PY2010-2012 CALIFORNIA STATEWIDE EMERGING TECHNOLOGIES PROGRAM EVALUATION PHASE I REPORT VOLUME II - APPENDICES

CALMAC Study ID: CPU0066.01

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For the

California Public Utilities Commission

Energy Division

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INTRODUCTION

This is the second of two documents that comprise the evaluation results of the Phase I: Assessment of Design and Implementation for the PY2010-2012 Emerging Technologies Program (ETP).[1] The Program Design and Implementation Assessment has five evaluation goals. For ease of understanding, we have structured the appendices by these evaluation goals, which correspond to the tasks undertaken by the evaluation team.

A. To provide recommendations on how the program design and implementation could be improved

B. To provide recommended guidance document for scientific rigor (not included as still in progress)

C. To assess how the program design and implementation support the overall CEESP goals

D. To assess the evaluability of the ETP in advance of the impact evaluation

E. To assess the quality and availability of data within the ETP database

[1] Comprise the utility-specific ETPs operated by four investor-owned utilities (IOUs): Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SCG), and San Diego Gas and Electric (SDG&E).

EVALUATOR CONTACT INFORMATION

Table 1 presents the contact information for the firms evaluating the PY2010-2012 Emerging Technologies Program. Itron is the prime contractor and serves as oversight for the efforts undertaken by the subcontractors. Opinion Dynamics is responsible for the majority of the activities and reporting undertaken in the evaluation. SBW Engineering is leading the development of the guidelines for conducting ETP technology assessments with Navigant Consulting supporting this effort.

Table 1. Key Evaluator Contact Information, by Firm

Firm/Agency	Name	Address	Email	Phone
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Table 2. Key CPUC Contact Information

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DETAILED EVALUATION METHODOLOGY

The following section provides a detailed evaluation methodology for the Phase I evaluation effort. Additionally, we have included detailed research questions relevant to the evaluation effort as well as the program performance metrics (PPMs) included in the 2010-2012 Program Implementation Plans (PIPs).

A. Detailed Evaluation Methodology for Design and Implementation Assessment

The ETP evaluation is phased. Phase I began in September 2011 and covered the program design and implementation assessment. Phase II evaluation activities will begin in 2012 and cover the impact assessment. The Team will develop a more detailed Phase II plan within 2012.

This section provides details regarding each evaluation goal outlined above, including the data collection effort and detailed research question for each evaluation element.

Evaluation Focus #1 – The Program Design and Implementation Assessment has five evaluation goals:

A. To provide recommendations on how the program design and implementation could be improved

B. To provide recommended guidance document for scientific rigor

C. To assess how the program design and implementation support the overall CEESP goals

D. To assess the evaluability of the ETP in advance of the impact evaluation

E. To assess the quality and availability of data within the ETP database

Each goal contains an overview of the key evaluation research objectives, the evaluation activities (such as the data collection efforts required), and any deviation from the evaluation plan.

1.1 Goal A: To Provide Recommendations on How the Program Design and Implementation Could Be Improved

This evaluation goal comprises two objectives:

Objective 1: To Determine the Extent to Which the Intended ETP Design is Being Implemented

Objective 2: To Determine the Effectiveness of the Program as Implemented

The program design and implementation assessment provided recommendations on how to improve the program design and implementation. This effort provided a description of each program element as designed and implemented, and assessed the quality of the implementation. Additionally, for the technology assessment element, the team systematically reviewed the past evaluation recommendations and assessed the extent to which these recommendations have been implemented.

The implementation analysis included several distinct data collection efforts that outline in detail each of the following program element sections. These data collection efforts included the following: 1) interviews with energy efficient portfolio program managers, 2) interviews with ETP managers, 3) interviews with program element customers, 4) observations, and 5) surveys with end-users of program

element information.

Each program element had distinct research questions and data collection activities. Each task is described below.

1.1.1 TECHNOLOGY ASSESSMENT

The ETP technology assessment element evaluates the extent to which new technologies meet manufacturer performance claims and are effective in reducing energy consumption and peak demand. The element focuses on emerging technologies that are new to a market or under-utilized for a given application. Technology Assessment is the backbone of the ETP and has been so for much of its history. The assessment function plays a large role in determining whether there is transfer of promising measures into the IOUs' energy efficiency portfolio.

Volume I describes the technology assessments conducted by ETP staff, including any differences in implementation of the technology assessment element relative to the IOU January 2011 PIP description. In addition, it describes the types of measures tested, the number of assessments launched during the program period to date, the cost of these assessments, and the primary users of the technology assessments.

Data were collected from energy efficiency program managers and conducted additional in-depth discussions with ETP staff. Through the energy efficiency program manager interviews, data were collected from those receiving information from the ETP. The data were then comprehensively assessed for quality and ease of use. Because energy efficiency program managers are the primary users of technology assessments, the Team asked them about any knowledge gained through their interactions with ETP and determined the quality of the implementation by assessing their level of satisfaction. The team interviewed ETP staff and updated the process models from the previous evaluation to capture changes in the current program. The Team also assessed the use and quality of the current screening tools and the criteria used to select technologies.

1.1.2 SCALED FIELD PLACEMENT

The ETP Scaled Field Placement element places emerging technology measures at multiple customer sites. Typically, these measures have already undergone technology assessments and been adopted into the energy efficiency portfolio.

The team provides a description of Scaled Field Placements as implemented and where this program element fits within the overall ETP strategy. The team describes any deviations from the January 2011 program implementation plan. Where there are differences, the team explains why. In addition, the team identifies the types of customers involved in the Scaled Field Placements, the types of measures included, the number of placements launched during the program period, and the cost of these placements. Additionally, the Team examines the criteria used to select technologies.

At the time of the team's data collection, there were six sites under consideration, but only one nearing completion. In conjunction with the CPUC-ED, the team chose to defer any assessment of these SFP sites within this Phase of the evaluation. As such, assessment of the quality of the implementation by examining the balance between proven underutilized technologies with low or no market traction and new advanced technologies that meet the program element goals and the satisfaction of customers with the implementation process will occur within Phase II.

1.1.3 DEMONSTRATION SHOWCASES

The ETP Demonstration Showcases program element exposes customers to new measures in real-world demonstrations to increase visibility and awareness of emerging technologies.

The Team performed a qualitative assessment of this element through gathering non-structured information and analyzing the data to obtain findings. Most of the Team's data on Demonstration Showcases came directly from the IOUs in the form of interviews and files from a data request in October 2011. This was appropriate at the early stage of the evaluation, as there had been little interaction with external stakeholders at the time of the initial data collection.

The Team originally planned to include interviews with individuals who attended the showcases, an analysis of the marketing and outreach for these showcases, as well as an assessment of the quality and effectiveness of outreach efforts, but because no showcases were stated to be completed at the time of the Team's data collection in November 2011, this could not occur in the Phase I research. The Team plans to revisit this in the Phase II assessment (report due in June 2013, per the Evaluation Plan).

For the Phase I evaluation, the Team replaced the assessment of marketing and outreach with a literature review regarding Demonstration Showcases to provide context for the analysis. The literature review compiles information regarding what is known about how people react to seeing technology in settings such as the showcases. The Team sought and reviewed articles relating to how people interact with showcases to achieve changes in awareness, knowledge, attitudes and behaviors, a focus based on the Program Performance Metric (PPM) of knowledge transfer. The Team also conducted a literature review and analysis of 23 relevant articles or books.

1.1.4 MARKET AND BEHAVIORAL STUDIES

The ETP Market and Behavioral Studies (MBS) program element conducts targeted research on customer behavior and decision-making to promote the adoption of emerging technologies.

The Team described the current market and behavioral studies element by listing the number of studies launched and completed during the program cycle, identifying the criteria used for choosing studies, identifying staff involved in conducting the studies, determining where this program element fits within overall ETP strategy, and providing cost information regarding each study. The Team describes any implementation differences relative to the January 2011 PIP description. Where there are differences, the Team explores the reasons why. The Team also identifies the ultimate users of the MBS, how the ETP staff use the studies within the ETP process, and how information is disseminated to end users.

The Team assessed the quality of the implementation by examining the MBS reports, identifying whether or not the studies were data driven, and determining the effectiveness of the use of secondary data within the reports. The Team performed energy efficiency program manager surveys within the technology assessments element. Using that same instrument, the Team assessed the influence of the market and behavioral studies on the ETP and energy efficiency staff. The Team determined whether staff interpreted and implemented the market research effectively. The surveys will assess whether the intended audience found the study results useful and assess how staff used the results.

1.1.5 TECHNOLOGY DEVELOPMENT SUPPORT

The ETP Technology Development Support (TDS) program element supports development of energy efficiency products through working with private industry in areas that provide value to the industry. For example, the IOUs may provide customer contacts for field evaluations or make their lab testing facilities available to companies without this capability or work with the company to develop standard testing protocols.

The Team provides description of TDS as implemented by describing the projects undertaken during the program cycle, and reviewing the types of companies involved and the use of TDS products and resources. The Team describes any implementation differences relative to the January 2011 PIP description. Where there are differences, the Team explores the reasons why. The Team describes how this program element fits within overall ETP strategy. In addition, the Team assessed the effectiveness of the IOU activities, determining if current efforts were useful to those involved.

The PIP indicated that use cases could be written and the Team planned to assess the quality of the implementation by examining how the end-users, in this case, manufacturers, use the use cases. Additionally, the Team planned to determine if the presentation and dissemination of the use case by ETP staff was clear. However, there were no use cases written within the element and thus, no assessment occurred.

1.1.6 BUSINESS INCUBATION (TRIO)

The ETP Business Incubation element, or TRIO, attempts to generate innovative program ideas with outreach and other approaches such as training, workshops, and mentoring technology developers.

The Team provides a description of TRIO as implemented by describing the TRIO events including the number that have occurred, content, attendees, and network opportunities that are present. The Team assesses the level of coordination needed to implement these events and describes how this program element fits within overall ETP strategy. The Team observed two meetings (one round table and one symposium) to learn what occurs at a TRIO meeting and be able to provide recommendations to inform design and implementation.

1.1.7 TECHNOLOGY TEST CENTERS

The ETP Technology Test Centers are testing facilities that evaluate the performance of new technologies. SCE is the only IOU that implements this program element. There are currently three different test centers, focusing on refrigeration, lighting, and HVAC. As part of ETP, SCE is constructing a new test center to provide engineering testing in support of zero net energy (ZNE) efforts.[2]

The Team's focus on the ZNE test center determined the status of the facility construction and describes how the new facility aligns with the CA Strategic Plan. Outside of the ZNE element, the Team will describe what activities occur within the test centers as well as how the test center coordinates with other ETP efforts as well as efforts external to ETP, such as Workforce Education & Training.

[2] We note that the program managers chose to discontinue the Residential ZNE Facility in 2012.

The TTC has a full suite of engineering assessment capabilities housed in the centers. Pictures are the best form of communication to understand what occurs here and how TTC supports ETP. The Team visited each of the three test centers during a single visit, photographed the facilities, and interviewed the managers of each of the test centers while on site to obtain a comprehensive overview of the interactions between TTC and ETP.

1.2 Goal B: To Provide Recommended Guidance Document for Scientific Rigor

This goal comprises three objectives:

Objective 3: To Describe ETP Technology Field Assessment Practices/Protocols in Use within California

Objective 4: To Describe and Compare Other Protocols in the Field of Technology Assessment in Use Outside of California

The 2006-2008 evaluation included a rigorous peer review. One of the main findings from that task indicated that there was a relatively high degree of variability in the quality of technology assessments. Some were very high quality, while others appeared to have a lower level of scientific rigor applied as documented in the reports.

For this evaluation, the Team did not conduct additional peer reviews, but focused on working collaboratively with the IOU staff to determine how they perform field assessments. This effort drew upon a review of secondary data and in-depth interviews with staff to create a document describing what occurs in the field assessments that support energy savings calculations from site measurement. This document will include types of engineering measurement instruments used, when and how the instruments are calibrated, how long data is collected, and how the process is communicated to others (i.e., what is included in a report).

Objective 5: To Create Recommended Guidance Document for Scientific Rigor

The Team is currently taking information from the above document and using it to inform and create a recommended guidance document for scientific rigor for all IOU staff involved in implementing field assessments of energy savings. This task is expected to be completed in fall 2012.

1.3 Goal C: To Assess How the Program Design and Implementation Support the Overall CEESP Goals

This goal comprises three objectives:

Objective 6: To provide recommendations on ETP strategic design in support of the long-term CEESP goals

Objecitve 7: To provide recommendations on setting up the structure and facilitating the advancement of the ETP program design for the future program cycles

Objective 8: To provide recommendations as a framework to structure the ETP portfolio to balance the short-term needs versus the long-term needs (balance short-term needs of energy efficiency programs and long-term strategic objectives of the Strategic Plan)

Balancing the selection of projects and program activities to meet the CPUC Energy Efficiency Savings Goals as well as long-term Strategic Plan goals will require appropriate planning of resources and activities, as well as selection of different mixes and distribution of technologies that are suitable for California's energy efficiency market. The CPUC needs ongoing assessment to ensure that they obtain this strategic balance. Other key factors regarding program balance of the emerging technologies projects include fuel types, end-use applications, market sector, and consideration of technical and market potential, as well as risk.

Activities in this task include collection of secondary data, the analysis of qualitative data, and conducting one Expert Panel focus group.

1.4 GOAL D: TO ASSESS THE EVALUABILITY OF THE ETP IN ADVANCE OF THE IMPACT EVALUATION

This goal comprises one objective:

Objective 9: To Review and Update the Program Theory and Logic Model That Describes the ETP and Its Elements

An evaluability assessment (EA) determines whether there exists a minimum level of conditions to allow for evaluation of a program. The Team began the EA with a review of the logic models and discussions with the IOUs around data availability. The EA continued as the Team assessed the quality of information once received and more thoroughly reviewed the logic models in preparation for the Phase II research plan. This task followed two main steps:

- The team reviewed current program logic models in the January 2011 PIPs and updates as needed. This occurred through two interactive meetings with the CPUC-ED and IOUs. (November 2011, and February 2011) and a meeting with the CPUC-ED (March 2012).
- For each new program element (i.e., Scaled Field Placement, Demonstration Showcases, market and behavioral studies, technology supply side efforts, and technology resource incubator outreach), the Team determined if the element is able to be evaluated for impacts by determining the extent to which the elements meet each of the following criteria:
  - Impact goals and priority information needs are well defined
  - Impact goals are plausible
  - Relevant performance data can be obtained at reasonable cost

1.5 GOAL E: TO ASSESS THE QUALITY AND AVAILABILITY OF DATA WITHIN THE ETP DATABASE

This goal comprises two objectives:

Objective 10: To Assess the Availability of Data for Both Process and Impact Evaluations

Objective 11: To Assess and Update the ETP Database and Ensure That the Variables Capture the Program Activities

The ETP database is the repository of ETP technology assessment tracking information. The Team performed quality assurance activities associated with the ETP database.[3] The Team's quality assurance will include the following:

- Determining number of missing and invalid data
- Checking for the range of information within a variable and seeing if the data is out of a plausible range
- Determining whether the data are of sufficient quality for use in the Phase II aggregate analysis task

This analysis will include secondary data review and in-depth interviews with program staff (n=4).

Additionally, the Team created a list of variables from each of the elements to include in the ETP database so that the database represents the full program. The Team shared the list with the CPUC contractor responsible for constructing the database so they can fully implement the data collection details.

Table 3 provides an overview of data collection efforts for Phase I.

[3] There is an ongoing parallel activity to update and maintain the ETP database on the EEGA website.

Table 3. Phase I Data Collection Efforts by Task

Evaluation Focus	Evaluation Goal	Program Element	Secondary Data Review	Interviews with IOU Staff	External Target Audience Interviews	Focus Groups	Site Visits	Internal Target Audience Quantitative Surveys
Program Design and Implementation Assessment	1. To provide recommendations on how the program design and implementation could be improved	Technology Assessment	✓	✓ (n=6)[a]			✓ (n=1)	✓ (n=51)
		Scaled Field Placement	✓	✓ (n=3)[a]				
		Demonstration Showcases	✓	✓ (n=3)[a]				
		Market and Behavioral Studies	✓	✓ (n=3)[a]				✓ (n=51)
		Technology Development Support	✓	✓ (n=3)[a]	✓ (n=4)			
		TRIO	✓	✓ (n=3)[a]	✓ (n=6)		✓ (n=2)	
		SCE Technology Test Centers	✓	✓ (n=6)[a]			✓ (n=1)	
	2. To provide recommended guidance document for scientific rigor	Technology Assessment	✓	✓ (n=6)[a]				
	3. To assess how the program design and implementation support the overall CEESP goals	All Elements	✓			✓ (n=1)[a]		
	4. To assess the evaluability of the ETP in advance of the impact evaluation	All Elements	✓	✓				
	5. To assess the quality and availability of data within the ETP database	Technology Assessment	✓	✓ (n=6)[a]				

[a] This number is a census

B. DETAILED RESEARCH QUESTIONS

Table 4. Technology Assessment Detailed Research Questions

Program Element: Technology Assessment	
Description	• How has the program, as currently implemented, changed from what is written in the program implementation plan (PIP)? • Why have the changes occurred? • What types of measures are being tested? • How do technical assessments fit into the overall strategy of the program? • What is the process for moving measures into the portfolio and approximate timeline for this to occur? • What are the criteria in place to determine the composition of the portfolio (e.g., short term and long term, which market sector, allocation of funding across program elements, etc?) • How many technology assessments were launched during 2010-2012? • How many technology assessments were completed during 2010-2012? • What is the level of scientific rigor used in the assessment of the technologies? • Who are the main users of the information derived from the assessments? • What are cost data for the technology assessments (i.e., average, range)? • How does the staff learn about potential measures? • What is the timeline for each project? • Are results disseminated to the intended audience? • If so, how are they disseminated? • Who attends conferences and workshops and what information are they disseminating? • What types of communications are made with supply partners and EE managers?
Quality of Implementation	• What criteria are used to select technologies? (e.g. one-pager, background research) • Are the end users of the information from the technology assessment reports satisfied with the process set up to learn about the information?

Table 5. Technology Test Center Detailed Research Questions

Program Element: Technology Test Center (SCE Only)	
Description	• When is ZNE residential test facility being constructed? • How does the ZNE test center fit into the overall strategy of the program? • What occurs in the test centers for any of the four areas? • What does the test center look like (e.g., visuals of center and what it contains) • How many ETP measures were assessed in the TTC during the program cycle? • How does the test center coordinate with other ETP efforts and outside of ETP (if the test center works with others)? • Who are recruited to attend public workshops? • Do attendees represent the intended audiences for these workshops? • What criteria were used to determine the desired capabilities? • What are the defined ZNE TTC specifications? • What are the plans for ZNE information dissemination and lab development? • Who has access to these plans, and what process was used to determine the intended audience(s) for information dissemination? • Where are the progress reports stored? • Who is the intended audience of the progress reports? • Are the progress reports complete and comprehensive?
Quality of Implementation	None – any technology assessment performed by TTC will be evaluated in that sub-section.

Table 6. Scaled Field Placement Detailed Research Questions

Program Element: Scaled Field Placement	
Description	• Has the program, as currently implemented, changed from what is written in the program implementation plan (PIP)? If so, how? • Why have the changes occurred? • Where do these occur? • How do scaled field assessments fit into the overall strategy of the program? • Who is involved in testing the equipment (i.e., technical person, office manager, etc.)? • What types of measures are being tested? Were these measures in the current EE portfolio? • How many scaled field placements were launched during 2010-2012? • How many scaled field placements were completed during 2010-2012? • What are cost data for the scaled field placements (i.e., average, range)? • What is the timeline for each project? • Who attends conferences and workshops and what information are they disseminating? • What types of communications are made with supply partners and EE managers?
Quality of Implementation	• Balance between "proven" underutilized technologies with low or no market traction and "new" advanced technologies that meet the SP goals. • Were the factors affecting the visibility and scalability of targeted technologies examined? • Was the screening and selection of candidate technologies for SFP systematic and data driven? • How were sites chosen? • Are the customers involved in the process satisfied with the implementation process?

Table 7. Demonstration Showcases Detailed Research Questions

Program Element: Demonstration Showcases	
Description	• What is being demonstrated? • How are the showcases marketed? • How do the showcases fit into overall strategy? • What are the attendance goals for the showcase (number and types of attendees)? • What is the duration of a showcase? • What is the level of collaboration and uniqueness of element effort with other external efforts (e.g. community college efforts, LGPs, other IOU efforts, etc.)? • How much do showcase content overlap? (across programs and utilities) • What are the cost data for the showcases (i.e., average, range)? • What is the timeline for each project? • Are monthly project updates complete/comprehensive? • Are results disseminated to the intended audience? • If so, how are they disseminated? • Who attends conferences and workshops and what information are they disseminating? • What types of communications are made with supply partners and EE managers?
Quality of Implementation	• How successful are the outreach efforts? Who is attending? • What is the selection process for showcases? • How are technologies bundled with existing measures? • Was the selection of program participants/sites for DS systematic; targeting various CZ, applications? • Were the factors affecting the visibility and scalability of targeted technologies examined?

Table 8. Market & Behavior Studies Detailed Research Questions

Program Element: Market & Behavior Studies	
Description	• How many market and behavioral studies were launched during 2010-2012? • How many market and behavioral studies were completed during 2010-2012? • How are the studies chosen? • Who has performed the studies? • What are the costs of the studies (i.e., average, range)? • Who are the ultimate users of this data? (EE and ETP programs) • What are the different types of information provided in the studies (e.g., high level secondary research, or in-depth market potential?) • At what stage in the process is the data utilized (e.g., by ETP or EE staff, prior to an assessment or after the assessment?) • Where are studies posted? • Who has access to reports? • How are people informed about the availability of new results? • What is the timeline for each project? • Are monthly project updates complete/comprehensive?
Quality of Implementation	• What is the quality of the reports? • To what extent were market and behavioral studies data driven? • Was secondary data used effectively (e.g. was market research interpreted and implemented effectively?)

Table 9. Technology Assessment Detailed Research Questions

Program Element: Technology Development Support	
Description	• How many new performance specifications and/or Use Cases were produced as a result of TDS sub-program? (Use case is technical specifications of selected product for CZ, etc.) • How many new performance specifications and/or Use Cases were presented to manufacturers/private industry for possible action? • Which companies were involved? • Where does the technology in the Use Case sit along the proof-of-concept to prototype stage, type of technology? • How does TDS fit into the overall strategy of the program? • What types of needs are identified? • Are these needs supported by the CA Strategic Plan goals? • How does the staff learn about potential companies to work with? • What criteria are used to score potential technologies? • What criteria are used to select technologies? • What type of information is included in the proposals? • What is the timeline and budget for each proposal? • What decisions are made during periodic reviews? • How do reviews affect proposal status and completion (e.g. are proposals never closed, and if so, why)? • Are results disseminated to the intended audience? • If so, how are they disseminated? • Who attends the final presentations? • How are the use cases utilized by manufacturers? • How do ETP dollars support the overall effort within the company? • How do the Use Case products align with the California Strategic Plan?
Quality of Implementation	• Do the manufacturers find the use case useful? • Was the presentation of the Use Case clear? • Are final reports considered comprehensive and useful?

Table 10. TRIO Detailed Research Questions

Program Element: TRIO	
Description	• What types of candidates are identified? • Do the candidate technologies support the CA Strategic Plan goals? • How does the staff learn about potential candidates? • How many meetings have occurred? • Where are the meeting held? • How many people attend the meetings? • Who attends the meetings (type of participant)? • What criteria are used to accept participant abstracts? • What types of networking opportunities are present? • What type of coordination occurs to implement the meetings? • How does Trio fit into the overall strategy of the program? • What occurs in a TRIO meeting? • What type of information is included in the proposals? • What criteria are used to score potential technologies? • What is the timeline and budget for each proposal? • Where are lists of accepted proposals stored? • What information is documented regarding accepted proposals? • Who attends the annual showcase?
Quality of Implementation	• Do the participants of the workshops find value in the meetings? • For the relevant sub-group who may follow through on working with the IOUs, do they find the process clear? • For this sub-group choosing to work with the IOUs, is the ability to work with the IOUs considered easy? If not, what suggestions are there to help that process?

C. ETP PROGRAM PERFORMANCE METRICS

On December 2, 2010, the Commission issued Resolution E-4385, approving Program Performance Metrics (PPMs) for Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas and Electric Company for 2010-2012 statewide energy efficiency programs and subprograms.

Below are the approved PPMs and metric types for the Emerging Technologies Program (Resolution E-4385, Appendix A, pp. 39-40):

Table 11. ETP Program Performance Metrics

Metric Type	Description
ET Program	1. The number of new "proven" ET measures adopted* into the EE Portfolio. * "Adoption" means measure is available to end-use customers through IOU programs. Adoption of a measure may be attributed to one or more ET sub-programs
	2. Potential energy impacts* (energy savings and demand reduction) of the adopted ET measures into the EE portfolio. * Potential energy impacts to be reported based on ET project findings and estimated market potential (reported through quarterly ET database updates)
Technology Assessment (TA)	1. Number of ETP measures which have undergone TA that are adopted* into the EE portfolio, including but not limited to each of the following: (a) Advance HVAC technologies (b) High efficiency plug loads and appliances (c) Advanced lighting technologies * "Adoption" means measure is available to end-use customers through IOU programs.
Scaled Field Placements (SFP)	1. Number of ETP measures that have undergone SFP and are adopted* into the EE portfolio. * "Adoption" means measure is available to end-use customers through IOU programs.
Demonstration Showcases (DS)	1. Self-reported increase in knowledge by randomly selected sample of targeted stakeholders who either 1) visited the DS or 2) were informed about the DS in a workshop about benefits of the DS.
Market and Behavioral (M&B) Studies	1. Self-reported increase in knowledge among internal ET stakeholders about the technologies targeted by the M&B studies.
Technology Development Support (TDS)	1. Number of new performance specifications and/or Use Cases* produced as a result of TDS sub-program. * "Use Cases" describe the need for a technology or application.
	2. Number of new performance specifications and/or Use Cases presented to

Metric Type	Description
	manufacturers/private industry for possible action.* * "Possible action" means that the manufacturer/private industry considered TDS results in their product development efforts.
Business Incubation Support (TRIO)	1. Percent of attendees who voluntarily respond and self-report increased understanding on how to do business with utilities.
Technology Test Centers (TTC)	1. Number of ETP measures evaluated at the TTCs in support of ET Assessments Sub-Program that are adopted* into the EE portfolio (and/or available in the market). * "Adoption" means measure is available to end-use customers through IOU programs.

GOAL A: PROVIDE RECOMMENDATIONS FOR PROGRAM DESIGN AND IMPLEMENTATION

The following section provides a review of scoring tools for Technology Assessments, Scaled Field Placements and Demonstration Showcases, and IOU scoring tools. In addition, this section also contains detailed methodologies for the content analysis and surveys fielded to Market & Behavioral Studies and Technology Assessment report recipients, followed by a topline report of survey responses. This section also includes project descriptions of ongoing projects, where relevant for a selection of program elements. Finally, we include findings from literature reviews conducted on the Demonstration Showcase and Market & Behavioral Studies program elements.

D. SCORING TOOLS

1.6 TECHNOLOGY ASSESSMENTS

PG&E ETOS Tool

PGE ETOS Tool.docx

SCE Scoring Tool

SCE Tool.docx

SDG&E Scoring Tool

SDGE Tool.docx

SCG Scoring Tool

SCG Tool.docx

1.7 SCALED FIELD PLACEMENTS

PG&E ETOS Tool

Q1.5 etos.4710.doc

SCE Scaled Field Placement Proposal and Scorecard

SFP Proposal ETXXSCE3XXX - Temp

ETYYSCENNN SFP Scorecard_022210.xl

SCG Scoring Tool

SCG ETPA.docx

1.8 DEMONSTRATION SHOWCASES

SCE Scaled Field Placement Proposal and Scorecard

SCE DS PP and ScoreCard.docx

1.9 MARKET & BEHAVIORAL STUDIES

PG&E ETOS Tool

Q1.5 etos.4710.doc

SCE Scoring Tools

SCE Scoring Tool

SCG Scoring Tool

SCG ETPA.docx

1.10 TECHNOLOGY DEVELOPMENT SUPPORT

PG&E ETOS Tool

Q1.5 etos.4710.doc

SCE Technology Development Support Proposal and Scorecard

ET10SCE5010 Backlit Signs, Menu Board Pr

ET10SCE5010 TDS Scorecard_Menu Boa

E. TECHNOLOGY ASSESSMENT SCORING TOOLS ASSESSMENT

Detailed Scoring Tool Analysis Findings

As part of our evaluation, we also detail findings regarding Technology Assessment scoring criteria for each IOU.

PG&E

PG&E uses their Emerging Technology Opportunity Summary (ETOS) tool to score potential technologies for the Technology Assessment program element. The ETOS tool requires the PG&E product manager to input a variety of information. The tool begins with a series of questions regarding an overview of the project, project plan, technology status, market/energy demand opportunity, non-energy benefits, a value proposition summary[4], and sustainability or environmental impact. In addition, the tool provides a scoring matrix for a variety of criteria including market size, program office request, and estimated market penetration. The ETOS tool allows the product manager to indicate whether this technology resulted from PIER activities, which is a valuable addition for tracking the sources of emerging technologies. We suggest that this tool also include other sources for technologies, including project sources used within the ETP database, such as National Laboratories, Universities, EE Program Managers, Manufacturers, Professional Organizations, etc., as well as TRIO.

The tool also collects data to consider resources, such as how PG&E will staff the project. In addition, the scoring tool includes more operational elements to the project including estimated project cost, anticipated outcomes, and contractors identified. Planning for the project in this manner is useful, as it requires the project manager to consider a variety of logistical aspects to the feasibility of a new project. The ETOS scoring aid also helps to guide product managers or other staff in filling out the tool and understanding the various criteria.

There are a few areas in the ETOS guide that PG&E could revise to bring further clarity to the tool. We have the following recommendations for PG&E to consider for their ETOS:

- Either the tool or the scoring aid could provide a detailed explanation of the 'Program Office Request Fit.' The ETOS sheet does not clearly show how the 20 points from this request is incorporated into the scoring tool, and by whom. We suggest that PG&E include additional language within their scoring aid to address these criteria.
- The scoring aid could address how the questions included in ETOS tool regarding Estimated Market Penetration are calculated from the 60 points available. These questions include Technical Risk, Product Risk, Market Penetration Risk, and Other Risks. However, in the scoring aid, market penetration is calculated by energy, demand or gas savings only. It is not clear how

[4] The value proposition includes the target customer, statement of customer need, product, recognized product category, statement of key benefit, primary competitive alternative (e.g. the existing technology that the emerging technology could replace), and statement of primary differentiation.

these risk factors are incorporated into the value given in the matrix. Table 12 provides a comparison of the ETOS tool and aid regarding scoring parameters. We suggest that PG&E review these differences and update the tool and aid to reflect how technologies are scored.

Table 12. ETOS Parameters that Could Benefit from Further Discussion in ETOS Aid

Scoring Parameters	ETOS Tool Parameter	Current ETOS Aid Discussion
Market Size	# of units or sites in territory Price compared to alternatives % of applicable market Maximum energy and demand savings over lifetime	Size of market (# of widgets) X first year savings per widget OR Size of market (annual energy use) x percent savings from technology
Program Office Request	Program applicability PG&E Program advocacy Other Delivery Channels	Not in aid
Estimated Market Penetration	How technology removes barriers to savings Technical risk Product risk Market penetration risk Other risks	Annual technology sales x first year annual energy savings per widget

SCE

SCE has four scoring documents: 1) ET Assessment Initial Review Questions, 2) ET Project Funding Proposal, 3) Technology Assessment Scorecard, and 4) Lifecycle Savings and Customer Payback Potential. Below we provide a description of each tool along with findings.

SCE Scoring Document #1 - ET Assessment Initial Review Questions

SCE's ET Assessment Initial Review Questions document is used as an initial review of the feasibility of conducting a technology assessment. This scoring tool helps to clarify the needs for the project and what SCE hopes to achieve from the technology assessment. We found that this tool incorporates elements that facilitate project documentation.

The tool considers resources, such as how SCE will staff the project, as part of their criteria. In addition, the scoring tool includes more operational elements to the project including preliminary budget estimate, main objectives, and plans for disseminating results. Planning for the project in this manner is useful, as it requires the project manager to consider a variety of logistical aspects to the feasibility of a new project.

This tool documents whether the technology assessment is approved and assigns a project number to the assessment. For example, the tool provides a rubric for developing a project ID, by providing an area where the project manager can create and enter the new project number (i.e., Project Number-ET11SCE1__ __ __).

SCE Scoring Document #2 – Emerging Technology Project Funding Proposal (Long Form)

The ET Project Funding Proposal requires ETP staff to provide a variety of information including a description of the innovation, goals, objectives and methodology of the project, quantitative market and financial information, market intelligence, estimated demand and energy savings, prior research,

and anticipated outcomes. This tool also includes project logistics, such as project duration, project budget, plan for disseminating results, and considering transfer path to EE programs. This final item is a valuable addition to understand how the technology can be transferred into the EE portfolio through considering the length of time until the technology is 'program ready', additional requirements to get the technology ready, the product that will be delivered to the portfolio, if there is an EE sponsor, and what the product will look like after transfer (e.g. uptake in program, calculations, etc.) We found that this tool was comprehensive and incorporates elements that facilitate project documentation.

While this tool does not include a direct value proposition statement (like tools from PG&E and Sempra), with one exception, the scoring tool embeds the value proposition within the tool across several questions (i.e., the scoring tool has questions that provide responses that support the value of the assessment). The one missing component of the value proposition is how the technology is different from the existing equipment under the description of the technology (e.g. statement of primary differentiation). Since the tool already requires SCE staff to include incumbent or baseline technology, adding in this type of information may be easy to do. We recommend that SCE consider this addition so that all three IOUs have similar information about the value of the produce being considered.

SCE Scoring Document #3 -- Technology Assessment Scorecard

The Technology Assessment Scorecard includes scores and weights and is used by ETP staff to assess a variety of information weighted according to scoring criteria. These criteria include whether the technology aligns with Big Bold Strategies for ZNE and also supports a balanced portfolio. The scorecard also assesses the existence of barriers to adoption, testing methodology, testing results, host sites, and collaboration opportunities. The scoring system provides different weights for each criterion. Both ETP staff and the ET Steering Committee fill out this scorecard independently. This is a useful secondary review, as some criteria are known in greater detail by ETP staff rather than Steering Committee members and vice versa, (e.g. ETP staff may be more familiar with technology risk, while Steering Committee members may have a better idea of portfolio balance and alignment with Big Bold Goals).

The current scoring tool uses a six-point scale to assess each topic (or criteria). This scale is anchored with "Yes, Definitely" and "No" and forces gradations between the anchors using the categories as written of "Hardly; Somewhat; Likely; and Most Likely." Few multi-level scales use the binary Yes/No as anchors, although categories such as Yes/No/Maybe or Yes/No/Don't Know are often used when requesting information. We assume that the choice of a six-point scale was made to introduce variation into the responses from ET staff and the ET Steering Committee and allow for a higher degree of differentiation in the project choices.

The gradations between the two anchor points of Yes and No do not fit well with certain questions and may lead to users filling in inaccurate responses to suit the scale or leaving these questions blank resulting in an ultimate score that does not reflect the questions. The choice of likelihood options in the scale is somewhat confusing as the word "likely" often describes the potential for something to occur, while the next level down in the scale from the "likely" option is "somewhat," which does not denote likelihood.

However, if the scale is actually "Hardly likely" and "Somewhat likely," then this scale works better for some items. If this is the case, we recommend the scale names be changed to "not likely; somewhat likely; likely; and very likely" which are more typical likelihood gradations.

Table 13. Overview of Current and Proposed Likelihood Scales

Scale	0	1	2	3	4	5
Current Categories	No	Hardly	Somewhat	Likely	Most Likely	Yes, Definitely
Proposed Categories		Not likely	Somewhat Likely	Likely	Very Likely	

Because certain questions are not amenable to even the likelihood change (e.g., "No or Few known barriers to adoption?") we recommend one of two options:

- Rewrite the question to be specific to a likelihood type of scale (e.g., "What is the likelihood that the proposed study could be in alignment with the 2010-2012 target research-types?") OR
- Keep the question as written and change the scale to a binary choice to better fit the question.

If the second option is chosen, then the weights for the topics should be adjusted so that appropriate weight is given to this topic. This second option may be required for certain items that do not lend themselves to likelihood questions. For example, the question "No or Few known barriers to adoption?" is best answered with "Yes, there are no or few known barriers" or "No, there are several or many known barriers."[5]

In the case of option 2, we recommend changing the scale to a binary choice for the following scorecard questions:

- Barriers to adoption: No or Few known barriers to adoption?
- Host Site: Is the host site or test lab identified?

SCE could also consider developing a guidance document to create a common baseline of knowledge for completing the tools.

Portfolio Objectives: If a link were available in a document that points the person filling out the tool to where they can find the current portfolio balance and what SCE's goals are for specific areas, this would allow each person to be more informed when assigning a score. Conversely, if there is no document like this for reference, it would be useful for new staff to have a location that describes what this variable means and what the different scores mean.

Big Bold Goals: Similar to the portfolio balance, if the Big Bold Goals were stated in the document, it would bring similar knowledge to all involved in the scoring.

SCE Scoring Document #4 - Lifecycle Savings and Customer Payback Potential

The Lifecycle Savings and Customer Payback Potential tool is an Excel sheet that identifies the technology's potential life cycle savings (GWh) and demand (MW) reductions. Savings and demand reductions are calculated by inputting gross annual kWh and gross annual peak kW per technology,

[5] The "Don't Know" option, while often available, is not desired in this case as this allows for equivocation and the scorecard has been put together to reduce the uncertainty derived from equivocation.

customer rate ($/unit), additional annual customer costs, initial technology customer costs, number of projects/participants, known market penetration, net to gross factor, estimated useful life, and technology risk (as a %).

The scoring tool is very thorough and contains relevant and appropriate criteria to determine whether the ETP should assess a technology. The tool includes a variety of inputs for assessment, and clearly explains where a project manager or ETP staff member can access information to complete the form.

The tool also includes an assessment of customer market potential (e.g. estimates per unit savings and dollars per unit) as well as incorporates technology risk into life cycle savings. We suggest that SCE consider explicating what initial technology customer costs and additional annual customer costs – O&M cover and provide a rationale for timing around costs (e.g. 3 to 5 years).

Sempra

Since the 2006-2008 evaluation, Sempra has finalized their scoring tools. SCG and SDG&E both use a similar tool, called the Emerging Technology Project Assessment (ETPA). This tool identifies seven to eight criteria (for SCG and SDG&E, respectively) for determining whether a technology should undergo an assessment. The criteria include technology risk, technical savings potential, cumulative market potential, technology economics/simple payback, market information/risk/potential customers, non-energy benefits, criticality of their involvement, and program viability. SCG and SDG&E weight their criteria slightly differently. SCG has 50% their scoring on energy savings and market risk, which SDG&E has 60%. SCG places the 10% difference in program viability, which SDG&E does not include in their tool. Both tools clearly lay out specific categories associated with the scales for each parameter.

Sempra also includes a value proposition, which is identical to the value proposition statement used by PG&E in their ETOS tool. We support inclusion of this value proposition as a clear method to document why the technology should be selected for an assessment.

For the Sempra IOUs, we provide five recommendations regarding the ETPA tool.

Technical Savings Potential and Cumulative Market Potential: SDG&E uses an "MkWh" label for their technical savings potential and cumulative market potential parameter. We recommend either changing this to "MWh" or GWh", depending on what order of magnitude SDG&E desires. Additionally, it is unclear whether therms are applicable for this tool. As SDG&E considers natural gas measures, we suggest that the label be something such as "MWh / Therms".

Include Date of Creation: As part of our review, we were unable to determine whether the two ETPA tools provided from the data request were the most current tools available. We suggest that SDG&E and SCG consider including a footer or note regarding the date that the tools were updated.

Program Viability: The program viability scale for SCG's ETPA tool may be utilizing the scale in the wrong direction (e.g. on a scale from 1 to 5 where 1 is High and 5 is low). High scores mean a higher likelihood of choosing a technology (based on the other scores). As such, a high program viability seems to be a positive thing, yet it received a low score overall. We suggest that SCG consider reversing the order of this scale to align with the other parameters.

Review Parameters Across Sempra Utilities: It is unclear why there are different numbers of parameters between the two IOUs. Sempra may want to consider reviewing the different parameters and align them more or document selection choices.

Incorporate Project Management and Logistic Information: The Sempra tools provide a nice description of concept and ties that to the parameters through similar naming conventions. There are a couple of additional variables that Sempra should consider incorporating that are forward-looking and could help to tie these scores to active assessments. Specifically, for those measures moving forward, we suggest space in the tools to add:

- the active Project # (and provide a format something like what SCE has done),
- estimated project cost,
- assigned project manager, and description of the technology, objectives and anticipated outcome

F. SCALED FIELD PLACEMENT SCORING TOOLS ASSESSMENT

Each IOU has a different process for selecting a Scaled Field Placement. The following section summarizes findings from our review of scoring tools used to select a project for an SFP, and provides specific recommendations where applicable for each IOU. Table 14 shows a list of these scoring tools provided to the evaluation team in our data request (Appendix A also lists these tools).

Table 14. List of Scoring Tools

Utility	Name of Scoring Tool
SDG&E	• Emerging Technology Project Assessment (ETPA)
SCG	• Emerging Technology Project Assessment (ETPA)
PG&E	• Emerging Technology Opportunity Summary (ETOS) Tool
SCE	• ET Scaled Field Placement Proposal • Scaled Field Placement Scorecard

Both San Diego Gas and Electric (SDG&E) and Southern California Gas (SCG) use the Emerging Technology Project Assessment (ETPA) tool to score potential Scaled Field Placements, although SDG&E had not initiated any Scaled Field Placements in 2011.

PG&E uses its Emerging Technologies Opportunity Summary (ETOS) tool to score potential Scaled Field Placements. This is the same tool that is used for screening technology assessments and showcases.

As part of our evaluation, we also detail findings regarding Scaled Field Placement scoring criteria for each IOU.

PG&E

PG&E uses their ETOS tool to score potential technologies for both the Scaled Field Placement and Technology Assessment program element. As described earlier, PG&E considers the SFP projects an avenue to obtain useful information around specific measures across multiple sites or around the integration of measures in a single site. As this reasoning is comparable to why PG&E chooses a Technology Assessment project, use of the same scoring tool makes sense.

The ETOS tool requires the PG&E product manager to input a variety of information. The tool begins with a series of questions regarding an overview of the project, project plan, technology status, market/energy demand opportunity, non-energy benefits, a value proposition summary[6], and sustainability or environmental impact. In addition, the tool provides a scoring matrix for a variety of criteria including market size, program office request, and estimated market penetration. The ETOS

[6] The value proposition includes the target customer, statement of customer need, product, recognized product category, statement of key benefit, primary competitive alternative (e.g., the existing technology that the emerging technology could replace), and statement of primary differentiation

tool allows the product manager to indicate whether this technology resulted from Public Interest Energy Research (PIER) activities, which is a nice addition for tracking the supply of emerging technologies.

The tool collects data to consider resources, e.g., how PG&E will staff the project. In addition, the scoring tool includes more operational elements to the project including estimated project cost, anticipated outcomes, and contractors identified. Planning for the project in this manner is useful, as it requires the project manager to consider a variety of logistical aspects to the feasibility of a new project. As stated earlier, PG&E includes an ETOS scoring aide, which guides product managers or other staff in filling out the tool and understanding the various criteria. However, we did not review the scoring aide for this element, as we did not include it in our data request. This aide is analyzed within the technology assessment element.

Table 15. Information in PG&E Screening Tool (ETOS)

Information Collected	Information / Criteria

Written Information to Inform Scoring and Project Logistics	**Overview** • Background • Estimated project cost **Project Plan** • Core idea, description, methods • Defined scope/tasks • Start/end dates • Status of Project • Expected results • ET applicable • PIER connection • Contractors identified • CWA or Contracting process • Host site **Technology Status** • Technology status/maturity • Time to market **Market & Energy Demand Opportunity** • Product features • Market segments • Plausible energy and demand impacts compared to alternative tech • Estimated Energy Savings **Value Proposition** • Value to CA ratepayers Sustainability /Environmental Impact
Scoring Parameters	1. Estimated Market Penetration **(60%)** (enables savings, technical risk, product risk, market penetration risk, other risks) 2. Market Size **(20%)** 3. Program Office Request applicability, advocacy **(20 %)** (fits PG&E program structure, has PG&E advocate)

SCE

SCE uses two specific documents to help select a Scaled Field Placement.

SCE Scoring Document #1 – ET Scaled Field Placement Proposal

The ET Scaled Field Placement Proposal asks ETP staff to provide a variety of information including a description of the project and selection criteria. The project description includes background, objectives, deliverables, Big Bold Strategies, and partnerships. This tool also provides selection criteria for a project that aligns with the Scaled Field Placement Scorecard (see Scoring Document #2 described below). This tool explains each criterion and asks ETP staff to identify factors included in each criterion. For example, for market readiness, ETP staff identifies whether the project is a proven technology that is commercially available, if there is a risk of performance failure, and if the performance can be monitored and measured. For barriers, ETP staff must consider several concepts including reasons why the measure is underutilized (e.g., cost, visibility, performance) and what data

shows that level of underutilization; what other attempts have been made to promote the measure; and what barriers a successful SFP will reduce.

SCE Scoring Document #2 – Scaled Field Placement Scorecard

This tool contains scores and weights. ETP staff fill out the Scaled Field Placement Scorecard to provide a variety of information weighted according to scoring criteria. Table 16 documents these criteria. The scoring system provides different weights for each criterion. Both the ETP staff and the ET Steering Committee fill out this scorecard independently. This is a useful secondary review, as some criteria are known in greater detail by ETP staff rather than Steering Committee members and vice versa, (e.g., ETP staff may be more familiar with prior efforts, while Steering Committee members may have a better idea of reasons why technologies are underutilized). For SFP projects, SCE has heavily weighted their criteria to the topics of "market readiness" and "Big Bold." When considering a project, the ability of the measure to potentially reduce energy on a "game-changing" level is 40% of the weight while the fact that the measure is technically sound and commercially available with no risk of performance failure is 30%. These weights align well with the stated outcomes in the PIP.

Table 16. SCE Scoring Tools

Information Collected	SCE Scoring Tool	Information / Criteria
Scoring Parameters	**Scaled Field Placement Scorecard:**	• Ability of the measure to have the potential to reduce energy on a "game-changing" level **(40%)** • Technical soundness of the measure and commercial availability, with no risk of performance failure **(30%)** • Knowledge of why measure is underutilized **(10%)** • Prior or ongoing efforts **(10%)** • Host Site Identified **(10%)**

Information to Inform Scoring and Project Logistics	**ET Scaled Field Placement Proposal:**	• Project Description (background, objectives, deliverables, Big Bold Strategies, Partnerships)
		• Selection Criteria:
		  ○ Market Readiness
		  ○ Barriers
		  ○ Stakeholder and Host Sites
		• Proposed Budget and Schedule

The current scoring tool uses a six-point scale to assess each topic (or criteria). This scale is anchored with "Yes, Definitely" and "No" and forces gradations between the anchors using the categories as written of "Hardly; Somewhat; Likely; and Most Likely." Few multi-level scales use the binary Yes/No as anchors, although categories such as Yes/No/Maybe or Yes/No/Don't Know are often used when requesting information. We assume that the choice of a six-point scale was made to introduce variation into the responses from ET staff and the ET Steering Committee and allow for a higher degree of differentiation in the project choices. However, the gradations between the two anchor points of Yes and No do not fit well with certain questions and may lead to uncertain completion of the scale and an ultimate score that does not reflect the questions. The choice of likelihood options in the scale is somewhat confusing as the word "likely" often describes the potential for something to occur, while the next level down in the scale from the "likely" option is "somewhat" which does not denote likelihood.

However, if the scale is "Hardly likely" and "Somewhat likely," then this scale works better for some items. If this is the case, we recommend the scale names be changed to "not likely; somewhat likely; likely; and very likely" which are more typical likelihood gradations. Because certain questions are not amenable to even the likelihood change (i.e., "Is a host site already identified?"), we recommend one of two options:

1) Rewrite the question to be specific to a likelihood type of scale (e.g., "What is the likelihood of the host site to participate in the program?") OR

2) Keep the question as written and change the scale to a binary choice to better fit the question.

If the second option is chosen, then the weights for the topics should be adjusted so that appropriate weight is given to this topic. This second option may be required for certain items that do not lend themselves to likelihood questions. For example, the question "Has another IOU or other entity already studied this measure or something similar?" is best answered with "Yes," "No," or "Don't know." However, in terms of scoring an item, the "Don't Know" is not desired as this allows for equivocation and the scorecard has been devised to reduce the uncertainty derived from equivocation.

