing solutions in energy efficiency, renewable energy, distributed energy resources, and custom software implementation that benefit both energy producers and consumers.[17] In addition to the TPM and project scoring activities mentioned above, AESC supports project implementation and specializes in industrial and agricultural research.
- **The Ortiz Group (TOG)**: TOG uses consultant-based, project-focused teams to provide management services to public organizations administering 3P programs.[18] With expertise in conducting outreach and electrification projects in disadvantaged communities (DACs), TOG supports VEIC in project scanning to ensure alignment with program priorities and goal achievement related to research that supports low-income customers and DACs. TOG also approaches the scoring process from this perspective and assists other project implementers with customer and site recruitment in DACs. TOG assists CalNEXT project teams with developing implementation materials for research projects with a DAC focus.
- **UC Davis**: As a research facility, UC Davis focuses on delivering new technologies that will positively impact the world by supporting researchers and innovators.[19] As a project implementer, UC Davis tends to focus on early-stage technologies due to the variety of research labs available on their campus.

GET has one core partner, Lincus, who plays an integral role in the program. Once approved, Lincus leads most projects through implementation, handling quality control, budget, scope adjustments, and timeline updates. They then meet with ICF biweekly to discuss updates. In addition to project implementation, Lincus supports ICF with other program activities, including TPM prioritization, drafting research plans, program outreach, and coordinating webinars.

[15] https://www.veic.org/
[16] https://www.trccompanies.com/
[17] https://www.aesc-inc.com/
[18] https://ortiz-group.com/
[19] https://research.ucdavis.edu/

OTHER SUBCONTRACTORS

The remaining subcontractors listed in Figure 7 represent organizations that support at least one of the ETPs with project implementation. Subcontractors who are not core partners to one of the ETPs typically only implement projects originally submitted by their organization unless program implementation staff requests their support otherwise.

OTHER STATE ORGANIZATIONS AND INITIATIVES

Other organizations are operating in California that are focused on emerging technologies but are not included in Figure 7. According to interviews, CalNEXT and GET have had little to no contact with the CEC, California Flexible Unified Signal for Energy (CalFUSE),[20] and the DRET collaborative.

California's Market Transformation Administrator (CalMTA) engages with a broad range of stakeholders to identify and develop market transformation initiatives that aim to mainstream energy efficiency and help California achieve its energy and climate goals while promoting workforce development and equity.[21] CalMTA focuses on decarbonization, so it interfaces minimally with GET, but according to interviews, CalMTA meets with a member of the CalNEXT implementation team biweekly to discuss upcoming and ongoing projects. To date, meetings between ETP and CalMTA have been focused on opportunities to leverage one another's research to address market needs and meet shared goals. CalNEXT and CalMTA have each submitted at least one project idea to the other initiative.

4.2.2 PROGRAM PROCESSES

Figure 8 illustrates the essential steps in the ETP process. Each ETP year begins by identifying what technology families are the highest priority for program funding based on the IOU portfolio and market needs. These priority technologies are communicated to potential project submitters (defined in the PTLM as the "audience" and includes but is not limited to technology developers, researchers, manufacturers, and distributors), who submit project ideas via the electric or gas ETP websites. Program staff and relevant SMEs scan and score project submissions, primarily from the core partners. If approved, projects move into implementation to test hypotheses and verify technology impacts. Once a project has been fully implemented, the project implementation team analyzes the data and drafts the results in a final report shared with a target audience of relevant stakeholders. The target audience may include manufacturers, technology developers, utility program design teams, or others with a particular interest in the project findings and can potentially assist with transfer activities. At this stage, project implementers and program staff work with the necessary stakeholders (e.g., CalTF, Codes and Standards staff) to identify and recommend the best way project results can be transferred and potentially integrated into the IOU portfolios and utilized in resource acquisition programs.

Figure 8. ETP Process Chart

TECHNOLOGY PRIORITY MAP PRIORITIZATION AND REVISIONS

[20] CalFUSE is a framework proposed by the CPUC to promote demand flexibility.
[21] https://calmta.org/about/

TPMs define technology families the ETPs have identified as high priorities to address IOU portfolio and market needs. Program staff develop TPMs separately for the gas and electric ETPs. Both program implementers review their TPMs annually and revise them as needed to stay current with constantly evolving market needs.

CalNEXT

According to interviews, CalNEXT has seven TPMs for 2024, six of which identify a high-priority technology family and one that specifically states priorities for Focused Pilots. The CalNEXT TPMs for 2024 include:

- HVAC
- Lighting
- Plug Loads and Appliances
- Process Loads
- Water Heating
- Whole Buildings
- Focused Pilot[22]

[22] Note the 2022 Focused Pilot TPM was the most recent version available. The TPM covers five technology areas and that CalNEXT planned to initiate three Focused Pilots in 2023.

Each CalNEXT TPM is developed as a standalone PDF document. The program implementer, Energy Solutions, divvies up the TPMs to be reviewed once throughout the year. Each quarter, Energy Solutions coordinates a working group across its core partners to explore how the program can update and refine priorities for the upcoming year based on technology and market changes since the last update. For each TPM, the selected working group meets, as needed, to discuss revisions. Typically, this involves up to five workshops conducted throughout the quarter.

Energy Solutions reviews the TPMs and provides input to the working group on its revisions during this process. Once the working group drafts its proposed revisions, Energy Solutions distributes the updated TPM draft to the broader stakeholder advisory group, including IOU staff, who have a week to review and provide comments. After stakeholders have a chance to review and provide feedback on the revisions, Energy Solutions holds a webinar with the broader group to discuss questions and comments. Stakeholders are typically given a few extra days to review the draft and provide any final input they may have. Once finalized, Energy Solutions publishes the updated TPM on the CalNEXT website for public access and files the TPM with SCE, along with feedback received during the review process, to show proof of completion. Energy Solutions facilitates all workshops and external review meetings during the TPM prioritization process.

Energy Solutions staff reported that some emerging areas are more crosscutting than originally anticipated. As currently designed, ETP projects do not typically allow program staff to understand what application or program type a technology will be most effective in and what customer group(s) it is best suited for. To address IOU portfolio needs more holistically, CalNEXT staff are working towards adding a new TPM that is *portfolio needs-based* rather than *technology-focused.* At the time of the Energy Solutions interview, the new TPM was under review and was expected to launch in the summer of 2024. Energy Solutions met with multiple core partners to get their input on this update.

GET

In contrast to CalNEXT, GET's TPM is designed as a single Excel spreadsheet that houses technology priorities across multiple end uses. GET's TPM for 2024 includes:

HVAC

- Water Heating
- Appliances
- Miscellaneous[23]
- Cooking Equipment
- Process Loads
- Whole Building

The TPM spreadsheet is reviewed and updated on an annual basis. Lincus, ICF's core partner for GET, takes on the responsibility of making initial updates to the TPM and then passes the revised document to ICF for review. ICF mentioned that since the inception of the 3P design, they have added Technology Readiness Level (TRL) as a consideration when assessing research priorities because they have observed many innovators using this as a proxy for technology progress. Once ICF finishes making additional revisions as they see fit, they distribute the updated document to the Technical Advisory Group (TAG). Similar to CalNEXT's working group, ICF gets SME input on the GET TPM through the TAG. Individuals in the TAG are selected and invited by ICF staff with no input from SoCalGas. The group is primarily ETCC members, although it includes others who provide the program with a national perspective. GET staff meet with the TAG quarterly to discuss program updates and provide the opportunity to comment on the annual research plan and TPM, which play a significant role in research priorities for the subsequent program year. In addition to the TPM, the annual research plan is a key document that informs GET plans and goals. The TPM and annual research plan are typically shared with the TAG for input in the fourth quarter of each year to plan for the upcoming year. ICF integrates TAG member input, as necessary, and delivers the revised TPM to SoCalGas for final approval.

[23] Miscellaneous technology families include combined heat and power, engine-combi systems, sorption-combi systems, controls-combi systems, burners, engine-pumping, hybrid-combustion, and thermodynamic cycle-combi systems.

Occasionally, GET staff leverage input from other industry professionals outside of the TAG when considering TPM updates. During interviews, one stakeholder said that due to the progressively negative feelings around gas technologies, it has become increasingly difficult to engage with staff members of prominent industry organizations.

Two interviewed stakeholders indicated that although the GET TPM process is less extensive and structured than for CalNEXT, they feel the process is fitting for GET, a smaller program with a considerably smaller budget and fewer end-use applications for technologies.

Cross-Program Summary

Overall, interviewed staff and stakeholders said the TPM prioritization process is effective at defining ETP priorities for both CalNEXT and GET. Interviewees indicated the annual cadence for TPM updates is appropriate, one noting there is plenty of research to do each year. Interviewees felt the TPM process has been very effective in identifying high-priority technologies that are best fit to address portfolio needs and encourage relevant project submissions. As the program progresses, interviewees have seen stronger alignment between submitted project ideas and TPM technology priorities.

PROJECT SUBMISSIONS

Anyone can submit a project to the ETPs. The CalNEXT and GET websites each offer a publicly accessible portal. Online submission forms require the submitter to provide key details about the project, such as the technology focus area, the target market sector, and the expected impact of scaling the proposed technology or strategy. Once received, the project submission moves on to scanning and scoring.

PROJECT SCANNING AND SCORING STRATEGIES

Once projects are submitted, ETP staff undergo a project selection process.

CalNEXT

VEIC manages the quarterly intake and scanning process for CalNEXT project submissions. VEIC begins by completing an initial, high-level scan of each submission to ensure the research is aligned with basic program priorities outlined in the TPMs and that all necessary information is provided within the submission. This step ensures projects that move on to scoring, a more in-depth review process, are worthwhile for core partners to take the time to review. To help avoid potential biases, the scoring process is blind to core partners aside from VEIC, which manages the original intake process. Typically, three to five SMEs are selected among core partner staff for the scoring process of each project. Scorers are selected based on their expertise in the priority area of the project submission, although according to interviews, scoring ideally involves SMEs involved in the TPM review process for that priority technology family. This increases the likelihood that these individuals will be able to review and select projects based on gaps in the research for that TPM technology family. In cases when a core partner is the project submitter, that partner is excluded from the scoring process to prevent bias. This does not apply to the initial scanning of project submissions, as VEIC is still responsible for this step when their organization makes a submission.