In the case of option 2, we recommend changing the scale to a binary choice for the following scorecard questions:

- **Barriers to Adoption:** Do we know why this measure is underutilized?
- **Prior or Ongoing Efforts**: Has another IOU or another entity already studied this measure or something similar?
- **Host Site:** Is an optimal host site available?

SCG and SDG&E

The Sempra utilities (SCG and SDG&E) use the same (ETPA) tool to help choose either a Scaled Field Placement or a Technology Assessment. Similar to PG&E, SCG and SDG&E consider the SFP projects an avenue to obtain useful information around specific measures across multiple sites and to confirm savings based on a large sample size. As this reasoning is comparable to why SCG and SDG&E choose a technology assessment project, use of the same scoring tool makes sense.

This tool identifies seven criteria for determining whether a technology should undergo an assessment (see Table 17). The criteria include technology risk, technical savings potential, cumulative market potential, technology economics/simple payback, market information/risk/potential customers, non-energy benefits, criticality of their involvement, and program viability. The tool clearly lays out specific category associated with the scales for each parameter.

Sempra also includes a value proposition, which is identical to the value proposition statement used by PG&E in their ETOS tool. We believe that having this value proposition is a clear method to document why the technology should be selected for an assessment.

Table 17. Information in Sempra (SCG & SDG&E) Screening Tool (ETPA)

Information Collected	Information / Criteria
Written Information to Inform Scoring and Project Logistics	**Value Proposition** **Technology Risk** • Technical Risk • Leading Suppliers **Technical Savings Potential** • Annual Energy Savings • End of Life / Early Life Replacement **Technology Economics** • First Cost • Incremental Cost • Annual Savings • Simple Payback **Market Information** • Market Development Issues • Potential Customers • Market Risk **Non Energy Benefits** • GHG Reductions • Emission Reductions • Water Usage Reductions • Maintenance Savings **Criticality of SEU Involvement** **Program Viability** • Distribution Channels • Persistence of Savings • Impact on Customer Behavior/ Training • Rebate/Upstream/Statewide/other **Other Information**
Scoring Parameters	**1.** Technical Savings Potential **(20%)** **2.** Technology Economics (Simple Payback Period) **(15%)** **3.** Market Information (Market Risk) **(15%)** **4.** Criticality of SEU Involvement **(15%)** **5.** Program Viability **(15%)** **6.** Technology Risk **(10%)** **7.** Non Energy Benefits **(10%)**

For Sempra, we provide two recommendations regarding the ETPA tool.

- **Program Viability:** The program viability scale for Sempra's ETPA tool may be utilizing the scale in the wrong direction (e.g., on a scale from 1 to 5 where 1 is High and 5 is low). High scores mean a higher likelihood of choosing a technology (based on the other scores). As such, a high program viability seems to be a positive thing, yet it received a low score overall. We suggest that SCG consider reversing the order of this scale to align with the other parameters.

- **Incorporate Project Management and Logistic Information**: The Sempra tools provide a good description of concept and ties that to the parameters through similar naming conventions. There are additional variables that Sempra should consider incorporating that are forward looking and could help to connect these scores to active assessments. Specifically, for those measures moving forward, we suggest space in the tools to add:

  The active Project #

  Estimated project cost

  Assigned project manager

  Description of the technology, objectives and anticipated outcome of the SFP

G. DEMONSTRATION SHOWCASE SCORING TOOLS ASSESSMENT

Through our review of the selection process, the evaluation team found that one IOU, SCE, has a screening process that is well documented and specific to the Demonstration Showcase element. SCE uses three separate efforts to collect information and score projects (i.e., a concept proposal, a funding proposal, and a scorecard). PG&E has a tool (ETOS) that is not specific to Demonstration Showcase, and the other utilities (SCG and SDG&E) do not use a formal screening process. SCE's model is the most robust model and should be the start of a consistent process. The evaluation team analyzed the model; the analysis and several recommendations for improvement are provided below.

Table 18. Summary of SCE Scoring Tools

Information Collected	SCE Scoring Tool	Information / Criteria
Scoring Parameters	**Demonstration Showcase Scorecard**	• Solution is comprehensive, market-ready combination of EE measures on an integrated project level **(30%)** • Alignment with Big Bold Strategies showcase whole building integrated solutions in marketplace to reduce energy on a 'game changing' level **(20%)** • Project encompasses significant % of stakeholders related to major energy consumptive building stock **(15%)** • Solution can be replicated **(15%)** • Host Site Identified **(10%)** • Fit with SCE goals **(10%)**

Information to Inform Scoring and Project Logistics	**ET Demonstration Showcase Concept Proposal**	• Project Description (background, objectives, deliverables, Big Bold Strategies, Partnerships)
		• Selection Criteria:
		  ○ Market Readiness
		  ○ Barriers
		  ○ Stakeholder and Host Sites
		  ○ Ability to Replicate
		  ○ Host Site

	Demonstration Showcase Project Funding Proposal	• Project Overview (Background, Objectives, Deliverables, Big Bold Strategies, Partnerships) • Scope of Work • Schedule (New Construction, Retrofit, Paper Study, RFQ/RFP) • Resources • Budget

SCE program managers are asked to fill out a concept proposal that incorporates a description of the project, and a funding proposal that assesses projects based upon internal resources, timing, and staffing levels. Projects are then assessed via a scorecard with scoring parameters including technology

solutions, alignment with California Energy Efficiency Strategic Plan (CEESP) Big Bold Energy Efficiency Strategies (BBEES), sector and stakeholders[7], replicability, site, and fit with SCE goals. Finally, the Demonstration Showcase Project Funding Proposal allows ETP staff to document and plan for logistics of a demonstration showcase project. We present details of each scoring documents next.

SCE Scoring Document #1 – ET Demonstration Showcase Concept Proposal

The Energy Technology (ET) Demonstration Showcase Concept Proposal requires ETP staff to provide a variety of information including a description of the project and providing information that responds to selection criteria. The project description includes background, objectives, deliverables, Big Bold Strategies, and partnerships. The Demonstration Showcase Concept Proposal tool also has similar selection criteria to the criteria for the Demonstration Showcase Scorecard (see Scoring Document #2). This tool explains each criterion and asks ET staff to identify factors included in each. For example, for market readiness, ET staff identifies whether the showcase would highlight a systems approach, commercial availability, cost-effectiveness, and performance risk, etc., within this criterion.

This tool also identifies barriers reduced through the showcase, such as barriers that contribute to the under-utilization of the measures; and ensuring that the showcase criteria also aligns with ZNE goals among specific target building types. SCE identifies whether the potential project site "encompasses a significant percentage of stakeholders related to the major energy consumptive building stock in California."[8] These include offices, big-box retail, universities buildings, schools, and single-family homes.

We recommend that the following information be added to the concept proposal to ensure that all relevant information is captured in the proposal.

- **Clear Purpose of Demonstration:** Consider adding "purpose" in the project description section. ETP staff should identify whether the site is for an experimental or exemplary demonstration or both. This will help in structuring the objectives, deliverables, and expectations for the project.
- **Marketing**: Consider adding "marketing" in the project description section. A clear marketing plan will help the project gain traction and achieve its objectives.
- **Knowledge Dissemination**: Consider adding a section for how the project will disseminate information. The goal of a demonstration showcase is to inform stakeholders and market actors with information on new integrated solutions. A clear and actionable knowledge dissemination plan will help achieve this goal.

SCE Scoring Document #2 – Demonstration Showcase Scorecard

ETP staff fills out the Demonstration Showcase Scorecard and provides a variety of information that is scored using weighted criteria. Table 18 lists these criteria including whether the solution is a comprehensive, market-ready combination of EE measures on an integrated project level, is aligned with Big Bold Strategies for whole building integrated solutions, encompasses significant consumptive

[7] We define stakeholders as both internal to the IOUs and external audiences as both are needed.

[8] SCE's ET Demonstration Showcases Scorecard.

building stock, is a solution that can be replicated, is a host site, and fits with SCE goals. The scoring system provides different weights for each criterion. Both ETP staff as well as the ET Steering Committee independently completes this scorecard. This is useful, as some criteria are known in greater detail by ETP staff rather than Steering Committee members and vice versa (e.g., ETP staff may be more familiar with the system of integrated measures, while Steering Committee members may have a better idea of the fit with SCE goals and alignment with Big Bold Strategies).

We recommend that the following information be added to the scoring tool to ensure that each person who completes a scoring document has the same level of knowledge on the SCE Goals and the Big Bold initiatives.

- **Fit with SCE Goals:** Consider providing a link within the screening document that directs the person filling out the tool to where they can find the current information regarding SCE's goals for specific areas. This addition would allow each person to assign a score with better information.
- **Big Bold Initiatives:** Similar to the fit with SCE goals, stating the Big Bold Energy Efficiency initiatives in the document would bring similar knowledge to all involved in the scoring.
- **Methodology for Adopting Project:** The current demonstration showcase projects are scored by the element program manager and by the ET steering committee. This allows for a more robust evaluation of the project. However, there are no clear criteria for adopting or rejecting a project. Consider proving information on (a) how the two scores are used together, (b) cut-off score for adopting a project (for current adopted projects, scores vary from 2.5 - 5.0), and (c) how projects are treated if projects have not been scored by both the program manager and the steering committee (in the current adopted projects, some projects have only received one score).
- **Overlaps:** Consider adding a question on whether the project being scored is unique. The collective knowledge of the program managers and the steering committee can help identify any overlaps with existing projects such that the demonstration showcase can leverage information/knowledge from those existing projects.
- **Rewrite Questions**: The current DS Scorecard uses a five-point scale to assess each topic (or criteria). This scale is anchored with "Yes, Definitely" and "No" and forces gradations between the anchors using the categories as written of "Hardly; Somewhat; Likely; and Most Likely." Few multi-level scales use the binary Yes/No as anchors, although categories such as Yes/No/Maybe or Yes/No/Don't Know are often used when requesting information. We assume that the choice of a five-point scale was made to introduce variation into the responses from ET staff and the ET Steering Committee and allow for a higher degree of differentiation in the project choices. However, the gradations between the two anchor points of Yes and No do not fit well with certain questions and may lead to uncertain completion of the scale and an ultimate score that does not reflect the questions. The choice of likelihood options in the scale is somewhat confusing as the word "likely" often describes the potential for something to occur, while the next level down in the scale from the "likely" option is "somewhat" which does not denote likelihood. If the scale is "Hardly likely" and "Somewhat likely," then it works better for some items. If this is the case, we recommend that the scale names be changed to "not likely; somewhat likely; likely; and very likely" which are more typical likelihood gradations. Because certain questions are not amenable to even the likelihood change (i.e., "Is a host site already identified?"), we recommend one of two options:

1) Rewrite the question to be specific to a likelihood type of scale (e.g., "What is the likelihood of the host site to participate in the program?") OR

2) Keep the question as written and change the scale to a binary choice to better fit the question.

If the second option is chosen, then the weights for the topics should be adjusted so that appropriate weight is given to this topic. This second option may be required for certain items that do not lend themselves to likelihood questions. For example, the question "Has another IOU or other entity already studied this measure or something similar?" is best answered with "Yes," "No," or "Don't know." However, in terms of scoring an item, the "Don't Know" is not desired as this allows for equivocation and the scorecard has been put together to reduce the uncertainty derived from equivocation.

In the case of option 2, we recommend changing the scale to a binary choice for the following scorecard question:

- **Building Stock:** Does this project encompass a significant percentage of stakeholders related to the major energy consumptive building stock in California?

E *SCE Scoring Document #3 – Demonstration Showcase Project Funding Proposal*

The Demonstration Showcase Project Funding Proposal allows ETP staff to document and plan for logistics of a demonstration showcase project. The Demonstration Showcase Funding Proposal requires a project overview, a scope of work that identifies the methodology for conducting the showcase, as well as schedules for: 1) new construction, 2) retrofit, or 3) paper study[9]. The proposal also requires resource hours and budget for the showcase. This tool is a helpful addition to the scoring process, as it permits ETP staff to consider resources and timing for project planning.

Overarching Findings

Overall, these tools comprehensively cover relevant components for scoring a Demonstration Showcase. Notably, SCE's scoring tools provide differentiated scoring criteria for each program element. These scoring criteria align with program goals and expected outcomes as described in the PIP and in our program manager interviews.

Due to the inability of the ETP to fund renewable measures, yet acknowledging that these are needed for a ZNE type of demonstration, we recommend that the screening tools add in a low weighted topic for likelihood of availability of renewable funding.

In addition, the evaluation team will discuss with the CPUC-ED where additional detail is needed for the process evaluation effort. This may include steps such as additional review of the scoring tool (e.g., collecting details of individual scoring and performing a sensitivity analysis of the weighting in the SCE's scoring tool), and additional follow up on tracking and the status of PG&E's efforts.

[9] Paper studies are opportunities to provide insight into impacts of ZNE within a specific setting. These studies can help to identify barriers to aid in addressing those barriers in other Demonstration Showcase elements.

H. MARKET AND BEHAVIORAL STUDIES SELECTION PROCESS

SCE Selection Process

In general, at SCE, program managers identify potential gaps in ongoing activities, and generate consensus within the team to conduct a study to help "better focus our activities within the other program areas."

ETP staff use two screening tools to determine whether to conduct a study: 1) ET Market & Behavior Study Proposal tool, and, 2) Market & Behavioral Studies Scorecard. The first tool is a document that includes project logistical information (proposal date, project start and end date, project number, and name), a project description (background, objectives, deliverables, and estimated budget), and scoring criteria. Upon completion of this tool, the ET Steering Committee[10] and the Manager of MBS approve the study. The accompanying tool, the Market & Behavioral Studies Scorecard, provides a scoring system for a potential study based upon the criteria noted in the ET Market & Behavior Study Proposal tool. The scorecard weighting criteria is found in Table 19.

Table 19: SCE Market & Behavioral Studies Scorecard Weighting Criteria

Scoring "Topic"	Topic/Criteria Description	Weight
Strategic Focus	The study helps meet the CEESP goal of "enhancing market intelligence and behavioral research activities related to energy efficient technologies"	30%
Cross-Element Collaboration	The study will help SCE make decisions about a project related to another ETP element (e.g., Technology Assessment, Demonstration Showcase, Scaled Field Placement, or Technology Development Support)	25%
Alignment	The study is in alignment with 2010-2012 target research (as delineated in the PIP)	25%
Existing Research	Research already exists regarding the technology	10%
Collaboration	There are collaboration opportunities (internal to SCE and with external partners)	10%

The current scoring tool uses a six-point scale to assess each topic (or criteria).[11] This scale is anchored with "Yes, Definitely" and "No" and forces gradations between the anchors using the categories as written of "Hardly; Somewhat; Likely; and Most Likely." Few multi-level scales use the binary Yes/No as anchors, although categories such as Yes/No/Maybe or Yes/No/Don't Know are often used when requesting information. We assume that the choice of a six-point scale was made to introduce variation

[10] SCE's ET Steering Committee reviews the project idea developed by the program or project manager. It is comprised of the ET Program Manager, the Element Manager and may include a subject matter expert that is deemed appropriate for a particular study. The Committee meets to evaluate the proposal against element-level criteria and program metrics.

[11] The six point scale used to assess each topic is as follows 0 = No, 1 = Hardly, 2 = Somewhat, 3 = Likely, 4 = Most Likely, 5 = Yes, Definitely.

into the responses from ET staff and the ET Steering Committee and allow for a higher degree of differentiation in the project choices. However, the gradations between the two anchor points of "Yes" and "No" do not fit well with certain questions and may lead to uncertain completion of the scale and an ultimate score that does not align with the questions. The choice of likelihood options in the scale is somewhat confusing as the word "likely" often describes the potential for something to occur, while the next level down in the scale from the "likely" option is "somewhat," which does not denote likelihood.

SCE's scoring tools provide differentiated scoring criteria for each program element. These scoring criteria align with program goals and expected outcomes as described in the PIP. For example, the scoring tool uses scoring criteria such as enhancing market intelligence and behavioral research activities, in addition to cross-element collaboration.

PG&E Selection Process

In general, PG&E product managers and product teams identify studies in a similar fashion to Technology Assessments. However, the MBS selection process at PG&E is less formal than that of other program elements; a product manager or project team selects the study based on a one-page summary of the issue at hand and the potential market impact. According to the program managers, the product manager includes project scope, final results, need for the effort, expected outcomes, and potential savings based upon the research. This one-page summary is approved through the governance process.[12] However, the technology or solution in question may have already passed through the more formal Emerging Technology Opportunity Study (ETOS) process in connection with another ETP program element, such as a Technology Assessment. PG&E's Street Lighting Network Controls Market Assessment study was selected without formal review because it directly supported two existent LED streetlight and network control technology assessments. The technology assessment had suggested that, "Nearly 70% savings could be achieved from a non-networked HPS [High Pressure Sodium] baseline," but technology, policy, and adoption barriers had to be understood and addressed to accelerate market adoption. The MBS effort was conducted to achieve the objective of understanding specifics of the technology.

Sempra Selection Process

At the time of the evaluation team data collection effort, Sempra stated they do not currently have a formal selection process, but may develop a process in the future prior to conducting a study.

Detailed Recommendations based upon findings:

- SCE Selection Tool recommendation:

[12] PG&E has a separate Emerging Technologies governance process that is used to approve ETP projects. This process includes a formal presentation to, and approval from, an internal committee consisting of senior level management within Customer Energy Solutions organization. The ET Governance process ensures that, cross functionally, senior management formally supports new ET projects, and enables leadership to evaluate whether these products align with the overall portfolio and are an effective use of resources.

SCE should consider changing the scale in their selection tool. We recommend the scale names be changed to "not likely; somewhat likely; likely; and very likely" which are more typical likelihood gradations. Because certain questions are not amenable to even the likelihood change (i.e., "Is the proposed study in alignment with the 2010-2012 target research-types in regard to the subject matter…?" we recommend one of two options:

- Option #1 - Rewrite the questions to be specific to a likelihood type of scale (e.g., "What is the likelihood that the proposed study could be in alignment with the 2010-2012 target research-types?") OR

- Option #2 - Keep the questions as written and change the scale to a binary choice to better fit the questions.

  If the second option is chosen, then the weights for the topics should be adjusted so that appropriate weight is given to this topic. This second option may be required for certain items that do not lend themselves to likelihood questions. For example, the question "Does research already exist for this topic?" is best answered with "Yes," "No," or "Don't know." However, in terms of scoring an item, the "Don't Know" is not desired as this allows for equivocation and the scorecard has been put together to reduce the uncertainty derived from equivocation.

  In the case of option 2, we recommend changing the scale to a binary choice for the following scorecard questions:

- Existing Research: Does research already exist for this topic?

- Alignment: Is the proposed study in alignment with the 2010-2012 target research-types in regard to the subject matter?

This differentiated selection criteria for each program element is not currently in place for PG&E and Sempra as their selection process is less formal. The evaluation team has only looked closely at one study completed by PG&E and none by Sempra. It appears that the informal process has led to studies aligned well with the expected outcomes of the element and following the program theories. However, we recommend that PG&E and Sempra formalize a selection tool for MBS and suggest that they align that tool conceptually with the expected outcomes similar to what SCE has developed.

I. TECHNOLOGY ASSESSMENT CONTENT ANALYSIS SAMPLE

Table 20. Technology Assessments Reports Analyzed for Content Analysis

IOU	Report Name	Description
SCE	LED Light for Commercial Pools	LED Pool Lamp is an underwater lighting fixture used to illuminate swimming pools for safety/security and aesthetics. This project will assess LED pool lighting with an incandescent baseline.
SCE	L Prize A-Lamp Laboratory Assessment	A lab performance assessment of the Philips entry to the DOE L prize competition LED replacement for a 60W incandescent light bulb.
SCE	Hot Food Holding Cabinets for Food Service	Project assesses the energy efficiency level of a hot food holding cabinet to determine an appliance baseline and a minimum energy efficiency level to qualify for the food service qualifying product list.
PG&E	Heat Pump Water Heaters (HPWH) Lab Test	Project investigates the operating characteristics of two new heat pump water heats in a laboratory setting in comparison with other types, and their energy savings potential and cost effectiveness.
PG&E	Thin Client	Study provides information that will help PG&E explore new/alternative energy efficiency programs for Thin Clients (computers or programs that rely on another computer to fulfill its computational roles), PCs, and Imaging equipment in the commercial segment.
PG&E	Water Energy Study - SJWC	Report presents a feasibility study for implementing an energy-pumping optimization algorithm through a Supervisory Control and Data Acquisition (SCADA) system using real-time energy consumption data.
PG&E	Small Commercial Energy Management Systems (EMS) for HVAC and Lighting	Project tests the hypothesis that a deemed savings model can be created based on the analysis and simplification of variables involving the operation of a small energy management system (EMS).
SCG	ECO5	Testing attempts to determine if the installation of an ECO Systems ECO NG 5 Fuel Enhancer could produce energy savings on equipment utilizing natural gas.
SCG	HeatSavr Liquid Swimming Pool Cover	Report identifies energy savings gained by using the HeatSavr Liquid Pool Cover, a chemical treatment added to the water daily that forms a thin surface on the surface of the water which slows the evaporation of water into the air, and compares the product's performance to that of no pool cover.
SDG&E	Office of the Future 25% Solution Assessment (VA)	Project determines the impact of high quality, efficient lighting, a measure recommended by the Office of the Future Consortium's 25% solution, which assists tenants, building owners and managers in reducing site electrical energy use in office spaces by 25% or more.
SDG&E	High Ceiling Lighting Options	Project determines the energy savings potential provided by CFL and LED general illumination as compared to the existing incandescent base cases in high-ceiling applications (i.e. ceilings over 16 feet in height).

J. TECHNOLOGY ASSESSMENT CONTENT ANALYSIS METHODOLOGY

Content Analysis

The sample for the Technology Assessments content analysis was drawn from a total of 35 Technology Assessments reports completed by ETP during the 2010-2012 program cycle (some of which began in the 2009 program cycle).

Out of these 35 reports, we sampled 11 reports using a stratified simple random sample. This was the best, most cost-effective approach to ensure that all sub-groups are adequately represented in the sample, given limitations posed by time and resources. The population was divided into six strata and a simple random sample selected in each stratum. The strata are categorized by IOU and author type (internal or external[13] author). Table 21 shows the sample design and chosen sample points.

Table 21. Technology Assessment Content Analysis Sample

	Strata	Population Size	% of pop	Sample Size	% of sample
Strata	SCE Internal Author	10	29%	3	27%
	PG&E Internal Author	4	11%	1	9%
	PG&E External Author	9	26%	3	27%
	SCG Internal Author	3	9%	1	9%
	SCG External Author	2	6%	1	9%
	SDG&E External Author	7	20%	2	18%
Sample by IOU	SCE	10	29%	3	27%
	PG&E	13	37%	4	36%
	SCG	5	14%	2	18%
	SDG&E	7	20%	2	18%
	Totals	**35**	**100%**	**11**	**100%**

Because the reports are one of the main conduits to information dissemination to the targeted audience, the reports must be clear and relevant to decision makers. As such, the Evaluation Team scored the clarity and relevance of the Technology Assessment reports in conveying test results. Table 22 shows how we scored each concept. We also identified whether the reports incorporated the recommendations made as a result of the process evaluation conducted during the 2006-2008 program cycle[14]. We only assessed the incorporation of selected recommendations (items # 35, 39, and 40) in our content analysis, as they were the most appropriate for our efforts.

[13] Some Technology Assessments reports were completed by outside firms.

[14] Summit Blue Consulting, LLC; Energy Market Innovations; Opinion Dynamics Corporation; Strategic Energy Technologies; ADM Associates, Inc.; E SOURCE GDS Associates, Inc.; SDV/ACCI California Technology

To minimize the bias in analyzing the reports, three different evaluation staff assessed each report and compared results to determine whether there was inter-rater reliability in the scores assigned to each report. If there was more than a 10% variation in the scores assigned to a report (4 out of the 11 reports), we discussed and attempted to reconcile any differences in the ratings. We then averaged the three scores given to each report to develop a final score.

Table 22. Qualitative Method for Scoring Clarity and Relevance of Technology Assessment

Report Attribute	Item Scored	How Scored
Clarity	Is the format of the report logical?	Zero to 1
	Is there a Project Background / Scope / Objective section?	Zero to 1
	Is there a Methodology section?	Zero to 1
	Is it easy to find the report conclusions?	Zero to 1
	Index of clarity based on above items	1 to 5 where 1=not at all clear 5=very clear
Relevance	How relevant is the information for EE Program Manager's to help decide whether to adopt or reject a technology or move forward (or not) with another element?	1 to 5 where 1= not at all relevant 5 = very relevant
	Does the report target its audience correctly (those that are looking to find out about technologies that will bring them energy savings)?	1 to 5 where 1= not at all relevant 5 = very relevant
	Index of relevance based on above items	1= not at all relevant 5 = very relevant
Incorporation of Recommendations from Previous Evaluation	ETP staff should include the incremental cost of procuring, installing and operating, and maintaining the technology being evaluated as part of the assessment. (Item #35[a])	Zero to 1
	ETP project managers should provide the background and objectives of the project, description of the existing system and emerging technology, results of changes, instrumentation, data analysis procedures and conclusion drawn. (Item #39[a])	Zero to 1
	ETP staff should document the assumptions and parameter values used as input to technology performance models developed for assessment projects. (Item #40[a])	Zero to 1

[a] Item numbers correspond to the 60 Day Recommendations Report Attachment regarding the 2006-2008 Emerging Technologies Program (ETP) M&V Recommendations.

We also assessed the reports on a more technical level, looking closely at other recommendations made in the 2006-2008 evaluation (items # 3, 25-26, and 28-31). A Ph.D. engineer closely reviewed each report and determined if the technology assessment reports were aligned with the recommendation. We used a zero to one scale for each recommendation as shown in Table 23.

Innovations, Inc. "Interim Report #1 for the PY 2006-08 California Statewide Emerging Technologies Program." 2008.

Table 23. Analysis of Technical Content

Item #[a]	2006-2008 Evaluation Recommendation	IOU Response: Specific program change	Scoring Scale
25	ETP project managers should clearly identify and document the incumbent technology to which the emerging technology will be compared in every assessment project	Incumbent technology is clearly identified in all assessment unless it is a new or new application of existing technology	0 = Recommendation not followed 0.25 =Not clear if recommendation followed 0.50 = Recommendation somewhat followed 0.75 = Recommendation mostly followed 1 = Recommendation followed
26	ETP assessment projects should be designed such that the only change made to the system under study between the pre-post-retrofit periods is the installation of the technology or technique being evaluated. When multiple energy savings measures are installed in the course of a project, it is essential to install instrumentation and stage data collection so that energy consumption impacts of each measure can be determined independently of the others	Understood and this approach is included in enhancements of scientific rigor for ET elements, especially Assessments	
28	ETP staff should validate the accuracy and proper sensitivity of sensors and the proper functioning of data loggers prior to initiating data collection.	Utilities will document the calibration of instrumentation per manufacturer's specifications when conducting their own measurements. When working with consultants, utilities will request an instrumentation plan documenting the calibration protocols to ensure proper accuracy.	
29	Project managers should present the uncertainty associated with all measured data in project documentation	[No response provided by IOUs in this document for this recommendation]	
30	ETP staff should measure and document the baseline performance of the incumbent technology in every ETP assessment project	[No response provided by IOUs in this document for this recommendation]	
31	Use relevant monitoring protocol such as the International Performance Monitoring and Verification Protocol for technology assessment	[No response provided by IOUs in this document for this recommendation]	
3	Develop more robust technical and market potential estimates	One of the new program elements. Budget for this is small. "Robust" should mean using data that's not from the manufacturer, using secondary data from reputable sources, or gathering primary data when necessary	

[a] Item numbers correspond to the 60 Day Recommendations Report Attachment regarding the 2006-2008

Item #[a]	2006-2008 Evaluation Recommendation	IOU Response: Specific program change	Scoring Scale
Emerging Technologies Program (ETP) M&V Recommendations.			

K. Technology Assessment and Market & Behavioral Studies Internet Survey Methodology

We conducted a quantitative online survey of 51 IOU staffers who received the Technology Assessments and/or Market and Behavioral Studies. The survey collected data relevant to recipient awareness of the reports and the information contained within them, as well as the effectiveness of the reports in providing information for use in deciding whether to adopt or reject a new technology for the IOU EE programs.

The survey was fielded from a list of the targeted audience for Technology Assessments and from staff members who may have received Technology Assessments and 20 who may have received a Market and Behavioral Study (MBS). This database served as the sample population for the online survey. The survey was sent to a total of 167 email addresses. Survey respondents were given 2 weeks to complete the survey and were sent two reminders via email in that timeframe. A total of 51 responses (or 32.3% of those targeted) yielded results within a 90% confidence interval with a standard error of +/- 9.6%.

A breakdown of the sample population and response rates for the MBS respondents appear in Table 24.

Table 24. Response Rates by Recipient Type

Type	#
# of Recipients (N)	167
Completes (n)	51
Undeliverable	7
Not Eligible	2
Response Rate[a]	32.3%

[a] AAPOR response rate #1.[15]

[15] We calculated the response rate using the standards and formulas set forth by the American Association for Public Opinion Research (AAPOR). AAPOR is the leading professional organization devoted to public opinion and survey research and is dedicated to the development and promotion of survey research best practices. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys, AAPOR, 2009.* http://www.aapor.org/Standard_Definitions/1818.htm

L. DATA COLLECTION INSTRUMENTS

1.11 TECHNOLOGY ASSESSMENTS

Interview Guide

Technology Assessments Progran

Internet Survey

Technology Assessment Internet

1.12 TECHNOLOGY TEST CENTERS DATA COLLECTION INSTRUMENTS

Program Staff Interview Guide

Technology Test Centers Interview Gu

Observation Guide

Technology Test Centers Observation

1.13 SCALED FIELD PLACEMENT DATA COLLECTION INSTRUMENTS

Program Manager Interview Guide

SFP Program Manager Interview Gı

1.14 Demonstration Showcases Data Collection Instruments

Program Manager Interview Guide

Demonstration Showcase Interview (

1.15 Market & Behavioral Studies Data Collection Instruments

Program Manager Interview Guide

Market and Behavioral Studies Pr(

Internet Survey

Market and Behavioral Studies Int

1.16 TRIO Data Collection Instruments

Program Manager Interview Guide

TRIO Program Manager Interview G(

Entrepreneur Interview Guide

Entrepreneur Interview Guide.docx

Investor Interview Guide

Investor Interview Guide.docx

Observation Guide

ETP TRIO Roundtable Meeting (

1.17 TECHNOLOGY DEVELOPMENT SUPPORT DATA COLLECTION INSTRUMENTS

Program Manager Interview Guide

Technology Development PM Inte

Stakeholder Interview Guide

Technology Development Stakeho

M. TECHNOLOGY ASSESSMENT AND MARKET & BEHAVIORAL STUDIES TOP LINE REPORT

QBI1

First, we'd like to learn more about you. What is your job title?

N: 51

Choices	
(Open-ended Response)	100%

QBI2

What energy efficiency program(s) are you working on?

N: 51

Choices	
(Open-ended Response)	76%
Not applicable	24%

QEA1

How would you rate your familiarity with the Emerging Technologies Program?

N: 51

Choices	
1 - Very unfamiliar	6%
2	8%
3	35%
4	22%
5 - Very familiar	29%
Mean	**3.61**

QEA2

Please provide a short description of the Emerging Technologies Program.

N: 26

Choices	
(Open-ended Response)	100%

QEA3

Have you communicated with members of the Emerging Technologies Program staff in the last twelve months?

N: 51

Choices	
Yes	78%
No	22%

QEA4

In the past twelve months, how often have you communicated with Emerging Technologies Program staff?

N: 40

Choices	
Never	3%
Once	10%
About once every 2 months	30%
About once a month	23%
More than once a month	35%

QEA5

How would you rate the ease of getting in contact with ETP program staff?

N: 40

Choices	
1 - Very difficult	0%
2	0%
3	15%
4	30%
5 - Very easy	55%
Mean	**4.40**

QEA6

How would you rate how helpful ETP program staff was in answering your questions?

N: 40

Choices	
1 - Not helpful at all	0%
2	0%

3	23%
4	33%
5 - Very helpful	45%
Mean	**4.23**

QEA7A

Do you need to learn about new energy efficient technologies for your job?

N: 51

Choices	
Yes	73%
No	27%

QEA7BA

In general, where or from whom do you learn about new energy efficiency technologies for your program?

N: 27

Choices	
IOU peers/colleagues	85%
External peers/colleagues	78%
Emerging Technologies Program	78%
Industry reports	70%
Industry conferences	63%
IOU reports	56%
Other	44%

QEA7BB

In general, where or from whom do you learn about new energy efficiency technologies for your program?

N: 10

Choices	
Industry conferences	90%
Industry reports	80%
IOU peers/colleagues	70%
IOU reports	70%
Idea Management Team	70%
Emerging Technologies Program	70%
External peers/colleagues	60%

Other	20%

QEA8

You stated that you learn about new energy efficiency technologies from the (Emerging Technologies Program/Idea Management Team). How do you learn about new technologies?

N: 30

Choices	
Reports	83%
Emails	77%
Discussions	73%
Meetings	60%
Conferences	50%
Memos	20%
Other	23%

QUTo

Have you heard of the Technology Assessment reports?

N: 51

Choices	
Yes	67%
No	16%
Not sure	18%

QUToA

Have you received any information regarding technology assessments from anyone at your organization?

N: 8

Choices	
Yes	0%
No	50%
Not sure	50%

QUToB

From whom did you receive this information and what information was provided?

N: 0

Choices	
(Open-ended Response)	0%

QUT1

Have you received a technology assessment report?

N: 34

Choices	
Yes	68%
No	32%

QUT2

Have you read any technology assessment reports?

N: 23

Choices	
Yes	100%
No	0%

QUT3

Have you received any information described in the Technology Assessment reports in any other form, such as a memo, meeting or informal discussion?

N: 34

Choices	
Yes	65%
No	18%
Not sure	18%

QUT3A

In what forms have you received this information regarding technology assessments?

N: 22

Choices	
Informal discussion	86%
Meeting	73%
Presentation	73%
Memo	27%
Other	18%
Don't remember	0%

UTYPE

UTYPE

N: 34

Choices	
Have not heard	0%
Have heard	32%
Received Report	0%
Read Report	68%
Received Information contained within report	0%

QUT4

How many technology assessment reports have you received?

N: 23

Choices	
2	13%
3	13%
10	4%
15	4%
20	9%
22	4%
50	4%
Don't know	48%

QUT5

About how many times a year do you receive information regarding technology assessments from a source other than the technology assessment reports that you believe originally came from these reports?

N: 22

Choices	
0	5%
2	9%
3	5%
4	27%
5	9%
6	5%
12	5%
20	5%

60	5%
Don't know	27%

QUT6

Do you share information found in, or derived from, the technology assessment reports with anyone on your staff or within your organization?

N: 23

Choices	
Yes	96%
No	4%

QUT7

You indicated that you read some technology assessment reports, how many reports have you read?

N: 23

Choices	
2	17%
3	13%
5	4%
10	4%
15	9%
20	13%
Don't know	39%

QTA5

How would you rate the clarity of the information found in, or derived from, the Technology reports?

N: 23

Choices	
1 - Not at all clear	0%
2	0%
3	9%
4	70%
5 - Very clear	22%
Mean	**4.13**

QTA5A

Why did you give this rating?

N: 2

Choices	
(Open-ended Response)	100%

QTA6

How relevant is the information found in, or derived from, the Technology Assessment reports for making a decision to adopt a new technology?

N: 23

Choices	
1 - Not at all relevant	0%
2	4%
3	22%
4	43%
5 - Very relevant	30%
Mean	**4.00**

QTA7

Why did you give this rating?

N: 6

Choices	
(Open-ended Response)	100%

QTA8

It seems that you have received, but not read the report(s). Why haven't you read the report(s)?

N: 0

Choices	
(Open-ended Response)	0%

QTA9

Do you think other Energy Efficiency program managers read the Technology Assessment reports or receive information derived from them?

N: 34

Choices	
Yes	56%
No	3%
Don't know	41%

QTA10

Do you think other Energy Efficiency program managers use the information derived from the Technology Assessment reports to incorporate new technologies?

N: 19

Choices	
Yes	89%
No	5%
Don't know	5%

QTA11

Do you know who to contact to get a copy of relevant technology assessment reports?

N: 34

Choices	
Yes	88%
No	12%

QTA12

In general, are reports the best way to convey information about new energy efficiency technology for your program?

N: 51

Choices	
Yes	63%
No	12%
Not applicable	25%

QTA13

In your opinion, what is the best way to convey information about new energy efficiency technology for your program?

N: 6

Choices	
(Open-ended Response)	100%

QTA14

It is assumed that the technology assessment reports provide you the information you need to adopt new energy efficiency technologies in to your portfolio. Is this a valid assumption?

N: 23

Choices	
Valid all the time	13%

Valid most of the time	57%
Valid some of the time	26%
I never use this information	4%

QTA15

How do you typically receive the technology assessment reports?

N: 23

Choices	
Email	87%
Web	43%
Hardcopy	22%
Other	4%

QTA16

Do you have a preferred way of receiving technology assessment reports, if at all?

N: 51

Choices	
Yes - (Open-ended specification)	24%
No preferred way	76%

QTA17

In your opinion, could the process of receiving the reports be improved?

N: 23

Choices	
Yes	39%
No	61%

QTA18

How could the process of receiving the reports be improved?

N: 9

Choices	
(Open-ended Response)	100%

QTA19

Did the information you received from the technology assessment reports or other sources contain information that was new to you?

N: 23

Choices	
Yes	87%
No	13%

QTA20

Although you don't think the information was new, did the information from the technology assessment reports or other sources influence whether you adopted a new energy efficient technology into your portfolio?

N: 3

Choices	
Yes	33%
No	67%

QTA21

How did the information from the report(s) or other sources influence you?

N: 1

Choices	
(Open-ended Response)	100%

QTA22

How often do you use information from the technology assessments (in any form, such as report or memo) to make decisions about whether to adopt a new technology into your program?

N: 23

Choices	
Never	9%
Seldom	4%
Some of the time	30%
Most of the time	43%
Nearly all the time	13%

QTA23A

The information I received regarding the technology assessment …Caused me to consider adopting the corresponding energy efficient technology into my program.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	30%
Agree	52%
Strongly agree	17%

QTA23B

The information I received regarding the technology assessment …Increased my awareness of new energy efficient technologies that could garner savings in my program.

N: 23

Choices	
Strongly disagree	0%
Disagree	4%
Neutral	22%
Agree	57%
Strongly agree	17%

QTA23C

The information I received regarding the technology assessment …Was useful to explain how I could achieve savings in my program by adopting new energy efficient technologies.

N: 23

Choices	
Strongly disagree	0%
Disagree	4%
Neutral	30%
Agree	57%
Strongly agree	9%

QTA23D

The information I received regarding the technology assessment …Helped me to quickly learn about new energy efficient technologies.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	17%
Agree	57%
Strongly agree	26%

QTA23E

The information I received regarding the technology assessment …Reduced any concern I had regarding how much energy the new energy efficient technology could save.

N: 23

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	22%
Agree	48%
Strongly agree	22%

QTA23F

The information I received regarding the technology assessment …Reduced any concern I had regarding maintenance costs for the new energy efficient technology.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	39%
Agree	52%
Strongly agree	9%

QTA24

How much did the information you received regarding the technology assessment influence you to adopt or reject the new energy efficient technology?

N: 23

Choices	
1 - Not at all influential	4%
2	0%
3	17%
4	52%
5 - Very influential	26%
Mean	**3.96**

QTA25A

The information I receive regarding the technology assessment…Provides me with the information I need to meet energy efficiency goals for my program.

N: 23

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	39%
Agree	48%
Strongly agree	4%

QTA25B

The information I receive regarding the technology assessment…Provides me with the information I need to meet my long-term portfolio needs.

N: 23

Choices	
Strongly disagree	0%
Disagree	4%
Neutral	43%
Agree	48%
Strongly agree	4%

QTA25C

The information I receive regarding the technology assessment… Provides me with the information needed to fit new energy efficient technologies into my target market.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	30%
Agree	61%
Strongly agree	9%

QTA25D

The information I receive regarding the technology assessment… Provides me with the information I need to make the decision to adopt or reject a new technology.

N: 23

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	22%
Agree	61%
Strongly agree	9%

QTA25E

The information I receive regarding the technology assessment…Has allowed me to adopt new energy efficient technology into my program.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	35%
Agree	57%
Strongly agree	9%

QTA25F

The information I receive regarding the technology assessment…Has allowed me to have a better understanding of assessed technology.

N: 23

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	4%
Agree	78%
Strongly agree	17%

MUTo

Have you heard of the Market and Behavioral Studies that are created by the Emerging Technologies Program?

N: 51

Choices	
Yes	45%
No	37%
Not sure	18%

QMUToA

Have you received any information regarding Market and Behavioral Studies from anyone at your organization?

N: 19

Choices	
Yes	21%
No	63%
Not sure	16%

QMUToB

From whom did you receive this information and what information was provided?

N: 4

Choices	
(Open-ended Response)	100%

QMUT1

Have you received a Market and Behavioral Study?

N: 23

Choices	
Yes	48%
No	52%

QMUT2

Have you read any Market and Behavioral Studies?

N: 11

Choices	
Yes	91%
No	9%

QMUT3

Have you received any information described in the Market and Behavioral Studies in any other form, such as a memo, meeting or informal discussion?

N: 23

Choices	
Yes	43%
No	30%
Not sure	26%

QMUT3A

In what forms have you received information derived from the Market and Behavioral Studies?

N: 10

Choices	
Informal discussion	80%
Presentation	70%
Meeting	50%
Other	20%
Don't remember	0%

MTYPE

MTYPE

N: 23

Choices	
Have not heard	0%
Have heard	52%
Received Study	0%
Read Study	43%
Received Information contained within Study	4%

QMUT4

How many Market and Behavioral Studies have you received?

N: 11

Choices	
1	55%
2	9%
4	9%
5	9%
Don't know	18%

QMUT5

About how many times a year do you receive information regarding Market and Behavioral Studies from a source other than the study that you believe originally came from these studies?

N: 10

Choices	
0	20%
1	10%
2	10%
3	10%
4	10%
5	10%
Don't know	30%

QMUT6

Do you share information found in, or derived from, the Market and Behavioral Studies with anyone on your staff or within your organization?

N: 11

Choices	
Yes	91%
No	9%

QMUT7

You indicated that you read some Market and Behavioral Studies, how many studies have you read?

N: 10

Choices	
1	50%
2	10%
4	20%
5	10%
Don't know	10%

QMBS5

How would you rate the clarity of the information you received in the Market and Behavioral Studies?

N: 11

Choices	
1 - Not at all clear	0%
2	0%
3	18%
4	55%
5 - Very clear	27%
Mean	**4.09**

QMBS5A

Why did you give this rating?

N: 2

Choices	
(Open-ended Response)	100%

QMBS6

How relevant is the information found in, or derived from, the Market and Behavioral Studies to making a decision to adopt a new technology?

N: 11

Choices	
1 - Not at all relevant	9%
2	9%
3	9%
4	64%
5 - Very relevant	9%
Mean	**3.55**

QMBS7

Why did you give this rating?

N: 3

Choices	
(Open-ended Response)	100%

QMBS8

It seems that you have received, but not read any studies. Why haven't you read any studies?

N: 1

Choices	
(Open-ended Response)	100%

QMBS9

Do you think other Energy Efficiency program managers read the Market and Behavioral Studies or receive any information derived from the reports?

N: 23

Choices	
Yes	39%
No	0%
Don't know	61%

QMBS10

Do you think other program managers use information found in or derived from the Market and Behavioral Studies to incorporate new technologies?

N: 9

Choices	
Yes	100%
No	0%
Don't know	0%

QMBS11

Do you know who to contact to get a copy of relevant Market and Behavioral Studies?

N: 23

Choices	
Yes	83%
No	17%

QMBS12

How do you typically receive the Market and Behavioral Studies?

N: 11

Choices	
Email	73%
Web	55%
Hardcopy	18%
Other	9%

QMBS13

Do you have a preferred way of receiving the Market and Behavioral Studies?

N: 51

Choices	
Yes - (Open-ended specification)	29%
No preferred way	71%

QMBS14

In your opinion, could the process of receiving the Market and Behavioral Studies be improved?

N: 11

Choices	
Yes	64%
No	36%

QMBS15

How could the process of receiving the Market and Behavioral Studies be improved?

N: 7

Choices	
(Open-ended Response)	100%

QMBS16

When do you typically receive Market and Behavioral Studies or information derived from them?

N: 11

Choices	
When considering selecting a new technology	55%
After selecting a new technology	45%
Prior to selecting a new technology	27%

QMBS17

Was the information found in, or derived from, the Market and Behavioral Studies new to you?

N: 11

Choices	
Yes	82%
No	18%

QMBS18

Although you don't think the information was new, did the information from the study(ies) influence whether you selected a new energy efficient technology into your program?

N: 2

Choices	
Yes	0%
No	100%

QMBS19

How did the information from the study(ies) influence you?

N: 0

Choices	
(Open-ended Response)	0%

QMBS20A

How often do you use information from the Market and Behavioral Studies (in any form, such as report or memo) to... Make decisions about whether to adopt a new energy efficient technology into your program

N: 11

Choices	
Never	9%
Seldom	18%
Some of the time	36%
Most of the time	36%
Nearly all the time	0%

QMBS20B

How often do you use information from the Market and Behavioral Studies (in any form, such as report or memo) to…Determine which market you would target with the new energy efficient technology

N: 11

Choices	
Never	9%
Seldom	9%
Some of the time	45%
Most of the time	9%
Nearly all the time	27%

QMBS21A

The information found in, or derived from, the Market and Behavioral Studies… Caused me to consider selecting the corresponding energy efficient technology into my program.

N: 11

Choices	
Strongly disagree	0%
Disagree	18%
Neutral	36%
Agree	45%
Strongly agree	0%

QMBS21B

The information found in, or derived from, the Market and Behavioral Studies… Increased my awareness of new energy efficient technologies that could garner savings in my program.

N: 11

Choices	
Strongly disagree	0%
Disagree	18%
Neutral	27%
Agree	55%
Strongly agree	0%

QMBS21C

The information found in, or derived from, the Market and Behavioral Studies…Was useful to explain how I could achieve savings in my program by adopting new energy efficient technologies.

N: 11

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	27%
Agree	55%
Strongly agree	9%

QMBS21D

The information found in, or derived from, the Market and Behavioral Studies… Reduced my uncertainty about selecting a new energy efficient technology.

N: 11

Choices	
Strongly disagree	0%
Disagree	18%
Neutral	36%
Agree	45%
Strongly agree	0%

QMBS21E

The information found in, or derived from, the Market and Behavioral Studies... Provided me with information about the appropriate market to target.

N: 11

Choices	
Strongly disagree	0%
Disagree	0%
Neutral	18%
Agree	82%
Strongly agree	0%

QMBS22

How much did the information found in, or derived from, the Market and Behavioral Studies influence you to adopt/reject the new energy efficient technology?

N: 11

Choices	
1 - Not at all influential	9%
2	18%
3	27%
4	45%
5 - Very influential	0%
Mean	

QMBS23A

The information found in, or derived from, the Market and Behavioral Studies... Provides me with the information needed to work towards meeting the energy efficiency goals for my program.

N: 11

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	45%
Agree	45%
Strongly agree	0%

QMBS23B

The information found in, or derived from, the Market and Behavioral Studies... Provides me with the information needed to work towards meeting my long-term portfolio needs.

N: 11

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	55%
Agree	36%
Strongly agree	0%

QMBS23C

The information found in, or derived from, the Market and Behavioral Studies... Provides me with the information needed to fit new energy efficient technologies to my target market(s).

N: 11

Choices	
Strongly disagree	0%
Disagree	18%
Neutral	18%
Agree	64%
Strongly agree	0%

QMBS23D

The information found in, or derived from, the Market and Behavioral Studies... Provides me with the information needed to make the decision to adopt or reject a new technology.

N: 11

Choices	
Strongly disagree	0%
Disagree	36%
Neutral	9%
Agree	55%
Strongly agree	0%

QMBS23E

The information found in, or derived from, the Market and Behavioral Studies… Has allowed me adopt a new energy efficient technology into my program.

N: 11

Choices	
Strongly disagree	9%
Disagree	27%
Neutral	27%
Agree	27%
Strongly agree	9%

QMBS23F

The information found in, or derived from, the Market and Behavioral Studies… Has given me a better understanding of how customers purchase energy efficiency products.

N: 11

Choices	
Strongly disagree	0%
Disagree	9%
Neutral	9%
Agree	64%
Strongly agree	18%

QTT1

Who is responsible for finding new energy efficiency technologies for your program?

N: 51

Choices	
Myself	4%
Myself and others	49%
Others	22%
Not applicable	25%

QTT2

Please specify who (else) is responsible.

N: 37

Choices	
(Open-ended Response)	100%

QTT3

Who makes the decision to add a new energy efficient technology into your program?

N: 51

Choices	
Myself	4%
Myself and others	33%
Others	29%
Not applicable	33%

QTT4

Please specify who (else) makes the decision.

N: 32

Choices	
(Open-ended Response)	100%

QTT5

What is the approximate range of time it takes, in weeks, to move a technology into your program, from first learning about a new energy efficient technology to providing that measure to customers?

N: 51

Choices	
5	2%
12	2%
15	2%
24	4%
26	4%
30	4%
52	10%
80	2%
100	2%
Don't know	69%

QTT6A

How important are the following in choosing to adopt a new energy efficient measure into your program or not? Energy savings potential

N: 51

Choices	
Unimportant	8%
Of little importance	0%

Moderately important	8%
Important	20%
Very important	65%

QTT6B

How important are the following in choosing to adopt a new energy efficient measure into your program or not? Cost-effectiveness

N: 51

Choices	
Unimportant	8%
Of little importance	0%
Moderately important	14%
Important	25%
Very important	53%

QTT6C

How important are the following in choosing to adopt a new energy efficient measure into your program or not? Fit with target market

N: 51

Choices	
Unimportant	10%
Of little importance	0%
Moderately important	6%
Important	39%
Very important	45%

QTT6D

Are there any other factors that are important in choosing to adopt a new energy efficient measure into your program?

N: 51

Choices	
Yes - (Open-ended specification)	53%
No	47%

QTT6E

How important is (QTT6D Response) in choosing to adopt a new energy efficient measure into your program?

N: 27

Choices

Unimportant	0%
Of little importance	0%
Moderately important	7%
Important	30%
Very important	63%

QTT7

What sector(s) do you typically work with?

N: 51

Choices	
Commercial	80%
Residential	69%
Industrial	55%
Agricultural	43%
Other	18%

QTT8

What end use areas do you typically work in?

N: 51

Choices	
HVAC	63%
Lighting	61%
Building Shell/Envelope	45%
Motors	43%
Industrial Process	41%
ZNE	27%
Other	35%

QC1

Is there anything else that we have not discussed that you think would be helpful for us to know?

N: 51

Choices	
(Open-ended Response)	16%
No other comments	84%

N. LIST OF TECHNOLOGY ASSESSMENT COSTS

List of Technology Assessments 2009-2012				
IOU	**Project Number**	**Project Name**	**Funding Cycle**	**Cost***
PGE	ET09PGE0901	Emerging Technologies Water Energy Pilot Implementation at San Jose Water Company	2009	$33,500
PGE	ET09PGE0902	LEDs for Hospital Operating Rooms	2009	$41,596
PGE	ET09PGE0903	Office of the Future 50% Solution	2009	
PGE	ET09PGE0904	[NAME] Cool Endothermic Refrigeration Tube@FSTC	2009	
PGE	ET09PGE0905	Electronic HID Consolidated Report	2009	
PGE	ET09PGE0906	Advanced Streetlighting Network Controls	2009	$56,000
PGE	ET09PGE0907	[NAME] Hybrid	2009	
PGE	ET09PGE0908	[NAME] Compressor Control	2009	
PGE	ET09PGE0909	Whole Product Definition for Large Offices	2009	
PGE	ET09PGE0910	[NAME] M2G Boiler Control	2009	
PGE	ET09PGE0911	Lab Evaluation of the [NAME] Indirect Evaporative Cooler	2009	
PGE	ET09PGE0912	Data Center Air Management Research ([NAME] Datacenter Control Delivery)	2009	$80,000
PGE	ET09PGE0913	LED Streetlighting Network Controls - San Jose	2009	
PGE	ET09PGE0914	Street Lighting Network Controls Market Assessment	2009	
PGE	ET09PGE0915	LED Street Lighting - Phase IV, Oakland One-Year Field Measurements	2009	
PGE	ET09PGE0916	Energy Performance Analysis for Heat Pump Water Heater	2009	
PGE	ET09PGE0917	Laboratory Testing of Heat Pump Water Heaters	2009	
PGE	ET09PGE0918	Laboratory Testing of Residential Pool Cleaners	2009	
PGE	ET09PGE0919	Integrated Lighting System Product for Existing Buildings - Market and Economic Analysis for Offices Phase 1	2009	$24,116
PGE	ET09PGE0920	Thin Client	2009	$50,000
PGE	ET10PGE1001	Heat Pump Water Heaters (HPWH) Field Study	2010-2012	
PGE	ET10PGE1003	Carbon and Energy Management Systems	2010-2012	$170,000
PGE	ET11PGE 1105	Data Center Infrastructure Management	2010-2012	$46,025
PGE	ET11PGE 1107	Smart Thermostats	2010-2012	$196,720
PGE	ET11PGE1102	Oil Well Pump Optimization Development	2010-2012	$100,000
PGE	ET11PGE1103	Agricultural & Irrigation Optimization Tool	2010-2012	$285,000
PGE	ET11PGE1104	Advanced Window Films	2010-2012	
PGE	ET11PGE1106	Moving Bed Bio Reactor and Algae Treatment Process for Waste Water	2010-2012	

List of Technology Assessments 2009-2012				
IOU	**Project Number**	**Project Name**	**Funding Cycle**	**Cost***
SCE	ET09SCE1010	Light Emitting Diode (LED) lighting technology for Street Lighting	2009	
SCE	ET09SCE1020	Refrigeration and A/C Unit Electrical Consumption Economizer (Refrigeration Economizer).	2009	
SCE	ET09SCE1070	[NAME]	2009	
SCE	ET09SCE1080	[NAME] Ovens	2009	
SCE	ET09SCE1090	Half size convection oven	2009	
SCE	ET09SCE1190	[NAME] Server Facility Evaluation	2009	
SCE	ET09SCE1200	[NAME] Executive Office Systems	2009	
SCE	ET09SCE1210	Federal Building	2009	
SCE	ET09SCE1220	Landmark Square	2009	
SCE	ET10SCE1010	Drag Reducing Agent for Fuel Pumping Stations	2010-2012	
SCE	ET10SCE1030	Liquid Desiccant AC for Grocery Stores	2010-2012	
SCE	ET10SCE1050	VSD Evaporative Fan Control for Walk-in Coolers	2010-2012	$108,000
SCE	ET10SCE1060	[NAME] electrostatic filter	2010-2012	
SCE	ET10SCE1070	VSD for Die Casters	2010-2012	
SCE	ET10SCE1090	[NAME] Cooling Software	2010-2012	
SCE	ET10SCE1100	Turbo Blower for Waste Water Treatment Plants	2010-2012	
SCE	ET10SCE1110	VRF for Lodging Application	2010-2012	
SCE	ET10SCE1120	Induction Barrel Heater Evaluation	2010-2012	
SCE	ET10SCE1130	LED Light for Commercial Pools	2010-2012	$27,000
SCE	ET10SCE1140	Fisonic Pump for Hot Water Applications	2010-2012	
SCE	ET10SCE1150	IR Peeling System for Agriculture	2010-2012	
SCE	ET10SCE1160	Blower for Industrial Applications	2010-2012	$35,000
SCE	ET10SCE1170	Build Energy Sim Comparison	2010-2012	
SCE	ET10SCE1180	LED T8	2010-2012	
SCE	ET10SCE1190	LED Recessed Luminaire	2010-2012	
SCE	ET10SCE1200	OTE Optimization for Waste Water Treatment Plants	2010-2012	
SCE	ET10SCE1210	VFD Pump at High Pressure Pump Stations	2010-2012	
SCE	ET10SCE1220	L Prize A-Lamp for Hospitality Applications	2010-2012	$5,825
SCE	ET10SCE1230	L Prize A-Lamp Laboratory Assessment	2010-2012	$34,000
SCE	ET10SCE1240	Frontier Project	2010-2012	$46,580
SCE	ET10SCE1250	Smart Corridor Bi-Level Lighting for Office Applications	2010-2012	
SCE	ET10SCE1270	[NAME] VRF Evaluation	2010-2012	
SCE	ET10SCE1290	LED A-Lamp Laboratory Assessment	2010-2012	$3,500
SCE	ET10SCE1310	Hot Food Holding Cabinets for Foodservice	2010-2012	$36,000
SCE	ET10SCE1330	Combination Ovens for Food Service	2010-2012	$108,000
SCE	ET10SCE1340	Pizza Conveyor Ovens for Foodservice Applications	2010-2012	
SCE	ET10SCE1390	Steamers for Food Service Applications	2010-2012	

List of Technology Assessments 2009-2012				
IOU	**Project Number**	**Project Name**	**Funding Cycle**	**Cost***
SCE	ET10SCE1400	Taco Tower for Food Service Applications	2010-2012	
SCE	ET10SCE1410	High Density Holding Cabinets for Food Service	2010-2012	
SCE	ET10SCE1420	Dedicated Holding Bin Cabinets for Food Service	2010-2012	
SCE	ET10SCE1430	Dry Well for Food Service	2010-2012	
SCE	ET10SCE1440	Steamer/Kettle for Food Service Applications	2010-2012	
SCE	ET10SCE1450	Vacuum Sealing/Packaging Machines for Food Service	2010-2012	
SCE	ET10SCE3010	LED Street Lighting	2010-2012	
SCE	ET11SCE1010	Backlit Signs and Menu Boards Lab Evaluation	2010-2012	
SCE	ET11SCE1030	Hospitality VRF Evaluation	2010-2012	
SCE	ET11SCE1040	High Efficiency Blower Under 50hp Retrofit	2010-2012	
SCE	ET11SCE1050	Commercial Tubular Daylighting System	2010-2012	
SCE	ET11SCE1060	Efficient Low Pressure Blower for Sparging	2010-2012	
SCE	ET11SCE1070	Efficient Pneumatic Transport with VSD Controls	2010-2012	
SCE	ET11SCE1080	Single Family Radiant Cooling System	2010-2012	
SCE	ET11SCE1100	Off-grid Commercial Office DC Grid System	2010-2012	
SCE	ET11SCE1130	Evaporator Fan Delay Control	2010-2012	
SCE	ET11SCE1160	Waste Water Pond Treatment Evaluation	2010-2012	
SCE	ET11SCE1170	Efficient Solar Thermal Block Heater for Emergency Generators	2010-2012	
SCG	ET10SCG004	SF/MF WH data/survey	2010-2012	
SCG	ET10SCG0011	[NAME] Lab Monitoring Study	2010-2012	
SCG	ET10SCG003	Wireless Steam Trap Monitor (WSTM) Technology	2010-2012	
SCG	ET10SCG002	Direct Steam Injection	2010-2012	
SCG	ET10SCG008	Residential Water Heating Project	2010-2012	
SCG	ET10SCG009	Advanced Radiant HVAC Systems	2010-2012	
SCG	ET10SCG0003	Field Study of [NAME] Study	2010-2012	
SCG	ET10SCG0015	Thermodynamics Process Control	2010-2012	
SCG	ET10SCG007	[NAME] Energy System Technology	2010-2012	
SCG	ET10SCG011	Boiler Thermodynamic Process Control	2010-2012	
SCG	ET10SCG0007	Direct Steam Injection Study	2010-2012	
SCG	ET10SCG0006	Cypress-Steam Trap Monitoring	2010-2012	
SCG	ET10SCG0001	SF/MF WH data/survey	2010-2012	
SCG	ET10SCG0014	[NAME] Energy System Technology	2010-2012	
SCG	ET10SCG0008	[NAME] Water Heating Study	2010-2012	
SCG	ET10SCG0010	[NAME] HVAC Study - CEC - SCG	2010-2012	
SCG	ET10SCG0009	[NAME]	2010-2012	$50,000
SCG	ET10SCG0012	Res SF Recirc Pump	2010-2012	
SCG	ET10SCG0013	[NAME] Fuel Enhancer Evaluation	2010-2012	
SCG	ET10SCG0016	Advanced Heat Recovery Economizer (TMC) – Evaluation	2010-2012	

List of Technology Assessments 2009-2012				
IOU	**Project Number**	**Project Name**	**Funding Cycle**	**Cost***
SCG	ET10SCG0018	Test [NAME] Water Heater	2010-2012	
SCG	ET10SCG010	Solar Water Heating Systems	2010-2012	
SCG	ET10SCG012	Warm Mix Asphalt	2010-2012	
SCG	ET10SCG013	Microprocess Based Boiler Cycling Control	2010-2012	
SDGE	ET10SDGE0001	Gas Station Canopy Lighting Systems	2010-2012	
SDGE	ET10SDGE0002	High Ceiling Lighting Options	2010-2012	$20,000
SDGE	ET10SDGE0003	Greenhouse Retrofit	2010-2012	
SDGE	ET10SDGE0004	Electronic HID - [NAME]	2010-2012	
SDGE	ET10SDGE0005	Electronic HID Lighting System - [NAME]	2010-2012	
SDGE	ET10SDGE0006	Bi-Level Corridor Lighting	2010-2012	
SDGE	ET10SDGE0007	LED Task Light	2010-2012	
SDGE	ET10SDGE0008	Integration of BMS and ALC	2010-2012	
SDGE	ET10SDGE0009	Electronic HID Lighting System - [NAME]	2010-2012	
SDGE	ET10SDGE0010	Electronic HID Lighting System - [NAME]	2010-2012	
SDGE	ET10SDGE0011	Electronic HID Lighting System - [NAME]	2010-2012	
SDGE	ET10SDGE1001	Gas Station Canopy Lighting Systems	2010-2012	
SDGE	ET10SDGE1002	High Ceiling Lighting	2010-2012	$20,000
SDGE	ET10SDGE1003	Greenhouse Retrofit	2010-2012	
SDGE	ET10SDGE1004	Electronic HID	2010-2012	
SDGE	ET10SDGE1008	VA Bi-Level Corridor Lighting	2010-2012	
SDGE	ET11SDGE0004	Restaurant Ambient Lighting Demonstration Showcase	2010-2012	
SDGE	ET11SDGE0005	[NAME]	2010-2012	
SDGE	ET11SDGE0006	Bi-Level LED Parking Structure Demonstration Showcase	2010-2012	
SDGE	ET11SDGE0007	[NAME] LED with RTU	2010-2012	
SDGE	ET11SDGE0008	Bi-Level LED Pathway Bollard	2010-2012	
SDGE	ET11SDGE0009	[NAME] Central Plant Electronic HID Lighting	2010-2012	
SDGE	ET11SDGE0011	Bi-Level LED Elevator Cab Lighting	2010-2012	

Source: Q1 2012 monthly Data Request

* Costs are defined as the contracted price and does not include internal personnel time on the project.

	Possible duplicate
	Unknown

O. MARKET AND BEHAVIORAL STUDIES PROJECT DESCRIPTIONS

Each of the 21 projects are listed with the project description in Table 25 and Table 26 below. The studies are separated into the two types of studies – research to facilitate technology selection and research to facilitate technology deployment.

Table 25: MBS Project Descriptions for Market Research to Facilitate Technology Selection

IOU	ETP #	Project Name	Project Description from ETP Database	Sector and End Use
SCE	ET11SCE4010	Market Intelligence Gathering Process Evaluation	The need for this study developed because the ET Program is searching for a way to obtain more accurate market information for emerging technologies. This market intelligence helps the program determine if the technology has the potential to meet the needs of SCE customers. A technology should have a strong market outlook in order for it to be recommended for inclusion in the EE portfolio. The objectives of this project is to evaluate the market techniques used by three consultants (Opinion Research Corporation, Energy Efficiency Center and Esource) to see if the information provided, by their expertise in market research, will better identify the key market intelligence needed to determine if a technology is a solid candidate for an ET Project, and to see how effective the approach each one takes is at satisfying the ETP's needs.	Residential All End Uses
SCE	ET10SCE4020	ZNE Technical Potential	Technical and market potential review to identify ZNE potential of various building types. (See Case Study #2)	Residential and C&I Potential of All End Uses
SCE	ET11SCE4080	Ground Coupled Space Conditioning Technical Potential	To determine the market size in SCE territory based upon known soil properties to better inform the ET Program of the potential for technologies using the ground as a heat exchanger.	Residential and C&I Potential of HVAC
SCE	ET11SCE4060	Commercial Buildings Simulation Based Deep Energy Reduction Potential Study	No Description available in the ETP database	C&I Potential of All End Uses

IOU	ETP #	Project Name	Project Description from ETP Database	Sector and End Use
SCE	ET11SCE4040	HVAC Technology Roadmap	The project develops a tool, in the form of an Excel spreadsheet, for SCE to determine which HVAC market segments offer the highest potential for kWh and peak kW savings. This allows users to focus the attention of future projects on those measures that will provide the greatest impact.	C&I Potential of HVAC
SCE	ET11SCE4050	Pool Light Residential Usage Survey	LED pool lighting is an energy efficient technology that lights up the swimming pool while using less energy than incandescent lamps. Previous Emerging Technology study (ET10SCE1130) logged commercial pool operating hours that was pretty typical of most commercial pools; dusk to dawn or dusk to close. Residential pool lighting hours were not logged due to various hours different homes may have along with the number of homes that needed to be sampled. This project is to phone survey SCE customers with pools on how many hours they operate the underwater pool lights in a year.	Residential Lighting
PGE	ET11PGE5261*	Technology SSE HVAC Quality Maintenance	Development of an accuracy and calibration specification for the measurement tools required for HVAC Quality Maintenance.	C&I HVAC
PGE	ET11PGE1141	EMS Data Translation (Pneumatic to Wireless)	The purpose of the Data Translation market study is to understand the technical landscape and vendor offering of the Energy Management and Information Systems space.	C&I Controls for All End Uses
PGE	ET11PGE4221	M&BS Building Stock Study	Quantitative analysis researching the potential and applicability of energy management systems (EMS) for existing commercial buildings in Pacific Gas and Electric Company ("PG&E") territory. This study focuses on the market penetration of EMS products through analysis of the commercial building stock, and strives to understand where EMS technology is currently in use.	C&I Potential of All End Uses
PGE	ET11PGE3241	EPRI Early Deployment Efficiency End User Technologies	Bridge gap in development pipeline between field demos and utility programs with early deployments	Residential and C&I HVAC, Water Heater, Lighting

* Note: This project is likely not an MBS project. However it is included in this table based on the information received by the evaluation team from the ETP database.

Table 26: MBS Project Descriptions for Customer Research to Facilitate Technology Deployment

IOU	ETP #	Project Name	Project Description from ETP Database	Sector and End Use
PGE	ET11PGE1101	Marketing Conjoint Study	A conjoint and customer study on new lighting options in the residential market with the following objectives: 1) To learn which new products can be transferred into new measures for our programs; 2) to learn market readiness and how to optimize customer acceptance of new technologies during their launch, growth, and mature stages, and; 3) to optimize savings across the portfolio of new product options in the residential market.	Residential Lighting
PGE	ET11PGE4081	Home Energy Management Insight Behavioral Research Smart Homes	This project was designed to evaluate consumer preferences and attitudes towards home energy management and "Smart Homes" through qualitative focus groups.	Residential All End Uses
PGE	ET11PGE4211	M&BS EMS Systems	To identify qualitative barriers to accelerating adoption of wireless, web-based and conventional energy management system for commercial and industrial customers that has been underutilized in this sector	C&I All End Uses
PGE	ET11PGE1109	Residential HVAC Quality Maintenance (QM) Program - Mkt. Research	HVAC Quality Maintenance (QM) is an HVAC product delivered to customers by HVAC Contractors. The foundation for the product is Standard 180 for commercial and Standard 4 for residential. Both of these are new and not being implemented. This ET project will support the successful launch and implementation of the products by providing necessary information on how to best engage customers.	Residential HVAC
PGE	ET11PGE3191	Continental Automatic Building Association (CABA) Research Project	The overall goal of the 2011 study is to identify North American consumer behaviors and attitudes surrounding the connected home, in order to identify concept development opportunities and marketing strategies to drive greater adoption.	Residential All End Uses

IOU	ETP #	Project Name	Project Description from ETP Database	Sector and End Use
PGE	ET09PGE0914	Street Lighting Network Controls Market Assessment	This report provides a technology and market assessment of emerging network control and monitoring systems in street lighting applications. Using network control and monitoring systems with streetlights has the potential to save a significant amount of energy. These systems offer the ability to more precisely control on/off schedules at dusk and dawn and represent a major shift from the traditional model of lights controlled only by photocontrols, with no operator feedback. Network systems provide citywide management and monitoring of streetlight assets from a remote location, including the potential to meter actual street lighting energy use for billing purposes. Network controls that offer a dimming capability can also provide energy savings through adaptive street lighting control, such as reducing lighting power as conditions change (i.e. lower traffic or pedestrian volume). Additional benefits from network controls can include reduced runtimes and detection of outages and "day-burners."	C&I Controls for Lighting
SCE	ET11SCE4020	Residential Human Comfort Behavior Study for Low Energy Cooling	Develop a human behavior study to determine and understand SCE's market potential for adopting low energy cooling technologies; specifically, evaporative cooling. Currently, evaporative cooling is not utilized widely, although it has the potential to save significant energy over more commonly utilized vapor compression-based technologies. The study will be conducted by the Fisher Center of UC Berkeley School of Business, with potential input from the Center for the Built Environment.	Residential HVAC
SCE	ET11SCE4030	Consumer Behavior Change via Online Integrated Demand-Side Management Leveraging Casual Social Games	[NAME] is a platform and online Integrated Demand Side Management service that incents consumers to conserve energy by leveraging social networks and social gaming. The internet-based platform enables social gaming (and other internet-based) companies to gain new revenue streams by trading their in-game currency for payments from utilities for verifiable energy usage reductions and energy efficiency activities. The payments flow from the utilities to the game companies through [NAME'S] proprietary service, with the game companies connecting via Application Programming Interface. This project is a Phase 1 to scope the interest of specific age groups through qualitative and quantitative studies before the actual creation of the software platform. Qualitative study will require couple focus groups that can be utilized to lay out the questions to be included in the quantitative study through an online survey.	Residential All End Uses

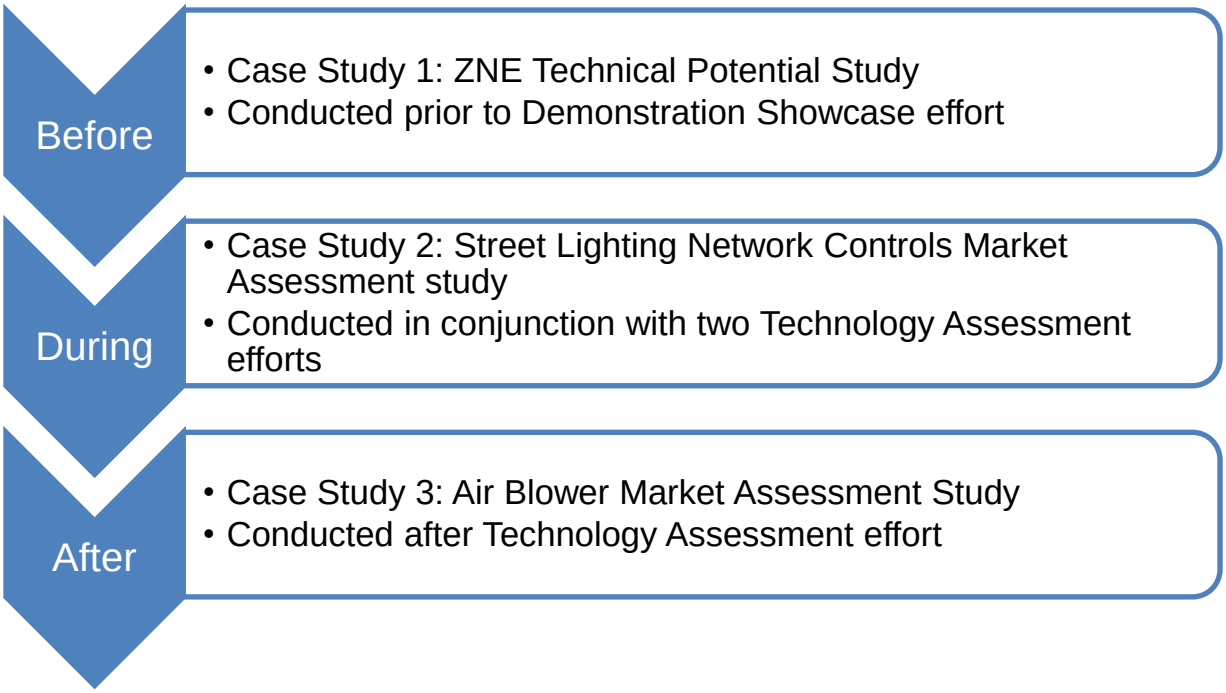
IOU	ETP #	Project Name	Project Description from ETP Database	Sector and End Use
SCE	ET11SCE4070	Future Outlook for Residential Energy Management	Conduct a market study, an adjunct to a main study, within SCE service territory to understand significant developments and trends in the Connected Home market by investigating consumer and manufacturers attitudes towards residential energy management in a connected home. A connected home can consist of distinct platforms or components that run independently within a home "ecosystem". With the advancements in technology consumers will purchase and connect more and more devices in their homes to suit their practical needs. In the end, all devices or connections will constitute a building block infrastructure of a connected home.	Residential All End Uses
SCE	ET10SCE4010	Air Blower Market Assessment	Compressed air systems are common among industrial facilities. They, however, consume considerably more energy, and very inefficient when applied to many industrial processes that blowers can perform (e.g., drying or cleaning products).	C&I Compressed Air
SCG	ET10SCG0001	SF/MF WH data/survey	Comprehensive market study on, water heating systems at and hot water usage habits of residential customers	Residential Hot Water

P. MARKET AND BEHAVIORAL STUDIES CASE STUDIES

Case studies of the three MBS reports received from the original data request (September 2011) are provided below. While the IOUs have started several additional studies since data collection in the fall of 2011, analysis was completed in December 2011. The case studies document how the IOUs identified study, sources of information culled to develop the report, a review of report content, and dissemination activities that occurred once the report was finalized.

MBS project results can "provide crucial insights at multiple points in technology development, assessment justification, and transfer to and deployment by EE programs."[16] Below are three case studies, each of which was used at a slightly different stage of the technology development and testing process (as shown in the figure below).

Figure 1: Case Study Timing of Efforts (Before, During, or After Other Program Element Effort)



Notably, the three MBS efforts for these case studies were developed to support other ETP program element efforts (as consistent with the overarching program theory). These studies were conducted either in advance of, in conjunction with, or after other program element efforts. These reports were selected because they were completed and available at the time of analysis.

[16] Ibid.

CASE STUDY 1: ZNE TECHNICAL POTENTIAL STUDY (ET10SCE4020)

This study is an SCE MBS project that was conducted to select technologies. SCE developed this market potential study as a screening tool for potential ETP projects, particularly Demonstration Showcase projects, similar to program theory #1 – research in support of technology selection.

The purpose of the study, as stated by SCE, is as follows: ZNE new construction and retrofit projects are still uncommon, especially in the U.S.; this study demonstrates the ZNE potential for a number of market segments and building types. The two primary goals in this study are: to develop a scoring system to select and prioritize potential ZNE Demonstration Showcase projects, and use the developed scoring system to identify the building types best suited for ZNE new construction and retrofits. This scoring system will help prioritize potential ETP Demonstration Showcase ZNE projects to advance the objectives of the California Long Term Energy Efficiency Strategic Plan.

The study was conducted between October 2010 and February 2011, and had a budget of $15,000.

To develop the scoring tool, the IOUs identified several parameters using previous ZNE and ETP project-screening experience. They developed definitions for each criterion, and then checked the criteria for consistency, duplication, and overlaps. This resulted in 15 parameters used in the scoring tool.

To identify business segments and building types with the greatest potential of achieving ZNE performance, SCE reviewed the building science literature and interviewed select ZNE and low-energy building practitioners. Based on this, six business segments and building types were identified (single family homes – new construction, single family homes – retrofit, single family homes – multi-family home retrofit in a planned development, medium box retail store – new construction, low-rise office building – new construction, and institutional facilities – retrofit).

This effort also created a scoring tool for the six business segments identified to enable selection and prioritization of potential ETP Demonstration Showcase ZNE projects.

Intended Users

SCE expects this project to lead to recommendations for ZNE project Demonstration Showcases. As such, the data is intended for the ETP program managers who work on Demonstration Showcases, as well as the IOU energy efficiency program managers.

Details around Relevance and Clarity

The evaluation determined whether the study summarized the market or behaviors of consumers well enough so that a general decision (possibly to move forward with a Technology Assessment or Demonstration Showcase, etc.) could have been made by ETP and EE staff. Overall, the study was relevant (4.5 out of 5.0).

Overall, however, the study was not very clear (3.8 out of 5.0 points) [17].The clarity of the reports was determined by how well key results were conveyed, whether the reports were logically structured, and whether the reports contained information a decision maker, such as an energy efficiency program manager, would need to effectively make a decision about a technology under consideration.

Further specifics of the clarity and relevance of the study follow:

- **Relevance**: The report fulfills the goals and objectives described in the introduction (to identify business segments and building types best suited for ZNE new construction and retrofits in SCE territory and develop a scoring system to prioritize and select potential ETP Demonstration Showcase ZNE projects). The report's evaluation of the six building types for potential ZNE projects resulted in a prioritized list of the six types, based on the score they received. Additionally, the report provided specific recommendations regarding whether the staff of ETP Demonstration Showcase element should pursue the segment, if the segment needs further evaluation, or if staff should not pursue the segment at this time.

- **Clarity**: This report provided a very thorough review of the scoring method established to select ZNE projects. The extensive description of the scoring method before any description of the six building types implies that the focus of the report is on developing the scoring method, rather than evaluating which of the six building types are best suited for ZNE. Establishing a scoring method may have been the primary focus and intent of the study, and therefore would have sufficiently served the needs of SCE. However, viewed from the perspective of Market and Behavioral Studies, it would have been helpful to provide information on the six business segments and building types earlier in the report before describing the scoring method. Four of the six building types are mentioned in the methodology section, but all six are not described until the Selected Business Segments and Building Types section.

  One area in the report was slightly confusing. A table called "ZNE Potential Evaluation Matrix – Proposed Score Sheet" provides a useful and clear summary of the scoring method established, showing each of the selected parameters, weighting values, and scoring scales. The text preceding the matrix describes each of these parameters in detail, numbering select parameters in the matrix. However, the matrix was not numbered, making it difficult to determine which parameters are being referenced.

CASE STUDY #2: STREET LIGHTING NETWORK CONTROLS MARKET ASSESSMENT STUDY (ET09PGE0914)

This study is a PG&E MBS project. Typically, PG&E selects MBS studies using its Technology Assessment scoring tool, the ETOS. However, PG&E did not complete their selection tool for this effort.

This study was conducted in conjunction with a TA to help understand the market prior to deployment of the technology. Specifically, PG&E conducted this study in conjunction with two LED Streetlight and Network Control Technology Assessment projects to identify technology, policy, and adoption barriers.

[17] Methodology for the clarity and relevance analysis can be found in Volume II.

This study supports program theory #2, research in support of technology deployment, by addressing market barriers as well as providing an overview of technologies available in the market for ETP staff and IOU EE program managers. According to the study, the use of network control and monitoring systems for streetlights can offer the ability to more precisely control on/off schedules at dusk and dawn and represent a major shift from the traditional model of lights controlled only with photocontrols, and no operator feedback. The intent of the study was to provide an overview and comparison of network controls technology currently available from five different manufacturers. The study collected data on pricing, potential energy savings, prior demonstrations, market barriers, and risks.

The study was conducted between June 2009 and January 2010, and had a budget of $52,000.

Five manufacturers were identified through desk research, industry contacts, and previous industry experience. According to the study, these manufacturers are leaders in the streetlight networks control market for the U.S. The data for the study were collected through secondary research (online literature and product research of manufacturer websites and materials) and primary research (interviews with manufacturer staff).

Intended Users

PG&E selected this project to directly support two existing LED streetlight and network control Technology Assessments. The MBS effort was conducted to achieve the objective of understanding specifics of these lighting technologies. As such, PG&E intends the data for the Technology Assessment program managers as well as the energy efficiency lighting product managers.

Details around Relevance and Clarity

The evaluation determined whether the study summarized the market or behaviors of consumers well enough so that a general decision (possibly to move forward with a Technology Assessment or Demonstration Showcase, etc.) could have been made by ETP and EE staff. Overall, the study was very relevant (5.0 out of 5.0).

The study was also very clear (4.3 out of 5.0 points). [18] The clarity of the report was determined by how well key results were conveyed, whether the report was logically structured, and whether the report contained information a decision maker, such as an energy efficiency program manager, would need to effectively make a decision about a technology under consideration.

Further specifics of the relevance and clarity of the study follow:

- **Relevance**: This market assessment report sufficiently meets the goals and objectives described in the report's introduction. The evaluation assumes that the scale and depth of the Street Lighting Network Controls report is consistent with the need for the information, and therefore should be considered very relevant in that it provides a wealth of information on the technology overall, as well as specific barriers and risks, and what is currently available in the market.

[18] Methodology for the clarity and relevance analysis can be found in Volume II.

- **Clarity**: PG&E's Street Lighting Network Controls Market Assessment report is very thorough and includes significant information on this technology, making it a good resource and reference document for PG&E. The report does not include an executive summary but is clearly and intuitively laid out, starting with a background section describing the technology in detail – including subsections on control capabilities and limitations, energy savings potential, interoperability with efficient streetlights, monitoring and metering capabilities, market readiness, and current costs.

  The bulk of the report then focuses on an overview and comparison of network controls technology from five different manufacturers. For each of the five manufacturers, the report provides:

  - Background information on the company
  - Current and future products available, how they function, their capabilities, and any potential limitations
  - Pricing information
  - Installation process
  - Prior demonstrations and installations
  - Following the in-depth descriptions of the five companies, the report provides a helpful and concise matrix that summarizes each of the product's characteristics, features, and costs. The report also includes sections that estimate the potential energy savings with network controls installed in California and in the PG&E territory, as well as any current market barriers and risks the technology may face.

CASE STUDY 3: AIR BLOWER MARKET ASSESSMENT STUDY (ET10SCE4010)

SCE program managers typically select MBS studies through identifying potential gaps in ongoing activities, and generating consensus within the team to conduct a study to help "better focus our activities within the other program areas." This study supports program theory #2, research in support of technology deployment, by addressing market barriers, interest in air blowers, and financial drivers, as well as estimating market size.

According to the study, the use of air blowers as opposed to compressed air systems for production processes such as cooling, drying, removing debris, cleaning, and mixing can result in significant energy and demand reductions (75% to 90% savings when compared to compressed air systems). The main goal for this market assessment study is to assess the market opportunity for the adoption of air blower technology in four standard industrial classification (SIC) groups, through primary research methods (telephone survey).

The study was conducted between May 2010 and December 2010, and had a budget of $18,000.

A telephone survey was conducted among 114 randomly selected SCE customers in the four selected SIC groups (fabricated metals; rubbers and plastics; food products; and stone, clay, and glass). Within the SIC groups, potential survey customers were selected if they had at least one compressed air system used for one or more key applications: cooling, drying, removing debris, cleaning, and mixing.

The surveys targeted decision makers and people responsible for equipment purchases, and included mostly senior operations managers in leased or rented facilities, with energy accounting for more than 10% of their operating costs.

The study performs in-depth primary research on customers' understanding and awareness relating to air blower technology and areas where the technology can be applied to achieve cost-effectiveness. The study also looks at market size of potential adoption, customer level of interest and awareness, obstacles and barriers, and financial drivers.

Intended Users

SCE selected this project after a related Technology Assessment to assess the market awareness and understanding for the new technology. As such, the data is intended primarily for the IOU energy efficiency program managers.

Details around Relevance and Clarity

The evaluation determined whether the study summarized the market or behaviors of consumers well enough so that a general decision (possibly to move forward with a Technology Assessment or Demonstration Showcase, etc.) could have been made by ETP and EE staff. The study was found to be very relevant (5.0 out of 5.0).

The clarity of the reports was determined by how well key results were conveyed, whether the reports were logically structured, and whether the reports contained information a decision maker, such as an energy efficiency program manager, would need to effectively make a decision about a technology under consideration. Overall, the study was clear (4.8 out of 5.0 points)[19].

Further specifics of the relevance and clarity of the study follow:

- **Relevance**: The report provides useful information, describing the survey results in detail, both by the overall market and specific market segments (business types). The report provides data to help energy efficiency program managers determine the potential market for the technology and barriers that they may face when introducing it to the market. Of specific interest were the survey data tables and figures showing the proportion of respondents with an interest, awareness, knowledge, or familiarity of the technology. The estimates of the total energy used and market potential of compressed air in SCE territory was useful. The study clearly incorporates survey findings into the conclusions and recommendations, along with a description of important steps that should be taken if the technology were to be selected by ETP (i.e., "Our findings also confirm that emerging technologies need to be presented into the market place with proper education and training in order to transform the market."[20])

- **Clarity**: The majority of the report describes survey findings such as size of the market opportunity for, familiarity with, and interest in, air blowers; obstacles of installing air blowers; desired return-on-investment time-frame requirements; financial drivers for accelerating market adoption; and

[19] Methodology for the clarity and relevance analysis can be found in Volume II.

[20] Air Blower Market Assessment, pp. 18.

overall interest in energy efficiency. The report logically lays out findings and follows an intuitive progression of these topics throughout. Most survey findings are presented in tables and figures, and are cross-tabulated by the SIC Code (or business type) of the survey respondents. Recommendations in the Air Blower Market Study are clear and concise and are included in both the Executive Summary and Recommendations and Conclusions sections in the report. The study shows estimates of the potential savings in SCE territory, but does not include background description of how the estimates were calculated. More description and detail of the calculations may be helpful for readers to determine for themselves whether the estimated savings are accurate.

Q. DEMONSTRATION SHOWCASE LITERATURE REVIEW

As stated earlier in this memo, given the early stage of implementation of the Demonstration Showcase program element and that no showcases are yet completed, the evaluation team revised the original evaluation plan of site visits and attendee and customer surveys with a literature review.

We conducted this literature review to focus on what is known about how people are affected by interacting with integrated technologies in settings such as Demonstration Showcases. The purpose is to provide findings to support ongoing and future Demonstration Showcase projects so they can more effectively increase attendees' awareness, knowledge, attitudes, and implementation of energy efficient measures and design.

We present our findings to support how to design and implement Demonstration Showcases to increase attendee knowledge. Although we used the IOUs' PIPs as a starting point to inform our literature review, we modified the review based on the program manager in-depth interviews. Thus, we also include findings beyond knowledge transfer that may be helpful to ETP staff. However, we did not attempt to research topics outside of knowledge transfer exhaustively. Instead, we included them when we discovered them among our primary sources covering knowledge transfer within a Demonstration Showcases framework.

First, we describe our method, followed by how our findings align with the current program theories for this element. Next, we describe relevant, conceptual frameworks seen in the literature. Finally, we discuss recommendations informed by our literature review in two sections, one focused on knowledge dissemination and one focused on general program implementation. Our review and analysis took place between October and December 2011.

Method

The evaluation team drew heavily on the goals, objectives, and the PPM[21] outlined in the PIPs to conduct this review. Our literature review focused on the PPM, a self-reported increase in knowledge, since we expected a literature review could help elucidate and produce useful recommendations. Additionally, measure and site selection are well underway and well understood by ETP staff. The PIP goals and objectives focused on included "contribut[ing] to EE/DR market transformation efforts," and "support[ing] achievement of the Strategic Plan Big, Bold initiatives for ZNE." We used university, industry, and general search engines, and contacted industry experts and practitioners to inform our research. We searched on terms and phrases such as "buildings with integrated design,", "technology display", green-", "energy efficient-", "Zero Net Energy (ZNE)" "building tours," etc. to locate relevant

[21] Program performance metric from Resolution E-4385: SCE AL 2476E, PG&E AL 3120G|3675E, SoCalGas AL 4114, SDG&E AL 2172E|1951G/cf1. Pp. 39-40

articles. In all, we followed up on 81 separate lines of inquiry[22] which resulted in a list of 23 articles and books. The following tables lists examples of search terms and parameters generated from the PIP.

[22] We use the phrase "line of inquiry" to mean the several possible permutations resulting from different combinations of relevant search terms using different search engines or industry sources.

Table 27. Examples of Search Terms and Parameters Generated from the PIP

PIP Element [a]	Examples of Resulting Search Terms and Parameters [b]
The Program Implementation Plan (PIP), states that the Demonstration Showcase element focuses on exposing "stakeholders (including the public) to various measures utilizing in situ, real-world applications and installations… and that may highlight a systems approach rather than an individual measure…"[23]	*Terms*: Demonstration Showcases; Buildings with integrated design *Parameters:* Factors that increase showcase effectiveness among both customers and market actors
PIP Objective 1.4 states that the Demonstration Showcase element is meant to "to expose stakeholders to the performance of measures. Highlight real-world applications and installations for market actors and end users."[24]	*Terms:* Technology display and interaction, Green/Energy Efficient/ZNE Building Tours
PIP Objective 3.1 states that the Demonstration Showcase element "help advance innovative measures and/or strategies to support ZNE…Industry and Market Transformation, and related solutions during 2010-2012."[25]	*Terms:* ZNE Building Tours, Information diffusion, Market transformation
The Demonstration Showcase PPM includes "Self-reported increase in knowledge by randomly selected sample of targeted stakeholders who… visited the DS."[26]	*Parameters:* Efficacy of related topics (e.g., technology display and interaction, Green/Energy Efficient/ZNE Building Tours, etc.) on knowledge increase
The IOUs provided overviews of their planned Demonstration Showcase projects which include integrated designs and measures at retrofitted and newly constructed commercial and residential buildings.	*Terms:* Effective museum curation *Parameters:* Efficacy of expository devices (e.g., placards, guides, pamphlets, etc.)

[a] Although the SCE PIP is sourced, the ETP PIPs for each of the other individual IOU submissions (SCG SW Emerging Technologies Final.doc; SDGE SW Emerging Technologies Final.doc; and PGE2108 ET SW PIP 01-2011 no redline.pdf) use similar descriptions.

[b] The search terms and parameters presented in the table are not exhaustive of all that we are using in this literature review.

[23] From SCE-SW-009 Emerging Technologies.doc pp. 775-6. Generally, the ETP PIPs for each of the other individual IOU submissions (SCG SW Emerging Technologies Final.doc; SDGE SW Emerging Technologies Final.doc; and PGE2108 ET SW PIP 01-2011 no redline.pdf) incorporate similar descriptions.

[24] From SCE-SW-009 Emerging Technologies.doc pp. 787.

[25] Ibid, pp. 791.

[26] Ibid, pp. 794.

We used approximately 20 search terms, but generated 81 separate lines of inquiry, some of which encompassed larger searches. For example, two or more search terms could be combined with different sets of search terms using different Boolean operators. Further, each of these combinations could be entered into several different search engines, of which we used seven (e.g., Google Scholar, ACEEE, and CALMAC). We counted each unique combination for each search engine as a separate line of inquiry. Notably, these searches generated several potential leads. We also reviewed all sources' references and, in a few cases, this resulted in a new source. After reviewing the abstracts or other summaries of the sources, we compiled 32 possible leads. Upon reading and reviewing these sources, we determined 23 sources were relevant to this study. These are included in the bibliography.

Definition and Alignment with Program Theory

In searching for "Demonstration Showcases" in the literature, we found that two terms, "exemplary demonstrations" and "experimental demonstrations," differentiate the purposes for a showcase. Moore (2006) paraphrases Myers' 1978 distinction between experimental and exemplary demonstrations:

> *Demonstrations perform two quite different functions: (1)* experimental demonstrations*, which are conducted to evaluate the effectiveness of an innovation under field conditions, and (2)* exemplary demonstrations*, which are conducted to facilitate diffusion of the innovation to other units. (Moore, 2006)*

Macey and Brown (1990), also citing Myers, state that in experimental demonstrations "evaluative tests (are) carried out by the sponsors or a specially selected small group of users;" however, in exemplary demonstrations, "evaluation is less important than performance information." Dearing (2009) further clarifies the influential role exemplary demonstrations are meant to play in innovation diffusion:

> *An exemplary demonstration is a persuasive event calculated to influence adoption decisions and thus increase the likelihood of diffusion. An exemplary demonstration is not staged for the purpose of merely disseminating information; rather, the objective is to showcase an intervention in a convincing manner (Baer et al., 1977; Magill & Rogers, 1981). Exemplary demonstrations increase the likelihood of diffusion partly by making a costly, worrisome, and complex intervention more understandable through visibility of its processes and observability of its outcomes. (Dearing, 2009).*

The two program theories outlined in the Element Design section of this memo generally align with these different types of showcases. Demonstration Showcase program theory #1 corresponds to "exemplary demonstrations" because the Demonstration Showcases are meant to increase customers' and market actors' awareness of integrated solutions and inspire them to consider adopting the technologies. Demonstration Showcase program theory #2 corresponds to "experimental demonstrations" because here the Demonstration Showcases are meant to provide EE program manager's savings data and convince them that customers and market actors would consider implementing the measures for themselves.

Understanding what terms appear in the literature and how they are used are important for the following reasons.

- First, the literature does not use the term "Demonstration Showcase" consistently. Searching on "Demonstration Showcase" produces a wide range of topics from the demonstration types

outlined above to 'demonstration projects' and 'lectures.'

- Second, judging from the dearth of sources we found, there are not many documented studies of "experimental demonstrations," "exemplary demonstrations," or "Demonstration Showcases" available in the literature. Development of this program element may be a process that requires a greater degree of experimentation or trial and error, rather than using other well-documented EE programs.

- Third, findings suggest that the distinction between experimental and exemplary demonstrations is critical (Buijs & Silvester, 1996; Macey & Brown, 1990; Dearing, 2009). Referencing other theorists (e.g., Macey & Brown, 1990), Dearing (2009) states that a "lack of clarity about the purposes of demonstration is a frequent culprit in the non-diffusion of effective interventions." Therefore, each Demonstration Showcase site should be designed as one or the other kind of demonstration, as mixing efforts or approaches may have negative consequences especially in creating market actor confusion – a point we discuss in more depth later in this memo.

Conceptual Frameworks

Before moving to our findings and recommendations, we use this section to discuss two conceptual frameworks uncovered by our literature review. These frameworks are useful for understanding knowledge dissemination within the Demonstration Showcase element, and our recommendations reference each where applicable. The first is the well-established Diffusion of Innovations (DOI) theory, applicable to many kinds of innovations including energy efficient buildings. The second is a relatively new model, Action Research for Environmentally Sustainable Housing (ARESH). We briefly describe these models next.

Diffusion of Innovations (DOI)

We start with the *Diffusion of Innovations* (Rogers, 2003), a conceptual framework that Rogers first introduced in the 1960s. We outline this theory since it is a popular model frequently used and built on by others, such as Moore's *Crossing the Chasm* (Moore, 2006) and Dearing's "Dissemination Science" (2009).The PIP frames the Demonstration Showcase program element rationale in terms of diffusion[27] suggesting that the Demonstration Showcase element was at least partially designed with this model in mind. The DOI model was thoroughly reviewed in the PY2006-2008 Interim Evaluation Report #1[28] delivered to the CPUC on May 30, 2008. For purposes of this memo, we draw from the report to review some of the key concepts.

[27] PGE2108 ET SW PIP 01-2011 no redline.pdf; 11. SCE-SW-009 Emerging Technologies.doc pp. 776; SCG SW Emerging Technologies Final.doc; SDGE SW Emerging Technologies Final.doc.

[28] Summit Blue Consulting, LLC; Energy Market Innovations; Opinion Dynamics Corporation; Strategic Energy Technologies; ADM Associates, Inc.; E SOURCE GDS Associates, Inc.; SDV/ACCI California Technology Innovations, Inc. "Interim Report #1 for the PY 2006-08 California Statewide Emerging Technologies Program." 2008.