The CalNEXT project scoring criteria in Table 9 follow those outlined in the Project Scoring Instructions document provided by program staff. These criteria and their associated scoring weights align with those listed in CalNEXT's Project Scorecard, although the category scoring weights are broken down more granularly in the Project Scorecard and do not include the "underserved community benefits" criteria. This criterion is exclusively scored by the Ortiz Group, which specializes in outreach and implementation in DACs and other hard-to-reach (HTR) communities. These benefits refer to how (1) the project scope directly benefits DACs or HTR communities, such

as site work that will result in spending project budget in these communities, and (2) the expected outcomes will uniquely benefit customers in these communities. Energy Solutions recognized that scoring along this criterion is difficult for some project types, such as lab studies, sharing that they have had ongoing internal conversations about what it means for lab studies to meet this criterion.

Table 9. CalNEXT Project Scoring Criteria

Weight of Score Section in Overall Review	Scoring Weight	Scoring Criteria
60%	15	Positioning for technology transfer
	15	Utility benefits
	10	Alignment with TPM priorities
	10	Underserved community benefits
	10	Project innovation
40%	10	Project clarity (i.e., scope and expected outcomes)
	10	Project readiness (i.e., identifies effective delivery and leverages appropriate partners)
	10	Stakeholder engagement (i.e., identifies relevant stakeholders and how they plan to engage such stakeholders)
	5	Timeline
	5	Cost

Once partners finish scoring a project submission, they upload their scorecards to SharePoint, where VEIC compiles the scores in an evaluation summary. Project scores are summed and weighted as described in Table 9. VEIC then assesses partner scores and comments to determine whether the project will be a topic for the next scoring review meeting, where Energy Solutions and scoring SMEs come together to discuss recently reviewed projects. Typically, projects are selected for discussion if scoring comments are inconsistent across criteria or if scores do not align with the comments provided. Scoring review meetings are held quarterly to discuss reviewed projects, get clarity around reviewer comments, and ultimately come to a consensus as a group about the score. As a guideline, a project submission must achieve at least a 75-point score to be considered for approval,[24] although it is possible for a project to move forward without a qualifying score based on discussions during the scoring review meeting. The final decision about a project submission, whether to approve, defer, or discontinue (or reject), is made as a group. Once approved, the selected project implementer drafts a formal Project Plan outlining the scope, budget, and other important details that Energy Solutions and SCE must approve before the project moves into implementation. SCE explained that when a project reaches them, their job is to assess whether (1) the project abides by contract terms and (2) the expected outcomes align with hypotheses proposed by the project theory. As part of this process and to support continuous improvement, SCE also acts as an evaluator of the overall scanning and scoring process, such that they may provide Energy Solutions with recommendations for improvement on a quarterly basis. It is up to Energy Solutions to execute any changes recommended by SCE.

CalNEXT also offers a specialized Fast Track process for projects that address immediate portfolio needs, such as technical data required to support a measure package update. A measure package update could be needed for several reasons; for instance, an existing measure package could be expected to expire at the end of the year,[25] or may require an additional baseline due to a modification to the technology. This track was developed to streamline the approval

[24] Program materials did not specify how the final score is calculated across all reviewer scores.

[25] Existing measure packages may be expected to expire due to a number of reasons, including but not limited to anticipated or scheduled T24 Code updates, data changes driven by CEDARS tracking data requirements, or other significant revisions to the measure definition or delivery type (e.g., downstream, upstream).

process for projects that address urgent portfolio needs. Energy Solutions has an internal staff member who works closely with CalTF to identify these needs. One interview respondent reported that although the Fast Track process was developed with great intentions, they do not feel it is much quicker than the normal process.

GET

GET uses a simpler review process: project scoring (referred to in the GET implementation plan as "screening") is completed internally by ICF. ICF controls the intake of projects, which project submitters can submit through the GET LinkedIn page in addition to the program website. ICF bases its review on priorities outlined in GET's annual research plan and TPM, scoring against the criteria listed in Table 10. Notably, although ICF scores the projects internally, they circulate the annual research plan to members of the TAG in the fourth quarter of each year to provide the opportunity to gather input on research priorities for the upcoming year. Additionally, to support GET's diversity, equity, and inclusion (DEI) screening, the TAG includes a few stakeholders who specialize in DAC and HTR community research. These individuals provide guidance and input on research priorities in these areas. Once ICF completes its internal scoring, it passes the project list to SoCalGas for final review. No specific score was identified as a threshold for approval.

Table 10. GET Project Scoring Criteria

Weight of Score Section in Overall Review	Scoring Weight	Scoring Criteria
30%	5	Alignment with corporate and regulatory goals
	5	Market urgency (high/medium/low)
	5	Time to launch
30%	5	Market size
	5	Energy savings potential
	5	Perceived customer impact
	5	Cost-effectiveness
20%	5	Technology maturity
	5	Implementation challenges and risks
	5	Technology fit within the existing portfolio
10%	5	Staffing availability
	5	Partner/vendor capability and accessibility
	5	Program processes impacted
10%	5	Expected impact on low-income communities, communities of color, and rural communities
	5	Are vendors supporting the proposed project minority or women-owned

If approved, project implementers draft a formal Project Plan (also referred to by GET staff as the Project Proposal) that scopes out implementation details. Program implementation staff identify and select project implementers; PAs are not involved in this decision-making process. Project implementers are not necessarily the same as the project submitter. Implementers are typically selected based on their expertise with the technology in question and their research experience and capabilities (e.g., lab testing, building simulations). The Project Plan drafting process typically involves talking with manufacturers to understand how the technology saves energy, why it is better than existing options, and for which customer groups it will work best. Project implementers work with ICF to approve the budget and other important details before they begin executing the project.

ICF reported no challenges with the GET project scanning and scoring process, sharing that, unsurprisingly, there were details they had to sort out early on in their role as the program implementer but that the process is now running smoothly.

Cross-Program Summary

Two stakeholders reported that the ETP project approval process can be quite lengthy. One stakeholder shared that they wish there were a way for ETP to compress these timelines, as it can often take a project up to six months from submission to receive approval for implementation. The second stakeholder compared the process with the historical program design, noting the process used to involve internal conversations among IOU staff; however, with more people involved and more layers of approval required, they have seen project reviews take up to a year.

PROJECT IMPLEMENTATION

Approved projects are executed by selected project implementers to test hypotheses and verify technology impacts. Methods for implementation can range from lab testing to building simulations or real-world applications that require customer participation. Aside from the Fast Track projects implemented exclusively by CalNEXT, projects implemented by the ETPs fall into one of the following project type categories:

- **Technology Development Research (TDR):**[26] These projects typically involve early-stage research for a new technology with the intent to develop a new measure or widget.
- **Technology Support Research (TSR):** This type of project generally supports research for commercially available technologies that require additional data or testing to support a measure package update.
- **Focused Pilots:** These projects are longer-term efforts typically involving ETP collaborating with another program effort. Focused Pilots support technology adoption by investigating ways to overcome supply chain and market adoption barriers for high-impact measures that are new or underutilized. According to stakeholder interviews, these projects have a larger, more comprehensive scope and longer timelines than others and may require formal approval from the CPUC for implementation through an advice letter process.[27]

PROJECT REPORTING AND DISSEMINATION

Once implementation activities are completed, the project team calculates and shares the results with relevant stakeholders to support the dissemination process. The ETPs utilize virtual outreach events (e.g., webinars), conferences, and the ETCC Summit to help communicate these findings to the target audience. As a key part of this process, the project team drafts a final report summarizing project activities, key findings, and recommendations for potential uses of the information moving forward. Once this report is finalized by ETP staff, it is posted to the ETCC and corresponding ETP website for public access. ETP staff or project implementation teams typically distribute the final report to stakeholders of interest by sending them a copy via email or alerting them through marketing outreach via email when it becomes publicly available. A few stakeholders noted they have directly contacted industry professionals when there is a certain individual they want to ensure has access to the information, such as a manufacturer or utility program design team.

Stakeholders did not mention any issues with the ETP dissemination process. One stakeholder involved in GET said they feel the process is working well so far and that they have seen strong attendance at GET virtual outreach events. This interviewee observed that ETP has gained more attention and traction from stakeholders since transitioning to the

[26] Due to the smaller budget allocated to GET, gas projects typically occur on shorter timelines than CalNEXT projects.
[27] IOU staff indicated that formal approval from the CPUC through the advice letter process may not be required for all Focused Pilots.

3P program design. Another interviewee highlighted how they see no gaps or areas for improvement in either ETPs' dissemination process, sharing they feel program staff are doing everything they can to get industry attention.

TECHNOLOGY TRANSFER ACTIVITIES

The final process for each ETP project is the technology transfer, which directly follows or occurs concurrently with steps in the dissemination process. Technology transfer helps to identify the best pathway for project results to be integrated with program portfolios and engages the appropriate stakeholders for this process (e.g., engineering teams,[28] IOU staff, Codes and Standards staff). Findings from ETP projects can be used in many different ways, from developing a new measure package or adopting an implementation strategy to a codes and standards update. One CalNEXT stakeholder recalled up to four projects, the results of which initiated a follow-up ETP project to conduct further research before recommending technology for integration.

The statewide organization, CalTF, plays an integral role in the technology transfer process. As the California electronic Technical Reference Manual (eTRM) developer, they are an essential stakeholder involved in developing new measure packages and supporting the adoption of those measures in the IOU portfolios. When a project team or stakeholder who received the project results for transfer (e.g., engineering team) feels the results can be used to develop or revise a measure, they connect with CalTF to initiate the process. From here, CalTF pairs the primary party with a "lead" or "sponsor,"[29] typically an IOU, who will fund and own the development of the measure. IOU staff then work with the primary party to develop the measure package.

CalTF houses a measure screening committee that focuses on reviewing measure ideas and providing feedback to help primary parties navigate the best path for transfer. In cases where results propose a transfer activity other than revising or developing a measure, the committee helps connect the primary party with the organization(s) they need to engage with for the transfer (e.g., Codes and Standards staff for results supporting codes and standards readiness). If the measure screening committee supports the idea and agrees that a technology is suited for a measure package or revision, the primary party will create a measure package plan and incorporate feedback from the committee. The measure package plan is a document that describes the measure and its expected savings in more depth. This document is reviewed by the CPUC and, if approved, is further developed into a full measure package. Once completed, the package undergoes a final round of review to receive CPUC approval to be adopted into the IOU portfolio.