Rogers states that "*diffusion* is the process in which an innovation is communicated through certain channels over time among the members of a social system"; and "*communication* is a process in which participants create and share information with one another in order to reach a mutual understanding." (Rogers 2003: 5). There are four main *elements* of this theory:

1. Innovation-includes five different attributes that affect how fast adoption of an innovation occurs.
    i. "*Relative advantage* (is the degree to which an innovation is perceived as better than the idea it supersedes.
    ii. *Compatibility* is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
    iii. *Complexity* is the degree to which an innovation is perceived as difficult to understand and use.
    iv. *Trialability* is the degree to which an innovation may be experimented with on a limited basis.
    v. *Observability* is the degree to which the results of an innovation are visible to others." (Rogers 2003: 15)
2. Communication-the many ways in which people learn about an innovation:
    i. Those with knowledge transfer it to those without. There must be a degree of difference between the two groups, i.e., not all from the same group, such that knowledge can spread throughout the groups as opposed to staying contained within one.
    ii. Communication channels are either mass communication channels (i.e., radio, TV, newspapers) or interpersonal channels. Mass media can create awareness and knowledge of innovations but it is the interpersonal channels (i.e., a face-to-face exchange) that are more effective at persuading someone to accept an innovation (Rogers 2003: 18).
3. Time- covers decision-processes and adopter categories
    a. Decision-processes: incorporating innovation is sensitive to people's perception of the "newness" of the innovation and is reflected in five stages. The decision-maker must have 1) knowledge of the innovation; then, 2) be persuaded; then, 3) decide to implement and 4) actually implement the innovation; and 5) confirm or maintain the implementation decision.
    b. Adopter categories: these categories highlight characteristics within a population and how these affect when an implementation may occur.
        i. Innovators (Venturesome). This group is able to cope with a high degree of uncertainty about an innovation at the time they adopt. They tend to have more financial resources to help cushion losses.
        ii. Early Adopters (Respect). Early adopters help trigger the critical mass when they adopt an innovation. The early adopter decreases uncertainty about a

new idea by adopting it, and then conveying a subjective evaluation of the innovation to near peers through interpersonal networks.

iii. Early Majority (Deliberate). The early majority interacts frequently with their peers but seldom hold positions of opinion leadership in a system.

iv. Late Majority (Skeptical). This group must be pressured by peers to adopt. Their relatively scarce resources mean that most of the uncertainty about a new idea must be removed before the late majority feel that it is safe to adopt.

v. Laggards (Traditional). The laggard's precarious economic position forces the individual to be extremely cautious in adopting innovations.

4. Social system-the community or population in which diffusion is expected to occur. Rogers explores "how the system's social structure affects diffusion," and includes several topics. We outline the two that are most relevant here:

   a. Opinion leaders-those within groups to whom others tend to look to because of their technical competence, social accessibility, and similarity to the group. They are not necessarily innovators.

   b. Change agents-those who "influence clients' innovation-decisions in a direction deemed desirable by a change agency. A change agent usually seeks to secure the adoption of new ideas, but he or she may also attempt to slow the diffusion process and prevent the adoption of certain innovations with undesirable effects." (Rogers 2003: 366)

Action Research for Environmentally Sustainable Housing (ARESH)

Elfors and Svane (2008) introduce a second model relevant to knowledge transfer. The model, called ARESH, is based on the authors' experience with energy efficient housing projects as well as earlier theorists' work in experimentation and evaluation. The authors indicate that their ARESH model facilitates the diffusion of research-based energy efficiency and environmental sustainability knowledge to mainstream housing practitioners and to academic or research-based audiences alike.

In the ARESH model, both the researchers and the users/practitioners cooperate in the implementation of the project, as well as the research process, and thus the groups are also known as "researchers" and co-researchers" respectively. Applying the model to the Demonstration Showcase program element, the first group might consist of internal program evaluators and managers, and, while the article does not clearly delineate practitioner and end-user roles, the second group might consist of architects, builders, engineers, or possibly property managers and residents. Each group keeps reflection notes on the project's process and then disseminates findings to respective peers and audiences.

The researcher must strike a balance throughout the project between three roles: researcher (meant to evaluate the project critically and reflectively); advocate (meant to teach about and promote innovation); and participant (meant to collaborate and support the completion and development of the project). Practitioners, as "co-researchers" must also go beyond their normal job duties by collecting and documenting reflections and data throughout the project that will be most conducive to providing insight to their peers and colleagues. Drawing on the work of Stake, the authors (Elfors, Svane, 2008) explain that information created by the researcher and co-researcher is not meant to be scientifically objective. Instead, the final product is a kind of case study that is context-dependent and presented to

audiences for internalization and application to other similar cases.

While Roger's DOI model helped to structure the Demonstration Showcase program theory, we make the following points about the applicability of the ARESH model given the extensive collaboration between program managers and market actors already occurring within several Demonstration Showcase projects:

- The ARESH model can be extended to non-residential projects including, commercial Demonstration Showcase elements such as restaurants, hotels, etc.
- Formalizing the role of market actors as "co-researchers" from the beginning may increase market actor buy-in and focus resulting in a more integrated project.
- Using the model with collaborating market actors (lighting designers, home builders, engineers, etc.) and asking them to incorporate reflection, documentation, and dissemination to their peers increases the chances of them sharing a contextualized, relevant story of the showcase, which is an important point for knowledge transfer as will be discussed later.
- The model highlights the varied but critical role program manager's play as collaborators, champions, and critical thinkers, when they take the necessary multi-pronged approaches to steer the Demonstration Showcase projects forward.

Next, we present findings from the literature review based on the differentiation between exemplary and experimental showcases as well as drawing on the two different conceptual frameworks of how knowledge may be disseminated.

Findings Related to Knowledge Dissemination

In this section, we outline the ways knowledge is characterized within the building industry and then offer several recommendations based on the literature review findings for how to best disseminate knowledge from the Demonstration Showcase projects to both market actors and end users. These findings are conceptually abstract, but connect to our recommendations regarding best practices regarding knowledge transfer and program element implementation.

There are some limitations with applying literature review findings to understanding how best to increase knowledge in Demonstration Showcase attendees. First, much of the literature we found encompasses knowledge dissemination to market actors, e.g., designers, architects, builders, etc. as opposed to end users. Second, most of the literature we found addresses exemplary, but not experimental demonstrations. Third, much of the literature is focused on new construction projects as opposed to retrofits. Although these limitations exist, it is possible to extrapolate beyond them and findings' limitations are noted.

We draw heavily on one source, Femenìas (2004) as this author quotes several other authors. The author's focus on "demonstration projects" supporting sustainability within the building sector was based on data collected in Sweden and the Netherlands and by an extensive review of many international sources including those originating in the United States. **Although much of the author's focus is on new construction, many of the findings are applicable to retrofits projects as well.** The author's work is based on the DOI model and derives empirical findings, with results that are applicable

to the implementation of the Demonstration Showcase element in California.

Femenìas (2004) states that "knowledge in the building sector is mainly developed through… practice, through the construction of projects" and tends to be "subjective and contextual" (Femenìas, 2004).

Limits to Innovative Knowledge

Femenìas (2004) presents "several factors that challenge" innovative knowledge related to energy efficient design and implementation within the building sector. These include:

- The "temporary nature of the building project," in that the "building project is usually considered a unique event," and usually lacks "long-term relationships between actors"
- "The fragmentation of the building process involving actors from different professional cultures at clearly defined phases" so that "knowledge is lost as actors in the project team enter and exit the process during its course"
- "The decentralised decision-making process and the ad-hoc problem-solving on the spot, which does not encourage long-term thinking"

However, the sources of knowledge within the building industry may indicate ways to reduce these limitations.

Sources of Knowledge

Linn (1998), paraphrased in Femenìas (2004), identifies three typical sources for building practices knowledge: "the products (buildings, landscapes etc.), written documents (documents from the process etc.), and the living praxis (with tools, methods, values, problem views etc.)." While the first two are "concrete and explicit", the third, praxis, "involves implicit and tacit knowledge." Femenìas (2004), paraphrasing Lundequist (1984), states that praxis is "an abstraction that is made up by the common ideas and patterns of actions carried out by an identified group of people." Praxis is the way things are done, based on guiding principles and informed by context. It is not just information; rather it is knowing how to react to information.

Examples of Knowing How to React to Information

Market actors in the building sector learn from examples to create praxis. They learn how to react to information which becomes internalized as knowledge. Schön (1984), as quoted in (Femenìas, 2004), highlights the importance of examples in the transmission of knowledge.

> *The example has an important role in the transmission of professional knowledge. The practitioner builds up a personal repertoire of precedent familiar examples, images, understandings, and actions to be used in new unfamiliar situations. Schön (1984)*

Femenìas concludes that "such a repertoire of 'good examples' is usually shared and developed by individuals in a profession…" Thus, to increase knowledge, exemplary demonstrations act as examples to highlight new concepts that market actors will use to guide their own unique projects.

Examples of efficient building, or exemplary demonstrations, have the potential to increase market actor knowledge regarding integrated energy efficient design because they offer an experience that

may start to affect their ability to react to information (i.e., their praxis). As paraphrased in Femenìas (2004), various writers (Molander, 1993; Lundequist, 1995b) believe "the example has the advantage of illustrating comprehensive views on a subject." The understanding of the complexity of the building will inform new decision-making situations (Femenìas, 2004). The literature supports the Demonstration Showcase element program theory of achieving changes in market actor knowledge and decision-making by providing exemplary Demonstration Showcases.

Context makes Examples Useful

Femenìas (2004) cites several authors and states "the transfer of experiences from a built example must include the contextual circumstances in which the building was produced." Since "a building project involves many contextual and unique conditions…that which is generally applicable has to be distinguished from that which is specific…in order to make the example useful." Knowledge dissemination-activities arising from exemplary Demonstration Showcases should highlight the concepts of the integrated measure design while incorporating the site-specific context that informed its implementation.

LITERATURE REVIEW RECOMMENDATIONS GOING FORWARD

In this section, we outline the following recommendations for the Demonstration Showcase program element. Notably, given the variety of Demonstration Showcase sites in development across the IOUs, not each recommendation will support implementation at every Demonstration Showcase site.

Overall, we make 11 recommendations from our literature review, 7 recommendations focused on how to effectively disseminate knowledge and 4 general recommendations about Demonstration Showcase design and implementation. Table 28 summarizes the key recommendations informed by the literature review by topic area. Following, the table, we discuss each recommendation at length, providing connections to the literature review findings.

Table 28. Summary of Key Recommendations Based on the Literature Review

Topic	Recommendation
Knowledge Dissemination	Design each Demonstration Showcase site as an experimental or an exemplary demonstration
	Pre-survey to understand and properly target attendees
	Emphasizing the process through which decisions were made to get to the integrated design is more likely to capture a market actor's attention
	Use case studies to capture context
	Create and tell a story
	Use key Diffusion of Innovations-defined players

Topic	Recommendation
Overall DS Design and Implementation	Expect that extensive management and administration will be required
	Bring all construction players on board to affect the industry network
	Keep projects focused but flexible
	Expect resistance to innovation from the building industry

Recommendations Related to Knowledge Dissemination

Design Each Demonstration Showcase Site as an Experimental or an Exemplary Demonstration, but not both

ETP staff should clearly consider the objectives of each project and for knowledge dissemination, it is important to not mix experimental and exemplary demonstrations activities at the same site. According to Dearing (2009), if exemplary demonstrations include the testing of unknown hypotheses that result in negative findings, market actor confusion increases.

> *A disconfirmed hypothesis that leads to a design improvement is a positive result in an experimental demonstration; in an exemplary demonstration, such an outcome is noise that will lead to perceptions of higher, not lower, uncertainty among potential adopters.*

Since at least some of the Demonstration Showcase program sites are focused on experimental demonstrations, the IOUs should carefully control the findings and not plan to broadcast them to the market actor community. In some cases, the Demonstration Showcase sites are designed to convince EE managers about customer receptivity to implementation of integrated design. Since ETP staff must expose customers to collect their feedback and perceptions, it is best to carefully recruit and control a sample of customers for whom the Demonstration Showcase site measures may be attractive. Depending on the needs of EE managers, one possible way to collect customer perceptions without broadcasting the Demonstration Showcase site specifics to a larger customer audience is to use focus groups. Focus group composition and selection can be based on the most relevant DOI adopter categories, i.e., the innovators and early adopters. The topics can include customer perception of the Demonstration Showcases' innovation attributes (i.e., relative advantage, compatibility, etc.).

If it is necessary to use the same Demonstration Showcase site for both experimental and exemplary demonstration activities, program managers should consider phasing the Demonstration Showcase site activities. A first set may include experimental activities, and the second set may include exemplary demonstration activities. For example, if the results of the experimental demonstration are positive, then there is some opportunity to open it to all relevant customer and market actor attendees.

One important caveat for this discussion is that it may be impossible to actually implement any of the Demonstration Showcase sites as true exemplary demonstrations. The reason for this is that many of the integrated measure implementations are customized to the specific site conditions and needs of the key stakeholders (e.g., owners, builders). Therefore, these sites are always new and, to some limited extent, unproven. In other words, there can never be the certainty of a 100% successful

implementation that defines a true exemplary showcase. Instead, the implementations are designed based on integrated models of proven technologies and the expected, but not guaranteed, success.

Overall, this should not be viewed as a problem and, when packaged correctly, can potentially facilitate knowledge transfer of adapted and applied integrated design. For example, knowledge dissemination activities to market actors can highlight the rationale for applying proven technologies to new situations. However, an inherent problem for ETP staff is to understand at what point the Demonstration Showcase project is so unproven with respect to new integrated applications and unique site conditions that it should not be presented to the market actor and end user communities as an exemplary demonstration. This is not an easy problem to solve, but we offer the following guidance: The chances of an exemplary demonstration succeeding should be left to engineering judgment based on the ease of modeling the project and the knowledge of the components of the integrated design.

Additionally, Demonstration Showcases are most successful when knowledge dissemination is careful planned (Van Hal, 2000). For example, experimental projects collect data regarding integrated solution performance, rather than attempt to transfer knowledge regarding these measures to market actors and end-users (exemplary projects).

As a result of these findings, we suggest that the IOUs:

- **Design each Demonstration Showcase site as an experimental or an exemplary demonstration.** We suggest that the IOUs determine whether each project is an 'experimental' or 'exemplary' showcase and consider technology, site, and target audience selection to shape knowledge transfer activities.

OR

- **Consider a phased approach for experimental and exemplary projects.** If ETP combines these showcase approaches, we suggest the approach be phased and begin with experimental activities to measure and collect evidence of the integrated system of solutions feasibility, followed by targeting contextualized knowledge transfer to identified audiences / attendees.

Pre-survey to Understand and Properly Target Attendees[29]

Several articles (Hayward and Rothenberg, 2004; Sarini and Strapparava 1998; Egmond, Jonkers and Kok, 2006) stressed pre-surveying attendees to understand aspects such as their existing levels of knowledge, their professional role or position, and into which DOI adopter category they may fall. With this information, knowledge dissemination can be tailored to the particular attendee or group, an important consideration in effective information transfer (Van Hal, 2000). For example, information provided to innovators might stress how the approaches are forward thinking and futuristic, while information provided to early adopters may highlight the ways the Demonstration Showcase meets the five innovation criteria (i.e., relative advantage, compatibility, complexity, trialability, and observability).

[29] At least one IOU indicated that, for each DS, they develop a communication plan to identify intended messages and the target audiences.

Pre-surveying can also contextualize changes in knowledge reflected on post surveys (Hayward and Rothenberg, 2004). This may be useful in understanding how effective knowledge dissemination efforts were to each adopter category.

Since tailoring content to adopter categories is important for innovation diffusion (Rogers, 2003), and since some of the Demonstration Showcase sites will remain accessible to the target audience throughout the program cycle and beyond, program managers should consider ways to disseminate information across the life of the site. One option found in the literature was the use of "hyperaudio" tours (Sarini and Strapparava 1998), which may be a good way to educate attendees/market actors at the appropriate knowledge level and point on the adoption curve. An initial questionnaire uses the visitor's interest and/or pre-existing knowledge levels to generate a self-guided hyperaudio tour. The following excerpt gives the gist of the tour mechanics, which could be updated to include tablet computers:

> *Each visitor is equipped with a palmtop computer endowed with headphones, on which an infrared receiver is mounted. Each meaningful physical location has a small (power-autonomous) infrared emitter, sending a code that uniquely identifies it. Exploiting the infrared signals, the system is able to identify when the visitor reaches a certain physical location and can activate a relevant portion of the information repository loaded on the palmtop. Meaningful information (is) selected and organized to be played as audio messages or displayed as follow-up links on the palmtop screen.*

- **If possible, consider pre-surveying potential attendees regarding existing levels of knowledge, etc.** Pre-survey information can be used to focus knowledge dissemination activities on appropriate attendee target groups.[30]

Emphasize Process

Based on empirical work, Femenìas (2004) concluded that emphasizing process over a prescribed set of measures is more likely to capture market actors' attention. Showing only the solutions or the resultant measures without the process through which the decisions were made suggests a closed solution set that lacks the flexibility and scalability necessary for other integrated projects. Since knowledge is created through the understanding of context, knowledge-increasing activities stemming from the exemplary Demonstration Showcases should be designed to focus on the decision-making process around the design and implementation of the integrated measures.

- **Discuss process in any documentation of the showcase.** Information regarding what was done to implement a demonstration showcase is required, but to help create knowledge, a discussion of the process that took place should also be provided. For example, a placard at a demonstration showcase could state something like "The architects and engineers considered five different systems before ultimately choosing the system in place. This back and forth added approximately three weeks to the timeline, but participants felt it was a worthwhile effort."

[30] At least one IOU indicated that they perform a pre-survey of the target audience when it is appropriate such as a retrofit project. However, they state this can be more difficult for new construction projects.

Use Case Studies to Capture Context

One way to document context is with the use of a case study. As applied to the exemplary demonstrations, a study could entail a thorough description of the design development process including the rationale and context for each decision. Several articles (e.g., Johnson et al., 2004, Femenìas, 2004, Cooke et al., 2007) cited the value of the case study for providing context and external generalizability to decision makers in the market. For example, Cooke et al. (2007) stated that building professionals and consultants should "use detailed case study information and use more informed 'holistic' approaches to decision making" to support the integration of alternative energy technologies. Notably, this fits in with the ARESH model in that co-researchers could present their experience with the project through case studies. ETP considers the final report as the case study.

Create and Tell a Story

Since the Demonstration Showcase projects incorporate integrated designs, a story of the design process and final implementation can provide structure for multiple details while imparting main messages. Hayward and Rothenberg (2004) make several points about how to effectively design and measure a zoo exhibit focused on increasing knowledge and urgency around animal conservation. We adapt a few of these to the exemplary Demonstration Showcase element. Generally speaking, the physical path through the Demonstration Showcase should be thoughtfully designed for increasing interest in the attendee. For example, at the start, the attendee should be told about how the Demonstration Showcase uses an integrated approach to save energy over a comparable building. The tour of the Demonstration Showcase should highlight or preview a few important measures responsible for the savings that the attendee will encounter later. Along the way, the tour should note and discuss key considerations that were part of the project implementation and show off impressive design or equipment features. The tour should end with a flashy summation of the energy savings and other key statistics.

One possible aid for flashy summation is the data display. Arner (2011) argues that data displays should elucidate the benefits of PV installations in green buildings. Similarly, educational and interactive data displays could also work at Demonstration Showcases sited with or without PV. Displays should highlight stakeholder benefits and offer adequate information on how to account for these benefits. Displays of ongoing energy use and dollar amounts could be shown next to the same metrics associated with the conventional buildings. The displays should be placed in high-traffic areas.

Green/ZNE Home Example

Next, we discuss how creating and telling a story might take place at a home retrofit tour. In a study of initiatives that encourage homeowners to participate in residential energy efficiency programs, Action Research (2010) quoted a program manager who indicated that green home tours may have limited success because "the retrofits are typically invisible and when they are visible, they aren't pretty." The study also asked respondents what types of information they would expect to receive by attending a retrofitted home tour. Respondents wanted to know how to save money (43.1%); the retrofit cost (35.3%); and how to reduce their energy use (24.6%). Combining these findings with those above, a successful home tour would likely need to:

1. Orient attendees to the project with an overarching idea or story (e.g., "through smart and attractive energy upgrades, we remodeled a house so that it has no net energy

impact on the grid.").

2. Preview or foreshadow key upgrades they will see and plan attendees' path through the home so that the most impressive or visually appealing upgrades are shown toward the end.

3. Use displays where energy efficient retrofits are otherwise not visible. For example, if energy efficient windows were installed, display a conventional window next to a low EE window outside facing the sun or in front of an incandescent light, so that attendees can hold their hands up behind the glass and feel the difference in heat transfer.

4. Make use of cutaways or cut outs in unoccupied model homes to showcase normally hidden upgrades such as insulation, insulated pipes, radiant barriers, tight ducts, etc.

5. Make retrofits attractive with auxiliary placards noting financial/energy savings.

6. Consider contracting a professional home stager to increase the appeal of model homes.

7. Conclude the tour with key statistics such as a list of financial/energy savings over a conventional home and the additional costs associated with the upgrades.

- **Contextualize information in case studies and other relevant dissemination methods.** We recommend tailoring content to appropriate attendee groups, especially through an emphasis on the context and concepts of each showcase site. Using a case study or a story are two ways that help focus attendees on the showcases' success; i.e., feasible realization of energy savings. These modes of knowledge dissemination give attendees the conceptual structure upon which to connect the details and the decisions associated with implemented integrated measures.

Use Key Diffusion of Innovations-defined Players

Various articles (e.g., Dearing, 2009, Femenìas 2004) stress the importance of using the key, DOI-defined players, i.e., change agents, opinion leaders, as well as "champions" to transfer knowledge to market actors and end users. Expanding on the definition listed above, we start with change agents, whose role "is one of advocacy, information, and implementation support (Femenìas, 2004)." The change agent needs to be technically knowledgeable and understand integrated design. Second, the change agent must "seek out and intervene with the client system's opinion leaders, paraprofessional aides, and innovation champions (Dearing, 2009)," possibly identified through attendee surveys. Demonstration Showcase program managers should consider who within their organization can serve in this capacity. Focusing mainly on opinion leaders and champions yields the best return on the change agents' time. Dearing (2009) explains that the proper focus makes for efficient dissemination:

> *When all is said, the promise of… diffusion practice is a promise of efficiency in intervention: Communicating an innovation to a special small subset of potential adopters so that they, in turn, will influence the vast majority of other potential adopters to attend to, consider, adopt, implement, and maintain the use of worthy innovations. – Dearing 2009*

Next, we turn to innovation champions, those who fit into the earliest DOI category, "Innovators." These earliest adopters are usually located within the market actor organization but also occasionally operate outside of it. Van Hal (2000) states that the chance of successful diffusion increases when one

of the members of the project team acts as an innovation champion. Notably, the ARESH model suggests that the co-researchers can be used as a kind of champion to broadcast the Demonstration Showcase findings to other market actors within the building sector. However, innovation champions are generally considered to reside within the client, i.e., market actor, organizations and can be good information dissemination targets for change agents. As champions, they are both technically knowledgeable and help to overcome internal barriers to implementation. To some extent, they influence opinion leaders.

Although it is important to get the champion buy-in, these DOI actors are not usually responsible for widespread innovation adoption. Change agents should also focus on opinion leaders, who in turn are able to influence a large portion of market actors. Dearing (2009), paraphrasing other authors' states that opinion leaders are most effective under certain circumstances:

> *In dissemination intervention, opinion leaders are especially effective when they are not asked to do too much. Asking opinion leaders to advocate, persuade, promote, or educate in ways they normally would not with their colleagues is asking them to risk their status within the system in question by formalizing what is an informal role.*

How should change agents balance their focus between champions and opinion leaders? To some extent, this question is answered by how radical the innovation is perceived to be. Dearing (2009) explains that the more radical an innovation is, the more likely it is that the change agent should focus on the champion:

> *Opinion leaders are perceived as expert and trustworthy precisely because of their relative objectivity regarding innovations. Indeed, most of their judgments about innovations are negative. One implication of this tendency is that innovations perceived as radical are especially likely to be rejected by opinion leaders and, thus, are better targeted first to innovators who are sources of information for the opinion leaders in question.*

Recommendations Related to General Program Implementation

Although we conducted this literature review to primarily focus on the transfer and increase in knowledge, we came across findings relevant to information provided through the interviews with ETP staff. The following section lists findings beyond knowledge dissemination that may be useful for ETP staff to consider. One caveat is that these topics were not exhaustively researched and so the findings should not be viewed as exhaustive. Nonetheless, we believe the associated recommendations are appropriately balanced considering the limits of the literature search. Given the variety of Demonstration Showcase sites in development across the IOUs, each recommendation may support each Demonstration Showcase site differently.

Expect Resistance to Innovation from the Building Industry

ETP staff should expect resistance to innovation from the building industry. Compared to many other industries, several authors (e.g., Dulaimi et al., 2003; Femenìas, 2004; Lovins, 1992) conclude that the building industry is especially innovation-resistant, which undermines both knowledge build-up and innovation implementation. Lovins (1992) explains that the industry consists of market actors who complete their work without regard to the larger vision of the project, using conventional and

inefficient practices. Since there are so many actors participating at once together, the overall network naturally forces compliance with convention:

> *…many of the roughly two dozen actors who play a role in this process have perverse incentives that reward inefficient practice. Fragmented and commoditized design, false price signals, and substitution of obsolete rules-of-thumb for true engineering optimization have yielded buildings that cost more to build, are less comfortable, and use more energy than they should. (Lovins, 1992)*

Given the intrinsic, resistance to innovation position of the industry, any positive, small effects that the Demonstration Showcase element has on the market actor community should be viewed as a success. For this reason, some authors (e.g., Femenìas, 2004) stress that innovation in the building industry may best be encouraged through gradual steps from conventional building to fully sustainable buildings. Although much of the author's focus is on new construction, many of the findings are applicable to retrofits projects as well.

Expect that Extensive Management and Administration will be Required

ETP staff should expect the Demonstration Showcase projects to require extensive management and administration in two ways. Both stem from the fact that the Demonstration Showcase projects consist of innovative elements and therefore require cooperation from stakeholder partners that trust the innovative approach. Several studies (e.g., Lovins, 1992; Femenìas, 2004; Anderson et al., 2004; Van Hal, 2000) suggest that Demonstration Showcase processes require extensive coordination among stakeholders to initiate and complete. Notably, this was a challenge cited by some program managers during the interviews. First, Demonstration Showcase projects require finding stakeholder partners who trust and value innovative design and implementation, a difficult process especially during the current economic downturn. Many resources can be exhausted locating suitable partners and sites for Demonstration Showcase projects. Second, since market actors often work apart from each other to complete their tasks on a conventional project, project implementation requires a committed project manager or "project champion" (see above) who understands how the integrated measures fit together and ensures that project integrity is not lost as market actors rotate in and out of the project per their tasks. Although resources are drained in provisioning an overall project manager, if this actor's reflections are brought forth during knowledge dissemination activities (see ARESH model and case studies above), then an additional return on the investment can be realized. We make no specific recommendations around how to ameliorate this challenge, but bring it forward as a given that this is a difficult and lengthy process to implement.

Bring All Construction Players On Board to Affect the Industry Network

Since the building industry network includes so many actors (e.g., owners, financers, architects, engineers, contractors, etc.), innovation by any of them will be a direct challenge to the network itself. As Andersen et al. (2004) explained,

> *Resistance will meet initiatives taken by any single actor, as they may challenge the effectiveness of the existing network, or lead others to bear the risk of implanting new technologies (Andersen et al., 2004*

For Demonstration Showcase projects to affect the industry, a majority of market actors will have to be

reached simultaneously. Femenìas (2004) summarizes empirical studies that support this point.

> *The empirical studies show that actors within the building sector are opposed to the extraordinary or ideological experiment that fails to address the majority of the actors in the sector and that consequently falls outside the sector's main agenda. Instead, the empirical studies point out the advantage of an incremental and successive development through realistic (and economically justified) projects using technology and methods applicable on a broad scale. (Femenìas, 2004)*

Persuading so many market actors at one time may not seem feasible, but this memo has outlined some general strategies beyond effective knowledge dissemination upon which such an effort may be considered. For example, it is not necessary to reach all market actors at once; instead, the DOI theory states that the first step is to identify and target key players such as the innovators and opinion leaders within each organization.

Keep Projects Focused but Flexible

Several authors' findings (e.g., Femenìas 2004, Macey & Brown 1990, Johnson et al. (2004) suggested that projects aimed at spurring innovation should be focused but flexible, accommodating the range of the needs of the stakeholders that comprise any Demonstration Showcase project. Johnson et al. (2004), discussing energy efficiency innovations, generally emphasize that there has to be a combined focus on the technical capabilities and the needs of other stakeholders:

> *Too exclusive a focus on the technical capabilities of the product must be avoided and tempered with respect for the interests of all intermediaries and influencers. All innovations are disruptive, but if too challenging to existing practices and interests of any key actor in the marketplace, risks of failure are greatly increased." (Johnson et al., 2004)*

Macey and Brown (1990) state that the success of demonstration projects rests on the flexibility of the project while incorporating user need:

> *Rigid program designs should be avoided. Flexibility is needed to accommodate user input on modifications to improve effectiveness. (Macey & Brown, 1990)*

This flexibility also includes prioritizing aesthetics. Citing other studies and based on her own empirical work Femenìas 2004 suggests that energy efficient building Demonstration Showcases may suffer if some market actors' aesthetic concerns are ignored.

> *The contemporary discourse on sustainable building often overlooks architectural quality and aesthetics as being criteria of importance. As a result, visions and objectives for sustainable building have often failed to address the interest of architects. (Femenìas 2004)*

ETP staff appear to have already incorporated this recommendation as found through interviews with IOU staff. Some respondents described the flexibility of the Demonstration Showcase project implementation through working to meet owner and end user needs as well as taking advantage of opportunities that other actors (e.g., manufacturers) presented.

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R. REVIEW ON MARKET STUDIES

To help assess how the design of MBS compares to other uses of these types of studies, the evaluation team performed a short, focused literature review. To focus this review, the Opinion Dynamics evaluation team drew heavily from the goals, objectives, and the Program Theory Logic Model outlined in the PIPs[31]. According to the PIP, MBS should

> "*involve targeted research on customer behavior, decision making, and market behavior to gain a qualitative and quantitative understanding of customer perceptions, customer acceptance of new measures, and market readiness and potential for new measures. Studies may involve primary research, such as studies of potential measure impacts and barriers, market segment needs and gaps, technology performance gaps, pre-studies to qualify potential measures and sites for scaled field placements and demonstration showcases, measure usability studies, long-term market potential studies for the ETP, and the like*."

Additionally, the PIP states Objective 1.5 for MBS to:

> "*perform targeted studies of customer behavior, decision making, and market behavior to gain understanding of customer/market perception and acceptance, and to identify potential barriers to measure adoption*."

Based on these, the following search terms and phrases were deemed appropriate for conducting the literature review[32]:

- Best practice in product adoption market intelligence
- Effectiveness of market intelligence for product adoption
- Market and behavioral studies - emerging technologies
- Rate of adoption – new technologies
- Market intelligence – best practices
- Commercialization of New Technology – best practices

The search engines used were Google and Google Scholar. Notably, these searches generated several potential leads. We also reviewed all sources' references and, in a few cases, this resulted in a new source. The relevant articles and papers found are cited throughout this memo.

[31] Although the SCE PIP is sourced, the ETP PIPs for each of the other individual IOU submissions (SCG SW Emerging Technologies Final.doc; SDGE SW Emerging Technologies Final.doc; and PGE2108 ET SW PIP 01-2011 no redline.pdf) use similar descriptions

[32] The search terms and parameters presented in the table are not exhaustive of all that we are using in this literature review.

This section discusses the three process frameworks and two conceptual frameworks relevant to MBS uncovered by the literature review:

- Process Frameworks for New Products
  - Stage Gate Framework
  - Set Based Design Framework
  - Integrated Design Framework,
- Conceptual Frameworks for Increasing Market Share
  - Market Intelligence
  - Diffusion of Innovation

These frameworks are useful for understanding the best practices for using market and behavioral studies when dealing with emerging/new technologies.

The evaluation team literature reviews findings, presented next, describe what these frameworks are, provides graphics for each, and pulls in how each may be relevant to ETP. The IOUs already use several of the points below within their implementation of ETP.

1.17.1 Process Frameworks for New Products

While ETP does not actually develop new products, the use of marketing by companies within the creation of products provides a good understanding of the integral nature of this type of information. Successful New Product Development (NPD) requires a conceptual framework within which to work. There are several frameworks which have been proposed by researchers and are being used by industry specialists. This section relies heavily on the research by Ettlie (Ettlie, 1997 and Ettlie, 2006).

Three process-type frameworks in particular are discussed to help understand the complexities for NPD; namely Stage Gate, Development Strategy, and Integrated Design. According to Ettlie, it is not just following the specific outlined processes, but the frameworks can be successful only if the company culture incorporates practices and resources to assure:

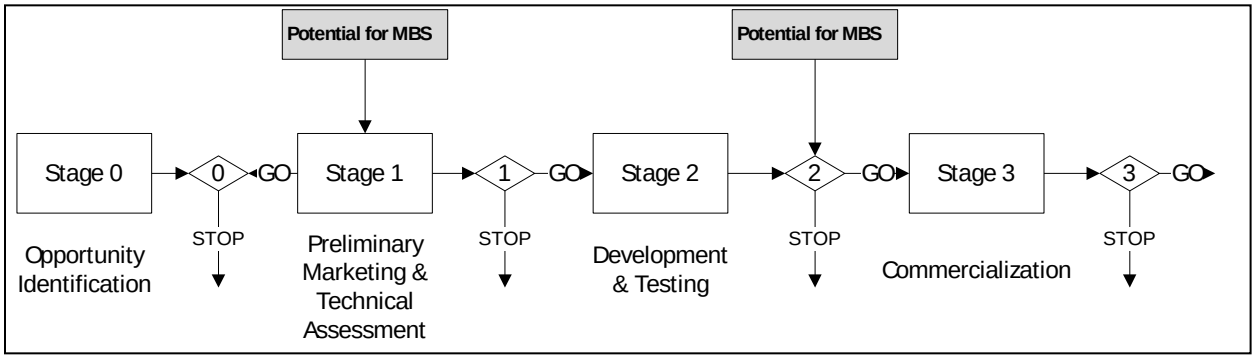
- Customer perception of product advantage is known: new product has to be clearly better on quality, cost-benefit and function
- Protocols are in place to create a first rate marketing and technical departments
- Proficiency in marketing activities is key: market research has to be excellent to know needs, sales, services etc
- Strategy for project is agreed throughout the company: corporate strategy and new product goals have to be consistent

Next is a description of the process frameworks followed by the conceptual frameworks.

Process Framework #1: Stage Gate

A framework for successful NPD is the stage gate process, popularized by Professor Robert Cooper. Users of this process have argued that it speeds up processes, promotes better quality products, provides greater integration across disciplines and allows for better performance across a company. The stage gate framework allows for research and testing to be performed throughout the product life cycle which in turn allows the product to constantly undergo changes. The framework is visually shown in Figure 2 below (Ettlie, 2006).

Figure 2: Stage Gate Process



Source: Ettlie, 2006 with gray boxes added by evaluation team

As shown above, Stage 1 supports a clear understanding of the market before a go/no-go decision is made to perform the next step (development and testing). While not specifically shown in the figure, learning about customer acceptance after Stage 2 also supports a go/no-go choice. Both are areas where ETP could use MBS – in Stage 1 to support selection choices and after Stage 2 to support information required by the energy efficiency programs for marketing to customers. The framework clearly shows when choices are made and lends itself to many of the requirements of stakeholders for ETP around understanding what is occurring when and why choices are being made.

SCE uses this type of process within ETP as they implement the stage gate process for all their ETP projects. SCE has MBS projects that are comparable to the Stage 1 box above as well as gathering data around customer interactions, comparable to post-Stage 2. While not using the stage gate process per se, PG&E also has MBS projects that are comparable to the Stage 1 box above as well as gathering data around customer interactions, comparable to post-Stage 2.

The evaluation team notes that this stage-gate process used by SCE seems to have helped clearly identify to the evaluation team many of the choices made. SCE created selection tools specifically for each element, a possible by-product of this process.

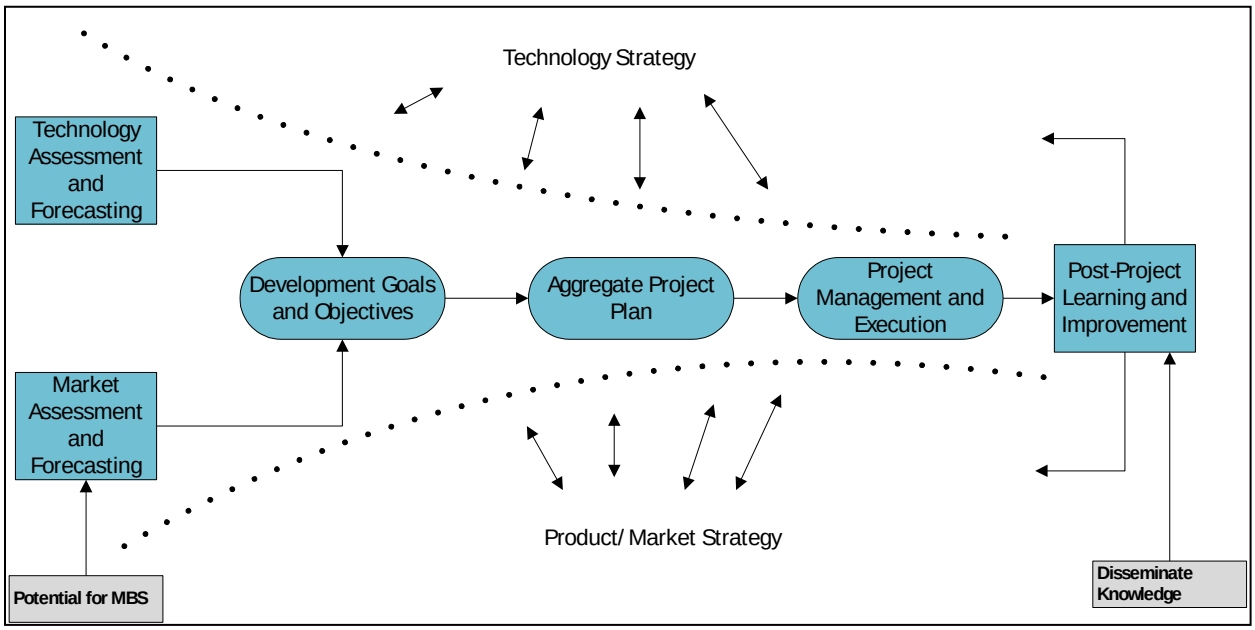
Process Framework #2: Set Based Design

The set-based design framework was coined in 1987 by researchers Ward and Seering and refers to "a process of specification development that gradually narrows options by eliminating inferior alternatives until a final solution is reached". This helps companies understand the technical viability and feasibility of new products. Market strategies play an important role in focusing efforts towards clear set of development goals and objectives and systematic learning and improvement for the product. For ETP, this framework brings out the need for understanding of the market to make selection choices as well

as the essential post-learning and improvement feedback.

The framework is visually shown in Figure 3 below (Ettlie, 2006).

Figure 3: Set-Based Design



According to Ettlie (2006), some of the advantages of using this framework include (a) reliable and efficient communication (as all disciplines must agree on decisions and consequences of those decisions), (b) greater parallelism in the process since all disciplines can start planning together to ensure synergies between products and between product stages, (c) decisions are based on data (early decisions are based on data which can hugely effect product design and impact), and (d) promotes institutional learning (due to immense documentation and collaboration).

This process sounds like a positive and useful process as the CEESP desires collaboration and data-driven decisions are clearly defendable. The drawback seen by the evaluation team is almost the same as the positives – immense documentation and collaboration all slow down processes. In our experience, collaboration slows down projects and can increase costs due to the need for more meetings. This drawback should be acknowledged as one of the differences between the application of this type of framework in the public versus the private sector and is, most likely, a needed component.

Process Framework #3: Integrated Design

Research has found that the commercial success of new products depend on the firm understanding needs of the market i.e. the customers. These needs have to be converted into product attributes for the product gain traction with the consumers – this conversion of needs is profitable when skill sets are integrated to synergize the development process. Integration means to have a disciplined approach to design – examples include job rotation, permanent transfers across disciplines (including design, manufacturing, engineering etc), and compatible and common software systems across disciplines (Ettlie, 2006). The three factors that promoted the integrated design framework are:

- Method benchmarking: determining which firms have best practices for NPD, what that means for

your company, and adopting appropriate best practices. This is an important factor for ETP.

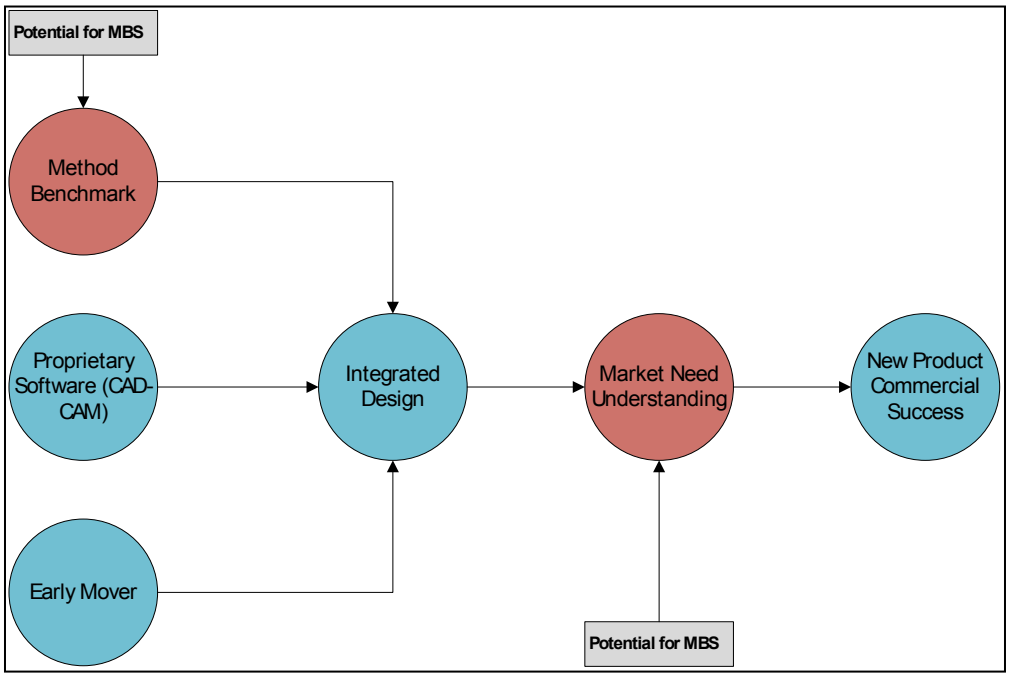
- Early Mover Strategy: the company can harness the advantages of being an early mover only by sustaining a product and company culture which cannot be replicated by their competitors. This is not an important factor for ETP, but is provided for completeness.
- Computer-aided-Design (CAD): a company should have CAD systems that are proprietary and innovative and fit the unique product requirements. This is not an important factor for ETP, but is provided for completeness.

The most relevant of these three factors for ETP is the first one shown – adopting appropriate best practices. The four IOUs are not competitors for products, but are part of a statewide team supporting California. Through meeting as a group and discussing how each can benefit from useful practices applied by other IOUs, but within the context of their own company culture, a form of method benchmarking can occur that is beneficial to all ratepayers.

This integrated design process uses market data to assure new product commercial success, another relevant area for ETP. It is through understanding the market for emerging technologies that can help assure success if transferred into the energy efficiency portfolio.

The one take-away from this framework is the method benchmarking opportunity. The framework is visually shown in Figure 4 below (Ettlie, 1997).

Figure 4: Integrated Design



Common Factors in the Process Frameworks

These frameworks describes above help in the successful commercialization of new product. A framework does not need to by slavishly followed, although it is helpful to name the processes used to

assure appropriate resources are in place and there is clear understanding of what is occurring and why.

Important ideas from these process frameworks that are applicable to ETP and specifically the MBS element of ETP are:

- *Sharing of process practices (not just project information) is essential*: work together to benchmark useful ETP process practices and adopt those that fit within the specific IOU culture.
- *Understanding of the overall market is key*: study not just the product but the overall market as well to make selection choices.
- *Customer and User needs must be known*: allocate resources to study needs, using appropriate customer research methods.

1.17.2 Conceptual Frameworks for Increasing Market Share

Regardless of the type of process framework used within a company to get new products into the market, the rate of adoption of new products (and hence market share) is dependent on several factors – such as perceived benefits over alternative products, price and ongoing costs, ease of use, promotional effort, and compatibility with existing standards and values. The literature review findings lay out two conceptual frameworks that, if followed, help increase market share – market intelligence and diffusion of innovations.

Conceptual Framework for Increasing Market Share #1: Market Intelligence

In order to find out customer preferences for products as well as to understand the overall market for products, it is important to gather market intelligence and conduct appropriate market and behavioral studies.

What is Market Intelligence?

According to a study conducted by First Resource, a market research firm, a survey of 16 marketing executives across industries, market intelligence is decision-centric where there is an emphasis on gathering relevant information from a wide variety of strategically chosen sources. The key benefit for gathering market intelligence is that it is a reliable and all-encompassing backdrop for confident decision making and answers to these fundamental questions of 'what do we need to know', 'what do we want to know', 'what decisions will we be able to confidently make as a result' and 'can we afford not to know' (Bernhardt, 1994). Thus, First Resource (2009) defines market intelligence as:

- A process, not a product
- Both quantitative and qualitative
- Dynamic, not static
- An ongoing activity, not a one-time snapshot
- Multifaceted—considers customers, influencers, Industry watchers, and channel players
- Cross-functional—it brings together perspectives often siloed by different groups (sales and marketing)

- Has a focus on external market data

Market intelligence helps in bring attention to marketing and sales initiatives, determine market potential, forecast product demands, aid sales forecasts, add input to R&D initiatives, define buyer behaviors, guide production and distribution adjustments and improve sales conversion rates (Lackman, 2000). This is a broad conceptual framework with several useful ideas for the ETP MBS element. As such, we delve into details next.

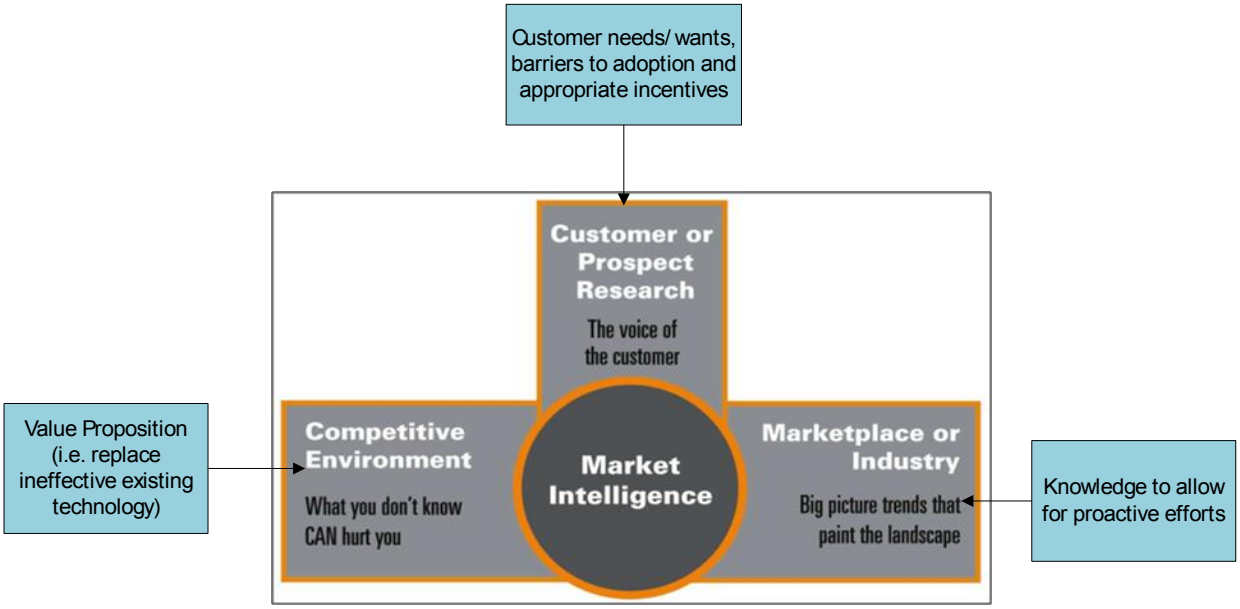
Focus Areas

Market intelligence focuses around three main categories; customer, competitive environment and the industry (First Resource, 2009).

Customer Focus: zeroing in on what customers want and need is the most important purpose of any market intelligence. By conducting customer interviews, a company can learn how their company is perceived (trust in organization and general attitudes toward your policies, products, and services, and belief in your brand). Additionally, customer needs (current pain points, complexity of their decision-making processes), product receptivity (how your product will be used and whether it dovetails with existing products and system) and barriers to product adoption (financial, technical, legal, operational, etc) become clear. Customer interviews can also help reveal which customers have similar needs, wants, and characteristics, what it will take to have continued success in various segments, if any customer changes have occurred that may devalue a targeted segment, what specific competitors are doing to capture market share and which ones are showing weakness that can be exploited.

The customer perception of the IOUs is not important for ETP to perform its work, but understanding customer needs, product receptivity, and barriers to adoption is valuable for emerging technologies to perform well in the marketplace. As such, MBS should focus upon these important areas, and have focused here. The IOUs planned to use MBS resources to research needs and barriers, and implemented the plan as shown by multiple customer-focused studies.

Figure 5: The Three Pillars of Market Intelligence



Competitive Environment Focus: in order to develop a differentiation strategy it is extremely important to understand the competitive environment, both what the competitors are doing and planning now as well as their capabilities for the future. Competitor intelligence assesses company-level elements such as service delivery, sales and marketing capabilities, branding, finances, etc. Such an analysis can help compare competitive strategies and drives differentiation in product line benefits (features): pricing, positioning, and product line extensions. This will also help understand customers better – in terms of the affinity customers have for loyalty, switching to another vendor, or doing business with multiple vendors – and thus how to defend against customer attrition. An analysis of the competitive environment also helps determine a company's product positioning and how it stacks up to competition, as well as the best opportunities for greater differentiation

For ETP, the competitive environment focus is not really about the ability to differentiate a product between one company and another, but to differentiate between an energy efficient product and one that is either not efficient or only of standard efficiency. As such, all of ETP's selection tools should have a value proposition component to help select appropriate technologies. For example, SCE's MBS selection tool allows for this differentiation (see Appendix H).

Market or Industry Focus: moving beyond customer and competitive environments can help monitor overall market or industry activity that could potentially affect the company – including but not limited to regulators and watchdog agencies, professional groups and societies, standards setting entities, public opinion, distributors, integrators, OEMs, and trade press. Customers rarely have a forward view of technology trends or any of the macro forces that impact any particular industry category. Thus, having an industry focus can help identify and track major trends that can affect the business, stay current on analysis by industry professionals, and maintain a professional relationship with the market influencers mentioned above.

This is also a key area for ETP to focus studies. However, to make this more applicable to this area, one should slightly change the idea from thinking about how market activity could affect a company and instead think about how activity within the market can affect market share of emerging energy efficient products. Important points about this area is that 1) it is not simply about a study to understand the market, but maintaining relationships with market influencers and 2) monitoring areas outside of the IOUs is needed to understand the market.

Purposes of Market Intelligence and Study Types for each Purpose

Companies typically put the three pillars described above into action through studies. Market intelligence can be used to assist with almost every decision faced by a company, and even though the purposes of market intelligence are constantly evolving, they help in making a company grow – to increase revenue, profit, or market share. The only relevant use of market intelligence for ETP is to help increase market share for emerging technologies. Table 29 shows the key purposes of market intelligence, and the type of market research or market intelligence study that is typically used to meet these requirements.

Table 29: Purposes of Market Intelligence, Associated Studies, and Applicability to ETP

Purpose	Type of Study that typically meets purpose	Applicability to ETP

Minimize the risk of an investment decision being wrong	Market assessment studies	Important for ETP to enable action plan that proactively pursues specific goals
Help enter new market, or expand presence in a market	Market entry and market expansion studies	Important for ETP to understand possible barriers to emerging technologies
Give the customers what they want, expand market share	Needs assessment studies	Important for ETP to help support the energy efficiency portfolio if the emerging technology is included in that portfolio
Tailor products and marketing efforts around customer needs	Segmentation studies	Less important for ETP per se, but EE Program managers may need information about an emerging product for appropriate marketing
Keep ahead of the competition, obtain first-mover advantage over competitors	Competitor intelligence study	Not relevant for ETP, but provided for completeness
Minimize the risk of an investment decision being wrong	Market acquisition studies	Not relevant for ETP, but provided for completeness
Establish and maintain a distinctive corporate identity	Corporate positioning studies	Not relevant for ETP, but provided for completeness

Source: Harrison (2011) for first two columns and evaluation team for last column on the right

A nice feature of the market intelligence concept is that it differentiates between existing and new products and existing and new markets and provides guidance about when to use which type of study. While ETP typically performs assessments of devices that are incrementally better than what is in the marketplace (and hence existing products), CEESP strives for "game-changing" products that are most likely going to be new products, so market intelligence studies on new products are relevant. Additionally, ETP looks at products used within the broad existing markets of residential, commercial, industrial, and agricultural. By expanding this idea of what is a "new market" to be synonymous with the market for an emerging technology, albeit with the same customers (as everyone uses energy equipment), market intelligence for new and existing markets are relevant for ETP.

Depending on the purpose, Harrison (2011) provides guidance on the type of studies to perform to help answer questions by existing/new product and existing/new market. Table 30 shows the different types of studies for different product and market types.

Table 30: Market Intelligence Report Matrix

	EXISTING PRODUCTS	NEW PRODUCTS
EXISTING MARKET	<u>Differentiation</u> *ETP Type Studies* • Segmentation studies *Not ETP Type Studies* • Competitive intelligence studies • Corporate positioning studies	<u>Product Development</u> *ETP Type Studies* • Needs assessment studies • Segmentation studies *Not ETP Type Studies* • Concept testing studies

NEW MARKET	Market Development *ETP Type Studies* • Market assessment studies • Market entry studies • Market expansion studies *Not ETP Type Studies* • Acquisition studies	Diversification *ETP Type Studies* • Market assessment studies • Market entry studies *Not ETP Type Studies* • Acquisition studies

Source: Harrison (2011) for report types and evaluation team for binning of studies into ETP and not ETP types

The means of gathering market intelligence vary according to the objectives of the intelligence. Harrison proposes that companies wanting information on customers and gaps for existing or new products use Needs Assessment and Segmentation studies to gather the desired data. These studies are most useful for ETP, given that their primary focus is on new technologies entering existing markets.

Needs assessment and segmentation studies are based on two key sources of information – customers and potential customers. The topic areas covered by both are similar, both referring (in different levels of detail) to how the decision-making process and buying process work, requirements from a supplier and views on suppliers. However, the two types of project vary greatly in terms of output, and complexity of analysis.

- Needs assessment is a means for determining and addressing needs, or "gaps" between current conditions and desired conditions. By clearly identifying the gaps, resources can be appropriately directed towards developing and implementing a feasible and applicable solution. Hence, needs assessment studies have direct input into identification of markets/customers and resource allocation.
    - Concept testing (is a specialized form of a needs assessment that can be used to identify gaps) is a means to identify key product and market information that is valued by the potential customer. By understanding customer attitude of a new product, appropriate reshaping or redefining of the product can be done to increase the potential for market acceptance. Additionally, concept testing can help identify segments of the population in which the appeal of a product is likely to be concentrated. Hence, concept testing studies have direct input into identification of markets/customers and product development.
- Segmentation is a means of differentiating oneself from the competition, in order to increase profitability. The most effective type of segmentation – needs-based segmentation – is based upon quantitative data on the target market's requirements. The target audience is broken down into groups of companies with similar needs. Each of these groups is then targeted (or not targeted) on the basis of these needs and the likely profitability of the segment to the supplier. Implementing the segmentation takes the form of developing and marketing different offerings for each of the chosen segments. Hence, segmentation studies have direct input into product development and marketing creative.

Alternatively, Harrison proposes that companies wanting information on new markets for existing or new products use Market Entry, Market Expansion and/or Market Assessment studies to gather the desired data. While ETP focuses mainly on existing markets for new technologies, conducting studies

focused on new markets can also help in understanding customers and market needs and gaps.

Market entry and market expansion studies are a means to identifying and understanding the various methods for dissemination of an existing product into a new and targeted market. Hence, these studies have direct input into identification of markets/customers and resource allocation. These studies are based on gathering information from the following sources:

- Potential buyers: to ascertain how much demand there is for the product/service
- Distributors, agents and other intermediaries: to find out how to best get products and services to market, and again to ascertain how much demand there is for the product/service
- Competitors: to find out how other companies have successfully entered and stayed in the market, and judge the market's likely response to a new entrant
- Industry experts such as journalists and industry associations: these organizations can frequently provide a quick and concise overview of the market, as well as numerous leads in the form of contact details of market players

Similar to these studies, market assessment is a means to cross-checking a decision that has largely been made, rather than exploring a completely new market or opportunity. In other words, these studies are the due diligence on whether the target market is appropriate for a particular product. Market assessment studies are based on gathering information from the following sources:

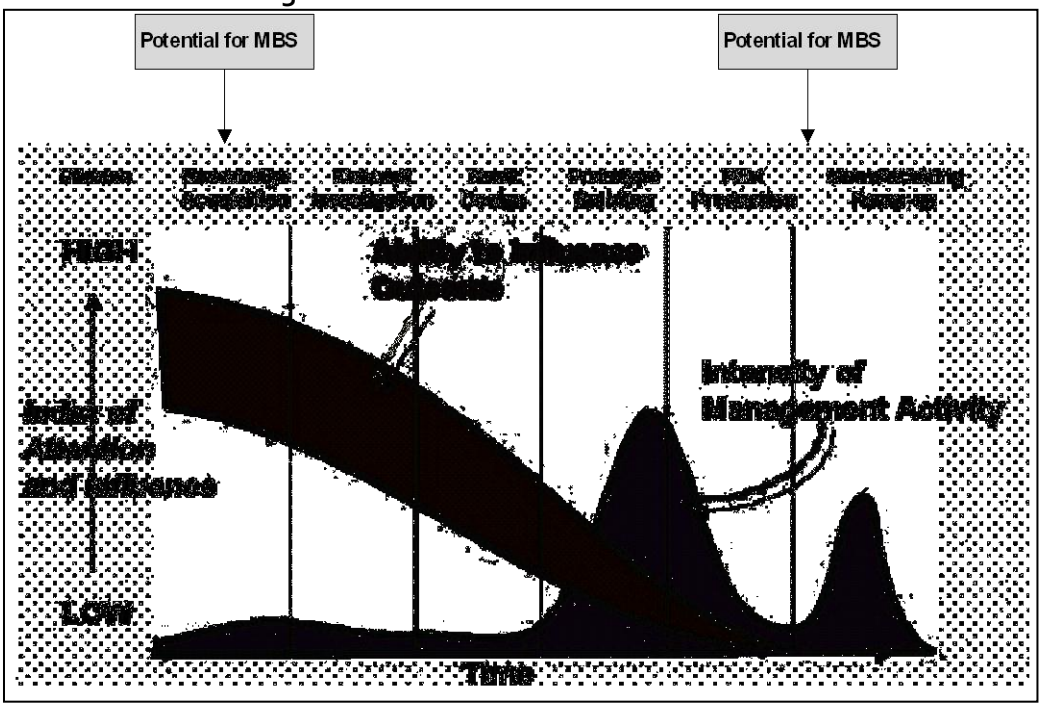
- Interviews with the acquisition targets themselves: to gauge their strategy, intentions, performance and characteristics
- Interviews with competitors of the acquisition target: to assess their views of the company's strengths and weaknesses as well as the strategy, intentions, performance and characteristics of the competitors
- Interviews with customers of the acquisition target: to gauge the reputation, performance and brand values of the acquisition target, as well as pick up 'industry gossip' regarding issues such as the target's financial status
- Published information such as annual reports and industry reports
- Suppliers and distributors to the acquisition target

Alternatively, companies wanting information on customers and gaps for existing or new products use Needs Assessment and Segmentation studies to gather the desired data.

Thus market entry, market expansion and market assessment studies tend to rely on qualitative information gathering. Whereas needs assessment and segmentation studies tend to rely on more quantitative data and analysis.

As explained above, it is important o conduct the appropriate type of study to gain the most useful information. Equally important is the timing of when to conduct the study. In Hayes (1988), the idea of the best time to influence the outcome of a new product is brought forward. While describing management activity, it is clear that paying attention early on within a process enables higher ability to influence. For ETP, gaining market intelligence early in any process through MBS can focus where to put resources to influence the outcomes desired within CEESP. Figure 6 shows attention is most beneficial in the early stages of the product life cycle.

Figure 6: Index of Attention and Influence



Source: Hayes, 1988

Market intelligence, as described above, can be somewhat prescriptive when thinking about studies used, but is more about a culture of wanting to understand the ultimate user of a product and enabling appropriate choices. For ETP, market intelligence can play two roles. Market intelligence could be a cornerstone of any plan to proactively pursue specific technologies for development support or assessment. Additionally, understanding specific customer barriers to emerging technologies is required to help increase market share.

Conceptual Framework for Increasing Market Share #2: Diffusion of Innovations

The second conceptual framework for increasing market share is specific to innovations. Unlike market intelligence, it is not about understanding a specific market for an emerging technology. It is about understanding the communication channels and getting to the right people to cause ideas to diffuse throughout a society. The Diffusion of Innovations (DOI) is a conceptual framework first introduced in the 1960s by Rogers (Rogers, 2003) and built upon by others such as Dearing's "Dissemination Science" (2009) and discussed in Moore's Crossing the Chasm (Moore, 2006). Because of the close ties to emerging technologies and especially to any "game-changing" technology (which is assumed to be very different from current technology), the framework needs to be discussed. However, this framework presents several ideas, but is more useful for ETP as implemented across all elements and not as specific to MBS. Some of the key concepts are reviewed below.

Rogers states that "diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system"; and "communication is a process in which participants create and share information with one another in order to reach a mutual understanding."

(Rogers 2003: 5). There are four main elements of this theory:

5. Innovation-includes five different attributes that affect how fast adoption of an innovation occurs.
    a. "*Relative advantage* is the degree to which an innovation is perceived as better than the idea it supersedes.
    b. *Compatibility* is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
    c. *Complexity* is the degree to which an innovation is perceived as difficult to understand and use.
    d. *Trialability* is the degree to which an innovation may be experimented with on a limited basis.
    e. *Observability* is the degree to which the results of an innovation are visible to others." (Rogers 2003: 15)

Through typical market research, MBS can determine customer perceptions across relative advantage, compatibility, and complexity for an emerging product. Trialability and observability are best determined through other avenues (such as scaled field placements or demonstration showcases).

6. Communication-the many ways in which people learn about an innovation:
    a. Those with knowledge transfer it to those without. There must be a degree of difference between the two groups, i.e., not all from the same group, such that knowledge can spread throughout the groups as opposed to staying contained within one.
    b. Communication channels are either mass communication channels (i.e., radio, TV, newspapers) or interpersonal channels. Mass media can create awareness and knowledge of innovations but it is the interpersonal channels (i.e., a face-to-face exchange) that are more effective at persuading someone to accept an innovation (Rogers 2003: 18).

MBS does not play a role in this part of the DOI theory.

7. Time- covers decision-processes and adopter categories
    a. Decision-processes: incorporating innovation is sensitive to people's perception of the "newness" of the innovation and is reflected in five stages. The decision-maker must have 1) knowledge of the innovation; then, 2) be persuaded; then, 3) decide to implement and 4) actually implement the innovation; and 5) confirm or maintain the implementation decision.
    b. Adopter categories: these categories highlight characteristics within a population and how these affect when an implementation may occur.
        i. Innovators (Venturesome). This group is able to cope with a high degree of uncertainty about an innovation at the time they adopt. They tend to have more financial resources to help cushion losses.
        ii. Early Adopters (Respect). Early adopters help trigger the critical mass when

they adopt an innovation. The early adopter decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near peers through interpersonal networks.

iii. Early Majority (Deliberate). The early majority interacts frequently with their peers but seldom hold positions of opinion leadership in a system.

iv. Late Majority (Skeptical). This group must be pressured by peers to adopt. Their relatively scarce resources mean that most of the uncertainty about a new idea must be removed before the late majority feel that it is safe to adopt.

v. Laggards (Traditional). The laggard's precarious economic position forces the individual to be extremely cautious in adopting innovations.

Others have performed several studies look at the decision-making process and segment people into one of the adopter categories. MBS is less needed here, although could be used to create a baseline for a specific products to enable later tracking of adoption.

8. Social system-the community or population in which diffusion is expected to occur. Rogers explores "how the system's social structure affects diffusion," and includes several topics. We outline the two that are most relevant here:

    a. Opinion leaders-those within groups to whom others tend to look to because of their technical competence, social accessibility, and similarity to the group. They are not necessarily innovators.

    b. Change agents-those who "influence clients' innovation-decisions in a direction deemed desirable by a change agency. A change agent usually seeks to secure the adoption of new ideas, but he or she may also attempt to slow the diffusion process and prevent the adoption of certain innovations with undesirable effects." (Rogers 2003: 366)

While the diffusion of an innovation through a social system is the ultimate goal for emerging technologies, this type of research should be a low priority for ETP, whose focus should be on the movement of technologies into the market. Other researchers should be tasked with tracking diffusion and providing feedback to ETP if needed.

1.17.3 Analysis of Frameworks and Recommendations

The following section uses the conceptual frameworks described above to make specific inferences and recommendations relevant to the MBS element. Based on the information gathered, the following three recommendations are relevant to MBS.

Recommendation 1: Proper Identification of MBS report type

Based on the market intelligence report matrix (see Table 30), MBS projects should be focused based on the type of product (new or existing/under-utilized) and type of market (existing or new market). Additionally, MBS should be positioned to be able to have the most influence on the technology and it being successfully being placed in the ETP energy efficient portfolio (see Table 29).

Recommendation 2: Take a Holistic Approach to Conducting MBS

Given that the ultimate goal for conducting MBS is to increase technology adoption both into the portfolio and by the consumers, it is important for the MBS to have a holistic approach. This would require the focus of the MBS to be on all three components that effect technology adopting – consumers, competitors and the industry. This holistic approach is also supported by the diffusion of innovation framework described in this memo.

For consumers, MBS could focus on the needs and the wants of the consumers as well as barriers that prevent technology adoption – this will provide information on how to provide appropriate incentives. For competitors, MBS could focus on two main things – replacing inefficient technologies in the portfolio with more efficient emerging technologies, and being aware of activities taking place in the California's energy efficient market for increasing the number of technologies being scanned. For the industry, MBS could focus on how the portfolio as a whole can provide synergies for the consumer and can help in promoting policy/CPUC mandates relating to energy efficiency.

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GOAL C: ASSESS SUPPORT OF OVERALL CEESP GOALS

S. EXPERT PANEL POWER POINT SLIDES AND PLANNING GUIDE

The attached slides represent the planned expert panel presentation and structure used by the Moderator. However, we note that changes were made during the presentation based upon timing and panelist feedback. As such, many of the later slides were not covered during the presentation. No discussions were made regarding different entities by tactic. Slides that were not incorporated include #21-28, #37-42, #45-46. We used information collected during the morning session, and adjusted the use of slides #47, 49, and 50 to reflect that discussion (omitting entities). Similar discussion questions were covered, but collected in a different format from those presented in the Moderator slides.

Expert Panel
PowerPoint Slides

The evaluation team carefully planned the panel structure with the desired type of output in mind. The table below shows our plan for the different activities included in the panel and the objective of each as well as the possible findings that we thought could arise from the information gathered from the panelists. The panel was implemented relatively closely to the plan until the later part of the panel, when we adjusted the effort based on timing and panelist feedback. Ultimately, we were successful in identifying tactics the panelists believed supported market push and pull (as defined within the panel) and how ETP helped to support these tactics as well as gaps for specific end-use emerging technologies. Due to timing, we were not able to determine if public or private entities were better positioned to support the various tactics discussed.

Table 31: Emerging Technologies Program Evaluation Expert Panel Analysis Plan

Agenda Item	Objective	Activity	Potential Findings / Output
Overview of Panel	• To orient panelists to goals of the panel and assumptions; • To describe CEESP		
Review Market **Push** Strategies to Support CEESP	• To identify tactics in support market push strategy; • To identify entity types well positioned to support tactics for market push strategy;	• Identify and discuss tactics to support market push; • Determine level of support tactics provide for market push • [WORKSHEET 1]	• Tactic X provides a high level of support for increasing market push for EE technologies; • Tactic Y provides a moderate level of support for increasing market push for EE technologies;

Agenda Item	Objective	Activity	Potential Findings / Output
	• To set the stage for determining if ETP elements support market push	• Determine if tactics are more or less relevant for specific end-use categories	• Building relationships with upstream partners provides a high level of support for increasing market push for EE HVAC technologies; OR • Tactics provide consistent levels of support for market push strategy for all end-use types
		• Identify whether public or private entity types are well positioned in support of tactics • [WORKSHEET 2]	• Private entities are very well positioned for identifying and providing performance specifications for energy efficient technologies in support of market push strategy; • Public entities are very well positioned to provide financing through grants, competitions and loans of energy efficient technologies in support of market push strategy;
Review Market **Pull** Strategies to Support CEESP	• To identify tactics in support market pull strategy; • To identify entities in support of market pull strategy; • To set the stage for determining if ETP elements support market pull	• Identify and discuss tactics to support market pull; • Determine level of support tactics provide for market pull • [WORKSHEET 3]	• Lab-testing tactic provides a high level of support for increasing market pull for EE technologies; • Market Intelligence tactic provides a moderate level of support for increasing market pull for EE technologies;
		• Determine if tactics are more or less relevant for specific end-use categories	• Lab-testing tactic provide a high level of support for increasing market pull for EE ZNE technologies; OR • Tactics provide consistent levels of support for market pull strategy for all end-use types
		• Identify whether public or private entity types are well positioned to perform tactics • [WORKSHEET 5]	• Public entities are very well positioned to conduct in-situ testing for energy efficient technologies in support of market push strategy; • Private entities are very well positioned to conduct market intelligence of energy efficient technologies in support of market push strategy

Agenda Item	Objective	Activity	Potential Findings / Output
IOU's Present ETP via Webinar	To provide panelists with similar level of knowledge of ETP program	• IOUs present webinar	
ETP Mapping and Gap Assessment in Support of Market Push and Pull	• To verify evaluation team mapping of ETP activities to Market **Push** tactics; • To identify gaps by tactic by end-use for market push	• Verify how ETP as designed maps to market push tactics • Identify gaps that exist regarding entities that implement tactics in support of market push strategy • If gap exists, determine if ETP should support tactic, and how	• ETP performs X tactic, which is well positioned to support market push; OR • ETP performs X tactic, which is not well positioned to support market push • No entities are positioned to support tactic X for end-use Y; • ETP program should support tactic X for end-use Y by performing activity Z
	• To verify evaluation team mapping of ETP activities to Market **Pull** activities; • To identify gaps by activity by end-use for market pull	• Verify how ETP as designed maps to market pull activities • Identify gaps that exist regarding entities that implement tactics in support of market pull strategy • If gap exists, determine if ETP should support tactic	• ETP performs X activity, which is well positioned to support market pull; OR • ETP performs X activity, which is not well positioned to support market pull • No entities perform activity X are for end-use Y; • ETP program should perform activity X for end-use Y
Potential Improvements to ETP Design (if time permits)	To identify opportunities to leverage ETP Activities and tactics with ongoing efforts in CA market	• Identify opportunities to leverage ETP activities within identified activities / tactics where other entities are in the market	• ETP program efforts in support of tactic X are also occurring through other entities; • ETP program efforts in support of tactic X are not occurring through other entities; • ETP program implementation should leverage efforts regarding X tactic with private entities, specifically XYZ
Future Impact Efforts (2nd panel / evaluation team)	To identify research required to assess ETP impact in context of tactics /activities identified	• Request lists of information needed to assess ETP impact	• List of research needed

T. ETP PROJECTS AS OF Q1 2012 BY END-USE

The following table provides a list of ETP projects conducted in PY2010-2012 as of Q1 2012 sourced from the ETP database. The final column, entitled "CEESP R&T End Use Classification" was developed by the Evaluation Team to classify technologies by the California Energy Efficiency Strategic Plan (CEESP) Research & Technology chapter end-use areas. The results of the classification are shown in Table 32. The classification was done by reviewing the "End Use" and "Project Description" variables included in the ETP database.

Table 32: Classification of ETP Projects as of Q1 2012 by CEESP R&T End-Use Area

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1320	Pressure Fryers for Foodservice Applications	Laboratory evaluation of Pressure Fryers using ASTM F1964	Active	Cooking	Other
Technology Assessments	SCE	ET10SCE1350	Cook & Hold Cabinets for Foodservice Applications	Lab testing of a cook and hold cabinet for food service applications.	Active	Cooking	Other
Technology Assessments	SCE	ET10SCE1360	Single Sided Griddles for Food Service Applications	Lab testing o single sided griddles	Active	Cooking	Other
Technology Assessments	SCE	ET10SCE1370	Rotisserie Ovens for Food Service Applications	Laboratory evaluation of rotisserie ovens	Active	Cooking	Other
Technology Assessments	SCE	ET10SCE1380	Double Sided Griddles for Food Service	Lab testing of double sided griddles	Active	Cooking	Other
Demonstration Showcase	SCE	ET10SCE2010	ZNE Tract Home Retrofit	Residential Retrofit of a number of existing homes of year 2000+ vintage to achieve ZNE or near-ZNE use.	Active	Battery Charging	ZNE
Demonstration Showcase	SCE	ET10SCE2020	ZNE Home Retrofit	Demonstration Showcase of Emerging Technologies	Active	Consumer Electronics	ZNE
Demonstration Showcase	SCE	ET10SCE2030	ZNE Commercial Focused Retrofit	Retrofit of three existing recreational facilities on UCSB campus to ZNE or near ZNE.	Active	Building Shell	ZNE
Demonstration Showcase	SCE	ET10SCE2040	ZNE New Home RFQ	New construction of model homes (RFP)	Complete, EE measure will not be pursued	Battery Charging	ZNE

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Market & Behavioral Studies	SCE	ET10SCE4010	Air Blower Market Assessment	Compressed air systems are common among industrial facilities. They, however, consume considerably more energy, and very inefficient when applied to many industrial processes that blowers can perform (e.g., drying or cleaning products). Blowers typically	Complete, EE measure has neither been implemented nor rejected	Other	Other
Market & Behavioral Studies	SCE	ET10SCE4020	ZNE Technical Potential	Technical and market potential review to identify ZNE potential of various building types.	Complete, EE measure will not be pursued	Other	ZNE
Technology Development Support	SCE	ET10SCE5010	Internally Illuminated Menu Boards for Multiple Applications	The goal of this project is to bring together sign manufacturers and rule making entities to establish standards for backlit menu boards. This will involve field and laboratory testing to verify effectiveness of standards developed.	Complete, EE measure will not be pursued	Lighting	Lighting
Technology Development Support	SCE	ET10SCE5020	Automatic Lighting Controls for Office Applications	The goal of this project is to bring together manufacturers and industry stake holders to develop standards for advanced lighting systems. This will involve field and laboratory testing	Complete, EE measure will not be pursued	Lighting	Lighting
Technology Assessments	SCE	ET11SCE1011	Backlit Signs and Menu Boards Field Evaluation	This project involves creating energy efficient solutions to current backlit signs, in particular, menu boards.	Active	Other	Lighting
Technology Assessments	SCE	ET11SCE1020	Grocery Medium Temperature Display Case Defrost Control	This ET Assessment proposes to evaluate a demand defrost control for a grocery medium temperature display case application. There are currently no known reliable ice detection control devices or systems for commercial refrigeration applications.	Active	Controls	Other
Technology Assessments	SCE	ET11SCE1090	Multi-Tenant Light Commercial PIER Evaluation	This project is fulfilling SCE's obligations for the Multi Tenant Light Commercial PIER project led by UC Davis. This project will look at the MTLC market, identify potential EE and DR solutions, and then test them in the field.	Active	Building Shell	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1110	Energy Resource Management Tool	This project will assess the benefits offered by an energy resource management tool. The tool utilizes advanced analytics to better understand energy consumption (e.g. billing data) and production data (e.g. # of units sold) individually, as well as how they interact. This project will look at the usage of this tool by a customer, evaluating user friendliness and ability to influence decision making.	Active	Other	Other
Technology Assessments	SCE	ET11SCE1120	Smart Multi-family DHW Recirculation Pump	This project will look at the application of a smart DHW recirculation pump in a multi-family facility. This pump operates at multiple speeds, better matching electrical draw to the flowrate requirements. The application at a multi-family facility will demonstrate the ability to vary speed to different DHW needs.	Active	Pumps	Other
Technology Assessments	SCE	ET11SCE1121	Advanced Drywall Insulation	This project will assess the benefits of installing phase change material drywall in a multi-family building in Isla Vista, CA. The PCM drywall provides added thermal mass which is allowing the elimination of conventional cooling systems (all natural ventilation).	Active	Thermal Storage	HVAC
Technology Assessments	SCE	ET11SCE1140	Hot Food Induction Holding Well		Active	HVAC	Other
Technology Assessments	SCE	ET11SCE1180	Microwave Controlled Advanced Street Lighting Evaluation	Find an appropriate string of ~ 40 intermediate collector non-dimmable HPS street lights. Replace one/one with mesh controlled LED coupled with microwave (MW) motion sensors (MS).Traffic modulates light levels.	Stopped	Unknown	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1190	HVAC Electrostatic Filter	The majority of residential and commercial air conditioning units include throwaway fiberglass media filters. The electrostatic air filter replaces these filters. In principle, it captures a larger amount of airborne contaminants, captures smaller size contaminants, and operates at a lower air pressure drop than fiberglass media filters.	Active	Fans	HVAC
Technology Assessments	SCE	ET11SCE1200	Deep Energy Reduction Supermarket	One of SCE's large supermarket customers is planning a remodel and expansion of an existing store in Carpenteria. The new store will be built with a goal of achieving 50% energy savings over a code-compliant building (ASHRAE 90.1 baseline). This will be achieved through inclusion of a variety of measures including: tight building envelope, daylighting, efficient lighting, efficient refrigeration system design, etc. Renewable energy generation may also be included to gauge ability of supermarkets to reach ZNE. Additionally, natural refrigerants will be used to lessen overall environmental impacts caused by leakage. This ET Assessment will fund the instrumentation and monitoring of performance of both the existing and new store.	Active	Building Shell	ZNE
Technology Assessments	SCE	ET11SCE1210	DC Powered Commercial Pool Pump	DC pool pump system is a hybrid AC and DC platform designed as an open architecture focused on reducing or eliminating inefficient AC pool pumps. The goal is to improve reliability and energy efficiency across all areas of commercial pool pump applications.	Active	Pumps	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1220	LED Lighting for Cold Cases	We are replacing cold case and exterior fixed baseline 400W metal halides lights with motion sensor coupled dimmable LED fixtures.	Active	Controls	Lighting
Technology Assessments	SCE	ET11SCE1221	Exterior LED Lights with Occupancy Sensors	Application of integral PIR occupancy sensors to LED exterior (structure and pole mtd) luminaires for dusk-dawn operation.	Active	Lighting	Lighting
Technology Assessments	SCE	ET11SCE1230	PV Forklift Charging	Assess the energy efficiency, performance, and controllability of direct DC photovoltaic(PV) charging for a mix of 36V forklift chargers, 24V pallet jack chargers, office lighting, and office a/c.	Active	Unknown	Other
Technology Assessments	SCE	ET11SCE1240	Small Commercial LED Lighting and Controls		Active	Lighting	Lighting
Technology Assessments	SCE	ET11SCE1250	Self-Commissioning Daylighting Controls Field Evaluation		Stopped	Lighting	Lighting
Technology Assessments	SCE	ET11SCE1260	Phase Change Material Paper Study	Phase change material (PCM) is a thermal energy storage device that utilizes its high storage density and latent heat properties to decrease the cooling load on the air conditioning unit. PCM appears in a variety of compositions of organic and inorganic materials. PCM products are being designed for wall board, duct work, floor panels, ceiling tiles, and as an extra layer adjacent to insulation in walls and attics with the goal to decrease space cooling and heating loads. This project will analyze the market and energy efficiency potential of the aforementioned PCM applications.	Active	HVAC	HVAC
Technology Assessments	SCE	ET11SCE1290	Evaporative Pre-Cooling of Air Cooled Chiller Field Evaluation	The general basis of this technology is evaporative precooling of the ambient air prior to contact with condenser coils.	Active	HVAC	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Demonstration Showcase	SCE	ET11SCE2010	ZNE Inverter Grid Impact Study		On-hold	Other	ZNE
Demonstration Showcase	SCE	ET11SCE2020	ZNE Big-box Retail	Demonstration showcase of a near-ZNE big box retail store. Combining latest energy efficiency measures in HVAC, lighting, and refrigeration with newly-installed 500 kW PV system to show feasibility and challenges of attaining ZNE in this market segment.	Active	Controls	ZNE
Demonstration Showcase	SCE	ET11SCE2030	ZNE New Home Site 1	Southern California Edison's (SCE) Emerging Technologies Program (ETP) is seeking to collaborate with Homebuilders to implement Integrated Demand Side Management (IDSM) solutions in Zero Net Energy (ZNE) or near-ZNE model homes. The goal of this Demonstration Showcase initiative is focused on creating market awareness and increasing penetration of energy-efficient, cost-effective home building practices key to achieving ZNE or near-ZNE performance. The proposed location for the project is in Ontario, CA within Brookfield Homes' Greendoor Community. Additional similar projects may be initiated with other Homebuilders under the Demonstration Showcase element of ETP.	Active	Lighting	ZNE
Demonstration Showcase	SCE	ET11SCE2050	ZNE Residential Load Impact Forecast	Southern California Edison (SCE) is seeking to develop reasonable estimates on load impacts from the residential new construction (RNC) market in SCE territory between the years 2012-2020.	Stopped	Other	ZNE

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Scaled Field Placement	SCE	ET11SCE3010	LED Downlights	LED Recessed Down Lights are one of many different lighting applications. Lighting applications include but not limited to kitchen under-cabinet lights, task lighting, and retail display. LED Recessed Down Lights take up 41% of the lighting market and have great potential to reduce energy and peak demand reduction. A recent Emerging Technologies project conducted in 2009 has proven that LED Recessed Down Lights can perform as well as their incumbent technology while benefitting from energy savings. This application currently is offered under the Express program with incentive amount of $30/unit. It is currently being considered to be in the upstream programs. This project is to deploy proven LED Recessed Downlights in high-visibility commercial market sectors to gain traction among potential customers who are unaware of the benefits.	Active	Lighting	Lighting
Scaled Field Placement	SCE	ET11SCE3020	Climate Appropriate HVAC	Test, and assist in market adoption and integration of high efficiency air conditioning units optimized for use in arid climates of the south-western United States. (Climate Zones 10 and 14). Promote air conditioners specifically selected to perform well at hot dry conditions (the HDACs)	Active	HVAC	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Market & Behavioral Studies	SCE	ET11SCE4010	Market Intelligence Gathering Process Evaluation	The need for this study developed because the ET Program is searching for a way to obtain more accurate market information for emerging technologies. This market intelligence helps the program determine if the technology has the potential to meet the needs of SCE customers. A technology should have a strong market outlook in order for it to be recommended for inclusion in the EE portfolio. The objectives of this project is to evaluate the market techniques used by three consultants (Opinion Research Corporation, Energy Efficiency Center and Esource) to see if the information provided, by their expertise in market research, will better identify the key market intelligence needed to determine if a technology is a solid candidate for an ET Project, and to see how effective the approach each one takes is at satisfying the ETP's needs.	Complete, EE measure has neither been implemented nor rejected	Other	Other
Market & Behavioral Studies	SCE	ET11SCE4020	Residential Human Comfort Behavior Study for Low Energy Cooling	Develop a human behavior study to determine and understand SCE's market potential for adopting low energy cooling technologies; specifically, evaporative cooling. Currently, evaporative cooling is not utilized widely, although it has the potential to save significant energy over more commonly utilized vapor compression-based technologies. The study will be conducted by the Fisher Center of UC Berkeley School of Business, with potential input from the Center for the Built Environment.	Active	HVAC	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Market & Behavioral Studies	SCE	ET11SCE4030	Consumer Behavior Change via Online Integrated Demand-Side Management Leveraging Casual Social Games	Zema Good is a platform and online Integrated Demand Side Management service that incents consumers to conserve energy by leveraging social networks and social gaming. The internet-based platform enables social gaming (and other internet-based) companies to gain new revenue streams by trading their in-game currency for payments from utilities for verifiable energy usage reductions and energy efficiency activities. The payments flow from the utilities to the game companies through Zema's proprietary service, with the game companies connecting via Application Programming Interface. This project is a Phase 1 to scope the interest of specific age groups through qualitative and quantitative studies before the actual creation of the software platform. Qualitative study will require couple focus groups that can be utilized to lay out the questions to be included in the quantitative study through an online survey.	Active	Consumer Electronics	Other
Market & Behavioral Studies	SCE	ET11SCE4040	HVAC Technology Roadmap	The project develops a tool, in the form of an Excel spreadsheet, for SCE to determine which HVAC market segments offer the highest potential for kWh and peak kW savings. This allows users to focus the attention of future projects on those measures that will provide the greatest impact.	Active	HVAC	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Market & Behavioral Studies	SCE	ET11SCE4050	Pool Light Residential Usage Survey	LED pool lighting is an energy efficient technology that lights up the swimming pool while using less energy than incandescent lamps. Previous Emerging Technology study (ET10SCE1130) logged commercial pool operating hours that was pretty typical of most commercial pools; dusk to dawn or dusk to close. Residential pool lighting hours were not logged due to various hours different homes may have along with the number of homes that needed to be sampled. This project is to phone survey SCE customers with pools on how many hours they operate the underwater pool lights in a year.	Complete, EE measure will not be pursued	Lighting	Lighting
Market & Behavioral Studies	SCE	ET11SCE4060	Commercial Buildings Simulation Based Deep Energy Reduction Potential Study		Active	Other	Other
Market & Behavioral Studies	SCE	ET11SCE4070	Future Outlook for Residential Energy Management	Conduct a market study, an adjunct to a main study, within SCE service territory to understand significant developments and trends in the Connected Home market by investigating consumer and manufacturers attitudes towards residential energy management in a connected home. A connected home can consist of distinct platforms or components that run independently within an home "ecosystem". With the advancements in technology consumers will purchase and connect more and more devices in their homes to suit their practical needs. In the end, all devices or connections will constitute a building block infrastructure of a connected home.	Complete, EE measure will not be pursued	Consumer Electronics	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Market & Behavioral Studies	SCE	ET11SCE4080	Ground Coupled Space Conditioning Technical Potential	To determine the market size in SCE territory based upon known soil properties to better inform the ET Program of the potential for technologies using the ground as a heat exchanger.	Active	HVAC	HVAC
Technology Development Support	SCE	ET11SCE5010	LED Lights for Commercial Pools	LED pool lamp is an underwater lighting fixture used to illuminate swimming pools. A study was conducted in 2010 under the Emerging Technology Assessment project (ET10SCE1130) which proved that LED pool lighting is an effective technology that can meet the performance of its incandescent counterpart. Using data from the recent study, minimum performance standard will be developed for this technology in order for manufacturers to submit products to qualify for a utility incentive.	Complete, EE measure implemented	Lighting	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Development Support	SCE	ET11SCE5020	Blower Test Standards	Blowers are widely used by industrial customers for various industrial processes. According to the Pacific Gas and Electric Company's 2006 study, blower (and fan) consumes approximately 1,300 gigawatt hours (GWh) per year in SCE's service area alone. This is fourth largest electric energy consumption components among industrial customers, and yet —unlike pump, lighting, or compressed air system— we still do not have an industry recognized efficiency testing standard or technical resources for promoting best practices. DES, therefore, has worked with other utilities through Consortium of Energy Efficiency to encourage the Compressed Air and Gas Institute (CAGI) to develop such an energy efficient performance testing standard for blowers. When the blower energy efficiency testing standard becomes available, design engineers, customers, and utilities with energy efficiency programs will be able to require the energy efficiency specification into their designs and operations.	Active	Compressed Air	Other
Technology Development Support	SCE	ET11SCE5030	Hybrid LED/Flourescent Bi-level Stairwell Lighting	Hybrid light emitting diode (LED) and 36-inch linear fluorescent lamp to a replace 48-inch linear fluorescent lamp in stairwell applications. The lamp has a built in occupancy sensor that switches power from the fluorescent lamp to the LED lamp when the stairwell is unoccupied. SCE provided manufacturer with report on bi-level stairwell lighting and held discussions regarding market need for more energy efficient solution.	Complete, EE measure has neither been implemented nor rejected	Lighting	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET12SCE1010	Energy Usage Social Gaming Assessment		Active	Unknown	Other
Technology Assessments	SCE	ET12SCE1020	Lighting Professional Certification		Active	Unknown	Other
Technology Assessments	SCE	ET12SCE1030	DC Handheld Industrial Sanders	DC sanders are designed to replace traditional sanders that run on compressed air systems that are inefficient and waste energy. This technology is designed to improve reliability and energy efficiency across this application in commercial and industrial buildings	Active	Compressed Air	Other
Technology Assessments	SCE	ET12SCE1040	Cheese Melter For Food Service	Lab and field assessment of Taco Bell's new cheese melter. The existing cheese melters consisting of one cavity will be replaced by newer models that have two cavities. Existing cookie-cutter restaurants have four cheese melting units. The new models will reduce the need to two units, while maintaining the total cheese melting capacity.	Active	Unknown	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1090	Distric Cooling Software	The proposed project is a software development effort for screening and analysis of the technical and economic feasibility of interconnecting chillers to maximize performance and minimize overall energy usage. It is a simplistic approach to district cooling for clusters of low rise buildings (minimum two) which currently operate individual chilling equipments. Interconnecting the building chillers with modern chilled water piping and use of developed software will allow automatic dispatch of these chillers according to their maximum performance efficiencies during the year. In so doing, the part load operation of chillers will be minimized. The customer will operate only the most efficient chillers in base load mode and the least efficient chillers in peak demand periods only. This operation will reduce electric consumption and peak demand of existing chillers by 20 to 30 % and increase the back-up chilling capacity and reliability of cooling supply.	Stopped	Heat Recovery	Building Management Systems and Diagnostics
Technology Assessments	SCE	ET10SCE1240	Frontier Project	The Frontier Project will consist of the design and installation of an energy management system and kiosk to evaluate energy usage for the various energy efficiency measures installed in the building: direct/indirect evaporative cooler, Daikin VRF System, and domestic hot water and space heating system. Additional monitors will be installed on the photovoltaic system and for outside air temperature and humidity measurements.	Complete, EE measure will not be pursued	Controls	Building Management Systems and Diagnostics

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1250	Smart Corridor Bi-Level Lighting for Office Applications	Bi-level and demand response (DR) capabilities will be demonstrated in corridor lighting for commercial and institutional market sectors through the use of step-dimming and/or full-dimming ballasts combined with occupancy sensors and DR controls in retrofit applications.	Complete, EE measure has neither been implemented nor rejected	Lighting	Demand Response
Technology Assessments	SCE	ET10SCE1030	Liquid Desiccant AC for Grocery Stores	The liquid desiccant system lowers and maintains indoor air relative humidity at or near 35%. Compared to the traditional vapor compression systems, the liquid desiccant system is capable of achieving lower humidity levels.	Active	HVAC	HVAC
Technology Assessments	SCE	ET10SCE1060	Dynamic V8 electrostatic filter	Polarizing media air cleaner technology uses a dielectric filter media in an electrostatic field to clean conditioning air for HVAC systems. The electrostatic field is created by two electrodes. The two electrodes create a steady-state voltage differential, polarizing both the dielectric media filter fibers and the particles that enter the electrostatic field. The electrostatic field creates an attracting force on the electrically charged media fibers and particles. The particles attach to the dielectric filter media therefore cleaning the changing air. The blending network of the dielectric filter media is less dense than that of fiberglass filters. This creates a low pressure drop, which translates into energy savings in the fan motor	Stopped	HVAC	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1110	VRF for Lodging Application	Variable Refrigerant Flow (VRF) systems are fundamentally different from unitary or other types of traditional HVAC systems. The space is cooled or heated directly by circulating refrigerant to evaporators located near or within the conditioned space. In	Active	HVAC	HVAC
Technology Assessments	SCE	ET10SCE1270	Harvey Mudd/CBE/EPRI VRF Evaluation	Variable Refrigerant Flow Systems take advantage of Inverter technology by varying the speed of the compressor in the outdoor unit to meet the changing load requirements in each of the indoor zones.	Stopped	HVAC	HVAC
Technology Assessments	SCE	ET11SCE1030	Hospitality VRF Evaluation	Variable refrigerant flow (VRF) HVAC systems are a direct expansion (DX) heat-pump technology platform built on the standard reverse Rankine vapor compression cycle. These systems are thermodynamically similar to unitary and other common DX systems, and share many of the same components—compressor, expansion device, and heat exchangers. Variable Refrigerant Flow Systems take advantage of Inverter technology by varying the speed of the compressor in the outdoor unit to meet the changing load requirements in each of the indoor zones.	Active	Heat Recovery	HVAC
Technology Assessments	SCE	ET11SCE1080	Single Family Radiant Cooling System	Single-family residential radiant cooling system with PEX pipes passing off-peak chilled water through radiant dry wall panels. The water is chilled with a standard A/C unit, with the evaporator coil being placed within the chilled water storage tank insulated with structural insulated panels. Radiant heating system will also be installed using hot water from gas water heater.	Active	HVAC	HVAC

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Technology Assessments	SCE	ET11SCE1130	Evaporator Fan Delay Control	This ET Assessment proposes to evaluate an Evaporator Fan Delay controller for air conditioning systems. In typical residential air conditioners, the evaporator (indoor) fan cycles off with the compressor when the thermostat is satisfied. These controllers are installed as bolt-on devices and allow the fan to continue running for several minutes to take advantage of the sensible and latent capacity left in the coil. The manufacturers claim significant energy savings merely from implementing this delay strategy.	Complete, EE measure has neither been implemented nor rejected	Controls	HVAC
Technology Assessments	SCE	ET10SCE1170	Build Energy Sim Comparison	Building Energy Simulation Modeling Tools Comparisons: The overall intent of this project is to compare and contrast the results of energy simulation in at least three different software programs for heating (kBTU/sf-year), cooling (kBTU/sf-year), domestic hot water, and other electricity (kW/sf-year).	Stopped	Other	Integrated Building Design
Technology Assessments	SCE	ET10SCE1130	LED Light for Commercial Pools	LED Pool Lamp is an underwater lighting fixture used to illuminate swimming pools for safety/security and aesthetics. This project will assess LED pool lighting with an incandescent baseline.	Complete, EE measure implemented	Lighting	Lighting

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Technology Assessments	SCE	ET10SCE1180	LED T8	LED T8 lamps are replacements for fluorescent T8 lamps that are widely used in areas such as offices, schools, and parking lots. In a LED T8 lamp, LED chips are mounted directly on to the printed circuit board and placed inside a tube with optics to guide the light. LED T8 lamp does not use ballast, but requires a driver that is either packaged inside or separate from the tube. This technology can replace 2 and 4 foot linear fluorescent lamp systems and is commercially available from multiple manufacturers.	Stopped	Cooking	Lighting
Technology Assessments	SCE	ET10SCE1190	LED Recessed Luminaire	Recessed LED luminaires, also known as lay-ins or troffers, feature an LED light engine in a traditional recessed luminaire form factor with dimensions 2'x2' and 2'x4'. This project will compare the light characteristics of the LED versus a linear fluorescent fixture of the same size and dimming capabilities while evaluating energy savings and cost.	Active	Lighting	Lighting
Technology Assessments	SCE	ET10SCE1220	L Prize A-Lamp for Hospitality Applications	Field installation and testing of the DOE L Prize entry of an LED technology integral lamp for a screw-in medium base socket to replace a 60W incandescent.	Complete, EE measure implemented	Lighting	Lighting
Technology Assessments	SCE	ET10SCE1230	L Prize A-Lamp Laboratory Assessment	A lab performance assessment of the Philips entry to the DOE L prize competition: LED replacement for a 60W incandescent A lamp. Lighting performance, power quality, and dimming performance are studied.	Complete, EE measure implemented	Lighting	Lighting
Technology Assessments	SCE	ET10SCE1290	LED A-Lamp Laboratory Assessment	Scoping study to see the viability of the technology as compared to the current Energy Star criteria.	Complete, EE measure implemented	Lighting	Lighting
Scaled Field Placement	SCE	ET10SCE3010	LED Street Lighting	Scaled Field Placement of cobrahead style street light luminaires using LED technology.	Active	Lighting	Lighting

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Technology Assessments	SCE	ET11SCE1010	Backlit Signs and Menu Boards Lab Evaluation	This project involves creating energy efficient solutions to current backlit signs, in particular, menu boards.	Active	Other	Lighting
Technology Assessments	SCE	ET11SCE1050	Commercial Tubular Daylighting System	This study will be to determine the effectiveness of the new solatube lensed tubular daylighting device to provide glare-free daylight into interior office spaces. Additionally, this study will measure actual savings achieved with this innovative daylighting system when operated with advanced lighting controls.	Active	Lighting	Lighting
Technology Assessments	SCE	ET10SCE1010	Drag Reducing Agent for Fuel Pumping Stations	Field evaluation of liquid agent to reduce friction in piping systems used to pump gasoline and diesel fuel.	Stopped	Other	Other
Technology Assessments	SCE	ET10SCE1020	Combination Ovens for Foodservice Applications	Lab evaluation of combination ovens	Stopped	Cooking	Other
Technology Assessments	SCE	ET10SCE1050	VSD Evaporative Fan Control for Walk-in Coolers	Investigate the use of variable speed drives on evaporatory fan motors in walk-in coolers under 3000 square feet. Also, investigate the infiltration and factors affecting infiltration.	Complete, EE measure has neither been implemented nor rejected	Refrigeration	Other
Technology Assessments	SCE	ET10SCE1070	VSD for Die Casters	Conventional die casting machines do not have variable speed drives on motors for changing pressures for hydraulic pumps. The VSD can control the speed of motors to open, close, and clamp the molds during casting. When the mold is clamped, a mechanical system (such as latch) provides the holding pressure; therefore, the motor does not need to run at full speed at this mode. The clamping mode is typically accounts for more than 50% of casting cycle, thus, it allows us to save energy by installing a VSD.	Complete, EE measure has neither been implemented nor rejected	Controls	Other