Under the historical design, measure packages were developed and revised by IOU engineering teams; ETP staff were not involved in this task. In the 3P design, CalNEXT and GET staff are available to support measure package activities as needed, although engineering teams are still primarily responsible. Project implementers may also help draft measure packages if they have the required skill set among internal staff. One of the three stakeholders who noted this improvement said the change has broadened the funding sources available to support measure development. One stakeholder shared that in a few cases, an engineering team has approached them as a project implementer to propose research in support of a measure package activity. In these cases, the engineers had already solidified utility funding to develop the package and were just missing funding for the required research or testing.

One stakeholder who supports project implementation explained that at the end of a project, they have two options to meet their contractual obligations to CalNEXT. The first option is to disseminate results to the target audience, verify that this step has occurred, and incorporate comments provided by stakeholders, as applicable, into the project's final report. The second option is to document that the project has resulted in a new measure package or supported a measure update. This individual stated that they never chose the second option, not because it is a bad idea, but because it is not feasible. A measure package or update can take over a year to be adopted once a project is finished.

[28] This could include IOU engineering staff or engineering teams from other industry organizations.

[29] The person(s) to whom results are handed off for transfer are referred to hereon out as the "primary party."

Stakeholders and program staff hesitated to provide input on the technology transfer process this early in the 3P program design. Multiple interviewees felt it was still too early in the 3P program design to fully understand what this process would look like in motion, as very few projects have begun since the transition. A few interviewees also noted that the technology transfer process can be quite lengthy, even years, when involving the development of a measure package. Program implementers indicated a need for more discussion between themselves and the PAs to clarify and better establish what technology transfer activities they, as program staff, are responsible for versus what is beyond their role. At the time of the interviews, no gas projects had undergone transfer, and only one electric project had gone through the process since the inception of the 3P design. This transfer resulted in the development of a new measure package, which was still ongoing at the time of the interviews.[30] Many interviewees echoed that despite the ETPs' best efforts to effectively conduct technology transfer activities, whether a technology or strategy is adopted into a utility resource program is ultimately out of the programs' control. The technology transfer process was described as "a web of support" by one interviewee. They highlighted how the process relies on engagement from many parties to be successful. Another said that to promote a successful transfer, project teams must identify who will likely utilize the technology in a real-world application (e.g., utility resource program teams) and get them involved early. This will help guide the project in providing the intended value efficiently.

4.2.3 PROGRAM METRIC TRACKING

The CPUC defines ETP under the market support pillar of the energy efficiency portfolio. During interviews, one of the program implementers for ETP indicated the program will likely move toward tracking market support metrics soon, as developed by the California Energy Efficiency Coordinating Committee (CAEECC).

CPUC DECISIONS DIRECTING DEVELOPMENT OF PROGRAM METRICS

CPUC Decision 18-05-041 adopted 330 common metrics and indicators for the energy efficiency portfolio that PAs have been reporting on for several years.[31] In the more recent Decision 23-06-055, the CPUC indicated that "there are several common metrics that were adopted within Decision 18-05-041 that have not been used and/or may no longer be relevant or useful."[32] The PAs assembled a working group to recommend modifications, suspensions, or removals of common metrics and indicators adopted in D.18-05-041. The working group recommended removing many common metrics associated with the SW programs, including ETP.

Alternatively, Decision 23-06-055 adopted 25 market support indicators, many of which were metrics or indicators recommended by the CAEECC Market Support Metrics Working Group (MSMWG).[33] Decision 23-06-055 requested that CAEECC re-engage the MSMWG and Equity Metric Working Group (a separate effort focused on the equity segment of the energy efficiency portfolio) to discuss and develop recommendations to clarify the adopted equity and market support indicators. CAEECC reconvened by consolidating the two working group efforts into a single Equity and Market Support Working Group (EMSWG) and recommended modifications to the 25 market support indicators adopted in Decision 23-06-055. A summary of the EMSMWG recommendations is provided in Table 11. Decision 23-06-055 also directed the PAs to track 17 additional market support segment indicators structured around annual surveys focused on awareness, knowledge, attitude, and behavior. In March 2024, the CAEECC EMSWG reached a consensus that the market support indicators would be used to measure the impacts of market support segment programs;[34] however, the

[30] According to the interviewee, the new measure package is for a high-efficiency window measure for residential applications.
[31] D.18-05-041.
[32] D.23-06-055.
[33] The charge of the CAEECC MSMWG was to identify and define the most important objectives and associated key metric(s) for the new Market Support portfolio segment established in CPUC Decision 21-05-031.
[34] *Clean_CAEECC EMSWG Final Report (posted 03-22-24)*

working group made no clear adjustments to refine the market support indicators from portfolio-level to program-level measurements.

Table 11. CAEECC EMSWG Recommendations for Market Support Segment Indicators

Indicator	Indicator Description Adopted in D.23-06-055	CAEECC EMSWG Recommendation
MS-1	Number of partners by type and purposes (Q, P)	▪ "Partner" refers to an entity engaged in partnerships including but not limited to educational institutions/organizations, governments, community-based organizations, trade associations, suppliers, manufacturers, and contractors. ▪ "Type" describes the nature of a partner or partnership. ▪ "Purpose" refers to what the partnership seeks to achieve.
MS-2	Dollar value of non-ratepayer in-kind funds/contributions utilized via partnerships (A, P)	▪ "Partnership" refers to an agreement between at least two entities to engage in a mutually beneficial relationship within the context of energy efficient products, services, education, and/or training (may or may not be legally contracted). ▪ "Non-ratepayer in-kind funds" refers to monetary contributions offered for free (e.g., through a grant or donation). ▪ "Non-ratepayer in-kind contributions" refers to goods, services (e.g., human capacity), and other tangible assets provided for free or lower than the usual charge.
MS-3	Percent of participation relative to eligible target population for curriculum (Q, S)	None
MS-4	Percent of total WE&T program participants that meet the definition of disadvantaged worker (Q, S)	None
MS-5	Number of career and workforce readiness participants who have been employed for 12 months after receiving the training (A, S)	None
MS-6	Prior year percentage of new measures added to the portfolio that were previously emerging technology program (ETP) technologies (A, P)	None
MS-7	Prior year number of new measures added to the portfolio that were previously ETP technologies (A, P)	None
MS-8	Prior year percentage of new codes or standards that were previously ETP technologies (A, P)	None
MS-9	Prior year number of new codes and standards that were previously ETP technologies (A, P)	None
MS-10	Savings (lifecycle net kWh, kW, and therms) of measures currently in the portfolio that were supported by ETP, added since 2009. Ex-ante with gross and net for all measures, with ex-post where available (A, P)	None
MS-11	Number of new, validated technologies recommended to the California Technical Forum (A, P)	None
MS-12	Cost-effectiveness of a technology prior to market support program relative to the cost-effectiveness of a technology after intervention by the market support programs (percentage change in cost-effectiveness) (A, S)	None
MS-13	Number of collaborations, with contextual descriptions, by business plan sector to jointly develop or share training materials or resources (A, P)	▪ Pause reporting to clarify what is intended to be measured and how to calculate the indicator.
MS-14	Number of unique participants by sector that complete training (Q, S)	None

Indicator	Indicator Description Adopted in D.23-06-055	CAEECC EMSWG Recommendation
MS-15	Number of projects (outside of ETP) that validate the technical performance, market and market barrier knowledge, and/or effective program interventions of an emerging/under-utilized or existing energy-efficient technology (A, P)	None
MS-16	Total projects completed/measures installed and dollar value of consolidated programs by sector (Q, P)	None
MS-17	Ratio of ratepayer funds expended to private capital leveraged by sector (Q, P)	▪ Pause reporting as further discussion is needed to agree upon the definition of private capital and to determine a method to calculate the indicator.
MS-18	Percentage of partners that have taken action supporting energy efficiency by type (Q, P)	▪ "Partner" definition (see MS-1). ▪ "Taken action" refers to what the partners have done to advance their shared purpose. ▪ The denominator should be the total number of all partners (total number is not fixed over time).
MS-19	Number of contractors (that serve in the portfolio administrator service areas) with knowledge and trained by relevant market support programs to provide quality installations that optimize energy efficiency (Q, S)	None
MS-20	Assessed value of the partnership by partners (A, P)	▪ "Partner" definition (see MS-1). ▪ "Partnership" definition (see MS-2).
MS-21	Percent of market penetration of emerging/under-utilized or existing energy efficiency products or services (A, P)	None
MS-22	Percent of market participant awareness of emerging/under-utilized or existing energy efficiency products or services (A, P)	▪ Pause reporting to clarify what the indicator is intended to measure, why it is being assessed, and how to calculate the indicator.
MS-23	Aggregated confidence level in performance verification by production, project, and service (for relevant programs) (A, P)	▪ Pause reporting to clarify what the indicator is intended to measure, why it is being assessed, how it should be integrated with the energy efficiency portfolio ETP, and how to calculate the indicator.
MS-24	Differential of cost defrayed from customers (e.g., difference between comparable market rate products and program products) (A, P)	None
MS-25	Comparisons between market-rate capital vs. capital accessed via energy efficiency programs (e.g., interest rate, monthly payment) (A, P)	▪ "Market-rate capital" refers to financing obtained from private investors, financial institutions, or capital markets at prevailing market interest rates that reflect the current economic conditions and risks associated with the investment. ▪ "Market rate" is defined as the rate of interest on a loan or investment that is commonly available on the market for that loan or investment. For a loan, this refers to the average rate of interest that will be charged to the borrower from a variety of providers. ▪ "Capital accessed via energy efficiency programs" is defined as financing acquired solely through energy efficiency portfolio initiatives and projects. ▪ Gather additional input on the indicator from their reporting teams, CAEATFA members, etc., to form a common basis for calculating "market rate capital vs capital accessed via energy efficiency programs."