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Technology Assessments	SCE	ET10SCE1100	Turbo Blower for Waste Water Treatment Plants	Turbo blowers has an advanced design, including 1) oil-free, non-contact air bearing, 2) self air cooling, 3) permanent magnet synchronous motor, 4) and speed controller, that is 10 to 30% more efficient than conventional air blowers. It also has good turndown performance with little efficiency drop-off. Turbo Blowers can be used in the aerating process of waste water treatment plants (WWTPs) replacing aged or inefficient positive displacement or centrifugal blowers. Several WWTPs worldwide have installed turbo blowers and reported energy savings.	Stopped	Motors	Other
Technology Assessments	SCE	ET10SCE1120	Induction Barrel Heater Evaluation	Barrel heaters are heaters used to melt plastic pellets for plastic injection molding machines. The industrial induction process heater system uses a high-frequency power supply and helical induction coils to generate heat directly within the barrel wall. A thermal insulating layer is interposed between the coils and barrel to combat heat loss, increase efficiency and improve control response. This heating method claims energy savings of up to 70% compared to traditional heater bands, which the induction barrel heaters are expected to replace. In addition, the system also claims a reduction in Air Conditioning load due to reduced heat loss because the machines are usually located in conditioned space. This project will not quantify savings from the ancillary benefit of reduced AC load since the said savings would depend on other factors in addition to the reduction of the load.	Stopped	Process Heaters	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1140	Fisonic Pump for Hot Water Applications	The Fisonic Devices (FD's) can be considered as supersonic, condensing heat pumps with a patented internal geometry. It is installed onto an existing piping system as a custom designed flange. As an emerging technology (ET), The FD can be used to replace both the electrically driven pump and the tube and shell heat exchanger.	Active	Pumps	Other
Technology Assessments	SCE	ET10SCE1150	IR Peeling System for Agriculture	IR Dry Peeling of Tomatoes. This ET technology utilizes infrared radiation in the form of electromagnetic waves to heat product surface without heating the surrounding air. In so doing, it is much more energy efficient than conductive or convective heating. Wavelength spectrum of IR coverso.76 to 1000 um.	Active	Food Processing	Other
Technology Assessments	SCE	ET10SCE1160	Blower for Industrial Applications	Compressed air systems are common in most industrial facilities in California. They use considerably more energy, and are very inefficient when they are applied to some industrial processes that lower pressure blowers can be used to perform. The scope of	Complete, EE measure implemented	Process	Other
Technology Assessments	SCE	ET10SCE1200	OTE Optimization for Waste Water Treatment Plants	Fabricate and install OTE monitoring device and hoods on small, medium and large wastewater facilities. Test for one year to obtain effects of seasonal issues such as temperature variations.	Active	Other	Other
Technology Assessments	SCE	ET10SCE1210	VFD Pump at High Pressure Pump Stations	Scoping Study, Replacing single speed with VFD motors at High Pressure Water or Reclaimed Water Pump Stations	Stopped	Motors	Other
Technology Assessments	SCE	ET10SCE1310	Hot Food Holding Cabinets for Foodservice	Laboratory evaluation of Hot Food Holding Cabinets for cooking using ASTM protocols	Complete, EE measure implemented	Cooking	Other

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Technology Assessments	SCE	ET10SCE1330	Combination Ovens for Food Service	Combination ovens are ovens that operate in convection, steam, and a combination of convection and steam modes.	Complete, EE measure implemented	Cooking	Other
Technology Assessments	SCE	ET10SCE1340	Pizza Conveyor Ovens for Foodservice Applications	Laboratory evaluation of Conveyorized Pizza Ovens using ASTM test protocol 1817. A pizza conveyor oven is an appliance that carries the food product on a moving conveyor into and through a heated chamber. The chamber may be heated by gas or electric forced convection, radiants, or quartz tubes. Top and bottom heat may be independently controlled.	Complete, EE measure has neither been implemented nor rejected	Cooking	Other
Technology Assessments	SCE	ET10SCE1390	Steamers for Food Service Applications	Steamers, or steam cookers, are cooking appliances wherein heat is imparted to food in a closed compartment by direct contact with steam. The compartment can be at or above atmospheric prssure. The steam can be static or circulated.	Complete, EE measure has neither been implemented nor rejected	Cooking	Other
Technology Assessments	SCE	ET10SCE1400	Taco Tower for Food Service Applications	One of SCE's large fast foodservice customers has requested assistance in evaluating a new piece of cooking equipment called the "Taco Tower". At least one manufacturer has built a prototype to replace the existing unit, but SCE testing is needed to compare performance based on efficiency and dissipation of heat to the surrounding space. In addition, the customer has requested assistance in determining the proper sizing of air conditioning equipment for their stores. The cooling loads in the store are significantly due to heat generated by the kitchen equipment and make-up air needed to replace exhaust air. Testing will be conducted to quantify the heat gain to the surrounding space of various pieces of kitchen equipment.	Complete, EE measure has neither been implemented nor rejected	Cooking	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET10SCE1410	High Density Holding Cabinets for Food Service	This project will perform a series of field tests on McDonald's current universal holding cabinets (UHC) and a new high density universal holding cabinet (UHC-HD). The current UHC is configured to have 4 columns and 3 rows with the ability to cook and hold 12 menu items. The new UHC-HD is configured to have 4 columns and 6 rows with the ability to cook and hold 18 menu items.	Complete, EE measure implemented	Cooking	Other
Technology Assessments	SCE	ET10SCE1420	Dedicated Holding Bin Cabinets for Food Service	Lab testing of dedicated holding bins	Stopped	Cooking	Other
Technology Assessments	SCE	ET10SCE1430	Dry Well for Food Service	Field performance assessment of a dry well used in foodservice applications	Complete, EE measure has neither been implemented nor rejected	Cooking	Other
Technology Assessments	SCE	ET10SCE1440	Steamer/Kettle for Food Service Applications	Field test of microwave steamers replacing steamer kettles at [NAME].	Complete, EE measure implemented	Cooking	Other
Technology Assessments	SCE	ET10SCE1450	Vacuum Sealing/Packaging Machines for Food Service	Laboratory and field evaluation of vacuum sealing/packaging machines for use in foodservice applications.	Active	Food Processing	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1040	High Efficiency Blower Under 50hp Retrofit	The blower power depends upon three variables: 1) flow rate; 2) pressure, and 3) efficiency; See Equation 1 below. The design of an energy efficient blower depends upon two main factors: 1) shape of impeller and 2) shape of blower housing that minimize pressure losses. The conventional blower's (i.e., incumbent technology) efficiency is typically below 60%, depending upon pressure and flow rate requirements. The new-generation blowers with improved impeller design and the blower housing is about 70% efficient (as high as 79% from limited number of manufacturers).	Active	Other	Other
Technology Assessments	SCE	ET11SCE1060	Efficient Low Pressure Blower for Sparging	Replace existing compressed air with energy efficient low pressure blower for mixing of sulfuric acid to achieve specific density at a Battery Manufacturing plant	Active	Compressed Air	Other
Technology Assessments	SCE	ET11SCE1070	Efficient Pneumatic Transport with VSD Controls	The pneumatic conveying is an industrial system that transports materials from a silo to a receiving bin for production. A variable speed drive can change the speed of the speed of pneumatic conveying when there are fluctuations of productions or changes in materials. The pneumatic conveying system, for example, can move materials at 2500 to 6000 feet per minute at around 15 psig.	Active	Other	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1100	Off-grid Commercial Office DC Grid System	DC micro grids is a hybrid AC and DC platform that is being designed as an open architecture focused on reducing or eliminating inefficient AC to DC conversions between power sources and light sources by converting and distributing power in DC. This platform is designed to improve reliability and energy efficiency across all areas of commercial buildings. Replace existing Alternating Current (AC) fed ceiling in a commercial office with a Direct Current (DC) micro grid that can be fed via Photovoltaic panels installed on the building or via a utility fed inverter. This evaluation is phase one of a multiphase project that aims to evaluate performance and provide proof of concept of a DC fed lighting system, vending machine and a ventilation system. This phase will provide proof of concept of DC ceiling in addition to evaluating the performance of the system.	Active	Controls	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCE	ET11SCE1160	Waste Water Pond Treatment Evaluation	The rural food and beverage industry sends their wastewater to ponds for settling and minor treatment since no sewer system for the wastewater exists or the existing wastewater system will not accept their waste in rural areas. New regulations require advanced treatment for these ponds. Current wastewater treatment technology requires large electrical energy requirements for aeration and mixing. New technologies on the market claim to do the mixing and/or aeration with low energy requirements. These new emerging technologies have very little, if any, commercial operating experience or data. This lack of operating experience and unbiased information is a barrier to the deployment of these low energy technologies.	Active	Other	Other
Technology Assessments	SCE	ET11SCE1170	Efficient Solar Thermal Block Heater for Emergency Generators	Advanced solar thermal converts sun's radiation directly into heat at 80% conversion efficiency. This converted energy can be customized for many applications including water heating, space heating, process heating and cooling. Unlike conventional flat plate collector, this advanced solar technology heats and transfers a proprietary fluid inside evacuated tube collectors to a much higher temperature (350°F).	Active	Process	Renewable and Storage
Technology Assessments	SCE	ET10SCE1300	LED Menu Board Lighting Laboratory Assessment	Testing of Menu board lighting in a laboratory setting	Missing	Other	Lighting
Other	SCG	ET10SCG0002	Green Plumbing Practice	Developing a workbook on best practices for residential in supporting hot water plumbing	Active	Water Heating Domestic Hot Water	Other
Technology Assessments	SCG	ET10SCG0003	Field Study of Masco Study / Res Recirpump	Technology assessment on hot water recir system for residential single family	Active	Unknown	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Other	SCG	ET10SCG0004	Boiler Workshop	Organizing one-day workshop on technology needs and emerging issues for commercial sector boilers. Attendees will be national experts, manufacturers and consultants.	Complete, EE measure has neither been implemented nor rejected	Water Heating Domestic Hot Water	Other
Scaled Field Placement	SCG	ET10SCG0005	[NAME]	Scaled field placement to assess [NAME] proprietary controls for [NAME] combined space heating and domestic water systems. This project is an extension of technology assessment performed in 2009	Complete, EE measure has neither been implemented nor rejected	Water Heating Domestic Hot Water	Other
Technology Assessments	SCG	ET10SCG0016	CEC Energy Efficiency Calculator Tools	Technology assessment on EE tool development. Primary objective of this project is to develop web-based software and desktop tools to aid Southern California Gas Company customers to identify, analyze and prioritize energy (i.e. natural gas and other alternate energy sources) savings opportunities. The tools are designed to help industrial end-users in analysis of energy saving opportunities and savings (energy in terms of MM Btu/year, energy cost in terms of US$ and CO_2 savings) by implementing selected energy saving projects.	Active	Computing Equipment	Other
Technology Assessments	SCG	ET10SCG0017	Nano-insulation	Technology assessment on Nansulate HomeProtect clear coat product and evaluate its applicability for thermal insulation.	Complete, EE measure has neither been implemented nor rejected	Other	HVAC

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Technology Assessments	SCG	ET11SCG0001	Thermal Recycler	Technology assessment on heat recovery device to evaluate the energy savings derived from using a heat recovery device on commercial and industrial laundry systems. The ROTOTHERM equipment is rotary air-to-air energy recovery equipment that significantly reduces fuel consumption, also reduces drying time, and reduces pollution contribution to atmosphere.	Active	Drying Clothes	Other
Technology Assessments	SCG	ET10SCG0012	Stanlin Energy System Technology	Technology assessment for Stanlin Energy System that is a device which is placed in the stack of a boiler/furnace to save energy by slowing the exhaust in the stack and increasing the dwell time of the heat in the equipment.	Complete, EE measure will not be pursued	HVAC	HVAC
Technology Assessments	SCG	ET10SCG0013	Thermodynamics Process Control	Technology assessment to validate the performance of a boiler control that measures the building load in real time and signals the boiler system to output only as much energy as the building load requires	Active	Water Heating Boiler	HVAC
Technology Assessments	SCG	ET10SCG0014	Advanced Heat Recovery Economizer (TMC) – Evaluation	Technology assessment on An adv. Heat recovery device utilizing ceramic membrance to capture low temperature waste heat (sensible and latent)	Active	Unknown	HVAC
Market & Behavioral Studies	SCG	ET10SCG0001	SF/MF WH data/survey	Comprehensive market behavior study on hot water heating systems at and hot water usage habits of residential customers. The subset of the activity is technology assessment on high efficient water heater on existing participants.	Active	Water Heating Domestic Hot Water	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCG	ET10SCG0006	Cypress-Steam Trap Monitoring	Technology Assessment on WSTM that is a non-invasive, wireless monitoring device that can be installed in minutes on a steam trap without disrupting operations. The WSTM uses two thermocouples that clamp onto the inlet and outlet of the steam trap and are attached to a unit that	Active	Other	Other
Technology Assessments	SCG	ET10SCG0007	Direct Steam Injection Study	Technology assessment on Direct Steam Injection system that potentially replace processes that use water and are heated in vessels with steam heating jackets	Stopped	HVAC	Other
Technology Assessments	SCG	ET10SCG0008	CEC/GTI Water Heating Study	Technology assessment on consumer behavior on water heating. This research study create a knowledge base for water usage patterns, practices, technologies. The overall goal of the project includes the following activities: a system analysis tool, system design and best practices guide, standard test method and rating system, building and energy code development, laboratory evaluation of equipment, field performance monitoring and customer behavior study, and training program for plumbing trade and others. Other elements impact from the study include technology development support and enhance code and standard	Active	Water Heating Domestic Hot Water	Other
Technology Assessments	SCG	ET10SCG0011	ECO System Fuel Enhancer Evaluation	Technology assessment to establish how the device produces the observed improvements in combustion and how they relate to natural gas fuel engines and burning equipment.	Complete, EE measure will not be pursued	Water Heating Boiler	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCG	ET10SCG0015	Test LoNox Water Heater	Technology assessment on residential water heater to meet new SCAQMAD emission guidelines. This is a joint effort with GTI who has the master contract with CEC-Pier	Complete, EE measure has neither been implemented nor rejected	Water Heating Domestic Hot Water	Other
Technology Assessments	SCG	ET10SCG0010	GTI HVAC Study - CEC - SCG	Technology Assessment for Adv. HVAC. The overall goal of the project is to evaluate the potential for residential radiant cooling in CA. The project also has emphasis on technology development support	Active	HVAC	Renewable and Storage
Technology Assessments	SCG	ET11SCG0018	Submetering MFR Homes for HW and/or gas	Technology assessment to evaluate energy savings potential for submetering in MF	Missing	Cooking	Other
Demonstration Showcase	SCG	ET11SCG0019	Near Zero energy for existing home	Demonstration showcase for feasiblity to achieve Near zero energy home in retrofit application	Missing	Other	ZNE
Demonstration Showcase	SCG	ET11SCG0020	Smart Gas Home	Demonstration showcase for feasibility to achieve Near zero energy home in new construction application	Missing	Other	ZNE
Demonstration Showcase	SCG	ET12SCG0001	CEC Pier RFP for Community Scale Renewable&ZNE	Demonstration showcase for feasibility to achieve Near Zero energy in community. Collaborate with CEC-Pier Demo Grant program to illustrate energy saving in community	Missing	Other	ZNE
Technology Assessments	SCG	ET12SCG0003	Energx Recir Pump Fractional HP VFD	Technology assessment to evaluate energy savings on MF boiler with VFD recirpump	Missing	HVAC	HVAC
Technology Assessments	SCG	ET12SCG0004	Raypak DHW Boiler Reset Controller	Technology assessment to evaluate energy savings on DHW boiler reset control	Missing	Water Heating	Plug Loads and Controls
Technology Assessments	SCG	ET12SCG0005	TRIO	Technology Resource Incubation Outreach	Missing	Other	Other
Technology Assessments	SCG	ET12SCG0006	Rheem AC/Hybrid system	Technology assessment to evaluate energy savings on Commercial rooftop unit with hot water heat recovery	Missing	Heat Recovery	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SCG	ET12SCG0007	Dynalloy	Technology assessment to evaluate energy savings on smart vent register for residential	Active	HVAC	HVAC
Technology Assessments	SCG	ET12SCG0008	Residential AMI	Technologya assessment to determine miniture gas meter for smart gas home. Developing miniture electronic gas meter for AMI	Missing	Residential appliances - general	Other
Technology Assessments	SCG	ET12SCG0009	GTI-ETP-Natural Gas-Early Deployment Program	Technology assessment in collaboration with other IOUs nationwide to roll out large assessment effort. The idea is to increase technology transfer effort to EE program	Missing	Unknown	Other
Technology Assessments	SDGE	ET10SDGE0006	Bi-Level Corridor Lighting	Technology assessment to determine the energy savings potential and customer acceptance	Stopped	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0010	Electronic HID Lighting System - City of Chula Vista	Technology assessment to determine the energy savings potential and installation cost for electronic HID lighting systems	Stopped	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0001	Energy Innovation Center	Demonstration showcase to demonstrate the lighting performance and quality of various lighting technologies (LED, high efficient fluorescent, induction, plasma, and solar pv) in numerous applications (site, pathway, interior)	Complete, EE measure has neither been implemented nor rejected	Lighting	Integrated Building Design
Demonstration Showcase	SDGE	ET11SDGE0002	Food Bank Office of the Future	Demonstration showcase to demonstrate the use of day lighting and other high efficiency lighting technologies in both a warehouse and office environment (Advanced Energy Office – Office of the Future)	Active	Lighting	Integrated Building Design
Demonstration Showcase	SDGE	ET11SDGE0007	San Diego Zoo HVAC	Demonstration showcase to demonstrate the lighting performance and quality of LED track lighting for retail displays	Stopped	Lighting	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Demonstration Showcase	SDGE	ET11SDGE0010	Sports Arena Electronic HID Lighting	Demonstration showcase to determine the validity of claims stating that unlike magnetic HID ballast, electronic HID ballast provide for higher lumen output (meaning lamp wattage can be reduced to provide comparable light level), better lumen maintenance, controllability including the ability to dim and potential Demand Response participation.	Active	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0012	PUSD Electronic HID Lighting	Demonstration showcase to determine the validity of claims stating that unlike magnetic HID ballast, electronic HID ballast provide for higher lumen output (meaning lamp wattage can be reduced to provide comparable light level), better lumen maintenance, controllability including the ability to dim and potential Demand Response participation.	Active	Lighting	Lighting
Technology Assessments	SDGE	ET11SDGE0013	Adaptive Fridge and Freezer Control for Commercial Applications	Technology assessment for adaptive fridge and freezer controller directed at improving energy efficiency by reducing fan and compressor use. Fan and compressor use are able to be reduced by monitoring temperature in room and at the evaporator by reducing heat introduced by fan use and continue cooling until threshold temperature at evaporator, instead of just in room	Active	Food Processing	Other
Technology Assessments	SDGE	ET11SDGE0014	Low-Temperature Freezer Monitoring in Scientific and Pharmaceutical Applications	Real-time web based energy and temperature monitoring system for ultra-low temperature freezer. By being able to monitor the energy consumption and temperature of freezers, a lab manager can assess the quality of a freezer and energy efficiency to avoid high run costs and have early detection for freezer failure.	Active	Hospital/Medical Equipment	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SDGE	ET11SDGE0015	Software-Based Energy Reduction for Windows/Linux Enterprise Environments	Technology assessment to validate savings from maintaining computers in low-power sleep state longer while still being active. Software and server based energy reduction within enterprise computer setups. Computers are put into sleepmode more often by being able to transfer their internet 'presence' to a server module (that can hold up to 250 computer images).	On-hold	Computing Equipment	Other
Technology Assessments	SDGE	ET11SDGE0016	Demand Control Ventilation with Centralized Air Sensors	Technology assessment that investigates the energy savings potential, market applicability and possible incremental effects of a DCV system that uses centralized air quality sensors in combination with miniature air ducts and routers.	Active	Controls	Building Management Systems and Diagnostics
Technology Assessments	SDGE	ET11SDGE0017	MF Swimming Pool & Spa VFD - Mariner's Cove	Technology assessment to validate savings for commercial facilities, similar to that in an existing statewide SF Residential Pool VFD rebate program. Many existing pools/spas are circulating much more than sanitation code requires. New integrated VFD pump/filter/motor offers hi-E and precise flow controls. Thus, savings come from both reduction in flow rate/run time, and superior system efficiency of the pump/filter/motor assembly. Good for new or replacement applications.	Active	Pumps	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SDGE	ET11SDGE0018	MF Swimming Pool & Spa VFD - Carmel Terrace	Technology assessment to validate savings can be achieved locally for commercial facilities, similar to that in an existing statewide SF Residential Pool VFD rebate program. Many existing pools/spas are circulating much more than sanitation code requires. New integrated VFD pump/filter/motor offers hi-E and precise flow controls. Thus, savings come from both reduction in flow rate/run time, and superior system efficiency of the pump/filter/motor assembly. Good for new or replacement applications.	Active	Pumps	Other
Technology Assessments	SDGE	ET11SDGE0019	Lab Fume Hood Automatic Sash Positioning System (ASPS)	Technology assessment to validate and demonstrate the savings can be achieved locally, similar to that found by SCE. Motion detectors are used to raise and lower sash to reduce the exhaust and makeup air. As a result, savings comes from reductions in fan power, and makeup air heating/cooling from the central plant. Good for new or retrofit applications.	Active	Other	Other
Technology Assessments	SDGE	ET10SDGE0008	Integration of BMS and ALC	Technology assessment to determine the energy savings potential and installation cost of the components of the Advanced Energy Office – Office of the Future	Stopped	Lighting	Building Management Systems and Diagnostics

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SDGE	ET10SDGE0003	Greenhouse Retrofit	Technology assessment to evaluate the impact of retrofitting exterior greenhouse walls. The installation involves the retrofitting of existing single-ply, fiberglass outer walls with an energy efficient, twin-wall polycarbonate material. Single ply fiberglass material is rated at a 1.20 U-factor and eight-millimeter, twin wall polycarbonate material is rated at 0.6 U-factor. The lower U-factor of the twin-wall material should result in substantial reduction of heating usage of the greenhouse.	Stopped	HVAC	HVAC
Demonstration Showcase	SDGE	ET10SDGE0002	High Ceiling Lighting Options	Demonstration showcase to provide a comparison between incandescent (base case), LED and CFL lighting systems for high ceiling lighting to determine lighting performance and characteristics including dimming.	Complete, EE measure has neither been implemented nor rejected	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0004	Electronic HID - City of San Diego	Technology assessment to determine the validity of claims stating that unlike magnetic HID ballast, electronic HID ballast provide for higher lumen output (meaning lamp wattage can be reduced to provide comparable light level), better lumen maintenance, controllability including the ability to dim and potential Demand Response participation.	Stopped	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0005	Electronic HID Lighting System - San Diego State University	Technology assessment to determine the energy savings potential and installation cost for electronic HID lighting systems	Stopped	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0007	LED Task Light	Technology assessment to determine the energy savings potential and installation cost of the components of the Advanced Energy Office – Office of the Future	Active	Lighting	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SDGE	ET10SDGE0009	Electronic HID Lighting System - Windmill Farms	Technology assessment to determine the energy savings potential and installation cost for electronic HID lighting systems	Stopped	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0011	Electronic HID Lighting System - Dr Jays	Technology assessment to determine the energy savings potential and installation cost for electronic HID lighting systems	Stopped	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0003	San Diego Zoo Gift Shop LED Lighting	Demonstration showcase to demonstrate the lighting performance and quality of LED track lighting for retail displays	Active	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0004	Restaurant Ambient Lighting Demonstration Showcase	Demonstration showcase to determine the energy savings potential and installation cost for LED restaurant lighting	Active	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0005	LED Theater Stage Lighting	Demonstration showcase to determine the energy savings potential and installation cost for LED theatrical lighting	Active	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0006	Bi-Level LED Parking Structure Demonstration Showcase	Demonstration showcase to demonstrate the lighting performance and quality of LED lighting for parking structures	Active	Lighting	Lighting
Technology Assessments	SDGE	ET11SDGE0008	LED Pathway Bollard	Technology assessment to determine the energy savings potential and installation cost for LED bollards for pathways	Active	Lighting	Lighting
Technology Assessments	SDGE	ET11SDGE0009	SDSU Central Plant Electronic HID Lighting	Technology assessment to determine the validity of claims stating that unlike magnetic HID ballast, electronic HID ballast provide for higher lumen output (meaning lamp wattage can be reduced to provide comparable light level), better lumen maintenance, controllability including the ability to dim and potential Demand Response participation.	Active	Lighting	Lighting
Scaled Field Placement	SDGE	ET11SDGE0011	Bi-Level LED Elevator Cab Lighting	Scaled field placement to determine the energy savings potential and installation cost for LED lighting systems in elevators	Active	Lighting	Lighting

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	SDGE	ET12SDGE0001	Bi-level Gas Station Lighting Technologies	Technology assessment to provide a comparison between metal halide HID (base case), LED and induction lighting systems for gas station canopy lighting to determine lighting performance and characteristics as well as potential for dimming.	Active	Lighting	Lighting
Technology Assessments	SDGE	ET10SDGE0001	Gas Station Canopy Lighting Systems	Technology assessment to provide a comparison between HID (base case), LED and induction lighting systems for gas station canopy lighting to determine lighting performance and characteristics as well as potential for dimming.	Stopped	Lighting	Lighting
Demonstration Showcase	SDGE	ET11SDGE0020	Chula Vista Energy Showcase Home	Demonstration showcase to demonstrate "deep" energy savings of over 50% and a new "plug & play" solar photovoltaic system in a residential home and to provide a local green job training opportunity.	Active	Distributed Generation - solar	ZNE
Technology Assessments	SDGE	ET12SDGE0002	Advanced Lighting Technologies - Fitness Clubs and Courts	Technology assessment to provide a comparison between metal halide HID (base case) and LED lighting systems for fitness club lighting to determine lighting performance and characteristics as well as potential for dimming.	Active	Lighting	Lighting
Technology Assessments	PG&E	ET11PGE1041	Advanced Window Films	The Emerging Technologies assessment aims to evaluate the validity of manufacturers' claims and quantify the potential benefits of advanced film products for PG&E customers.	Active	Building Shell	HVAC
Market & Behavioral Studies	PG&E	ET11PGE3241	EPRI Early Deployment Efficiency End User Technologies	Bridge gap in development pipeline between field demos and utility programs with early deployments	Complete, EE measure will not be pursued	Other	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	PG&E	ET11PGE 1051	Data Center Infrastructure Management	The ET assessment aims to evaluate IT Energy Monitoring (aka Data Center Infrastructure Management) software in a real data center setting.	Active	Computing Equipment	Integrated Building Design
Market & Behavioral Studies	PG&E	ET11PGE3191	Continental Automatic Building Association (CABA) Research Project	The overall goal of the 2011 study is to identify North American consumer behaviors and attitudes surrounding the connected home, in order to identify concept development opportunities and marketing strategies to drive greater adoption.	Complete, EE measure has neither been implemented nor rejected	Computing Equipment	Other
Market & Behavioral Studies	PG&E	ET11PGE1101	Lighting MSB Conjoint Study	A conjoint and customer study on new lighting options in the residential market with the following objectives: 1) To learn which new products can be transferred into new measures for our programs; 2) to learn market readiness and how to optimize customer acceptance of new technologies during their launch, growth, and mature stages, and; 3) to optimize savings across the portfolio of new product options in the residential market.	Active	Lighting	Lighting
Technology Assessments	PG&E	ET11PGE1071	ET Home Energy Management Lab Tech Assessment Smart Thermostats	The proposed assessment aims to evaluate the energy savings potential from a Wi-Fi enabled Honeywell programmable thermostat combined with OPower behavioral software, which can be accessed via the internet or a Smartphone. This assessment will give us an understanding of the energy savings potential to reduce energy consumption through behavior based programs combined with an enabled technology.	Complete, EE measure has neither been implemented nor rejected	Controls	HVAC

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	PG&E	ET11PGE1072	ET Home Energy Management Field Tech Assessment Smart Thermostats	The proposed assessment aims to evaluate the energy savings potential from a Wi-Fi enabled Honeywell programmable thermostat combined with OPower behavioral software, which can be accessed via the internet or a Smartphone. This assessment will give us an understanding of the energy savings potential to reduce energy consumption through behavior based programs combined with an enabled technology.	Active	Controls	HVAC
Technology Assessments	PG&E	ET10PGE1001	Heat Pump Water Heaters (HPWH) Field Study	About 90% of PG&E residential customers used gas water heaters. In California, Title-24 Building Standards encourage the use of gas water heaters in residential new constructions. And in some studies, HPWH was found to have less life cycle cost. Therefore, there is a need for our Emerging Technologies program (ETP) to understand water heater technologies, estimate life cycle cost with PG&E utility rates, determine energy savings potential, and market feasibility of HPWHs.	Complete, EE measure has neither been implemented nor rejected	Heat Recovery	Other
Market & Behavioral Studies	PG&E	ET11PGE5261	Commercial HVAC Quality Maintenance Standards Implementation Calibration and Diagnostic Protocol	Development of an accuracy and calibration specification for the measurement tools required for HVAC Quality Maintenance.	Active	HVAC	HVAC
Market & Behavioral Studies	PG&E	ET11PGE4081	Home Energy Management Insight Behavioral Research Smart Homes	This project was designed to evaluate consumer preferences and attitudes towards home energy management and "Smart Homes" through qualitative focus groups.	Complete, EE measure has neither been implemented nor rejected	Other	Plug Loads and Controls

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	PG&E	ET11PGE1081	Advanced Radiant HVAC Solutions	Comprehensive program that integrates radiant cooling, heating, and related envelope systems and installation methods in California homes. GTI as prime contractor; PG&E tentatively committed to providing in-kind labor resources estimated at $14,040: Admin assist with outreach, workshops, use of facilities; PAC meeting participation. GTI has requested confirmation of PG&E participation.	Active	HVAC	HVAC
Technology Assessments	PG&E	ET11PGE1151	LED High Bay Lightings	The project will evaluate the energy efficiency potential for LED High Bay lighting products by conducting a technical field assessment at a City of San Jose site and conduct customer and installer interviews to better assess various aspects of product performance and installation.	On-hold	Lighting	Lighting
Technology Assessments	PG&E	ET10PGE1031	Carbon and Energy Management Systems	Carbon and energy management software (CEMS) has the potential to help our customers report, analyze, and reduce their GHG emissions and energy usage. The software that we will be evaluating with this technology assessment combines traditional GHG reporting and energy dashboarding capabilities with strategic planning capabilities typically found in enterprise resource planning (ERP) software.	Active	Other	Other
Technology Assessments	PG&E	ET11PGE1021	Oil Well Pump Optimization Development	Oil Well Pump Optimization is a new incentive product in the Pump technology family to help upstream petroleum customers improve the efficiency of their pumping system.	On-hold	Other	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Assessments	PG&E	ET11PGE1061	Moving Bed Bio Reactor and Algae Treatment Process for Waste Water	MBBR is a product that provides a substantial increase in surface area for bio-reactions that occur in waste water treatment processes. This enhanced surface area system coupled with fine bubble air diffusers promote enhanced bio-reaction between waste water chemicals and the organisms that breakdown these chemicals. MBBR is already used in Europe and Japan; New in US. The Algae treatment system provides enhanced oxygen supply (compared to other mechanical or biological methods) to the waste water by utilizing Algae's natural characteristics. In addition, the algae system removes nitrogen in waste water	Active	Other	Other
Technology Assessments	PG&E	ET11PGE1121	Integrated HVAC Retrofit Solutions (Multi-Tenant Light Comm Bldgs)	CEC PIER Research Project headed by UC Davis Energy Efficiency Center/CLTC/WCEC. http://eec.ucdavis.edu/events/mtlc.php; PG&E tentatively committed to providing in-kind labor resources and facilities use.	Active	Other	HVAC
Scaled Field Placement	PG&E	ET11PGE3131	EMS Fault Detection Diagnostics	This technology assessment will be testing the software's ability to find specific HVAC system faults; faulty or out of tune Variable Air Volume (VAV) boxes and Economizers.	Active	Other	HVAC
Market & Behavioral Studies	PG&E	ET11PGE1141	EMS Data Translation (Pneumatic to Wireless)	The purpose of the Data Translation market study is to understand the technical landscape and vendor offering of the Energy Management and Information Systems space.	Active	Other	Plug Loads and Controls
Scaled Field Placement	PG&E	ET11PGE3161	Pulse Energy -Dashboard w/ Energy Mgr. Tech Assessment	Test efficacy and energy savings potential facilitated through Pulse Energy EMS and energy coaching	Active	Other	Other

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Scaled Field Placement	PG&E	ET11PGE3171	EMS Wireless Pneumatic Thermostat	The WPT project is a technology assessment focused on new networked thermostat technology geared towards large commercial buildings.	Active	Other	HVAC
Technology Assessments	PG&E	ET11PGE1181	Oil Field Project (Chevron, Bakersfield)	Oil Well Pump Optimization can offer scalable savings in the industrial sector: Simple pump optimization measures can match pumping operation to current downhole condition of well, improving efficiency by 10%	Active	Other	Other
Demonstration Showcase	PG&E	ET11PGE2201	CLTC Lighting Demonstration Project	Showcase for SMB customers to view LED lamps in mock retail and hospitality environments.	Active	Controls	Lighting
Scaled Field Placement	PG&E	ET11PGE3181	Follow Up Linear Panel and Controls Study (GSA)	Test scalability of LEDs and lighting controls	Active	Controls	Lighting
Market & Behavioral Studies	PG&E	ET11PGE1109	HVAC Quality Maintenance Standards Implementation Behavioral Study	HVAC Quality Maintenance (QM) is an HVAC product delivered to customers by HVAC Contractors. The foundation for the product is Standard 180 for commercial and Standard 4 for residential. Both of these are new and not being implemented. This ET project will support the successful launch and implementation of the products by providing necessary information on how to best engage customers.	Complete, EE measure has neither been implemented nor rejected	HVAC	HVAC
Market & Behavioral Studies	PG&E	ET11PGE4211	M&BS EMS Systems	To identify qualitative barriers to accelerating adoption of wireless, web-based and conventional energy management system for commercial and industrial customers that has been underutilized in this sector	Complete, EE measure has neither been implemented nor rejected	Other	Plug Loads and Controls

Program Element	IOU	Project Number	Project Name	Project Description	Project Status	End Use (ETP Database Code)	CEESP R&T Chapter End Use Classification
Technology Development Support	PG&E	ET11PGE 5231	Partial-Load Boiler Efficiency Test Procedure	To establish a test procedure to determine the part-load efficiency of commercial boilers. This test procedure will be used to influence revisions of ASHRAE 155, "Method of Testing for Rating Commercial Space Heating Boiler Systems".	Complete, EE measure has neither been implemented nor rejected	Other	HVAC
Technology Assessments	PG&E	ET11PGE1031	Agricultural & Irrigation Optimization Tool	The proposed Demand Response - Emerging Technologies assessment objectives are to evaluate the validity of manufacturers' claims and quantify the potential benefits of an agricultural irrigation optimization tool that is connected to irrigation pumps to save electricity and water.	On-hold	Pumps	Other
Technology Assessments	PG&E	ET11PGE1111	Residential Water Heating Program Proposal - CEC RFP#500-07-503	GTI is prime contractor; PG&E is providing engineering assistance with modeling tools/design guides, testing standards, and building energy codes.	Active	Water Heating Domestic Hot Water	Other
Market & Behavioral Studies	PG&E	ET11PGE4221	M&BS Building Stock Study	Quantitative analysis researching the potential and applicability of energy management systems (EMS) for existing commercial buildings in Pacific Gas and Electric Company ("PG&E") territory. This study focuses on the market penetration of EMS products through analysis of the commercial building stock, and strives to understand where EMS technology is currently in use.	Active	Other	Other

Figure 7: ETP Projects by IOUs (R&T Framework Area)

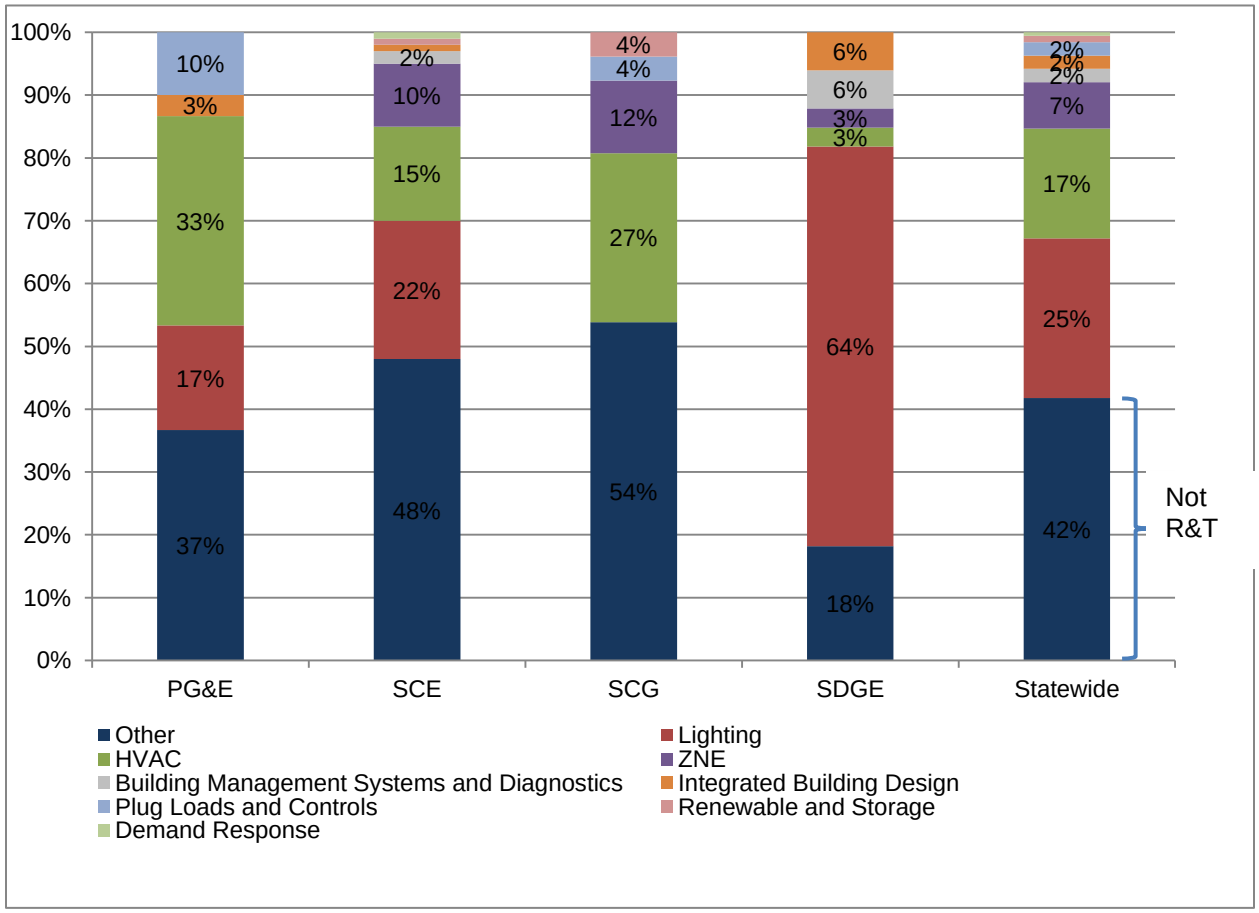
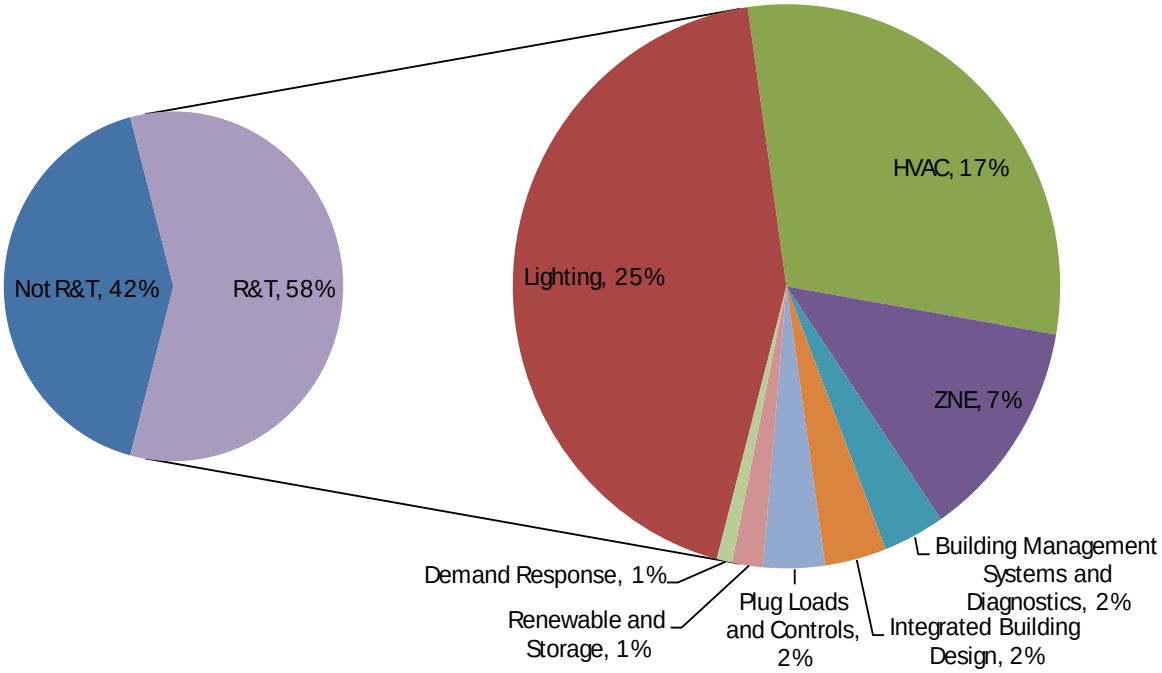


Figure 8: Statewide Projects by R&T Framework Area



U. TECHNOLOGY ASSESSMENT MARKET REVIEW

Element Design Evaluation

One of the six goals of the Phase I 20010-2012 ETP evaluation is to assess how the current ETP program design and implementation support the overall CEESP goals.[33] This evaluation effort brings attention to program design choices (i.e., the chosen strategy) in the current program cycle to facilitate learning and adaptation. There are typically two ways to evaluate strategy – perspective and position. When thinking about strategy, we could have included *perspective* (examining how the organization thinks about itself, including the extent to which the organization's leadership, staff, and participants in the organization articulate a consistent view of element design perspective) or *position* (focusing attention on where an organization aims to have an effect and contribute to outcomes)[34]. Since the CEESP recognizes that it will take both public and private entities to reach CEESP goals, position is the most important area upon which to focus evaluation efforts. This will help identify if ETP is in the right place to help meet the CEESP goals.

We will perform research to assess how the TA element is positioned compared to others who are conducting similar activities within the California Energy Efficiency residential and commercial lighting and HVAC market for emerging and under-utilized technologies. The evaluation will look closely at whether each element is positioned within the California Energy Efficiency (CA EE) market to meet the CEESP goals relevant to ETP.

Purpose

Within ETP, TA aims to verify manufacturer performance claims of energy efficiency for technologies that are new to market or under-utilized. To determine whether TA is appropriately positioned within ETP, it is important to see the make-up for the rest of the CA EE market to determine who the other players are and how they are similar/ different from TA.

Data Collection Methods

Primary data collection was performed through the use of investigative journalism.

Investigative journalism is a form of research in which the researcher looks deeply into a single topic with the help of primary and secondary data sources. Some of the commonly used tools, among others, are analysis of regulatory documents, databases of public records such as the ETP database, subscription research sources (such as industry associations), internet search, articles, books and interviews (asking about information relevant to the research topic as well as about other prospective interviewees). The investigative journalism process includes formulating a focused research question (what is expected to be researched), gathering the data (though the sources mentioned above),

[33] We note that the ETP PIP's Appendix 2 includes a description of the CLTEESP and ET PIP Connections. Appendix 2 summarizes how the ETP objectives and strategies during the 2010-2012 program cycle contribute to the fulfillment of the Strategic Plan near-term action and steps toward the plan's longer term goals.

[34] *Evaluating Strategy. New Directions for Evaluation.* Number 128, Winter 2010. *P 15.*

compiling key information with appropriate references, analyzing gathered data, and writing up of the results.

Research Questions

To determine TA's position within the expanded market space, the key research questions are:

- What else is going on in the CA EE market?
- Who are the other entities performing work similar to TA within the CA EE market and how are they similar or different to ETP?

Methods

To determine the other entities are performing work similar to TA, the following research steps were adopted:

- Review of internal IOU documents (reports of TA's performed as well as program manager interviews) to determine entities sub-contracts for performing technology assessments
- Review of American Council for an Energy-Efficient Economy (ACEEE) website, reports and CDs for finding entities within the CA EE market
- Online search to find entities independently engaged in TA (both privately or publically funded) and private manufacturers that actively engage in making their products energy efficient (specifically in lighting or HVAC).

Each of the mentioned research steps and the results from the effort are described in more detail below.

Review of Internal Documentation

A total of 44 internal IOU documents were reviewed to determine whether TA was performed internally or through an external sub-contractor. The table below outlines the number of reports reviewed and the number of reports that were prepared by external sub-contractors by the IOUs.

Table 33: Review of Internal Documentation

IOU	# of reports	# performed by external sub-contractor
SCE	19	0
PG&E	13	9
SCG	5	2
SDG&E	7	7
Totals	**44**	**18**

From these 18 reports performed by external sub-contractors, we were able to determine 11 unique entities, each of which were researched to determine whether they were indeed performing activities similar to TA and thus should/should not be included in the final results. The interviews performed by the Evaluation team with the program managers, while did not reveal specific entities, helped in formulating the parameters for selecting similar entities within California's energy efficiency market.

For each of the 11 entities, a thorough inspection was performed online using the following parameters[35]:

- Description of entity efforts
- Funding sources (sustainability of funding as well as where funding will be used, i.e. direction/long term goals of funding)
- Audience/clients
- Location (performing activities within the CA market)
- Product type
- Testing for energy efficiency
- Relevance to ETP [if the entity satisfied the above parameters (based on whether type of work performed, type of products tested and testing for energy efficiency were similar to TA) and was determined similar to TA, the following additional parameters were inspected]
- Position of product on the product testing continuum (i.e. closer to R&D phase or near market)
- Whether testing was done in a lab or *in situ*

Based on the parameters above, seven entities were found to be relevant and are listed below.

Table 34: Entities Performing Activities Similar to TA

IOU	# performed by external sub-contractor to IOUs	Names of 'Relevant to ETP-TA' Sub-Contractor
PG&E	9	Energy Solutions
		Architectural Energy Corporation
		BASE Energy Inc.
		Global Energy Partners
		UC Davis - California Lighting Technology Center
SCG	2	None
SDG&E	7	Western Cooling Efficiency Center
		Emerging Technology Associates

Review of ACEEE Material

A thorough review of the ACEEE website (http://www.aceee.org/) was performed specifically within their 'Publications' and 'Conferences and Events' tabs. Although the reports found within these tabs talking extensively about emerging technologies and the need for testing and utilizing these emerging technologies, they did not produce any leads for entities performing work similar to TA.

[35] Based on what is known about the ETP Element, the Evaluation Team determined the appropriate parameters to research.

Online Research

Google was the primary platform used for performing the online search. To get the most relevant search results, a combination of key terms were used:

- "Technology assessment - emerging energy efficient technology"
- "Technology assessment - emerging technologies for energy efficiency"
- "Companies in CA that do assessment of emerging Energy efficiency technology"
- "Top energy efficient lighting manufacturers"
- "Top energy efficient HVAC manufacturers"

The online search produced an extensive list of entities. The search results for each were research to complete a list of 42 entities which could potentially be relevant to TA. Each of these entities was then researched using the parameters specified above – 33 entities were found to be relevant.[36]

Research Findings

From the search performed a total of 40 entities (7 companies found through the internal review and 26 entities found through the online search) were found. Although this is not an exhaustive list, it is still relevant to make inferences about work being performed similar to TA within the overall CA EE market. Additionally, as explained before, the research performed will be useful to help augment the Delphi discussion.