Note: Q = Report Quarterly; A= Report Annually; S = Report at Segment Level; P = Report at Portfolio Level
Source: Clean_CAEECC EMSWG Final Report (posted 03-22-24)

EXISTING ETP METRICS TRACKING

During interviews, program staff shared that shifting to tracking market support metrics for the ETP made sense. With this change, program staff would not be held accountable for the amount of energy savings they achieve from ETP,

which is difficult to measure given that ETP staff are not responsible for integrating ETP measure recommendations into IOU portfolios.[35] The following interview findings relate to tracking the existing program metrics and KPIs defined in the CalNEXT and GET implementation plans.

CalNEXT

According to interviews, the length of the 3P implementation contracts poses difficulties for Energy Solutions in tracking some program metrics. Program staff explained that metrics used to track whether an ETP project results in a codes and standards update or adoption of a new measure in the IOU portfolio (see ETP-T1 – T5 in Table 21 in Appendix C) are very difficult to monitor due to the number of stakeholders involved and the length of time this process generally takes. With Energy Solutions' current 3P contract ending in 2027, SCE indicated some metrics are too long-term for the implementer to track, considering the 3P contracts are only three years long, and it will likely take longer than this to achieve program savings:

"From the third-party implementer perspective, the time that it takes [for a technology] to go from ET to actual savings in the IOU portfolio is a little bit too long for their span because their contract isn't that long itself."

CalNEXT staff also noted that some metrics (e.g., ETP-T5: Number of savings of measures currently in the portfolio that were supported by emerging technologies programs, added since 2009.) predate the current implementation team, complicating their ability to monitor because some metrics require tracking information prior to their involvement.[36] Implementation staff leans on the IOUs for support in reporting such metrics, although they noted most of this information is accessible in CEDARS for measures adopted into the portfolio as of or after 2021. Metrics related to projects that result in a codes and standards update were called out as particularly difficult to track. Due to the many different ways a codes and standards update can be incorporated, not all are easily tracked back to ETP.

When asked to clarify what the "specific statewide goals" program metric ETP-T5 refers to (i.e., ETP-T8: Number of SWEETP projects and technologies aligned with specific statewide goals, with specificity as to what aspect of each goal it is fulfilling.), Energy Solutions indicated that the CPUC has yet to define these goals.[37] Due to recent conversations Energy Solutions has had with the CPUC about these goals, they expect more clarity will be provided shortly. In situations where they are unable to reliably track or report on a performance metric, program implementers flag the metric for the PA and request clarification or additional support to ensure they are able to report accurately.

GET

GET staff did not express any difficulties tracking progress towards program metrics and reporting such progress to PA staff. They shared that KPIs are reported in regular status reports, either monthly, quarterly, or annually, depending upon the performance indicator. Program staff shared that they perceive these updates as a way to consistently "take the temperature" of the program and assess performance against overall goals. Program staff acknowledged working through a start-up phase after moving to the 3P program design and explained that they do not find it difficult to report on metrics, particularly those at the project level, now that they have the necessary tracking mechanisms and processes in place.

4.2.4 THIRD-PARTY IMPLEMENTATION

According to interviews, staff and stakeholders are satisfied overall with how the programs operate under the 3P implementation design. When asked about their experience with the 3P design, all program staff (including CalNEXT

[35] Although this finding came from a program implementer interview, it is not necessarily true. One of the CAEECC EMSWG indicators includes, "Savings (lifecycle net kWh, kW, and therms) of measures currently in the portfolio that were supported by ETP, added since 2009. Ex-ante with gross and net for all measures, with ex-post where available (A, P)." In addition to being difficult to track savings from ETP, it is difficult to reliably track ETP portfolio-adopted measures back to ETP prior to 2021.

[36] According to CAEECC updates to the market support metrics, this issue has not been resolved.

[37] According to CAEECC updates to the market support metrics, this issue has been resolved as this metric is no longer listed as an indicator.

and GET staff) expressed satisfaction with coordination and overall program functionality. That said, all program staff acknowledged the initial learning curve that came along with the transition. SoCalGas highlighted that the "newness" of the design had been one of the biggest struggles of the gas program, as there was no definition for how to make a program like ETP work at the SW level. SoCalGas also mentioned they needed to provide ICF guidance and training early to support their understanding of gas technologies. This was not a surprise, as SoCalGas indicated implementation firms may have limited experience with or knowledge about gas technologies, and SoCalGas was pleased with the progress ICF has made since the inception of the 3P design. Additionally, SCE shared that, as they would expect, it took some time for Energy Solutions, as the new electric ETP implementer, to gain an understanding of stakeholders' expectations of the program and subsequently modify their processes to align and meet those expectations. PAs discussed growing pains that occurred early in the transition to the 3P design but reported they have observed significant improvements over time and feel both the electric and gas ETPs are being implemented effectively. One non-implementer-affiliated stakeholder highlighted that under the 3P implementation design, they "feel there has been a strong desire to do good work, be efficient, find good ideas, and vet [technologies] appropriately" and are confident that the program is on the right track.

Over half of the stakeholders (5 of 8) reported at least one way they feel the 3P implementation design has improved the overall effectiveness of ETP:

- **Holistic look at portfolio needs and program priorities through a SW lens.** One implementer-affiliated stakeholder reported that because the 3P design prioritizes technologies on a broad SW scale, it allows larger projects to be implemented and lab testing to be done more efficiently compared to the historical program design. Under the previous design, larger-scale projects would typically become a lengthy and extensive process, requiring co-funding and additional written agreements to determine the scope of work. As the 3P design centralizes and streamlines this process, this stakeholder noted that it ultimately allows more funding to be allocated to research projects, and less is spent on administrative tasks.
- **Market-driven approach that comprehensively addresses portfolio needs**. One implementer-affiliated stakeholder said that historically, ETP reports were very technology-focused and did not tend to consider factors such as the type of resource program for which the technology would or would not be well suited. They felt that the 3P design takes a real-world approach to research, putting greater consideration into not just the technology or widget itself but how and in what specific application it best fits. Input from Energy Solutions staff supported this perspective, suggesting the broader research approach that is relatively new for ETP presents greater potential for CalNEXT to achieve long-term program goals:

  "[ETP] used to test similar technologies but not from a coordination standpoint. With CalNEXT there is a great chance to build upon results from previous reports and go beyond understanding performance in the field to thinking about how a technology becomes an active measure [in utility resource programs]."

- **Unifying priorities under the SW 3P program design has streamlined technology transfer activities**. Although there had been few opportunities for activities to occur by the time of the interviews, one implementer-affiliated stakeholder felt the way the 3P design centralizes research priorities helps the program achieve its intended impacts more efficiently. This stakeholder shared that historically, two to four measure packages would be written for the same technology by different IOUs due to a lack of coordination but that the 3P design allows new/revised measures to be managed at the statewide level. As such, developing measure packages and adopting measures into the resource acquisition programs to generate energy savings is more of a collective, streamlined effort.
- **Decreased potential bias in intake and review processes.** Although one non-implementer-affiliated stakeholder noted that project submissions could be made through the ETCC website under the historical program design, another implementer-affiliated stakeholder recalled the process differently. This individual shared that in their experience, historically, if you did not have a connection to an IOU ET staff member, the submission process could be quite difficult as the location of the link required to submit a project was not readily available or made

transparent. This stakeholder has been involved with ETP for over 10 years and praised the more impartial approach offered by the 3P design through a simplified submission pathway. Under the new process, project submissions can easily be made directly through the CalNEXT and GET websites, encouraging stronger participation from a broader audience of public submitters. Additionally, this stakeholder expressed that relationships with IOU ETP staff were previously viewed as a significant factor in achieving approval. In the past, submitters without a connection to ETP staff had a lower chance of receiving approval and funding for their project due to the influence of existing relationships with IOU staff.

Program implementers each shared at least one additional way they feel the 3P design has contributed to the innovation and success of the SW ETPs:

- **GET staff have expanded the stakeholder network and increased program engagement.** According to interviews, since ICF began implementing GET, staff have observed increased stakeholder engagement during ETP presentations at industry conferences. ICF shared that for program outreach, they have found LinkedIn to be a very valuable platform to engage with industry professionals in California and promote program interest at the national and even international levels. ICF noted that their LinkedIn presence, which started about a year and a half before the interview, has also helped to establish ETP publicly under the 3P design.
- **ICF and Energy Solutions have a physical presence throughout California.** Both implementers have boots-on-the-ground staff supporting them in northern and southern California. As a single entity, this allows them to implement a project encompassing multiple regions and climate zones across the state. This flexibility did not exist before. Under the historical program design, this example would have required multiple IOUs to implement separate projects in their service territories.
- **The Fast Track process has encouraged early conversations about technology transfer activities for CalNEXT.** Energy Solutions felt the Fast Track process has been effective in helping connect the project implementer with CalTF and IOU engineering teams early to support technology transfer activities. They shared this process has already led to many valuable conversations that have helped direct research activities. Energy Solutions also mentioned that although they have had limited opportunities to provide assistance so far, IOUs are aware they are available to assist with measure packages to help expedite the transfer process.

PROGRAM CHALLENGES

Collaboration between GET program staff addressed early contractual challenges. Both SoCalGas and ICF reported encountering an issue with the invoicing guidelines set in their initial contract early on in the 3P design. Notably, none of the SoCalGas or ICF staff that the Evaluation Team spoke with during interviews were involved in drafting the original GET contract. The initial contract was based on a Fixed Fee approach that set limitations around the size of projects, which, once underway, program staff quickly realized was not an effective approach for the program. ICF shared that this confined approach did not work well for GET because the program cannot be successful by implementing either a couple of very large projects or many small-scale projects that likely do not provide sufficient data for technology transfer activities. Instead, projects require more flexibility in the scope and budget, which SoCalGas shared is now reflected in their revised contract. ICF mentioned they plan to transition to a new approach that will allow them to implement smaller, more “agile” projects whose expedited evaluations will assess whether GET should move forward with a larger project for that technology. They confirmed that SoCalGas has signed off on this approach but that they had not yet begun implementing these types of projects at the time of the interview.

One stakeholder indicated that although they understand the value of and why contractual obligations exist, they feel the CalNEXT contract requirements do not always align with ETP objectives. Despite this, they felt CalNEXT had improved its ability to address SCE’s concerns and abide by contractual obligations.

Although some issues identified early on have been addressed, interviewees reported many broader, ongoing barriers they feel ETP faces under the 3P design. These challenges are discussed below.

Administrative Changes in Shifting to 3P Design

One implementer-affiliated stakeholder who was involved in ETP before the 3P design said one of the biggest changes they have observed is the shift in project implementers' responsibility. They explained that under the historical design, a project implementer would typically first engage with ETP when bidding on a project scope. At that time, IOU staff would develop the scope, recruit customers, hire project contractors, and even connect the project implementation team with the customer once their bid was approved for implementation. Under the 3P design, the project implementer is responsible for these tasks. This stakeholder shared that among these new responsibilities, customer recruiting has been a primary challenge for project implementers.

Project implementers do not have the same relationships and accessibility to customer contact information as IOU account managers, typically making recruitment a much more extensive and difficult process. ICF also identified this as a challenge, sharing that it is difficult for them to access IOU customer contact data. The GET implementer mentioned that they sometimes get lists from various sites or sources by project, but the information is not typically reliable. They also said that it can be quite difficult to identify the decision-maker in homes for residential projects, even when they do receive data. ICF and this stakeholder both indicated that support from IOU staff to help build these connections and gain access to account manager customer data would greatly benefit project implementers. ICF mentioned a new law had passed that allows third-party program implementers to access IOU data, but they did not believe it was ready to be rolled out at the time of the interview. Notably, the stakeholder who called out these new responsibilities as challenges circled back to note that although difficult, these tasks have helped them form many new industry relationships. ICF also noted that the lack of customer interest could partially be due to unfavorable views of gas technologies or a sense of mistrust, as most customers likely do not recognize the name of a project implementer but are very familiar with their utility.

Additionally, as mentioned above, the ETP needs to allow for a holistic and flexible approach to research. Three stakeholders mentioned issues related to how the ETP approaches innovative research, including how the program quantifies the value of technologies. One implementer-affiliated stakeholder shared that a lot of project administration is simply box-checking, pointing out that this is not an effective approach to emerging technology projects as the research can go in many different directions, and the program needs to be nimble to allow for this. They emphasized how, from their perspective, SCE has grown to be increasingly cautious since the inception of the 3P design and tends to focus a lot of its efforts on risk mitigation, which has further limited CalNEXT's ability to promote a flexible research approach. The second stakeholder (implementer-affiliated) also highlighted the need for greater flexibility when considering what types of ET research may be best fit to address market and portfolio needs. This person suggested that the SW ETP shift its focus towards electrification and begin considering technologies that, in addition to energy efficiency, address renewable generation, load flexibility, and battery storage. The third stakeholder, non-implementer-affiliated, added to this point, noting that although there are many non-energy efficiency technologies that ETP is interested in that could help address research gaps, quantifying the value of these technologies under the existing program rules and regulations has been difficult.

Three stakeholders reported challenges with the number of entities involved in key ETP processes and the associated regulatory "red tape." Two of the stakeholders, one non-implementer-affiliated and one implementer-affiliated, mentioned that although having many different parties involved in some processes can be advantageous, this can subsequently present issues in identifying and connecting with the appropriate person for specific information and can lead to long, inefficient searches. Among these two individuals, the implementer-affiliated stakeholder also called out how the inclusion of each new entity within ETP necessitates a greater allocation of funds toward administrative duties. They expressed a desire for the program to effectively manage these tasks to optimize the utilization of program resources. The third stakeholder, who was implementer-affiliated, focused their feedback on the pace of Focused Pilot

projects, explaining it would be helpful for ETP staff to provide clarity around the advice letter process and the expected timeline. They highlighted the importance of establishing stakeholder expectations, particularly for longer and/or unique processes like Focused Pilots.

Complex Regulatory and Stakeholder Environment

Energy Solutions mentioned a SW transition from total resource cost to total system benefit (TSB) as a measurement of cost-effectiveness or a technology's impact. They felt this change would work well for ETP as the calculation allows the program to account for energy efficiency benefits and benefits that represent technology's positive impact on the power grid, such as electrification and fuel substitution. However, Energy Solutions indicated it is critical for ETP to understand how TSB and total resource cost interplay and to assess when and in what applications certain value factors may be more important to consider. For example, they highlighted how it would be particularly important for a resource equity program designed to install residential heat pump water heaters in DACs to consider the cost of the product compared to a typical resource program. Despite the move to TSB, one of the stakeholders said they are still unclear about how exactly ETP will value technologies in a way that fits into the current regulatory environment.

Additionally, in 2019, the CPUC established a comprehensive market transformation framework in Decision 19-12-021,[38] calling for the creation of a market transformation administrator (now known as CalMTA). The framework provides funding for CalMTA to support market transformation initiatives (MTIs) to increase energy efficiency and reduce greenhouse gas emissions by driving market adoption of selected technologies and practices.[39] Subsequently, the objectives of the CalMTA and CalNEXT overlap. Two interviewees suggested ways in which they feel ETP could work with CalMTA to address portfolio needs more effectively. One GET staff member recommended that ETP take a more technical approach, focus on the engineering aspect of measure development, and subsequently take a step back from market-related research and the technology handoff process. As CalMTA focuses on the rollout of a product and bringing it to the market, this person suggested that ETP highlight research opportunities to CalMTA that support the uptake and adoption of technologies but that ETPs remain focused on addressing TPM priorities. This person also noted that this approach would help the overlapping initiatives avoid duplicative spending of research funds. One non-implementer-affiliated stakeholder added that coordination between ETP and CalMTA could get complicated considering the energy efficiency policy manual does not apply to CalMTA, meaning that, unlike ETP, they have no specified research priorities or restrictions (i.e., does not have to focus on addressing gaps in IOU portfolio). For this reason, this individual emphasized that for successful coordination, it would be essential for (1) ETP research to prioritize IOU portfolio needs above market transformation and (2) CalMTA to commit to focusing their market transformation research on supporting measures developed through ETP. The two interviewees agreed the two initiatives could benefit from one another and effectively support the portfolio and California market; however, some roles and responsibilities would need to be discussed to ensure effective coordination efforts.

Energy Solutions has also observed hesitancy from stakeholders in discussing quarterly TPM revisions. They said many stakeholders are afraid to provide input due to the influence IOUs have on funding and the potential bias it could prompt, such that they may decide to withhold favorable input they have about a technology if they do not think an IOU representative agrees with their view. Energy Solutions shared that they have attempted to address this issue by following up with many stakeholders individually to allow them to candidly share their feedback without the pressure of aligning their input with IOU staff.

[38] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M321/K507/321507615.PDF
[39] https://calmta.org/about/

Uncertainty About the Future of ETP

One implementer-affiliated stakeholder expressed concern about the future of ETP. They said no firm direction has been provided around what will happen to the program at the end of the current contracts with 3P implementers.[40] With this uncertainty, the individual is unable to prepare for the future and has concerns about whether the program will continue. This stakeholder explained that without future plans in place, there could be a gap in funding and all ET projects initiated under the current contract may need to be wrapped up before the contract concludes which could create gaps in the progress the ETP has made.[41]

Additionally, many interviewees called out the broader challenge GET faces programmatically due to gas technology limitations and lower industry interest. As the GET implementer, ICF shared that the program unsurprisingly receives significantly less interest than CalNEXT due to the increased interest in electrification and decarbonization technologies across the state and industry. Three stakeholders, one non-implementer-affiliated and two implementer-affiliated, also mentioned a general lack of interest in gas technologies as a particular challenge for GET.

One of these stakeholders (implementer-affiliated) explained that the way natural gas is treated from a regulatory standpoint, particularly in California, has made it challenging to connect with esteemed industry organizations and their affiliates, specifically stating:

"A lot of the places [GET staff] would go to get new contacts (e.g., technology SMEs, potential project submitters), ACEEE for example, are biased against gas. When calling people, a question that often comes up is 'is it even worth talking to you because gas is falling out of favor?"

According to program staff, there may not be a viable electric alternative for all technologies, emerging gas strategies can play a role in California's decarbonization landscape by helping to fill the gaps. Additionally, although natural gas pricing can be volatile, natural gas is currently a low-cost commodity for consumers.

ICF has tried to keep program outreach efforts broad to increase their chances of connecting with appropriate stakeholders who can potentially support the advancement or transfer of gas technologies. Likely correlated with lower stakeholder interest in GET projects, SoCalGas reported that gas technologies have high upfront capital costs and, due to the low commodity cost of gas, tend to be less beneficial from a financial standpoint. GET program staff and one implementer-affiliated stakeholder mentioned the limited number of end-use applications for gas technologies, highlighting how this affects the various stakeholders interested in the technologies and types of projects the program can focus research on. This stakeholder also felt that because gas technologies are not looked at favorably in California, getting an adequate supply of project submissions can be difficult.

One implementer-affiliated stakeholder mentioned a lack of variety in the types of projects submitted to CalNEXT. This stakeholder shared that CalNEXT receives fewer project ideas for certain less popular technologies,[42] at no fault of the 3P design, despite being prioritized by the program. They explained that the program design does not prevent good projects from being proposed or accepted but rather that project submitters tend to focus their research on certain technologies that are hot topics in the industry. Most recently, project submissions have been highly focused on heat pump technologies.

[40] The current contracts with 3P implementers end in 2027.

[41] Note this concern was provided by a program stakeholder and represents the opinion of this individual. Future program contracts were not discussed with program administrators or implementers during interviews.

[42] Interviewees specifically mentioned receiving fewer submissions for lighting measures.

4.3 PROJECT REVIEWS

This section presents the Evaluation Team's findings from the technical project reviews: two for CalNEXT and two for GET. The Evaluation Team considered the following when selecting projects for review:

- Diversity of end-uses and sector applications;
- Overall breadth of the project application;
- The extent to which the project's experimental design and results could benefit from a technical review; and
- Alignment between the project description and recent trends and priorities in technology and market development.

Table 12 includes the criteria developed by the Evaluation Team considered for the project reviews.

The purpose of the project reviews was to assess (1) project alignment with ETP priorities, (2) the Project Plan's efficacy in meeting the technology review's objectives, and (3) fidelity to the Project Plan and the reasonableness of project findings and recommendations.