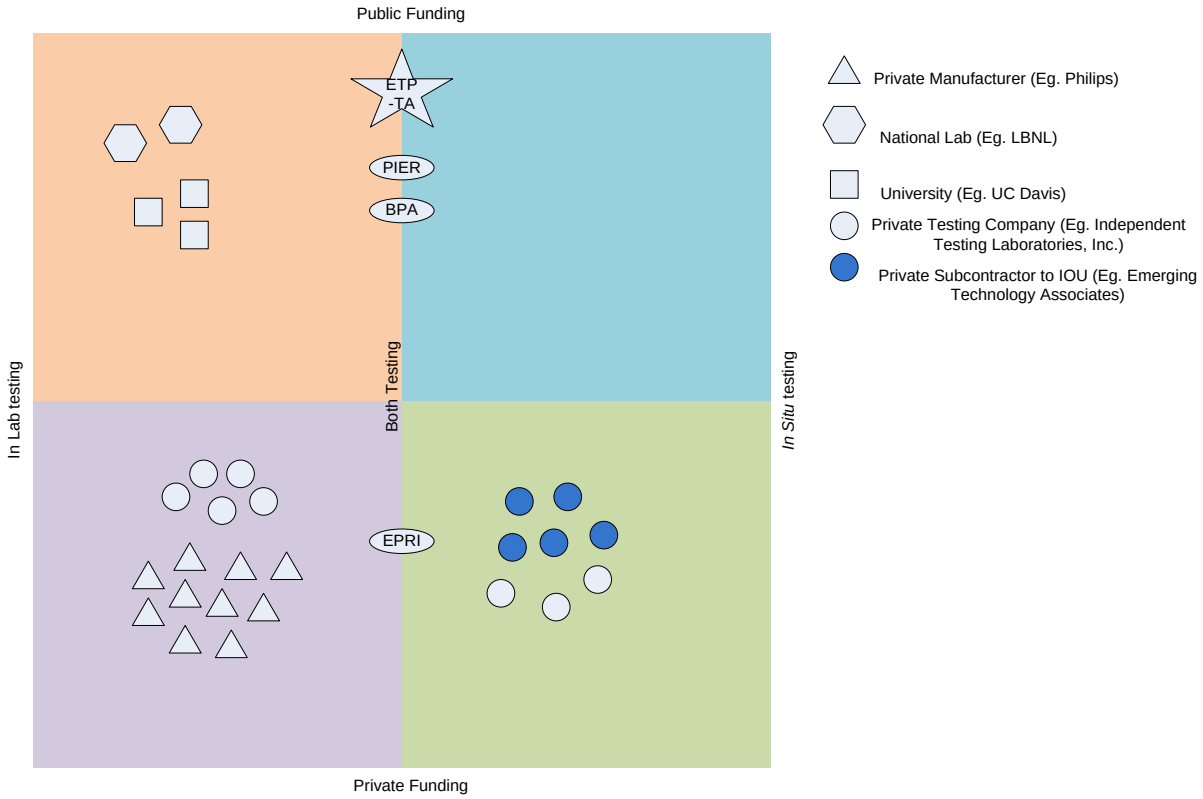
As described above, several parameters were used to determine the criterion for entity selection. To further categorize entities performing work similar to TA, some of the parameters were looked at more closely. These parameters were:

- Funding sources (public and private funding)
- Testing (in lab, *in situ*, both)

This helped in classifying the entities into an X-Y graph to visually determine where the entities fit into the overall CA EE market.

[36] Since the list of entities reviewed was so extensive, not all entities that were reviewed were document. The documented 39 entities were those that came closest to the activities performed by TA. These 39 entities were then researched more extensively.

Figure 9: Technology Assessments Market by Funding and Testing Types[37]



The X-axis looks at the stage of testing – i.e. whether testing was performed in a laboratory setting (in lab – far left of the axis), while installed or in use on an actual site (*in situ* – far right of the axis), or both (center of axis). This helped in distinguishing entities that are performing only one type of assessment as opposed to TA that performs both. The Y-axis looks at the source of funding received by the entities – i.e. private funding (bottom of the axis) versus public funding (top of the axis). This helped in distinguishing entities that have funding sources different from TA. Additionally, funding source is important since it not only helps determine sustainability of funding but also the long term goals for funding use. TA is publically funded by the CPUC and its long term goals of energy efficiency are well defined.

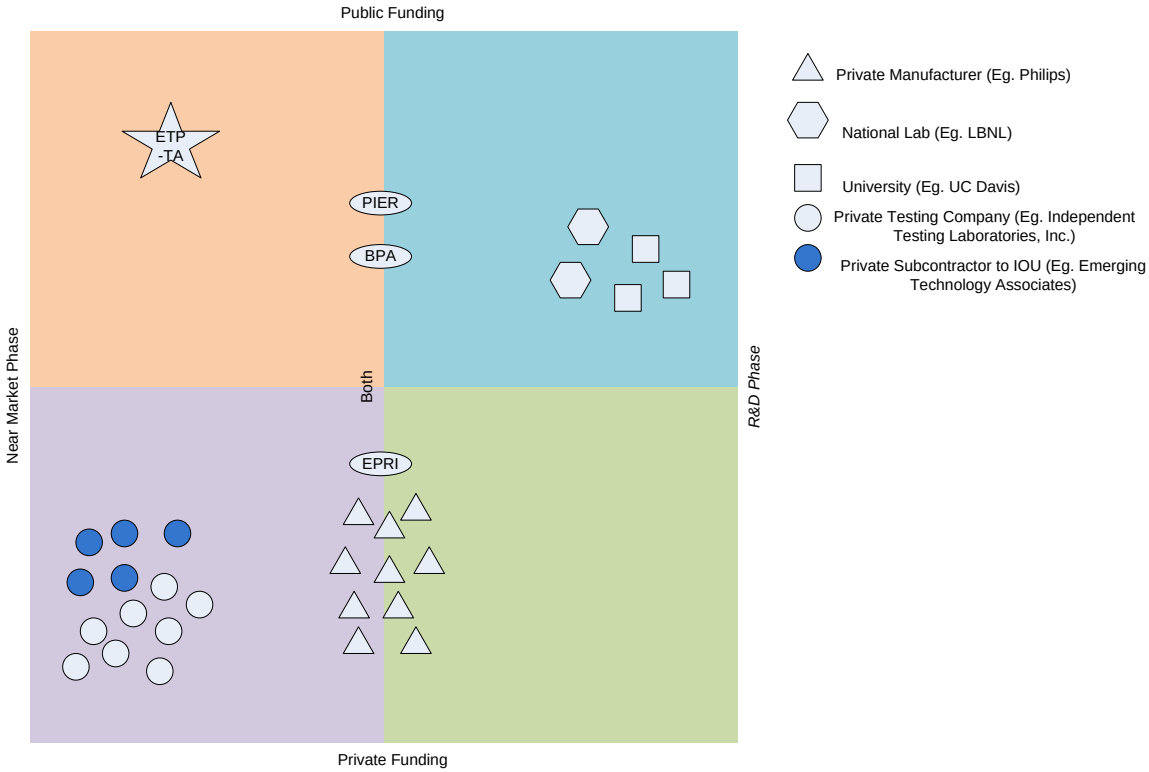
As can be seen in the figure, within the funding space, public funding entities are limited to universities and national labs that primarily focus on R&D of technologies and have technology assessments within the laboratory. There is much more activity within the private funding sphere – both in lab testing and *in situ* testing with private entities and private manufacturers. Additionally, it was found that there is a variation in the types of products that are tested by the various private and public entities (including but not limited to lighting, HVAC, cooling technologies, heat pumps, plumbing, consumer electronics, retrofits, washer/dryer, electric motors etc.).

[37] Note: The diagram shows where the entities fit based on four quadrant, however, it does not show any variations within each quadrant.

Besides funding and testing stage, an additional parameter was looked at more closely – Research, Development and Deployment (RD&D): this helped in classifying the entities into an X-Y graph to visually determine where the entities fit into the overall CA EE market. This can be seen in Figure 10.

The X-axis looks at the stage of product development and placed entities based on whether they test product that are in the early stages of research and development (R&D phase - far right of the axis), test product that are closer to being deployed and commercialized (near market phase – far left of the axis), or perform testing on products in any stage (center of axis). This helped in distinguishing entities that are performing assessment for products in one stage or another as opposed to TA that performs both. The Y-axis looks at the source of funding received by the entities – i.e. private funding (bottom of the axis) versus public funding (top of the axis). This helped in distinguishing entities that have funding sources different from TA. As explained before, funding source is important in terms of sustainability of activities and long term goals of an entity.

Figure 10. Technology Assessments Market by Funding Type and RD&D Space[38]



As can be seen in the figure above, within the funding space, public funding entities are limited to universities and national labs that primarily focus on R&D of technologies and have technology assessments within the laboratory. Additionally, entities are well divided between those performed testing of products in the R&D phase and the near-market phase. The universities and national labs concentrate heavily on the R&D stage - this differentiates them from TA as they are primarily

[38] Note: The diagram shows where the entities fit based on four quadrant, however, it does not show any variations within each quadrant.

innovators. The private manufacturers concentrate heavily on both the R&D process as well as getting the products ready for the market (deployment) – but they do this only for their own products. Private entities involved in technology assessments are similar to ETP-TA as they test technologies that are near-market or already in the market but under-utilized. There is more activity within the private funding sphere versus the public funding sphere.

To further determine whether TA is positioned preferably within the CA EE market, several other questions were addressed. These are discussed in detail below:

Question 1. How much is the IOU sub-contracted work a part of the sub-contractor's work? Would they exist without the TA funding?

The mentioned sub-contractors have a wide range of clients/audiences – which include the IOUs. However, based on the review done online, it can be concluded that the work sub-contracted through the IOUs is a small part of their work and these entities would still be relevant/exist without the sub-contracted work.

Question 2. For private entities performing technology assessments – is private testing sufficient to incorporate the technology into the IOU portfolio or do these products require additional testing through the IOU?

From the program manager interviews, it was inferred that the IOUs prefer getting technology assessment done internally or through sub-contractors hired specifically for a project. Thus even if a technology has undergone a technology assessment externally, it must go though the IOUs testing to be included into the EE portfolio.

Question 3. How high is energy efficiency as a priority for the private manufacturers? Will they continue testing for energy efficiency in the future?

Based on interviews with private entities and manufacturers, it can be concluded that currently, energy efficiency is a priority for them. The majority of manufacturers market themselves as an energy efficient company – not only in terms of their products but also as a corporation. However, if there is a drastic change in consumer preference, they would change their strategies to match those of the consumers (rather than the policy/CPUC mandates).

Question 4. Who sets the direction for the work performed by the national labs and universities? Will these organizations continue testing for energy efficiency in the future?

Based on interviews with universities and national labs, it can be concluded that currently, energy efficiency is a priority for them. The national labs are funded through the Department of Energy and thus receive their mandates and research direction from them. Currently, energy efficiency is a priority for the labs, however, this could change based on policy changes or changes in DOE's priorities. Similarly, the universities are funded through a variety of channels, such as PIER, that are heavily invested in energy efficiency. The mandates for the university seem to be more concrete with fewer potentially drastic changes due to policy or preference changes. However, universities invest more heavily in the research process rather than testing. Thus, even though universities and national labs are performing similar work to TA, their areas of priority

could change.

References

Online Search:

Search for "Top energy efficient lighting manufacturers" gave the following useful links:

- http://www.nytimes.com/2010/05/17/technology/17bulb.html?ref=energy-environment
- http://www.lightresource.com/litelink04.html - more extensive search was performed for the entities that had "energy efficient" in the short descriptions

- Search for "Top energy efficient HVAC manufacturers" gave the following useful links:
- http://www.tristatehvac.com/products.htm - more extensive search was performed for the entities that had "energy efficient" in the short descriptions

1.18 TA - Complete list of Online Research Entities

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
1	Western Cooling Efficiency Center	Yes - 1 - Central Hotel Guest Room Energy Controls - SDG&E	Western Cooling Efficiency Center (WCEC) - UC Davis Energy Efficiency Center -- The Center engages in primary research, innovation, laboratory testing, field demonstrations, education, outreach, and advocacy related to climate appropriate cooling technologies.	Public - University	Utilities, regulators, and government agency - Steering Committee members currently represent the major California electric utilities, the California Energy Commission, the UC Davis Energy Efficiency Center, the U.S. National Renewable Energy Laboratory, major retailers, and the New Buildings Institute	Davis, CA	Cooling technologies	Yes - but not the highest priority	Near-Market (Changed from - Primary research, innovation, laboratory testing, field demonstrations, education, outreach, and advocacy)	Both	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
2	Emerging Technology Associates	Yes - All 7 - SDG&E	Very specifically state that they do "In Situ Pilot Assessment of Technology" and "ET market development" - design in situ pilot projects as a means of validating stated performance claims	Private	SDG&E, IBEW-NECA California Labor Management Cooperation Committee, Travelers Companies, Jack In the Box, PG&E, The Connecticut Energy Efficiency Fund, VA San Diego Healthcare System, Mark Twain House & Museum, Long Beach Memorial Hospital, Town of East Lyme, Hamann Companies, CONVIA (Subsidiary of Herman Miller), Sharp HealthCare, DOE. SCG	San Diego, CA	HVAC, Lighting, geothermal heat pump system, Mechanical Electrical Plumbing,	Yes - but not a priority over: functionality, compatibility, design.	Testing only, also design projects to test EE (example MEP design services)	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
3	Energy Solutions	Yes - 1 - LED Street Lighting and Network Controls - PG&E	Evaluating the value and impacts of cutting edge energy efficiency innovations. Our efforts aim to accelerate the commercialization and adoption of the latest and best energy efficient technologies. provide comprehensive program design, management, and implementation services starting from technology assessment and market research, through marketing and management, to final reporting and quality assurance.	Private	ACEEE, Association of Bay Area Governments (ABAG), CEC, California State and Consumer Services Agency, City of Berkeley, City of Oakland, City of San Francisco, Cool Roof Rating Council (CRRC), Community Energy Services Corporation, Consortium for Energy Efficiency, SCG, East Bay Municipal Utility District (EBMUD), Global Environment Facility/Government of Ecuador, Hanson Roof Tile, Jasper Ridge Biological Preserve, Jyukankyo Research Institute, LBNL, PG&E, NV Energy, Regional Water Authority (RWA), Roseville Electric, Sacramento Municipal Utility District (SMUD), SCE, Stanford University	Oakland, CA and Long Beach, CA	Commercial lighting retrofits, boilers, water heaters, computer monitors, televisions, commercial and residential HVAC, ductless HVAC technologies, evaporative pre-cooling, and commercial clothes washers	Yes	Program design, management, and implementation services starting from technology assessment and market research, through marketing and management, to final reporting and quality assurance	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
4	Architectural Energy Corporation	Yes - 2 - Occupancy-Based Guestroom Controls Study, Small Commercial EMS for HVAC and Lighting - PG&E	Design consulting company - providing our clients with peak building performance over the life of their facilities - Our portfolio of services includes energy and daylighting analysis, sustainable design consulting, LEED® certification consulting, commissioning, measurement and verification, energy auditing, design and construction services and retro-commissioning - REM/Rate™ (RESNET® Accredited) is the most widely used home energy rating software in the US.	Private	Utilities, private companies	San Francisco, CA	Whole building - LEED certification	Yes	M&V plans in support of performance contracting, utility-sponsored energy efficiency and demand-side management programs, and LEED® projects.	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
5	BASE Energy Inc.	Yes - 1--Water Energy Pumping Operation - PG&E	Performing energy assessments, design review, evaluating products for energy efficiency, and engineering and R&D services to advance energy efficiency and environmental stewardship - provide Facility Energy Assessment, Targeted Energy Assessment, Design Review for Energy Efficiency (Savings By Design), Measurement and Verification, simulation of Energy Use by Buildings and Processes, Cogeneration, Self Generation and Alternative Energy Sources, Training in Energy Efficiency, Project Management and Specialized Research and Analytical Services	Private	Allergan Corporation, Amcor PET, Amgen, Inc. Anchorage School District, California Manufacturing Technology Consulting, Carpenter Group, City of Sunnyvale, Clift Hotel, Clinton Reilly Holdings, California Department of General Services, GasSonics International, Hanson Cement, Horizon Snack Food, Material Integrity Solutions, NASA Glenn Research Center, Neville Chemical, PG&E, Recolte Energy, Sacramento Municipal Utility District, SCE, SCG, US Air Force, US Army Corps of Engineers	San Francisco, CA	Whole building - design EE	Yes	Program design, M&V	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
6	Global Energy Partners	Yes - 1- - Water Energy Pilot Implementation - PG&E	Provider of Energy Efficiency (EE) and Demand Response (DR) programmatic solutions and innovative technology applications - Load Analysis - Load research sample design and analysis, load forecasting, statistical design and analysis of smart grid-enabled pilots and programs	Private	Utilities, Energy agencies, State and local governments, Regulatory agencies, Commercial and industrial companies and Water and wastewater facilities	Walnut Creek, CA	HVAC, lighting, food industry, DR technologies, electric motors,	Yes	On-site assessment of promising technology	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
7	UC Davis - California Lighting Technology Center	Yes - 1 - Integrated Lighting System ET Technology Development - PG&E	Stimulate, facilitate, and accelerate the development and commercialization of energy-efficient lighting and daylighting technologies. CLTC accomplishes these goals through technology development, demonstrations, and outreach and education activities	Public - University	The PIER Building Program provided start-up funding and support is provided by National Electrical Manufacturers Association (NEMA)	Davis, CA	Lighting	Yes	R&D	Lab	Yes
8	Independent Testing Laboratories, Inc.	No	Independent light testing laboratory - focus has always been on testing, offers our clients application engineering and luminaire design services, complete laboratory photometer systems and lighting related software	Private	Lighting manufacturers, specifies, designers, architects, the government	Boulder, CO	Lighting	Yes	Customers contact them for testing their lighting	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
9	OnSpeX	No	Focus on hardlines testing and data analysis - help retailers and consumer products manufacturers quantify and analyze the performance of products and suppliers to drive decisions	Private	Not-for-profit membership association serving consumers, business and government	Atlanta, GA	Energy Star® appraisals	Yes	Customers contact them for testing their product	Lab	Yes
10	CSA International	No	A Nationally Recognized Testing Laboratory - provider of product testing and certification services	Private	Regulators, manufacturers, retailers/specifies	Irvine, CA	Consumer electronics, HVAC	Yes	Customers contact them for testing their product	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
11	Pacific Northwest National Laboratory (PNNL)	No	Largely focuses on fundamental and applied research to address important issues including securing our homeland, reducing our dependence on foreign oil, and protecting our country's natural resources. deliver energy savings in all stages of buildings-related research, technology development, and deployment.	Public	DOE	Richland, WA	Lighting	Yes	R&D and testing of new products	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
12	Intertek Laboratories	No	Offer performance testing for virtually any type of products, testing to national, international, or industry standards, as well as retailer, or your own, specifications. - have proprietary method called Failure Mode Verification Testing (FMVT)	Private	Adtran, Aldi, ARI, Auchan, Bangladesh, Behr, BOC Edwards, Bosch, Bose, BP, Canon, Carrefour, ChevronTexaco, Citgo, ConocoPhillips, Costco Wholesale, CVRD, DSM, Ecuador, Electrolux, ELK Valley Coal, Ericsson, ExxonMobil, Gap Inc, Glencore, Goodman, Guinea, Haier, IKEA, Infinium, Irving Oil Ltd, JVC, Kenya, Koch, Kohl's, Kuwait, Lakeshore Learning Materials, Lear/Bing, Liebherr, Lloyd's Register, Lubrizol, Malawi, Marks & Spencer, Matsushita, McDonald's Corporation, Mexico, Morgan Cars, Mozambique, Nigeria, Nikon, Petrobas, Pioneer, QVC, Sabic, Samsung, Sanyo, Sasol,	San Francisco, CA	HVAC, lighting, and others	Yes	Energy Efficiency Testing for North America: ENERGY STAR®, EnergyGuide Label, AHRI, CEC, NRCAN, LEED and more	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
					Saudi Arabia, Sempra Energy, Shell, Siemens, Sierra Leone, Statoil, Sunoco, Teck Coal, Tesco, The Home Depot, Toshiba, Total, Trafigura, TRW, Uzbekistan, Valero, Vitol, Wal-Mart, Woolworths						

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
13	Electric Power Research Institute (EPRI)	No	Nonprofit - The Energy Technology Assessment Center (ETAC) conducts strategic assessments of electricity sector technology needs. ETAC research focuses on interdisciplinary analysis of technology development, energy policy, and economic factors.	Private	EPRI's members represent more than 90 percent of the electricity generated and delivered in the United States, and international participation extends to 40 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass.	Palo Alto, CA	Changes according to current needs	Yes	Innovation, R&D and testing	Both	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
14	Osram Sylvania	No	OSRAM SYLVANIA has several principal organizational units: General Lighting, Precision Materials & Components, Automotive Lighting, Electronic Control Systems, Display/Optic - In 1981 we introduced the SYLVANIA OCTRONâ family of fluorescent lamps, ushering in a new era of efficiency. Since then, we have helped our customers save more than 267 billion kWh -- enough to run all of New York City for 4 years!! -- and over $26 billion in electricity costs. OSRAM SYLVANIA was instrumental in developing the Department of Energy Federal Ballast ruling requiring the use of energy-saving	Private - Manufacturer	Commercial, Retail, Display/Optic, Industrial, Original equipment manufacturers, Automotive, Machine tool, Mining, Aerospace	Danvers, MA	Lighting	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
			electronic ballasts in most fluorescent luminaires by 2005, and for replacement purposes by 2010.								
15	TRANE	No	Offer a broad range of energy-efficient HVAC systems; dehumidifying and air cleaning products - apply expertise in environmental technology and energy conservation to make a difference in energy efficiency around the globe.	Private - Manufacturer	All types of buildings	Davidson, NC	HVAC	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
16	Carrier	No	Carrier has been the world leader in air conditioning, heating and refrigeration systems. A wholly-owned subsidiary of United Technologies Corporation. - examples - XDX® distributes frost evenly throughout the unit, making it more energy efficient, SEER, or Seasonal Energy Efficiency Ratio, is the official energy efficiency descriptor for residential central air conditioners and heat pumps, ComfortHeat, an energy-efficient, two-stage heating and variable-speed technology	Private - Manufacturer	All types of buildings	Farmington, CT	HVAC and refrigeration	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
17	Lennox	No	Lennox has some of the most efficient air conditioners available today. Examples - dual-fuel system offers the perfect combination of efficiency and comfort with two energy sources—an electric heat pump and a gas furnace.,	Private - Manufacturer	All types of buildings	Richardson, TX	HVAC	Yes	Innovation, R&D and testing	Lab	Yes
18	Harris Group Inc	No	The purpose of the independent technology assessment is to objectively analyze the merits and risks associated with investing in or applying a given technology or process - Harris Group Process Solutions moves emerging technologies from concepts to commercialization - Harris Group process engineers can tackle emerging technologies in any field	Private	Market areas - Automation Solutions, Biopharmaceuticals & Life Sciences, Chemical Plants, Emerging Technology Development, Fuel & Chemical Storage & Distribution, Manufacturing, Oil & Gas, Ports, Power Generation, Project Finance & Independent Engineering, Pulp & Paper, Railroad Planning & Engineering, Renewable Fuels & Chemicals	San Francisco, CA	All EE products	Yes	Moves emerging technologies from concepts to commercialization - including TA	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
19	MWE2s	No	MWE2s staff has performed over 500 administrative and technical reviews of applications and submittals for the California Commercial and Industrial incentive programs. This included performing inspections of baseline and installed equipment and performing any necessary measurement and verification in order to ensure claimed savings will stand up to rigorous measurement and evaluation procedures. Example - LED Field Assessments for a major utility. Similar to the DOE's Gateway program, we are in the process of a multi-year testing program for several sites across their	Private	Utilities, investor, product developer, or design professional looking for an expert view on the actual financial and environmental impacts of a new technology	Morro Bay, CA	All EE products	Yes	Field testing or building testing	In-situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
			service territory.								

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
20	Washington State University	No	Energy Efficiency Emerging Technologies Program (E3T) - implementing a multi-staged process to identify, analyze and demonstrate emerging energy efficiency technologies for adoption by Northwest utility conservation programs for the Bonneville Power Administration's E3T initiative. This includes organizing technical advisory groups of regional and national experts for lighting and HVAC; developing an online database of emerging technologies; participating in development of a Northwest regional roadmap for emerging technologies; and field assessment of technologies, including	Public - University	Associations, Research institutions, Consultants, Universities, Federal Agencies, Private Sector, Regional and other state agencies, utilities/municipalities -- http://www.energy.wsu.edu/AboutUs/OurPartners.aspx	Olympia, WA	Whole building research - different products for improving EE	Yes	Near market (Changed from Research and R&D and testing)	In Situ	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
			design of an outdoor street lighting test facility.								

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
21	Bonneville Power Administration	No	BPA launched the Energy Efficiency Emerging Technologies (E_3T) initiative to engage in a collaborative effort to "fill the pipeline" with innovative energy efficiency solutions and technologies that promise significant region-wide energy savings. In collaboration with Northwest utilities, BPA Office of Technology Innovation, Northwest Energy Efficiency Alliance (NEEA) and other stakeholders, BPA Energy Efficiency identified a number of emerging technologies it is supporting with pilot programs, testing or other research and development activities.	Public	Collaboration with NEEA, Livington Energy Innovations (LEI), Washington State University	Portland, OR	Lighting and heat pump water heater	Yes	Lab Tests, Field Tests, Demonstration Projects, Decision Tree	Both	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
22	Public Interest Energy Research (PIER)	No	CA's premier energy RD&D program - advancing science and technology in the fields of energy efficiency, renewable energy, advanced electricity technologies, energy-related environmental protection, and transmission and distribution, and transportation technologies. In the last decade PIER has invested more than $700 million to bring to market energy technologies that provide environmental and economic benefits to California's ratepayers.	Public	PIER enlists businesses, utilities, energy companies, public advocacy groups, and world-class scientists at California's universities and national laboratories.	CA	All EE products	Yes	RD&D and funding of innovations and testing	Both	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
23	Lawrence Berkeley National Laboratory	No	The Lumina Project - TA for LED light sources, Technology Evaluation, Modeling, and Assessment Group - for energy efficient products, Environmental Energy technology Division - for window test facilities,	Public	DOE	Berkeley, CA	All EE products	Yes	R&D, testing	Lab	Yes
24	8E, a division of AMERILLUMBRANDS	No	Design manufacturer of energy efficient, state-of-the-art, fluorescent lighting fixtures and retrofit conversion kits.	Private - Manufacturer	Industrial, institutional, commercial, retail, federal & municipal facilities. We've completed thousands of projects for countless satisfied end-users like Boeing, Johnson Space Center, Sara Lee Corporation, University of Arizona, California State University, PG&E, Los Angeles Motor Transit Authority and Marine Corps Base Camp Pendleton	Oceanside, CA	Lighting	Yes	R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
25	Litecontrol	No	Provide creative ways to save energy and match the lighting to the specific needs of a space.	Private - Manufacturer	All types of buildings	Hanson MA	Lighting	Yes	R&D and testing	Lab	Yes
26	Cooper Lighting	No	Leading manufacturer of track and recessed lighting in North America and one of the largest fixture manufacturers of LED, fluorescent, H.I.D., exit and emergency, vandal-resistant, landscape and complex environment lighting.	Private - Manufacturer	Commercial, industrial, residential and utility markets	Houston, TX	Lighting	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
27	McQuay	No	McQuay is the second largest air conditioning, heating, ventilating and refrigeration company in the world. benefit from lower installed and operating costs, high energy efficiency, quiet operation, superior indoor air quality (IAQ) and low cost maintenance and service. The Department of Energy announced the Daikin McQuay Rebel rooftop unit as the first entry to the DOE's High-Efficiency Commercial Air Conditioners Challenge for a new generation of air conditioners designed to reduce energy use by as much as 50 to 60 percent.	Private - Manufacturer	All types of buildings	Minneapolis, MN	HVAC	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
28	Philips	No	World leader in lighting, Philips integrates technologies and design into people-centric solutions - focus on increasing the energy efficiency of our products along with other environmental improvements since 1994. Steadily reduced energy consumption of many products in portfolio, such as TVs and lighting solutions.	Private - Manufacturer	All types of buildings	CA	Lighting	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
29	GE	No	GE manufactures hundreds of appliance models that carry the ENERGY STAR - Recognizing our commitment to creating appliances and lighting products that help reduce energy spending and protect the environment, the U.S. Department of Energy and Environmental Protection Agency have awarded GE with the 2011 Sustained Excellence Award.	Private - Manufacturer	All types of buildings	CA	Lighting, Appliances	Yes	Innovation, R&D and testing	Lab	Yes
30	Cree	No	A market-leading innovator of lighting-class LEDs, LED lighting, and semiconductor solutions for wireless and power applications - owns Rudd Lighting, Ecolight, BetaLED - all of which are involved in EE lighting	Private	All types of buildings	WI	Lighting	Yes	Innovation, R&D and testing	Lab	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
31	Salas O'Brien Engineers	Yes - 1 - LED for Hospital Operating Rooms - PG&E	Energy Audit company, MEP design services, architectural design services	Private	Universities, local governments, utilities, commercial	San Jose, Ca	Consulting services	No	NA	NA	No
32	QDI Strategies, Inc	Yes - 1 - Thin Client- PG&E	Strategy consulting for new products or new markets	Private	Utilities (PG&E), EPRI, private companies	Libertyville, IL	Consulting services	No	NA	NA	No
33	ANCIS Incorporated	Yes - 1- Data Center Air Management Research - PG&E	Air Management in Data Centers - provide energy solutions	Private	Data centers	San Francisco, CA	Consulting services	No	NA	NA	No
34	Information & Energy Services, Inc.	Yes - 2 - Suncache, Heatsaver Liquid pool cover - SCG	Energy information and consulting company	Private	End-use and energy service company clients from a variety of industries	San Diego, CA	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
35	Design & Engineering Services, Customer Service Business Unit at SCE	10 SCE reports	Utility Company	Public	Utility company	CA	Energy programs	Yes	NA	NA	No
36	L Prize	No	Encourage innovation (funded by DOE)	Public	Competition sponsored by DOE	DC	Lighting	Yes	Design of new products	Lab	No
37	CTAC - Edison	No	Source of energy efficiency information - offer seminars and workshops	Public	Utility company	CA	Energy programs	Yes	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
38	Agricultural Technology Applications Center (AGTAC) - Edison	No	AGTAC is an educational resource energy center, located in Tulare, California and has many hands-on exhibits and displays available for public viewing and demonstrations for seminars on related topics. There are pumps and motors, lighting and air conditioning, instrumentation and sensors, programmable logic controllers and energy management systems.	Public	Utility company	CA	Energy programs	Yes	NA	NA	No
39	Novi Energy	No	NOVI serves our customers at any stage in the process from concept and design, to engineering, construction and operation of energy facilities.	Private	Manufacturers and other private entities	Novi, MN	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
40	Heschong Mahone Group, Inc.	No	Professional consulting services in the field of building energy efficiency. We specialize in applying our knowledge of building design, construction technology, policy development and program design to the problem of making buildings more energy efficient.	Private	Manufacturers and other private entities	San Francisco, CA	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
41	Livingston Energy Innovations (LEI)	No	Technology and market analysis for DSM product and service development and introduction, program design, and investment assessment - Consulting services	Private	SCE (For SCE - technical study for ZNE, TRIO, helped write the ETP), Bonneville Power Administration, EcoFactor, Sacramento Municipal Utilities District, Emerging Technologies Coordinating Council, PARC (formerly Xerox PARC), Microstaq, Washington State University Energy Program, National Semiconductor, Northwest Energy Efficiency Alliance - http://www.livingston-ei.com/clients/	Mill Valley, CA	Demand-side management products	Yes	Testing and assessments	NA	No
42	Lawrence Livermore National Laboratory	No	More of a focus on renewables, nuclear fuels and reactors, and climate change	Public	DOE	Livermore, CA	Renewables	Yes	NA	NA	No
43	SLAC National Accelerator Laboratory	No	More of a focus on physics	Public	DOE (Operated by Stanford University)	Menlo Park, CA	Physics	Yes	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
44	Sandia National Laboratories	No	More of a focus on transportation energy efficiency	Public	DOE	Livermore, CA	Transportation	Yes	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
45	Energy Innovation Group, LLC	No	EIG is the nation's only Energy Program Integrator, bringing the latest advances in traditional and emerging technologies, special utility incentives, a 'big picture' strategy, and a highly efficient one-stop service to help companies, cities and schools reduce cost and qualify for major incentives, far beyond standard conservation measures. evaluate emerging technologies for reliability, energy savings, cost effectiveness, and are often able to arrange special rebates. EIG communicates with: utilities which review technologies for rebate qualification … venture capital firms that finance new technologies …	Private	Utility program rebate technologies	Los Angeles, CA	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
			universities which develop technologies … engineering firms which consult in product design … testing labs which test technologies … and contractors and customers who have been presented with technologies.								
46	Clean Edge, Inc	No	Clean Edge, Inc., founded in 2000, is the world's first research and advisory firm devoted to the clean-tech sector. For more than a decade, the firm has delivered timely data, expert analysis, and comprehensive insights to key industry stakeholders.	Private	All types of buildings	San Francisco, CA	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
47	NextEnergy	No	NextEnergy is a leader driving advanced-energy technologies and sustainability in many areas such as: Smart Grid, Advanced Energy Storage, Vehicle Electrification, Power Electronics, A Wide Range of Fuels, Renewables: Wind, Solar, Biofuels, Energy Efficiency	Private	Manufacturers and other private entities	Detroit, MI	Alternate and Renewable energy	Yes	NA	Lab	No
48	Davis Energy Group	No	Work encompasses efficient cooling, heating, and building systems, including system analysis, design, controls, simulations, product development, and technology transfer. DEG combines design, energy analysis and evaluation, energy program management, and product development under one roof.	Private	Manufacturers and other private entities	Davis, CA	Consulting services	No	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
49	Energy Design Resources	No	EDR offers a valuable palette of energy design tools and resources that help make it easier for architects, engineers, lighting designers, and developers to design and build energy-efficient commercial and industrial buildings in California.	Private	Manufacturers and other private entities	CA	Consulting services	No	NA	NA	No
50	Enovity, Inc.	No	Enovity is a premier energy engineering consulting and facility O&M company whose focus is on planning, validating and maintaining high performance, sustainable and energy efficient buildings.	Private	Manufacturers and other private entities	San Francisco, CA	Consulting services	Yes	NA	In-situ	No
51	TMT Associates Architectural Lighting Design & Consulting	No	Specialize in energy-efficient architectural lighting design, lighting energy efficiency consulting, and lighting education.	Private	TMT Associates offer lighting design and consulting services for the architectural, design, and energy service communities.	Antioch, CA	Lighting	Yes	NA	NA	No

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
52	Envirobrite	No	Envirobrite was founded in 1994 to achieve two goals: to save people substantial amounts of money through use of our energy-efficient products; and to help our environment.	Private	In-house funding. CPUC, Utilities, DOE	Florida	HVAC, Building Shell	Yes	R&D (building, testing, lab phases), Production Phase, to Market Phase	Both	Yes
53	Proctor Engineering	No	PEG designs and implements cost-effective energy efficiency programs that maximize energy savings and reduce peak demand. We specialize in Program Design, Pilot Programs, Program Evaluation, Energy Efficiency Research and Expert Project Manager	Private	In-house funding. CPUC, Utilities, DOE	San Rafael, CA	HVAC, Building Shell	Yes	R&D (building, testing, lab phases), Production Phase, to Market Phase	Both	Yes

#	Company Name	Helped on internal reports for IOU	Description of Company Efforts	Funding/Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?
54	Verified RCA	No	We are a team of research engineers, software engineers, systems analysts, technicians, trainers, and Ph.D. scientists working together to find energy efficiency solutions to reduce the impact of global warming.	Private	In-house, CPUC, Utilities, Manufacturers	Truckee, CA	Showerheads, AC/HVAC/furnaces, chillers, faucet, solar, waste water treatment aerators, LED fixtures/lamps, PC network software	Yes	R&D (design), near-market phase, in-market	Both	Yes

V. TECHNOLOGY TEST CENTER MARKET REVIEW

Purpose

TTC evaluates the performance of new/under-utilized energy efficient technologies – within a laboratory setting, and has begun construction of a ZNE test center for residential construction. To determine whether TTC is appropriately positioned within ETP, it is important to see the make-up for the rest of the CA EE market for entities performing work similar to TTC. Thus, the research will be performed to determine who the other players are and how they are similar to/different from TTC's laboratory testing of new/under-utilized energy efficiency technologies and similar projects currently underway within residential ZNE testing. We note that the program managers chose to discontinue the Residential ZNE Facility in 2012.

Data Collection Methods

Similar to TA, primary data collection was performed through the use of investigative journalism.

Investigative journalism is a form of research in which the researcher looks deeply into a single topic with the help of primary and secondary data sources. Some of the commonly used tools, among others, are analysis of regulatory documents, databases of public records such as the ETP database, subscription research sources (such as industry associations), internet search, articles, books and interviews (asking about information relevant to the research topic as well as about other prospective interviewees). The investigative journalism process includes formulating a focused research question (what is expected to be researched), gathering the data (though the sources mentioned above), compiling key information with appropriate references, analyzing gathered data, and writing up of the results.

Research Questions

To determine TTC's position within the CA EE market, the Evaluation Team developed the following overarching questions:

- What other entities perform laboratory testing of energy efficient products specifically to determine energy savings?
- Who else is conducting Residential Zero Net Energy (ZNE) testing?

Methods

To identify other entities that perform work similar to TTC, the following research steps were adopted:

- Review of American Council for an Energy-Efficient Economy (ACEEE) website, reports and CDs (collection of reports from conference) for finding entities that perform work similar to TTC
- Online research to find entities independently engaged in laboratory testing for energy efficiency (both privately or publically funded) and private manufacturers that actively engage in making their products energy efficient (specifically in lighting or HVAC technologies).
- Online research to find entities independently engaged in ZNE testing (both residential or

commercial sector projects as well as both privately or publically funded)

Each of the mentioned research steps and the results from each effort are described in more detail below.

Review of ACEEE Material

A thorough review of the ACEEE website (http://www.aceee.org/) was performed specifically within their 'Publications' and 'Conferences and Events' tabs. Although the reports found within these tabs extensively discuss emerging technologies and the need for testing and utilizing these emerging technologies. The site did not produce any leads for entities that perform work similar to TTC.

Online Research for Laboratory Testing Entities

The research performed for TA was used for the lab testing research. The 30 companies that were found to be relevant for TA were screen for relevance to TTC.

Online Research for Residential ZNE Testing Facilities

Google was the primary platform used for performing the online search. To get the most relevant search results, a combination of key terms were used:

- "Zero net energy testing centers"
- "Residential zero net energy testing centers"
- "Commercial zero net energy testing centers"

The search results for each term resulted in a list of 25 entities which could potentially be relevant to TTC's ZNE testing.

Research Findings

As a result of the search, the Evaluation Team identifies a total of 55 entities (30 entities found through online lab testing research and 25 entities found through the online ZNE testing research). Although this is not an exhaustive list, it is still relevant to make inferences about work being performed similar to TTC within the overall CA EE market.

For the 30 entities found in the TA research, a thorough inspection was performed to determine whether the testing was done in a lab or *in situ*. The entities that perform lab testing were relevant to TTC - based on this, 23 entities were found to be relevant.[39]

Similar to the TA research funding is an important component for TTC – where unlike other entities, mandates for energy efficiency products is clear and does not change based on policy or preference changes. Additionally, similar to TA, it was found that within the funding space and in lab versus *in situ* space, public funding entities are limited to universities and national labs that primarily focus on R&D of

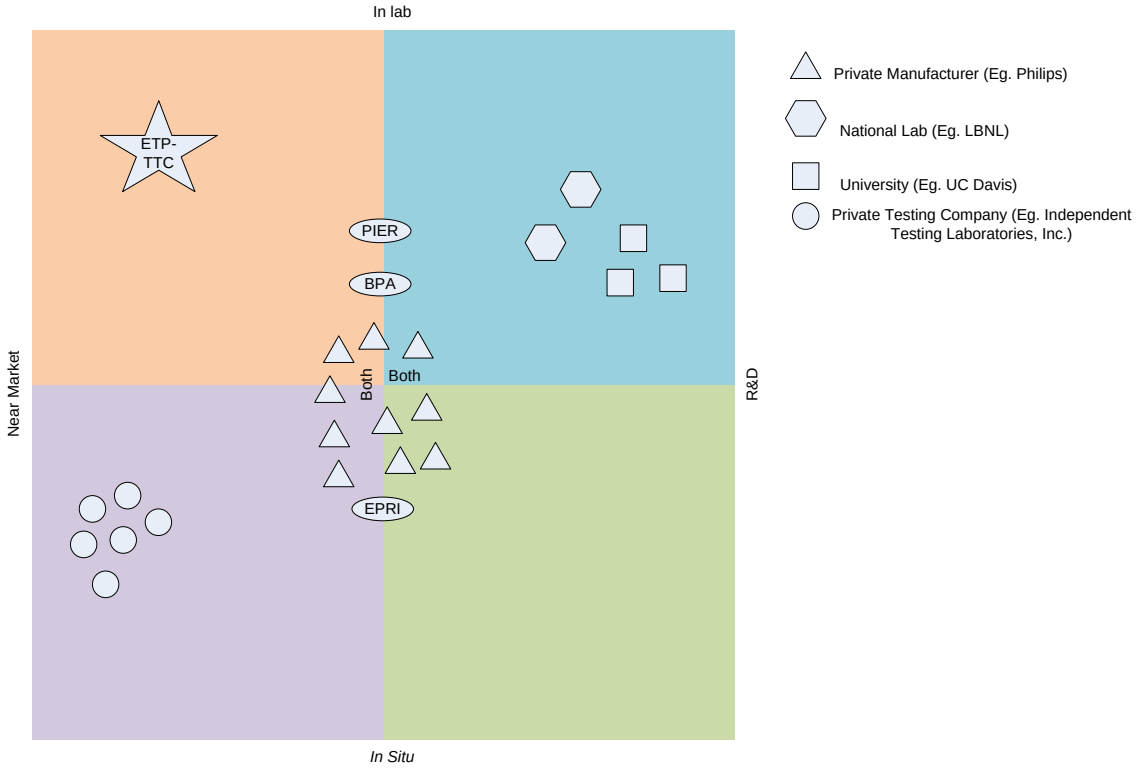
[39] Full list of companies can be found in the Appendix B

technologies and perform in lab testing while private funding entities include private entities and manufacturers that are primarily focused on *in situ* testing.

To further analyze entities performing work similar to TTC, an X-Y graph was constructed to determine where the entities fit into the overall CA EE market based on type of testing performed (in lab or *in situ*) and RD&D phases (near-market or R&D).

The X-axis looks at the stage of product development and placed entities based on whether they test product that are in the early stages of research and development (R&D phase - far right of the axis), test product that are closer to being deployed and commercialized (near market phase – far left of the axis), or perform testing on products in any stage (center of axis). This helped in distinguishing entities that are performing assessment for products in one stage or another as opposed to TTC that performs near market product testing. The Y-axis looks at the stage of testing – i.e. whether testing was performed in a laboratory setting (in lab – top of the axis), while installed or in use on an actual site (*in situ* – bottom of the axis), or both (center of axis). This helped in distinguishing entities that are performing both types of assessment as opposed to TTC that performs in lab testing.

Figure 11: TTC Market by Testing Type and RD&D Space[40]



As can be seen in the figure, private manufacturers concentrate heavily on in lab and *in situ* testing for both the R&D process as well as getting the products ready for the market (deployment) – but they do

[40] Note: The diagram shows where the entities fit based on four quadrant, however, it does not show any variations within each quadrant.

this only for their own products. Additionally, those entities, national labs and universities that are performing in lab testing focus primarily on the R&D phase of product development rather than near-market which is the focus for TTC.

For the 25 entities found in the online search for ZNE testing, a thorough inspection was performed online to determine the following parameters[41]:

- Description of entity efforts
- Funding sources (sustainability of funding as well as where funding will be used, i.e. direction/long term goals of funding)
- Whether the building was built for consumer usage (i.e. commercial building occupied by customers) or lab testing (thus site or lab)

Based on the criterion above, 8 entities were found to be relevant. Additional criterions were applied to these entities:

- Sector (Residential vs. Commercial – since TTC ZNE is for the Residential sector)
- Location (within California or not)

Based on the additional criterion above, only 1 program was found to be relevant – PG&E's pilot ZNE Program.[42]

To further determine whether TTC is positioned well within the CA EE market, several questions were addressed.[43] These are discussed in detail below:

Question 1. For private entities performing EE testing – is private testing sufficient for the technologies to be incorporated into the IOU portfolio or do these products require additional testing through the IOU?

From the program manager interviews, it was inferred that the IOUs prefer getting technology assessment done internally or through sub-contractors hired specifically for a project. Thus even if a technology has undergone a technology assessment externally, it must go though the IOUs testing or approved to be included into the EE portfolio.

Question 2. How do private manufacturers prioritize Energy Efficiency? Will they continue testing for energy efficiency in the future?

Based on the online review of the entities, it can be concluded that currently, energy efficiency is a high priority for the commercial sector (majority of the entities found were in the commercial sector). The entities also market themselves as an energy efficient company – not only in terms of their products but also as a corporation.

[41] Based on what is known about the ETP Element, the Evaluation Team determined the appropriate parameters to research.

[42] Full list of companies can be found in the Appendix C

[43] We note that the program managers chose to discontinue the Residential ZNE Facility in 2012.

However, given that profit is most important to private manufacturers, if there is a drastic change in consumer preference, it can be inferred that manufacturers would change their strategies to match those of their consumers (rather than policy/CPUC mandates).

Question 3. Do private manufacturers prioritize ZNE? Will they continue to prioritize ZNE in the future?

Based on the online review, it can be concluded that currently, ZNE has grown as a priority for private manufacturers (i.e. there is an increase in the number of commercial building being built as ZNE as opposed to energy efficient). Additionally, the entities that were identified market themselves as ZNE specialists. However, given that profit is most important to private manufacturers, if there is a drastic change in consumer preference, it can be inferred that private entities would change their strategies to match those of the consumers (rather than policy/CPUC mandates).

Question 4. Is EE a priority for universities/National Labs? If so, who sets the direction for the work done by the national labs and universities? Will they continue testing for energy efficiency in the future?

Based on the online review of the universities and the national labs, it can be concluded that currently, energy efficiency testing is a high priority for them. The national labs are primarily funded through the Department of Energy and thus receive their mandates and research direction from them. Currently, energy efficiency testing is a priority for the labs, however, this could change based on changes in DOE's priorities. Similarly, the universities are funded through a variety of channels, such as PIER, that are heavily invested in energy efficiency. The mandates for the university seem to be more concrete with fewer potentially drastic changes due to policy or preference changes. For example, grants received for the purpose of EE research are spread out over several years – ensuring that the work will continue for those specified years. However, universities invest more heavily in the research process rather than testing. Thus, even though universities and national labs are performing work within EE, their mandates and work priorities are different from ETP-TTC.

Question 5. Where do the EE technologies that are tested place in terms of product development continuum (i.e. is the product in the R&D phase or near-market)?

The universities and national labs concentrate heavily on the R&D stage. This differentiates them from TTC as they are primarily innovators. Private manufacturers concentrate on both the R&D process as well as getting the products ready for the market – but they do this only for their own products. Private entities involved in technology testing are similar to ETP-TTC as they test technologies that are near-market or already in the market but under-utilized. This can be seen in the figure below.

TTC mandates for testing energy efficiency products is clear and is run through the IOUs, which differentiates it from national labs and private manufacturers. Also, TTC is building a ZNE building for the purpose of testing, which differentiates it from the private entities who build ZNE facilities for residential or commercial use.