Table 12. Project Review Rubric

Review Criteria
Does the project align with the scoring rubric?
Innovation/justification
Market strategy
Project clarity
Project readiness
Reasonable cost
Reasonable timeline
TPM priority
Technology transfer and program alignment
Utility and energy efficiency program benefits
Was the project completed successfully?
Were deliverables described in the project plan completed?
What questions did the project seek to answer?
Were these questions answered by the completed project?
Are the reported conclusions accurate?
Were standard methodologies used correctly to calculate project impacts?
Are the project conclusions statistically significant?
Are there clear next steps for the project?

4.3.1 PROJECT #1

The following section describes the efficacy of Project #1 (a CalNEXT project) in meeting objectives set in the Project Plan.

PROJECT DESCRIPTION

Project #1 assessed the energy savings associated with using occupancy-based heating, ventilation, and air conditioning (HVAC) controls in commercial office buildings. In this model, occupancy sensors provide input from multiple spaces to a single HVAC system. When all sensors signal that the space is empty, the HVAC system enters unoccupied mode, such that the system's temperature set points are adjusted to conserve energy. Energy savings are generated by decreasing the run-time of the dedicated HVAC system that, without the sensors, would run consistently during standard business hours. A similar field study evaluated the savings from this technology in 2021, but post-COVID occupancy changes warranted further investigation. In addition to the field study, this project also included a market evaluation to determine the potential for this type of occupancy-based control system.

PROJECT SCOPE

Overall, the Evaluation Team found that Project #1 activities, as described in the final report, followed the original project scope. The objectives for Project #1, for the field study and market evaluation, are listed in Table 13, along with the Evaluation Team's assessment of whether the project achieved each goal.

Table 13. Project #1 Scope Assessment

Objective	Evaluation Team Comments
Technical Field Study	
Select two different communicating occupancy sensor technologies to install at two study sites – one technology at each site.	Based on the project documentation provided, it appears that only one technology functioned despite efforts to include a second technology at Site 2.
Identify and select two multi-tenant commercial study host building sites where tenant spaces include multiple spaces served by a single-zone air conditioner.	Achieved
At each host building site, map HVAC units to sub-zoned tenant spaces. The targeted space type includes intermittently occupied spaces such as private offices, conference rooms, and common areas.	Achieved
For 50% of HVAC unit-served spaces, install communicating occupancy sensors. The occupancy information in each space is communicated wirelessly (e.g., via ZigBee protocol)[43] to the thermostat. The thermostat can be programmed to turn off equipment, both supply fan and compressor, when associated spaces in a zone are detected to be unoccupied for a preset amount of time.	This objective applies to each Site individually. At Site 1, this objective was achieved (N=9; four included in the treatment group and five in the control group). At Site 2, less than 50% of the HVAC unit-served spaces had sensors (N=7; only one included in the treatment group and one in the control group).
Alternate mode of operations, such as setting back temperature instead of turning off the unit completely and/or running the fan longer than compressor shut off will also be investigated as measures to address safety/health concerns.	Unable to confirm whether this occurred based on provided project results.
50% of HVAC zones will remain untreated as the control group. In these spaces, occupancy will be only monitored but not used as a control parameter. This will allow for normalizing the occupancy data of the treatment group.	Occupancy was monitored as stated, but the results were based on the analysis of the other monitored parameters (e.g., power, current, and temperature). As such, it does not appear office occupancy was used to denote differences between the occupancy in the experimental areas and the office as a whole.
Perform at least one month of M&V, comparing the hourly energy consumption, load, and GHG of the treatment and control groups. The monitoring period length was shortened from the original plan because the technology savings come from the reduction in HVAC operating	The project completed one month of pre- and post-installation monitoring, but the difference in outside air temperature between these two periods makes it difficult to calculate savings reliably.

[43] Zigbee is a wireless protocol that is used to allow Smart Devices such as light bulbs, sockets, plugs, smart locks, occupancy sensors and door sensors to communicate with each other over a Personal Area Network (PAN).

Objective	Evaluation Team Comments
hours, not from the HVAC performance. Therefore, the baseline can be established by energy model simulations since the performance of a single zone packaged unit is well understood. We believe one to two months of monitoring with the technology will be satisfactory to characterize the occupancy behavior and the technology's performance.	
Following the selection of treatment and control tenant spaces, conduct tenant surveys to understand occupancy patterns, comfort, and workplace schedules and to return to work practices. This will be used to mitigate any unintentional bias in the selection of treatment and control spaces.	Documentation in the final report reviewed occupancy patterns and workplace schedules but did not discuss comfort.
In the project report, develop potential IOU energy savings and develop recommendations for measure development through deemed pathways and strategies to overcome discovered market barriers.	The estimated annual savings from the two sites (one of which did not show savings) did not provide consistent energy savings information to develop potential deemed savings for IOUs to support measure development.
Market Evaluation	
Conduct an initial market evaluation to size the total market of offices with single-zone air conditioners serving multiple zones.	Achieved, although the data used to determine what HVAC systems were used in office spaces were from 2014. The Evaluation Team noted that if or when available, project teams should use the most recent data to improve accuracy and reliability.
Identify workplace occupancy trends, leveraging studies less than six months old to evaluate workplace occupancy and return to work trends in California or nationally.	A sample of survey responses from 15 small- to medium-sized offices in 2022 was used to determine the reduction in occupancy and HVAC scheduling trends. This sample is relatively small and is likely not representative of trends across California businesses.
Identify the currently available communicating occupancy sensors that can be leveraged in commercial retrofit scenarios.	Achieved
Identify current marketplace opportunities and barriers identified through other ET studies nationally.	Achieved

FIELD STUDY OUTCOMES

The expected outcomes from the Project #1 field study included:

- measure technology energy efficiency and peak load reduction impacts;
- evaluate implementation difficulty, key technology barriers, and opportunities;
- evaluate technology cost-effectiveness; and
- develop a measure package or rebate calculation on a per-ton basis to help mass-market adoption.

As previously noted in Table 13, results from the Project #1 field study did not provide a large enough sample size of energy or demand savings to develop statistically significant savings values, which inhibited the project team's ability to evaluate cost-effectiveness or develop a rebate calculation. In reviewing the field study methodology, the Evaluation Team identified the following potential issues:

- The final report states that the project team used International Performance Measurement and Verification Protocol (IPMVP) Option A to calculate energy and demand savings for the project.[44] Based on the project team's

[44] IPMVP Option A is a key parameter(s) measurement that uses known values in addition to one or two key parameters to calculate savings. An example would be savings from changing out lighting fixtures. The key parameter would be the hours the fixtures are in use, while the wattage of the fixtures would be a known value.

measurement of equipment energy consumption and the calculations completed to determine savings, this project more closely aligns with IPMVP Option B.[45]

- The pre- and post-installation periods for Site 1 had little overlap in outdoor air temperature. The outdoor air temperatures in the pre-installation period ranged between 66°F and 78°F, while the post-installation period temperatures ranged between 55°F and 65°F. Given the dependence of HVAC energy consumption on outdoor temperature, this difference makes it difficult to compare the behavior of individual units between the two periods.
- The HVAC units in the control and treatment groups at Site 1 were located on different building levels. The two levels may have had different heat load characteristics that could impact the ability to compare the run times of the systems effectively.
- Site 2 relied on a comparison of only two HVAC units due to issues identified with all other potential HVAC units. With such a small sample size, results are likely not indicative of a whole building application.
- Three of the potential HVAC units at Site 2 did not result in savings due to the behavior of building occupants. During implementation, the occupants manually switched off the systems using the thermostat when leaving the site, which excluded these HVAC units from the study.

MARKET STUDY OUTCOMES

The expected outcome of the Project #1 market study was to estimate the total available market size and potential target buildings or business types that may offer higher potential energy savings. To do this, the project team used data points from the CPUC, the Energy Information Administration (EIA), and an energy retailer to estimate the technical potential for occupancy-based controls in commercial office spaces.

The annual GWh value (320–765) describing the technical potential for the occupancy-based controls is within a reasonable range based on the references provided by the project team,[46] but there is no additional discussion of potential gas savings or how the technical potential translates to the *achievable* potential.[47] In addition, using an energy retailer as a reference for smart thermostat savings values casts doubt on the accuracy of the savings. The Evaluation Team reviewed values provided in two different Technical Reference Manuals (TRMs) (the Illinois TRM [IL-TRM V12][48] and the Regional Technical Forum[49]) to verify that this number is reasonable. No similar measures were available for comparison in the California eTRM.

KEY FINDINGS FROM PROJECT #I TECHNICAL REVIEW

With greater attention to the experimental design of the project and a longer timeline, Project #1 could have provided greater value to the industry, potentially translating to market transformation. The Evaluation Team is in agreement with the project team's assessment that this technology requires further research and modifications before it is ready for large-scale deployment. Key issues the Evaluation Team identified for Project #1 are listed below:

- Project reviewers provided several suggestions in the Project Idea Scoring document that may have led to a more robust project, such as alternating weeks of occupancy sensor use/non-use in the same office areas rather than using a different office space as the control area. The project team's responses to these comments were not

[45] IPMVP Option B uses the measurement of all project parameters to calculate savings. An example of IPMVP Option B would be calculating energy savings from a variable speed drive for which the power used by the drive must be measured in addition to the hours of operation.
[46] The project team referenced multiple studies on which they based their analysis.
[47] Refers to the energy savings that could be realistically achieved given real-world constraints, such as market and programmatic barriers.
[48] https://www.ilsag.info/wp-content/uploads/IL-TRM-Version-12.0-Volumes-1-4-Compiled-Final.pdf
[49] https://rtf.nwcouncil.org/measures/

included in the scoring document but could be helpful to include to provide context around why certain suggestions were not implemented.

- Increasing the timeline for Project #1 may have enhanced the project team's ability to calculate technology savings accurately. To maximize data collection efforts, project teams should consider variables, such as weather, that may alter energy savings over time and ensure the project timeline allows for a sufficient range of data (i.e., seasonal temperature changes) to be collected and used in savings calculations. Additional time could benefit project teams conducting the final calculations and promote the success of transfer activities as this would ensure teams have the time needed to perform savings calculations accurately.
- Although most references utilized by the project team in the market study were reliable, one key value reference was for a website that is no longer active.

4.3.2 PROJECT #2

The following section describes the efficacy of Project #2 (a CalNEXT project) in meeting objectives set in the Project Plan.

PROJECT DESCRIPTION

Project #2 evaluated the technical viability, business model, user experience, and cost-effectiveness of an EV charging solution. The EV charging solution utilizes a single charging base with three ports that manage the load to move consumption to off-peak hours. Each charging base can accommodate either a single car using the Level 2 capability or two cars using the Level 1 capability.[50] The system is also capable of managing the charging load to shift electricity to off-peak hours and limit the capacity requirements on the site electrical panel. The project aimed to test the benefits of this charging solution at four sites.

PROJECT SCOPE

Overall, the Evaluation Team found that Project #2 activities, as described in the final report, partially followed the original project scope but presented limitations for the use of results. Project #2 objectives are listed in Table 14, along with the Evaluation Team's assessment of whether the project achieved each goal. The small sample of EV participants restricted the project team's ability to test the capabilities of the EV charging solution thoroughly and reliably.

Table 14. Project #2 Scope Assessment

Objective	Evaluation Team Comments
Recruit four sites to participate in the pilot.	Achieved, including one low-income multifamily site.
Oversee all steps leading to the installation of the equipment.	One site is fully operational, but the other three sites have fewer charging bases than planned due to utilities requiring service upgrades and additional panels and meters.
Provide on-site commissioning and testing of equipment, ongoing monitoring, maintenance, and customer support throughout the pilot.	Achieved to the extent possible. Mitigating factors included fewer charging bases than planned at three sites and only two sites with known on-site electric vehicles.
Engage and educate property managers and tenants on the technology, business model, using the equipment, and resources.	Partially achieved based on survey results. Thirty percent of respondents indicated a full understanding of the installed charging system, 40% indicated some understanding, and 30% indicated no understanding.

[50] An EV charger's "capability" refers to the amount of output power and this the time required to achieve a full charge.

Objective	Evaluation Team Comments
Interview property owners/managers and survey tenants/drivers to evaluate customer experience and identify concerns or barriers to utilization.	Achieved, although the small number of EV owners limited the survey size (N=3, only one EV owner completed the survey).

PROJECT OUTCOMES

Table 15 lists the expected outcomes of the project along with the Evaluation Team's comments regarding the effectiveness of the project in achieving each of the outcomes.

Table 15. Project #2 Outcomes

Expected Outcome	Evaluation Team Comments
Verification of the technical ability of [technology provider] to leverage circuit-sharing and panel-sharing capabilities to provide charging within capacity-constrained environments.	The project hit two issues that limited the ability to achieve this outcome. First, the small number of EVs utilizing the chargers at each site (two EVs at Site 1, one EV at Site 3, and none at Sites 2 and 4) made it impossible to test the impact of multiple vehicles charging simultaneously. Second, the utility providing electricity to three of the sites required infrastructure upgrades to meet current utility standards prior to authorizing the dedicated meter needed for this charging model. These requirements could not be completed within the project timeline.
Evaluation of driver experience in using [technology provider] technology.	The post-installation survey responses included only one EV owner. The project's evaluation of the driver experience remains more theoretical than practical.
Cost-effectiveness comparisons to traditional Level 2 or dedicated smart Level 1 solutions.	Given that (1) the project costs came directly from the technology provider,[51] and (2) not all chargers were installed as planned at three of the four sites, it is difficult to assess the accuracy of the results, especially the benefits.
Evaluation of the [technology provider] business model's appeal to market-rate and affordable housing multifamily property owners.	Interviews with two property managers provided insight into the appeal of this business model, but these results are limited in terms of the broader market.
Identification of barriers to broader commercialization of [technology provider] technology.	Project #2 proved fruitful for identifying expected and unexpected barriers to broader commercialization of the [technology provider] technology, such as meeting utility requirements and identifying sites with EV owners.

KEY FINDINGS FROM PROJECT #2 TECHNICAL REVIEW

Key issues the Evaluation Team identified for Project #2 are listed below:

- The limited number of EVs at the four project sites had an outsized impact on the results of this study. According to project results, when given the option to use faster charging, EV drivers chose this option more than half the time. The tested EV charging model has the ability to manage three EVs connected to a single charging base; however, the project was unable to thoroughly test the charging design because only one vehicle was plugged in at a time at each site due to a lack of on-site vehicles. Additionally, only one car can use the product's faster charging option per charger base due to amperage limitations, which also limited the number of charging vehicles at a given time. When EV drivers choose the product's faster charging capability, it equates to the same as a standard charging setup (i.e., one charger per base).
- An error was identified in the explanation of a figure in the final report, such that the report states that, on average, longer charging sessions were observed for Level 1 chargers than Level 2 chargers. The chart this text references displays the opposite trend.

[51] Costs provided were based on demonstration projects previously conducted by the technology provider.

- The utilization data used for analysis includes data from one of the project sites and two non-project sites. The technology company provided data from the non-project sites to supplement the data from sites where few or no EVs were in use.[52] Secondary data should not be used in place of field study data for the ETP.

4.3.3 PROJECT #3

The following section describes the efficacy of Project #3 (a GET project) in meeting objectives set in the Project Plan.

PROJECT DESCRIPTION

Project #3 is a market study analyzing gas-fired commercial food service (CFS) technologies identified as high-priority based on historical energy efficiency program participation data. The project identified technology adoption drivers and barriers for energy-efficient griddles, underfired broilers, automatic conveyor broilers, and steam tables. This information forms the base for recommendations to increase program uptake for commercial food service technologies.

PROJECT SCOPE

Overall, the Evaluation Team found that Project #3 activities, as described in the final report, deviate slightly from the original scope but ultimately meet the project objectives. Project #3 objectives are listed in Table 16, along with the Evaluation Team's assessment of whether the project achieved each goal.

Table 16. Project #3 Scope Assessment

Objective	Evaluation Team Comments
Conduct a literature review to inform the current known barriers that exist in adoption of energy efficiency CFS equipment.	Achieved
Use available data sources to select three energy efficiency CFS measures in addition to steam tables for further study.	Achieved
Determine the market potential and cost-effectiveness for the four energy efficiency CFS measures from publicly available data and project results.	Achieved
Interview subject matter experts about barriers to installation and operation of energy efficiency CFS equipment in California.	Achieved
Recruit and interview food service customers who have installed energy efficiency CFS equipment and get their feedback on the advantages and disadvantages of the equipment as well as their perception of the barriers to installing and operating the equipment.	Achieved
Summarize findings and provide recommendations, including a chart of barriers for each equipment type, whether barriers are real or perceived, and what other stakeholder buy-in is required to overcome the barriers.	Information is provided, but there is no chart of barriers for each equipment type, as discussed here.

PROJECT OUTCOMES

Table 17 lists the goals of Project #3, along with the Evaluation Team's comments regarding the effectiveness of the project in achieving each of the goals.

[52] Non-project sites were sites not funded by CalNEXT but that the technology provider agreed to provide the project team with charging data from.

Table 17. Project #3 Outcomes

Project Goals	Evaluation Team Comments
Understand gaps in the current delivery of the existing measures relative to their potential.	Achieved
Understand barriers to installation and operation of energy efficient CFS and gather input and feedback on strategies to reduce these barriers.	Achieved through the survey responses from SMEs and food service customers.
Uncover any unknown operational advantages and/or disadvantages of energy efficient CFS equipment.	Project report identifies non-energy advantages that could be used to promote CFS equipment.
Determine next steps for steam tables from prior ET study.	Achieved
Provide recommendations for improving energy efficient CFS equipment adoption.	Achieved
Provide recommendations for further field testing and/or pilot programs.	Achieved

KEY FINDINGS FROM PROJECT #3 TECHNICAL REVIEW

Key issues the Evaluation Team identified for Project #3 are listed below:

- One project recommendation was to create a customer energy cost savings tool, for which ENERGY STAR® already has a tool.[53] This existing tool should be leveraged if action is taken per this recommendation.
- The final report format posed some challenges for readers to follow the project results.

4.3.4 PROJECT #4

The following section describes the efficacy of Project #4 (a GET project) in meeting objectives set in the Project Plan.

PROJECT DESCRIPTION

Project #4 was a market assessment of emerging Ultra Low Nitrous Oxide (ULN) burner technologies for use in boilers, furnaces, and other industrial applications. Through a literature search and interviews with SMEs, the project team sought to compare the efficiency, cost, and nitrous oxide (NOx) levels of the technologies. The resulting information is intended to be used by utilities when considering measure development.

PROJECT SCOPE

Overall, the Evaluation Team found that Project #4 activities, as described in the final report, partially followed the original project scope but presented limitations for the use of its results. In addition to providing background information on burner types, their characteristics, and applications as discussed in the project scope, Project #4 also looked at the potential for the use of hydrogen blends in the burners, a topic outside of the original scope in the Project Plan. Project results did not include sufficient cost or energy efficiency information to support the development of energy efficiency measures as stated in the original scope. The objectives for Project #4 are listed in Table 18, along with the Evaluation Team's assessment of whether the project achieved each goal.

[53] https://www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service

Table 18. Project #4 Scope Assessment

Objective	Evaluation Team Comments
Literature search and visualization to identify and summarize emerging ULN burner technologies.	Achieved
Develop a summary table of potential ULN technologies and compare energy efficiency, cost, and NOx levels.	The summary table compares several parameters of each ULN technology but does not include energy efficiency or cost information.
Conduct phone screenings, interviews, and site visits to collect data on various ULN technologies.	Achieved

PROJECT OUTCOMES

Table 19 lists the expected outcomes pulled from the Project Plan along with the Evaluation Team's comments regarding the effectiveness of the project at achieving each of the outcomes.

Table 19. Project #4 Outcomes

Expected Outcome	Evaluation Team Comments
Provide IOUs with updated market data and recommendations related to the new ULN burner technologies.	Achieved
Propose future opportunities for potential burner retrofits.	Achieved, including information about hydrogen blending.
Help drive the commercialization of this technology.	Unable to assess the provided project results.

KEY FINDINGS FROM PROJECT #4 TECHNICAL REVIEW

Key issues the Evaluation Team identified for Project #4 are listed below:

- The information in the report is organized by burner name and type. As the intended audience is utility program staff, it may be more useful for the project team to organize this information by sector and application to align with energy efficiency program design. This may help better support technology transfer activities.
- As many resource acquisition programs are based on incremental improvements, it would be helpful to include the incremental reduction in NOx and potential energy savings associated with the burner types compared to baseline.
- The final report provided insufficient information on burner costs to apply standard cost-effectiveness calculations for measure package development.

APPENDIX A. DATA COLLECTION INSTRUMENTS

LEAD PROGRAM ADMINISTRATOR AND IMPLEMENTATION STAFF INTERVIEW GUIDE

https://opiniondynamics.sharefile.com/public/share/web-saa60d472deb34ca8a4294da7804c63be

STAKEHOLDER INTERVIEW GUIDE

https://opiniondynamics.sharefile.com/public/share/web-sd5b188a63dbd4c05bbedf6fc91e6937b

APPENDIX B. ACRONYM GLOSSARY

Table 20. Acronym Glossary

Acronym	Definition
AESC	Alternative Energy Systems Consulting
CAEECC	California Energy Efficiency Coordinating Committee
CalFUSE	California Flexible Unified Signal for Energy
CalMTA	California's Market Transformation Administrator
CalNEXT	Electric Emerging Technologies Program
CalTF	California Technical Forum
CEC	California Energy Commission
CFS	Commercial food service
CPUC	California Public Utilities Commission
DAC	Disadvantaged community
DEI	Diversity, equity, and inclusion
DRET	Demand Response Emerging Technologies
EIA	Energy Information Administrator
EPIC	Electric Program Investment Charge
ET	Emerging technologies
ETCC	Energy Transition Coordination Council
ETP	Emerging Technologies Program
eTRM	Electronic Technical Reference Manual
EV	Electric vehicle
GET	Gas Emerging Technologies Program
HTR	Hard to reach
HVAC	Heating, ventilation, and air conditioning
IL-TRM	Illinois Technical Reference Manual
IOU	Investor-Owned Utility
IPMVP	International Performance Measurement and Verification Protocol
KPI	Key performance indicator
MT	Market transformation
M&V	Measurement and verification
PA	Program administrator
PG&E	Pacific Gas and Electric
PTLM	Program Theory Logic Model
SCE	Southern California Edison
SoCalGas	Southern California Gas Company
SDG&E	San Diego Gas and Electric
SME	Subject matter expert
SW	Statewide
TAG	Technology Advisory Group
TDR	Technology Development Research
TOG	The Ortiz Group
TPM	Technology Priority Map
TRC	The Research Corporation
TRM	Technical Reference Manual

Acronym	Definition
TSB	Total System Benefit
TSR	Technology Support Research
ULN	Ultra-low nitrous oxide
VEIC	Vermont Energy Investment Corporation
3P	Third-party

APPENDIX C. EXISTING ETP METRICS AND KPIS

Table 21 lists the original program metrics for the electric and gas ETPs as presented in the program implementation plans. The table also includes responses regarding the progress tracked against these performance metrics in 2023 provided by program implementation staff during interviews. Reference to SWEETP in the metrics listed below reflects the electric ETP implementation plan continuing to reference the original program name under the 3P design (rather than the rebranded CalNEXT program).

Table 21. ETP Metrics by Program

ETP Metric	Description	ETP Staff Response to Existing Metrics (2023 results)
CalNEXT		
ETP-M1	Number of Technology Priority Maps initiated, including one Focused Pilot TPM, identifying market barriers for a diverse range of high-impact technologies through studies, and subsequently breaking down identified barriers via cooperative projects initiated in coordination with Workforce Education and Training, Marketing and Outreach, and other relevant IOU programs.	14
ETP-M2	Number of Technology Priority Maps updated.	13
ETP-M3	Number of projects initiated.	76
ETP-M4	Number of outreach events with developers of energy efficiency products (in whole or in part) that are less than one (1) year from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs).	12
ETP-M5	Number of outreach events with developers of energy efficiency products (in whole or in part) that are less than five (5) years from commercialization (where developers include new technology vendors, manufacturers, and entrepreneurs).	12, see ETP-M4
ETP-M6	Number of projects initiated with cooperation from other internal IOU programs associated with each Focused Pilot.	1
ETP-M7	Number of Focused Pilots initiated as part of the Focused Pilot TPM.	1
ETP-T1	For each year, the percent of technologies added as new measures to the energy efficiency resource portfolio that were previously supported by SWEETP.	Per ED, to be determined by an ED study*
ETP-T2	For each year, the number of technologies added as new measures to the energy efficiency resource portfolio that were previously supported by SWEETP.	Per ED, to be determined by an ED study*
ETP-T3	For each year, the percent of new codes or standards adopted and that were previously supported by SWEETP.	Per ED, to be determined by an ED study*
ETP-T4	For each year, the number of new codes or standards adopted and that were previously supported by SWEETP.	Per ED, to be determined by an ED study*
ETP-T5	Number of savings of measures currently in the portfolio that were supported by emerging technologies programs, added since 2009. Ex-ante with gross and net for all measures, with ex-post where available.	Per ED, to be determined by an ED study*
ETP-T6	Number and source (as reported by submitter) of potential emerging technology project ideas submitted outside of the Technology Priority Map research planning process, submitted by an IOU, a national lab, a manufacturer, or an entrepreneur.	PA: 7 National lab: 6 Manufacturer: 35 Entrepreneur: 49
ETP-T7	Number and source (as reported by submitter) of potential emerging technology project ideas submitted during the Technology Priority Map research planning process, submitted by an IOU, a national lab, a manufacturer, or an entrepreneur.	PA: 0 National lab: 0 Manufacturer: 1 Entrepreneur: 2

ETP Metric	Description	ETP Staff Response to Existing Metrics (2023 results)
ETP-T8	Number of SWEETP projects and technologies aligned with specific statewide goals, with specificity as to what aspect of each goal it is fulfilling.	N/A - The statewide goals to be tracked are still under collaborative discussion with CPUC and not yet available; hence, no data will be reported
GET		
ETP-M1	Number of TPMs initiated (gas and electric combined), including one (1) technology-focused pilot (TFP) TPM	Not reported
ETP-M2	Number of Technology Priority Maps updated.	Not reported
ETP-M3	Number of projects initiated.	14
ETP-M4	Number of outreach events with technology developers with products <1 year from commercialization, including new technology vendors, manufacturers, and entrepreneurs	Not reported
ETP-M5	Number of outreach events with technology developers with products <5 years from commercialization, including new technology vendors, manufacturers, and entrepreneurs	Not reported
ETP-M6	Number of projects initiated with cooperation from other internal IOU programs associated with each Focused Pilot.	Not reported
ETP-M7	Number of Focused Pilots initiated as part of the Focused Pilot TPM.	Not reported

Table 22 lists the KPIs for the electric and gas ETPs as presented in the program implementation plans.[54]

Table 22. ETP KPIs by Program

KPI	KPI Definition/Description	ETP Staff Response to Existing KPIs
CalNEXT		
Website visits	Number of website visits to the SWEETP website.	(Reported quarterly – Q1 2024) Home: 3,333 How to Participate: 478 About: 445 Events: 172 Resources: 1,026 Approved Projects: 1,679 Keep in Touch: 100
Idea evaluation approval rate	Percent of unique ideas submitted that move to Technology Development Research Projects or Technology Support Research Projects approval.	46%
Project Selection for DAC and HTR customers	Number of Technology Development Research Projects or Technology Support Research Projects for HTR or DAC customers sites.	TDR: 8 TSR: 32
Idea Submission Process Satisfaction	Percent of idea submitters that have a favorable experience with the submission process.	(Reported quarterly – Q1 2024) 100% satisfaction
Technology Projects Discontinued	Percent of Technology Support Research or Technology Development Research Projects discontinued. This KPI ultimately informs and improves screening and project implementation.	0%

[54] According to the CalNEXT implementation plan, program metrics represent ET sector-level metrics listed in CPUC Decision 18-05-041, while KPIs assist these metrics in assessing program progress.

KPI	KPI Definition/Description	ETP Staff Response to Existing KPIs
Technology Project Final Reports	Number of final reports completed, broken out by Technology Support Research, Technology Development Research, and Focused Pilots.	TDR: 9 TSR: 25 TFP: 0
Technology Transfer Rate	Number of technologies recommended for transfer compared to new measures adopted in the portfolio - this KPI monitors the extent to which technology transfer is occurring for each measure.	40%
Diverse Business Enterprises Spend	Aggregate amount paid to Diverse Business Enterprises	$252,637
Measures spend performance with Disadvantaged Workers	Total funds spent with Disadvantaged Workers	Not reported
Measures spend performance with HTR and DACs	Total funds spent through Projects in HTR/DAC Communities	$16,900
Sustainability Ratings	Evaluates the SWEETP against environmental and sustainability practices and metrics	0%; no contractors have reported on this metric
Safety Ratings	Maintain ISNetworld (ISN) grade of B or better	All contractors have maintained a grade of B or better
GET		
Invoicing and Billing Accuracy	Reviewed and accurate invoices submitted by the 10th of the month following any billable activity.	12
Program Reporting	Program reports including monthly, quarterly, annual, and ad hoc reports delivered on time, per requirements described in Attachment 1 Reporting Requirements of PIP.	12
Diverse Business Enterprise Spend	Year-to-Date cumulative DBE subcontract spend meets or exceeds proposed commitment of 21% of spend.	24%
Disadvantaged Worker Internships	Achieve program goal of two (2) internships per year.	1
Contractor Safety	Maintain ISNetworld (ISN) grade of A or B.	Not reported
Budget Utilization	Commit full budget for each Program year	Not reported
Program Data Quality	Project deliverables require no more than one (1) round of comments by SoCalGas. Project deliverables include reports, workpapers[55], test results, etc.	7
Project Milestones	Projects are completed within agreed to timeline. One (1) schedule adjustment of two (2) weeks maximum per project final deliverable is allowed if communicated to SoCalGas at least one (1) week prior to expected deliverable date.	42
Budget Compliance	Project deliverables are completed within 5% of approved budget amount provided in Project Proposal.	42

Note: KPIs reported by CalNEXT staff are cumulative unless otherwise indicated. KPIs reported by GET are annual as reported in the program's December 2023 Monthly Report.

[55] Per interview findings, workpapers are now referred to as measure packages.

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