References

Online Search:

Search for "Top energy efficient lighting manufacturers" gave the following useful links:

- http://www.nytimes.com/2010/05/17/technology/17bulb.html?ref=energy-environment
- http://www.lightresource.com/litelink04.html - more extensive search was performed for the entities that had "energy efficient" in the short descriptions

Search for "Top energy efficient HVAC manufacturers" gave the following useful links:

- http://www.tristatehvac.com/products.htm - more extensive search was performed for the entities that had "energy efficient" in the short descriptions

1.19 TTC - Complete List Of Online Research For Lab Testing Entities

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
1	Western Cooling Efficiency Center	Western Cooling Efficiency Center (WCEC) - UC Davis Energy Efficiency Center -- The Center engages in primary research, innovation, laboratory testing, field demonstrations, education, outreach, and advocacy related to climate appropriate cooling technologies.	Public - University	Utilities, regulators, and government agency - Steering Committee members currently represent the major California electric utilities, the California Energy Commission, the UC Davis Energy Efficiency Center, the U.S. National Renewable Energy Laboratory, major retailers, and the New Buildings Institute	Davis, CA	Cooling technologies	Yes	Primary research, innovation, laboratory testing, field demonstrations, education, outreach, and advocacy	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
2	UC Davis - California Lighting Technology Center	Stimulate, facilitate, and accelerate the development and commercialization of energy-efficient lighting and daylighting technologies. CLTC accomplishes these goals through technology development, demonstrations, and outreach and education activities	Public - University	The PIER Building Program provided start-up funding and support is provided by National Electrical Manufacturers Association (NEMA)	Davis, CA	Lighting	Yes	R&D	Lab	Yes	Yes
3	Independent Testing Laboratories, Inc.	Independent light testing laboratory - focus has always been on testing, offers our clients application engineering and luminaire design services, complete laboratory photometer systems and lighting related software	Private	Lighting manufacturers, specifies, designers, architects, the government	Boulder, CO	Lighting	Yes	Customers contact them for testing their lighting	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
4	OnSpeX	Focus on hardlines testing and data analysis - help retailers and consumer products manufacturers quantify and analyze the performance of products and suppliers to drive decisions	Private	Not-for-profit membership association serving consumers, business and government	Atlanta, GA	Energy Star® apprais als	Yes	Customers contact them for testing their product	Lab	Yes	Yes
5	CSA International	A Nationally Recognized Testing Laboratory - provider of product testing and certification services	Private	Regulators, manufacturers, retailers/specifies	Irvine, CA	Consum er electron ics, HVAC	Yes	Customers contact them for testing their product	Lab	Yes	Yes
6	Pacific Northwest National Laboratory (PNNL)	Largely focuses on fundamental and applied research to address important issues including securing our homeland, reducing our dependence on foreign oil, and protecting our country's natural resources. Deliver energy savings in all stages of buildings-related RD&D.	Public	DOE	Richland, WA	Lighting	Yes	R&D and testing of new products	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
7	Intertek Laboratories	Offer performance testing for virtually any type of products, testing to national, international, or industry standards, as well as retailer, or your own, specifications. - have proprietary method called Failure Mode Verification Testing (FMVT)	Private	Adtran, Aldi, ARI, Auchan, Bangladesh, Behr, BOC Edwards, Bosch, Bose, BP, Canon, Carrefour, ChevronTexaco, Citgo, ConocoPhillips, Costco Wholesale, CVRD, DSM, Ecuador, Electrolux, ELK Valley Coal, Ericsson, ExxonMobil, Gap Inc, Glencore, Goodman, Guinea, Haier, IKEA, Infinium, Irving Oil Ltd, JVC, Kenya, Koch, Kohl's, Kuwait, Lakeshore Learning Materials, Lear/Bing, Liebherr, Lloyd's Register, Lubrizol, Malawi, Marks & Spencer, Matsushita, McDonald's Corporation, Mexico, Morgan Cars, Mozambique, Nigeria, Nikon,	San Francisco, CA	HVAC, lighting, and others	Yes	Energy Efficiency Testing for North America: ENERGY STAR®, EnergyGuide Label, AHRI, CEC, NRCAN, LEED and more	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
				Petrobas, Pioneer, QVC, Sabic, Samsung, Sanyo, Sasol, Saudi Arabia, Sempra Energy, Shell, Siemens, Sierra Leone, Statoil, Sunoco, Teck Coal, Tesco, The Home Depot, Toshiba, Total, Trafigura, TRW, Uzbekistan, Valero, Vitol, Wal-Mart, Woolworths							
8	Electric Power Research Institute (EPRI)	Nonprofit - The Energy Technology Assessment Center (ETAC) conducts strategic assessments of electricity sector technology needs. ETAC research focuses on interdisciplinary analysis of technology development, energy policy, and economic factors.	Private	EPRI's members represent more than 90 percent of the electricity generated and delivered in the United States, and international participation extends to 40 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass.	Palo Alto, CA	Changes according to current needs	Yes	Innovation, R&D and testing	Both	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
9	Osram Sylvania	OSRAM SYLVANIA has several principal organizational units: General Lighting, Precision Materials & Components, Automotive Lighting, Electronic Control Systems, Display/Optic - In 1981 we introduced the SYLVANIA OCTRONâ family of fluorescent lamps, ushering in a new era of efficiency. Since then, we have helped our customers save more than 267 billion kWh -- enough to run all of New York City for 4 years!! -- and over $26 billion in electricity costs. OSRAM SYLVANIA was instrumental in developing the Department of Energy Federal Ballast ruling requiring the use of energy-saving electronic ballasts in	Private - Manufacturer	Commercial, Retail, Display/Optic, Industrial, Original equipment manufacturers, Automotive, Machine tool, Mining, Aerospace	Danvers, MA	Lighting	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
		most fluorescent luminaires by 2005, and for replacement purposes by 2010.									
10	TRANE	Offer a broad range of energy-efficient HVAC systems; dehumidifying and air cleaning products - apply expertise in environmental technology and energy conservation to make a difference in energy efficiency around the globe.	Private - Manufacturer	All types of buildings	Davidson, NC	HVAC	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
11	Carrier	Carrier has been the world leader in air conditioning, heating and refrigeration systems. A wholly-owned subsidiary of United Technologies Corporation. - examples - XDX® distributes frost evenly throughout the unit, making it more energy efficient, SEER, or Seasonal Energy Efficiency Ratio, is the official energy efficiency descriptor for residential central air conditioners and heat pumps, ComfortHeat, an energy-efficient, two-stage heating and variable-speed technology	Private - Manufacturer	all types of buildings	Farmington, CT	HVAC and refrigeration	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
12	Lennox	Lennox has some of the most efficient air conditioners available today. Examples - dual-fuel system offers the perfect combination of efficiency and comfort with two energy sources—an electric heat pump and a gas furnace.	Private - Manufacturer	All types of buildings	Richardson, TX	HVAC	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
13	Washington State University	Energy Efficiency Emerging Technologies Program (E3T) - implementing a multi-staged process to identify, analyze and demonstrate emerging energy efficiency technologies for adoption by Northwest utility conservation programs for the Bonneville Power Administration's E3T initiative. This includes organizing technical advisory groups of regional and national experts for lighting and HVAC; developing an online database of emerging technologies; participating in development of a Northwest regional roadmap for emerging technologies; and field assessment of technologies, including design of an outdoor	Public - University	Associations, Research institutions, Consultants, Universities, Federal Agencies, Private Sector, Regional and other state agencies, utilities/municipalities -- http://www.energy.wsu.edu/AboutUs/OurPartners.aspx	Olympia, WA	Whole building research - different products for improving EE	Yes	Research and R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
		street lighting test facility.									

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
14	Bonneville Power Administration	BPA launched the Energy Efficiency Emerging Technologies (E_3T) initiative to engage in a collaborative effort to "fill the pipeline" with innovative energy efficiency solutions and technologies that promise significant region-wide energy savings. In collaboration with Northwest utilities, BPA Office of Technology Innovation, Northwest Energy Efficiency Alliance (NEEA) and other stakeholders, BPA Energy Efficiency identified a number of emerging technologies it is supporting with pilot programs, testing or other research and development activities.	Public	Collaboration with NEEA, Livington Energy Innovations (LEI), Washington State University	Portland, OR	Lighting and heat pump water heater	Yes	Lab Tests, Field Tests, Demonstration Projects, Decision Tree	Both	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
15	Public Interest Energy Research (PIER)	CA's premier energy RD&D program - advancing science and technology in the fields of energy efficiency, renewable energy, advanced electricity technologies, energy-related environmental protection, and transmission and distribution, and transportation technologies. In the last decade PIER has invested more than $700 million to bring to market energy technologies that provide environmental and economic benefits to California's ratepayers.	Public	PIER enlists businesses, utilities, energy companies, public advocacy groups, and world-class scientists at California's universities and national laboratories.	CA	All EE products	Yes	RD&D and funding of innovations and testing	Both	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
16	Lawrence Berkeley National Laboratory	The Lumina Project - TA for LED light sources, Technology Evaluation, Modeling, and Assessment Group - for energy efficient products, Environmental Energy technology Division - for window test facilities,	Public	DOE	Berkeley, CA	All EE products	Yes	R&D, testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
17	8E, a division of AMERILLUMBRANDS	Design manufacturer of energy efficient, state-of-the-art, fluorescent lighting fixtures and retrofit conversion kits.	Private - Manufacturer	Industrial, institutional, commercial, retail, federal & municipal facilities. We've completed thousands of projects for countless satisfied end-users like Boeing, Johnson Space Center, Sara Lee Corporation, University of Arizona, California State University, PG&E, Los Angeles Motor Transit Authority and Marine Corps Base Camp Pendleton	Oceanside, CA	Lighting	Yes	R&D and testing	Lab	Yes	Yes
18	Litecontrol	Provide creative ways to save energy and match the lighting to the specific needs of a space.	Private - Manufacturer	All types of buildings	Hanson MA	Lighting	Yes	R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
19	Cooper Lighting	Leading manufacturer of track and recessed lighting in North America and one of the largest fixture manufacturers of LED, fluorescent, H.I.D., exit and emergency, vandal-resistant, landscape and complex environment lighting.	Private - Manufacturer	Commercial, industrial, residential and utility markets	Houston, TX	Lighting	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
20	McQuay	McQuay is the second largest air conditioning, heating, ventilating and refrigeration company in the world. benefit from lower installed and operating costs, high energy efficiency, quiet operation, superior indoor air quality (IAQ) and low cost maintenance and service. The Department of Energy announced the Daikin McQuay Rebel rooftop unit as the first entry to the DOE's High-Efficiency Commercial Air Conditioners Challenge for a new generation of air conditioners designed to reduce energy use by as much as 50 to 60 percent.	Private - Manufacturer	All types of buildings	Minneapolis, MN	HVAC	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
21	Philips	World leader in lighting, Philips integrates technologies and design into people-centric solutions - focus on increasing the energy efficiency of our products along with other environmental improvements since 1994, and in our manufacturing activities since 1984. Steadily reduced energy consumption of many products in portfolio, such as TVs and lighting solutions.	Private - Manufacturer	All types of buildings	CA	Lighting	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
22	GE	GE manufactures hundreds of appliance models that carry the ENERGY STAR - Recognizing our commitment to creating appliances and lighting products that help reduce energy spending and protect the environment, the U.S. Department of Energy and Environmental Protection Agency have awarded GE with the 2011 Sustained Excellence Award.	Private - Manufacturer	All types of buildings	CA	Lighting, Appliances	Yes	Innovation, R&D and testing	Lab	Yes	Yes
23	Cree	A market-leading innovator of lighting-class LEDs, LED lighting, and semiconductor solutions for wireless and power applications - owns Rudd Lighting, Ecolight, BetaLED - all of which are involved in EE lighting	Private	All types of buildings	WI	Lighting	Yes	Innovation, R&D and testing	Lab	Yes	Yes

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
24	Emerging Technology Associates	Very specifically state that they do "In Situ Pilot Assessment of Technology" and "ET market development" - design in situ pilot projects as a means of validating stated performance claims	Private	SDG&E, IBEW-NECA California Labor Management Cooperation Committee, Travelers Companies, Jack In the Box, PG&E, The Connecticut Energy Efficiency Fund, VA San Diego Healthcare System, Mark Twain House & Museum, Long Beach Memorial Hospital, Town of East Lyme, Hamann Companies, CONVIA (Subsidiary of Herman Miller), Sharp HealthCare, DOE. SCG	San Diego, CA	HVAC, Lighting, geothermal heat pump system, Mechanical Electrical Plumbing,	Yes	Testing only, also design projects to test EE (example MEP design services)	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
25	Energy Solutions	Evaluating the value and impacts of cutting edge energy efficiency innovations. Our efforts aim to accelerate the commercialization and adoption of the latest and best energy efficient technologies. provide comprehensive program design, management, and implementation services starting from technology assessment and market research, through marketing and management, to final reporting and quality assurance.	Private	ACEEE, Association of Bay Area Governments (ABAG), CEC, California State and Consumer Services Agency, City of Berkeley, City of Oakland, City of San Francisco, Cool Roof Rating Council (CRRC), Community Energy Services Corporation, Consortium for Energy Efficiency, SCG, East Bay Municipal Utility District (EBMUD), Global Environment Facility/Government of Ecuador, Hanson Roof Tile, Jasper Ridge Biological Preserve, Jyukankyo Research Institute, LBNL, PG&E, NV Energy, Regional Water Authority (RWA), Roseville Electric, Sacramento	Oakland, CA and Long Beach, CA	Commercial lighting retrofits, boilers, water heaters, computer monitors, televisions, commercial and residential HVAC, ductless HVAC technologies, evaporative pre-cooling, and commercial clothes washers	Yes	Program design, management, and implementation services starting from technology assessment and market research, through marketing and management, to final reporting and quality assurance	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
				Municipal Utility District (SMUD), SCE, Stanford University							
26	Architectural Energy Corporation	Design consulting firm - providing our clients with peak building performance over the life of their facilities - Our portfolio of services includes energy and daylighting analysis, sustainable design consulting, LEED® certification consulting, commissioning, measurement and verification, energy auditing, design and construction services and retro-commissioning - REM/Rate™ (RESNET® Accredited) is the most widely used home energy rating software in the US.	Private	Utilities, private companies	San Francisco, CA	Whole building - LEED certification	Yes	M&V plans in support of performance contracting, utility-sponsored energy efficiency and demand-side management programs, and LEED® projects.	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
27	BASE Energy Inc.	Performing energy assessments, design review, evaluating products for energy efficiency, and engineering and R&D services to advance energy efficiency and environmental stewardship - provide Facility Energy Assessment, Targeted Energy Assessment, Design Review for Energy Efficiency (Savings By Design), Measurement and Verification, simulation of Energy Use by Buildings and Processes, Cogeneration, Self Generation and Alternative Energy Sources, Training in Energy Efficiency, Project Management and Specialized Research and Analytical Services	Private	Allergan Corporation, Amcor PET, Amgen, Inc. Anchorage School District, California Manufacturing Technology Consulting, Carpenter Group, City of Sunnyvale, Clift Hotel, Clinton Reilly Holdings, California Department of General Services, GasSonics International, Hanson Cement, Horizon Snack Food, Material Integrity Solutions, NASA Glenn Research Center, Neville Chemical, PG&E, Recolte Energy, Sacramento Municipal Utility District, SCE, SCG, US Air Force, US Army Corps of Engineers	San Francisco, CA	Whole building - design EE	Yes	program design, M&V	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
28	Global Energy Partners	Provider of Energy Efficiency (EE) and Demand Response (DR) programmatic solutions and innovative technology applications - Load Analysis - Load research sample design and analysis, load forecasting, statistical design and analysis of smart grid-enabled pilots and programs	Private	Utilities, Energy agencies, State and local governments, Regulatory agencies, Commercial and industrial companies and Water and wastewater facilities	Walnut Creek, CA	HVAC, lighting, food industry, DR technologies, electric motors,	Yes	On-site assessment of promising technology	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
29	Harris Group Inc	The purpose of the independent technology assessment is to objectively analyze the merits and risks associated with investing in or applying a given technology or process - Harris Group Process Solutions moves emerging technologies from concepts to commercialization - Harris Group process engineers can tackle emerging technologies in any field	Private	Market areas - Automation Solutions, Biopharmaceuticals & Life Sciences, Chemical Plants, Emerging Technology Development, Fuel & Chemical Storage & Distribution, Manufacturing, Oil & Gas, Ports, Power Generation, Project Finance & Independent Engineering, Pulp & Paper, Railroad Planning & Engineering, Renewable Fuels & Chemicals	San Francisco, CA	All EE products	Yes	Moves emerging technologies from concepts to commercialization - including TA	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
30	MWE2s	MWE2s staff has performed over 500 administrative and technical reviews of applications and submittals for the California Commercial and Industrial incentive programs. This included performing inspections of baseline and installed equipment and performing any necessary measurement and verification in order to ensure claimed savings will stand up to rigorous measurement and evaluation procedures. Example - LED Field Assessments for a major utility. Similar to the DOE's Gateway program, we are in the process of a multi-year testing program for several sites across their service territory.	Private	Utilities, investor, product developer, or design professional looking for an expert view on the actual financial and environmental impacts of a new technology	Morro Bay, CA	All EE products	Yes	Field testing or building testing	In-situ	Yes	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
		Demand Response potential studies and technology feasibility studies for several golf courses' in California, including cart charging, water pumping, and facility measures.									
31	Salas O'Brien Engineers	Energy Audit firm, MEP design services, architectural design services	Private	Universities, local governments, utilities, commercial	San Jose, Ca	Consulting services	No	NA	NA	No	No
32	QDI Strategies, Inc	Strategy consulting for new products or new markets	Private	Utilities (PG&E), EPRI, private companies	Libertyville, IL	Consulting services	No	NA	NA	No	No
33	ANCIS Incorporated	Air Management in Data Centers - provide energy solutions	Private	Data centers	San Francisco, CA	Consulting services	No	NA	NA	No	No
34	Information & Energy Services, Inc.	Energy information and consulting company	Private	End-use and energy service company clients from a variety of industries	San Diego, CA	Consulting services	No	NA	NA	No	No
35	Design & Engineering Services, Customer Service Business Unit at SCE	Utility Company	Public	Utility company	CA	Energy programs	Yes	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
36	L Prize	Encourage innovation (funded by DOE)	Public	Competition sponsored by DOE	DC	Lighting	Yes	Design of new products	Lab	No	No
37	CTAC - Edison	Source of energy efficiency information - offer seminars and workshops	Public	Utility company	CA	Energy programs	Yes	NA	NA	No	No
38	Agricultural Technology Applications Center (AGTAC) - Edison	AGTAC is an educational resource energy center, located in Tulare, California and has many hands-on exhibits and displays available for public viewing and demonstrations for seminars on related topics. There are pumps and motors, lighting and air conditioning, instrumentation and sensors, programmable logic controllers and energy management systems.	Public	Utility company	CA	Energy programs	Yes	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
39	Novi Energy	NOVI serves our customers at any stage in the process from concept and design, to engineering, construction and operation of energy facilities.	Private	Manufacturers and other private entities	Novi, MN	Consulting services	No	NA	NA	No	No
40	Heschong Mahone Group, Inc.	Professional consulting services in the field of building energy efficiency. We specialize in applying our knowledge of building design, construction technology, policy development and program design to the problem of making buildings more energy efficient.	Private	Manufacturers and other private entities	San Francisco, CA	Consulting services	No	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
41	Livingston Energy Innovations (LEI)	Technology and market analysis for DSM product and service development and introduction, program design, and investment assessment - Consulting services	Private	SCE (For SCE - technical study for ZNE, TRIO, helped write the ETP), Bonneville Power Administration, EcoFactor, Sacramento Municipal Utilities District, Emerging Technologies Coordinating Council, PARC (formerly Xerox PARC), Microstaq, Washington State University Energy Program, National Semiconductor, Northwest Energy Efficiency Alliance - http://www.livingston-ei.com/clients/	Mill Valley, CA	Demand-side management products	Yes	NA	NA	No	No
42	Lawrence Livermore National Laboratory	More of a focus on renewables, nuclear fuels and reactors, and climate change	Public	DOE	Livermore, CA	Renewables	Yes	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
43	SLAC National Accelerator Laboratory	More of a focus on physics	Public	DOE (Operated by Stanford University)	Menlo Park, CA	Physics	Yes	NA	NA	No	No
44	Sandia National Laboratories	More of a focus on transportation energy efficiency	Public	DOE	Livermore, CA	Transportation	Yes	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
45	Energy Innovation Group, LLC	EIG is the nation's only Energy Program Integrator, bringing the latest advances in traditional and emerging technologies, special utility incentives, a 'big picture' strategy, and a highly efficient one-stop service to help companies, cities and schools reduce cost and qualify for major incentives, far beyond standard conservation measures. evaluate emerging technologies for reliability, energy savings, cost effectiveness, and are often able to arrange special rebates. EIG communicates with: utilities which review technologies for rebate qualification … venture capital firms that finance new technologies … universities which	Private	Utility program rebate technologies	Los Angeles, CA	Consulting services	No	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
		develop technologies … engineering firms which consult in product design … testing labs which test technologies … and contractors and customers who have been presented with technologies.									
46	Clean Edge, Inc	Clean Edge, Inc., founded in 2000, is the world's first research and advisory firm devoted to the clean-tech sector. For more than a decade, the firm has delivered timely data, expert analysis, and comprehensive insights to key industry stakeholders.	Private	All types of buildings	San Francisco, CA	Consulting services	No	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
47	NextEnergy	NextEnergy is a leader driving advanced-energy technologies and sustainability in many areas such as: Smart Grid, Advanced Energy Storage, Vehicle Electrification, Power Electronics, A Wide Range of Fuels, Renewables: Wind, Solar, Biofuels, Energy Efficiency	Private	Manufacturers and other private entities	Detroit, MI	Alternate and Renewable energy	Yes	NA	Lab	No	No
48	Davis Energy Group	work encompasses efficient cooling, heating, and building systems, including system analysis, design, controls, simulations, product development, and technology transfer. DEG combines design, energy analysis and evaluation, energy program management, and product development under one roof.	Private	Manufacturers and other private entities	Davis, CA	Consulting services	No	NA	NA	No	No

#	Company Name	Description of Company Efforts	Funding/ Space	Audience/Clients	Location	Product Types	Testing for EE	Where in Product Testing Continuum	Testing in lab, in situ or both	Relevant to ETP?	Relevant to TTC
49	Energy Design Resources	EDR offers a valuable palette of energy design tools and resources that help make it easier for architects, engineers, lighting designers, and developers to design and build energy-efficient commercial and industrial buildings in California.	Private	Manufacturers and other private entities	CA	Consulting services	No	NA	NA	No	No
50	Enovity, Inc.	Enovity is a premier energy engineering consulting and facility O&M company whose focus is on planning, validating and maintaining high performance, sustainable and energy efficient buildings.	Private	Manufacturers and other private entities	San Francisco, CA	Consulting services	Yes	NA	In-situ	No	No
51	TMT Associates Architectural Lighting Design & Consulting	Specialize in energy-efficient architectural lighting design, lighting energy efficiency consulting, and lighting education.	Private	TMT Associates offer lighting design and consulting services for the architectural, design, and energy service communities.	Antioch, CA	Lighting	Yes	NA	NA	No	No

1.20 TTC - Complete List Of Online Research For ZNE Testing Entities

#	Name	Description	Site/Lab	Sector	Location	Funding
1	PG&E ZNE Pilot Program	ZNE Energy Pilot Program is a non-resource program. A non-resource program guides customers to other utility incentive programs or finance/non-utility programs; this program does not offer rebates or account for energy savings.	Both	Residential and Commercial	CA	CPUC
2	National Institute of Standards and Technology	Resembling a typical suburban Maryland single-family home, the Net-Zero Energy Residential Test Facility is designed to produce as much energy as it consumes over the course of a year and will serve as a testbed for new home-scale energy technologies. The 2,700-square-foot (251-square-meter), two-story structure will use energy-saving appliances and design, as well as solar panels, to minimize the amount of energy it pulls from the grid and to generate at least an equal amount of energy. During a yearlong demonstration of the house's capabilities, appliances, lights, and kitchen and bathroom fixtures will be computer controlled to simulate a family of four living in the fully furnished home.	Lab	Residential and Commercial	Gaithersburg, Maryland	American Recovery and Reinvestment Act

#	Name	Description	Site/Lab	Sector	Location	Funding
3	Durham School of Architectural Engineering and Construction, UNL	ZNETH II (Zero Net Energy Test House)	Lab	Residential	Omaha, Nebraska	Nebraska Research Initiative Funding, additional research partners include the City of Omaha Parks, Recreation and Public Property Department; Peter Kiewit Institute Technology Department Corp.; University of Nebraska Medical Center College of Public Health; University of Nebraska at Omaha Department of Chemistry; and Nebraska Environmental Trust.
4	Lawrence Berkeley National Laboratory	will build and operate a new National User Facility for Net-Zero Energy Buildings using a competitively selected award of $15.9 million	Lab	Commercial	Berkeley, CA	DOE
5	National Renewable Energy Laboratory	The $64 million 220,000-square-foot office building will use only as much as energy as it generates -- and it will use at least 50 percent less energy than if it were designed to current commercial code.	Lab	Commercial	Golden, CO	DOE

#	Name	Description	Site/Lab	Sector	Location	Funding
6	UC Davis West Village	nation's largest "zero net energy" community	Site	Commercial	Davis, CA	Collaboration between UC Davis and West Village Community Partnership, LLC, a joint venture of Carmel Partners of San Francisco and Urban Villages of Denver.
7	Northeast Sustainable Energy Association	To help spur the market for zero energy buildings in the Northeast, the Northeast Sustainable Energy Association (NESEA) has developed the Zero Net Energy Building Award to recognize net-zero-energy buildings designed for the unique Northeast climate. As an incentive for design/build teams, NESEA will offer a $10,000 cash prize for the best building in the Northeast that can document net-zero energy use (as described in the earlier definition) while offering a high level of comfort, affordability and reliability.	Site	Residential	Greenfield, MA	Northeast Sustainable Energy Association
8	Net-Zero Energy Home (NZEH) Coalition	The purpose of the NZEH Coalition is to accelerate the market development of affordable net-zero energy homes.	Site	Residential	Ontario, Canada	Federally incorporated as a not-for-profit - Private firms (Enbridge, C3, Interactive Leader, Hydro Ottawa, Roxul)
9	Florida Solar Energy Center (FSEC), a research institute of the University of Central Florida	FSEC's first near Zero Energy Home was built in Lakeland, Florida in 1998.	Site	Residential and Commercial	Florida	Under the sponsorship of the U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL)

#	Name	Description	Site/Lab	Sector	Location	Funding
10	Maclay Architects	9 projects that are net-zero	Site	Residential and Commercial	Vermont	Private company
11	zHome	zHome is a revolutionary, 10-unit townhome development located in Issaquah, WA that uses smart design and cutting edge technologies to radically reduce its environmental impacts.	Site	Residential	Issaquah, WA	Private company
12	Transformations, Inc	Transformations has several Zero-Energy Communities both in the ground and in the planning stages throughout Massachusetts. Transformations has created Zero-Energy Affordable Housing units.	Site	Residential	Townsend, Massachusetts	Private company
13	Aldo Leopold Legacy Center	Offices, meeting rooms, exhibit area	Site	Residential and Commercial	Baraboo, WI	Aldo Leopold Foundation
14	Net-zero energy school - Richardsville Elementary School	The Louisville office of Lexington-based architectural firm Sherman-Carter-Barnhart PSC and Louisville-based engineering firm CMTA Inc. collaborated on the new $14.4 million building.	Site	Commercial	Bowling Green, Ky	Federal bloc grant through the Kentucky Dept of Energy for 50% of the solar costs.
15	North Shore Community College	College campus - commercial use	Site	Commercial	Danvers, MA	North Shore Community College

#	Name	Description	Site/Lab	Sector	Location	Funding
16	Hawaii Gateway Energy Center	The Hawaii Gateway Energy Center (HGEC) visitor complex, situated on the south coast of Kona on the Big Island of Hawaii, serves the Natural Energy Laboratory of Hawaii (NELH). It is the first building to be constructed on a 6.5 acre campus designed to house research, development, and demonstration facilities for energy and technological fields.	Site	Commercial	Kailua-Kona, Hawaii	The NELH facilities are run by the State of Hawaii under the Natural Energy Laboratory of Hawaii Authority (NELHA).
17	Audubon Center at Debs Park	The National Audubon Society is getting the new year off to a "green" start. The conservation organization announced today that the Audubon Center at Debs Park in Los Angeles has been certified as the nation's most environmentally friendly building. - Commercial use	Site	Commercial	Los Angeles, CA	The National Audubon Society
18	Challengers Tennis Club for Boys and Girls	The project is the first tennis center in South Los Angeles and was designed to be a long-life, low-maintenance green facility with respect for the well-being of children occupants. The 53,600-square foot site consists of four tennis courts and a 3,500-square foot tennis club that includes a large clubroom for multipurpose indoor activities, an office, and a snack bar.	Site	Commercial	Los Angeles, CA	The Whittier Foundation

#	Name	Description	Site/Lab	Sector	Location	Funding
19	Adam Joseph Lewis Center for Environmental Studies, Oberlin College	Classrooms, offices, atrium, & auditorium	Site	Commercial	Oberlin, OH	Oberlin College
20	Environmental Technology Center at Sonoma State University	Beyond serving as an inspirational demonstration project, the ETC is a "building that teaches," designed for people to see, touch, and understand how it works and for students and building science researchers to manipulate and measure its every function.	Site	Residential and Commercial	Rohnert Park, CA	The National Science Foundation, the California Energy Commission, and Sonoma State University
21	San Dimas Technology and Development Center	Commercially used center	Site	Commercial	San Dimas, CA	American Recovery and Reinvestment Act (ARRA) funds
22	IDeAs Z Squared Design Facility	It's one of the first commercial buildings in the United States to be designed to a "Z2" energy efficiency goal; that is, net zero energy, zero carbon emissions.	Site	Commercial	San Jose, CA	Private company funding
23	Science House at the Science Museum of Minnesota	Museum for commercial use	Site	Commercial	St. Paul, MN	Science Museum of Minnesota
24	Net zero house—Charlotte, VT	The project team sought to create a healthy home for a family of four to live in as independently and with as little environmental impact as possible, situated on a sustainable homestead producing energy and food.	Site	Residential	Charlotte, VT	Home Owner

#	Name	Description	Site/Lab	Sector	Location	Funding
25	TD Bank - Cypress Creek Store	On May 13, 2011, TD Bank opened what the company hopes will be the first net-zero-energy bank location in the United States in Ft. Lauderdale, Florida.	Site	Commercial	Ft Lauderdale, FL	Private company funding

W. TECHNOLOGY ROADMAPS (PG&E)


Technology Roadmap
For Ag PIP 1-21-09(1


Technology Roadmap
For BCE PIP 1-21-09(


Technology Roadmap
For Commercial PIP 1


Technology Roadmap
For Gas and Pool PIP


Technology Roadmap
For HVAC PIP 1-21-09


Technology Roadmap
For Industrial PIP 1-21


Technology Roadmap
For Lighting PIP 1-21-(


Technology Roadmap
For Whole House PIP

GOAL D: ASSESS THE EVALUABILITY OF THE ETP

The evaluation team wrote two memos with findings from the evaluability assessment. Included herein is the last memo.

X. EVALUABILITY ASSESSMENT

1.21 OVERARCHING FINDINGS

The Opinion Dynamics evaluation team performed a thorough review of each 2011 logic model and reviewed multiple program documentation items to arrive at the findings presented below. We conducted our data collection and analysis in September and October 2011.

The revised logic models reflect our understanding of each program element design and implementation processes based upon our interviews with program managers and reviews of program materials (as part of Goal A: Program Design and Implementation Assessment).

The team identified the following items when reviewing the existing PTLMs:

- The logic models are impact models. While they provide implementation guidance, the main use of the model is to document proposed outcomes.
- This revision focused on the outcome portion of these models to serve as an input to the Phase II impact assessment. As such, we numbered only those linkages between outputs and outcomes and between the various outcomes.
- The evaluation team color-coded outcomes to reflect proximal and distal outcomes, in addition to short-term, mid-term, and long-term outcomes. We believe this is an additional method to explain intended outcomes, as outcomes are not reflected in duration of time (yet this is often how they are thought of when the words short-, mid-, and long-term are used). Rather, the terms proximal and distal refer to whether the outcome is tied to the immediate "touch" of the program intervention (proximal) or is based on a series of outcomes that occur outside of the direct "touch" of the program (distal). We note that there is a loose relationship with proximal outcomes to program performance metrics, and distal outcomes to market transformation indicators.
- The evaluation team has included a program theory for each program element, as well as documented potential performance indicators and potential success outcomes for each linkage in the logic model. We based the program theory on information in the PIP and our discussions with ETP program managers. The performance indicators can be regarded as "what will be looked at" to determine if the expected change from the intervention is occurring, while the success outcomes will be used to evaluate whether those changes have occurred. These are all open for discussion.
- We will not evaluate linkages with the evaluation priority "none" in Phase II of the evaluation.

For the most part, we did not change the activities and outputs substantially. For the outcomes, we kept much of the same language as the logic models in the PIPs. We kept the same format of referencing boxes in each area as shown in the PIP logic models.

As a result of the meeting with CPUC and evaluation team members in March 2012, the following items were removed or deferred to a later date. These items will be provided in Wave II of the PTLM survey.

These are as follows:

- Technology Development and Support (TDS) PTLM –TDS was developed to provide feedback to both private product developers and organizations such as ASHRAE and AHRI about performance specifications for new technologies or baseline performance levels for existing technologies as well as give one-on-one feedback regarding product development and market orientation. This will help reduce product and service unavailability by developing standard test procedures and establishing baseline performance levels for emerging technologies to appropriately verify potential energy savings. However, after the initial process assessment, the evaluation team requires additional efforts to understand TDS program design and implementation, as well as understand how TDS activities and outputs result in stated outcomes. As such, the PTLM development for this program element will be deferred to a later date until better understanding of the program as implemented is determined via evaluation activities conducted during Phase II.

- ZNE Technology Test Center (TTC) PTLM –The sole impact outcome for this element is to complete construction of the ZNE Testing Center and have it operational by 1/2013. As such, the PTLM for this element has been removed from this memo.

- Alignment with California's Energy Efficient Strategic Plan (CEESP) Goals – According to the Program Implementation Plans, ETP as designed supports three goals; 1) to increase the adoption of energy efficiency measures, 2) increase energy efficiency technology supply, and 3) support the California Energy Efficiency Strategic Plan Big Bold Energy Efficiency Strategies (BBEES) goals and related solutions. As such, the PTLM's need further development to indicate how each program element align their activities and outputs to support the CEESP goals in the short, mid and long term associated specifically with the PIP Goals 2 or 3.

We begin with a discussion of the Emerging Technologies Program overarching program theory and methodology for obtaining success criteria metrics, followed by each program element. Section 1.31 contains the logic models from the 2011 PIPs and Section 1.32 contains the program theories for PY2006-PY2008 for completeness.

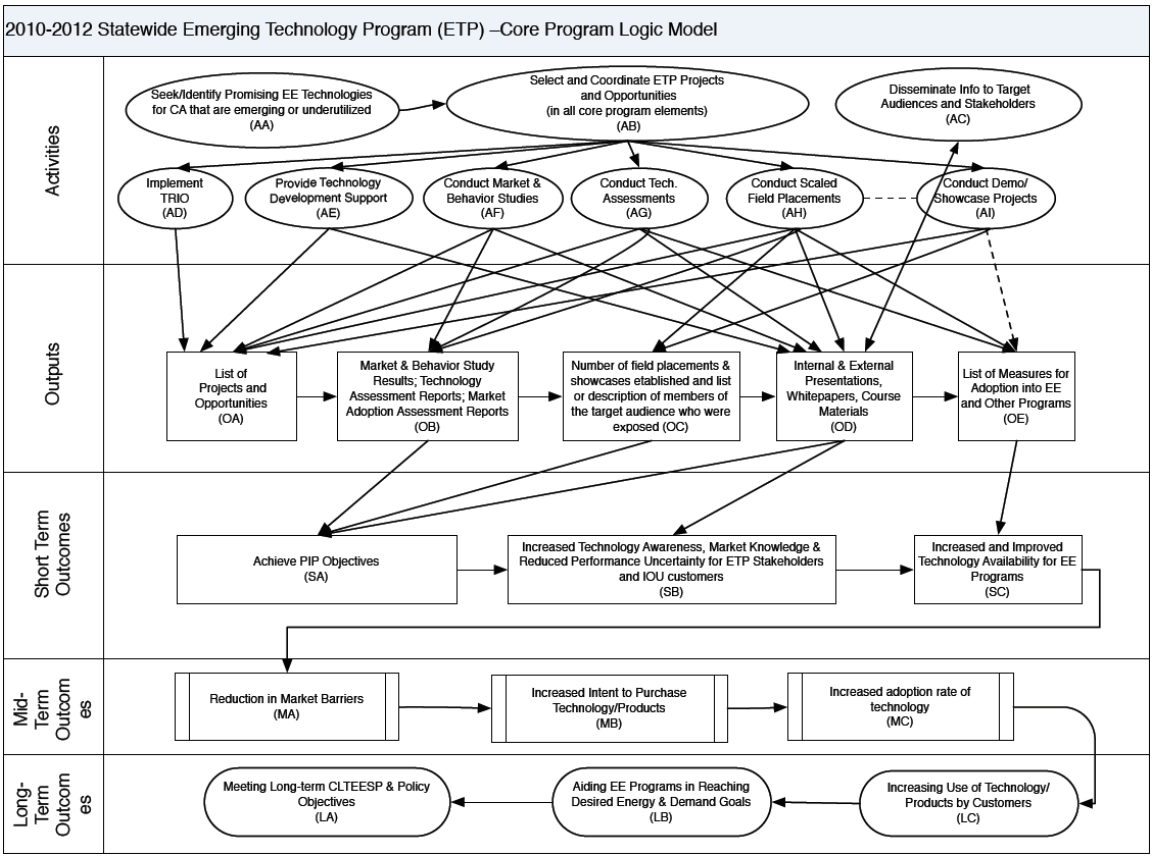
1.22 OVERARCHING PROGRAM THEORY

Energy efficiency (EE) program managers sometimes need additional information to understand the market need for a specific technology or how the market may react to a new technology. Multiple barriers exist that limit energy efficiency program manager and customer access to or understanding of new technologies. If the market barriers remain, there is a delay in adoption of the technologies and a diminished, slowed, or even stopped potential for energy benefits of new or under-utilized technologies. Actively helping to reduce certain market barriers for new or under-utilized technologies will increase the demand and supply for energy efficient technologies. Technologies that are included in the Energy Efficiency portfolio reduce certain market barriers simply by existing in the portfolio and providing a rebate to interested customers, as well as getting the technology to market more quickly.

1.22.1 CURRENT OVERARCHING LOGIC MODEL (FROM 2011 PIP)

Below we illustrate the overarching program theory and logic model provided in the 2011 Program Implementation Plan.

Figure 12. Emerging Technologies Overarching Logic Model – Draft



1.23 METHODOLOGY

The success criteria used for measuring statewide ETP performance were adopted through the following:

- Technology Assessment (TA) Success Criteria: The metrics are based on survey results as documented in the Technology Assessment memo prepared for the CPUC – "Emerging Technologies Program Phase I Evaluation – DRAFT Interim Findings Technology Assessments Program Element", dated January 31, 2012. The survey was fielded, in November 2011, to 184 IOU staffer who received the TA reports (the survey was fielded to only those EE Program Managers that are targeted by TA and not the entire EE portfolio). Out of the 51 who responded to the survey, 11 had received and read the Technology Assessment reports. The responses from these 11 staff members were analyzed. Additionally, these results are based on activities already performed by TA – as such these results inform us of the impact of TA rather

than potential impact. This memo has been provided to the IOUs in draft form and will be available on PCG Basecamp shortly.

- Demonstration Showcase (DS) Success Criteria for 'Word of Mouth Recommendations': This metric is based on survey results as documented in the memo prepared for the CPUC detailed in "Indirect Impact Evaluation of the Statewide Energy Efficiency Education and Training Program. Volume IV: Early Feedback Memos. - CG2 Wave 1 Survey Results: Behavior Change" pp 130, dated July 22, 2009. Approximately, 2,864 surveys were completed (respondents included market actors, commercial end-users and residential end-users) and respondents were asked whether they would share the Energy Center course information with friends, family, or colleagues. The results for information learned through the Centers is considered comparable to the information learn through attending a demonstration showcase. However to account for any difference, the results were halved as a success criteria for DS. The report can be accessed at http://www.calmac.org/../06-08_Statewide_Education_and_Traning_Impact_Eval_Vol_IV_FINAL.pdf

- All other Success Metrics will be provided by the IOU ETP Program Managers through a data request.

1.24 TECHNOLOGY ASSESSMENTS

1.24.1 PROGRAM THEORY

Based on the Program Implementation Plan (PIP) and discussions with IOU Technology Assessment program managers, we see the program theory as follows:

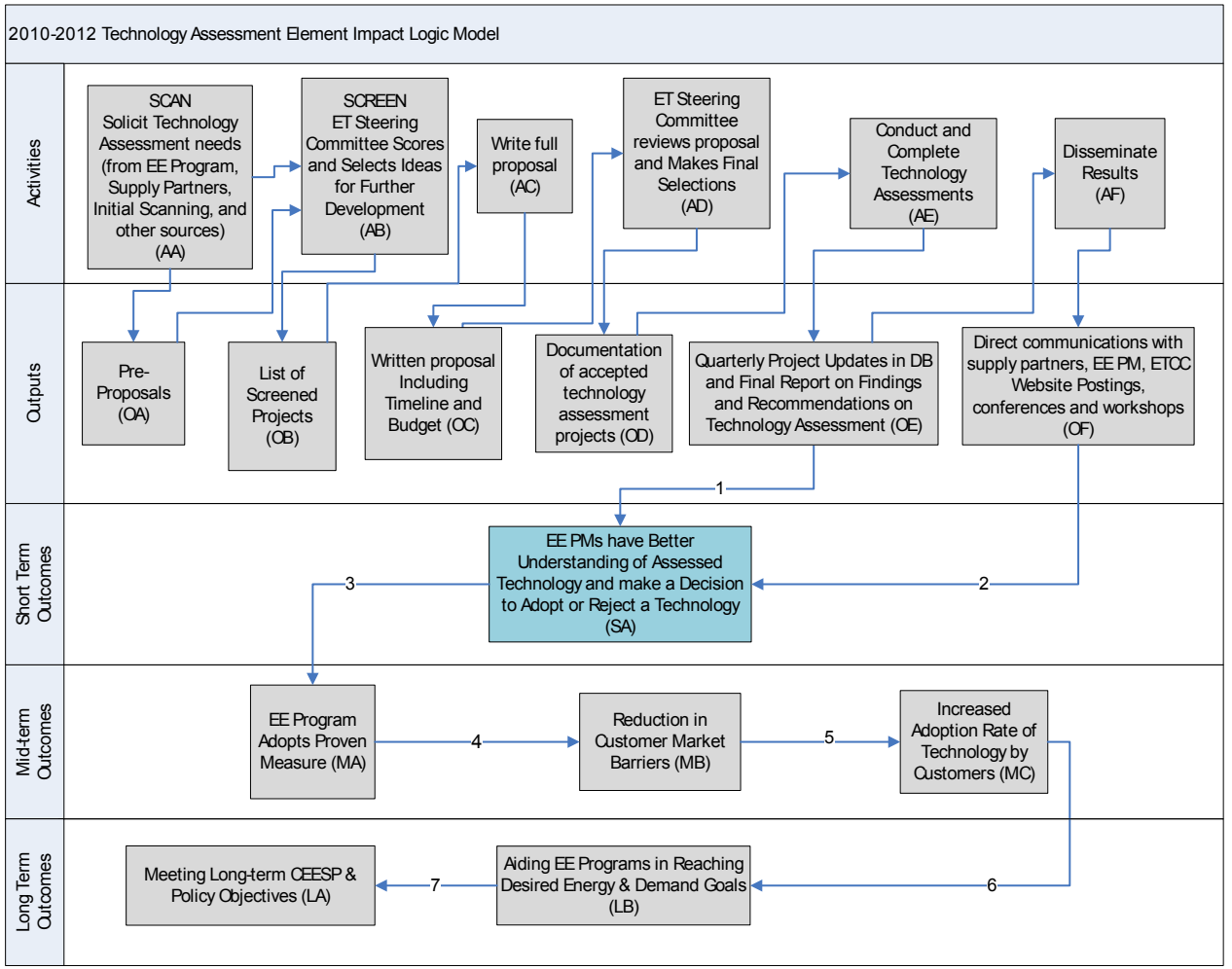
Energy efficiency program managers must continuously bring new measures into their portfolio to reach goals. However, it is difficult for program managers to find new measures, know if specific measures will save the level of energy or demand that is cost effective, or know how customers may respond to specific technologies. Information obtained through technology assessments allows them to learn about the new measures and make informed decisions on whether or not to include them into the energy efficiency portfolio. Technology assessments may also collect anecdotal information to provide them with useful information regarding customer interactions with a specific technology.

Section 1.32 provides the program theory from the technical assessment element as developed for the PY2006-2008 program (copied directly from the evaluation report). The program theory above and the program theory from the PY2006-2008 program (the short version in Section 1.32), while having slightly different wording, are conceptually identical. The logic models from the previous evaluation and this model differ in that this model also includes proximal and distal outcomes while the previous evaluation used short-term, mid-term, and long-term outcomes The proximal and distal outcomes are color-coded as brown (proximal) and blue (distal).Additionally, the current logic model does not include some of the activities performed by the energy efficiency program staff included in the previous models. The current model focuses on the outcomes up to the "hand off" between the Emerging Technologies Program and the Energy Efficiency portfolio and then moves directly to mid-term

outcomes based on customer uptake of measures through the energy efficiency program, which we believe is an acceptable manner to reflect the program theory. We also reviewed the potential performance indicators and potential success for the performance indicators from the previous evaluation for comparable logic model links. Our current performance indicators for comparable links require continued discussion to assign a percentage value, the proposed indicators will also include a score from a scale. We believe that this clearly indicates what the impact evaluation would consider success and is preferable to the previous set of performance indicators.

1.24.2 LOGIC MODEL

Figure 13. Emerging Technologies Technology Assessment Program Impact Logic Model – Draft



1.24.3 POTENTIAL PERFORMANCE INDICATORS AND SUCCESS OUTCOMES

Below we present potential performance indicators and success outcomes.

Table 35. Emerging Technologies Core Program Potential Performance Indicators and Success Criteria

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[44]
1	High	a. Level of knowledge regarding performance of assessed technology	a. 80% of energy efficiency program managers who learned about a technology from ETP reports state that they are more certain of the performance (or lack of performance) of the technology (>3 on a scale from disagree to agree)[45]
2	High	b. Level of knowledge regarding performance of assessed technology	a. 80% of energy efficiency program manager who learned about a technology from direct communications with ETP staff state that they are more certain of the performance (or lack of performance) of the technology (>3 on a scale from disagree to agree)[46]

[44] These success criteria are used for measuring statewide performance and not for each individual IOU, unless indicated.

[45] Based on survey results as documented in the Technology Assessment memo prepared for the CPUC – "Emerging Technologies Program Phase I Evaluation – DRAFT Interim Findings Technology Assessments Program Element", dated January 31, 2012. The survey question asked was "Please rate the following statements on a scale from 1 to 5, with 1 meaning strongly disagree and 5 meaning strongly agree – 'The information I receive regarding the technology assessment provides me with the information I need to make the decision to adopt or reject a new technology'."

[46] Based on survey results as documented in the Technology Assessment memo prepared for the CPUC – "Emerging Technologies Program Phase I Evaluation – DRAFT Interim Findings Technology Assessments Program Element", dated January 31, 2012. Program managers who received the report also engaged in direct communication with ETP staff and thus have a similar certainty level about the performance of the technology. The survey question asked was "Please rate the following statements on a scale from 1 to 5, with 1 meaning strongly disagree and 5 meaning strongly agree – 'The information I receive regarding the technology assessment provides me with the information I need to make the decision to adopt or reject a new technology'."

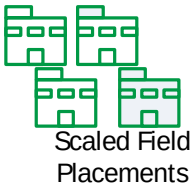
Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[44]
3	High	Number of technologies adopted into the energy efficiency portfolio	ETP meets performance goals of new technologies into energy efficiency portfolio during the 2010-2012 period (SCE=15, PG&E=12, SDG&E=4, SoCalGas=4)
5	Medium	Adoption rates of transferred technologies	Number of installations/adoptions for technologies from ETP in the EE portfolio increase annually, calibrating for measures that move to Codes & Standards.
6	Medium	Impact of technologies that were transferred from ETP and were installed through EE programs	Lifecycle energy gross savings for technologies transferred from ETP to the EE portfolio increase annually.
7	Medium	Achievement of long-term CEESP & policy objectives	Alignment of technology with CEESP end-uses as outlined in Goal 3, Objective 3.1 in the PIP

Table 36. Overarching Cross-Cutting Indicators for Portfolio (Not evaluated)[47]

Linkage	Evaluation Priority	Potential Performance Indicator
4	None	Change in market barriers experienced by customer

[47] No potential success criteria are outlined as these criteria are listed as having no evaluation priority and will not be evaluated.

1.25 SCALED FIELD PLACEMENT



1.25.1 PROGRAM THEORY

Based on the Program Implementation Plan (PIP) and discussions with the program managers, there appear to be three different theories about this element. We provide them here for further discussion.

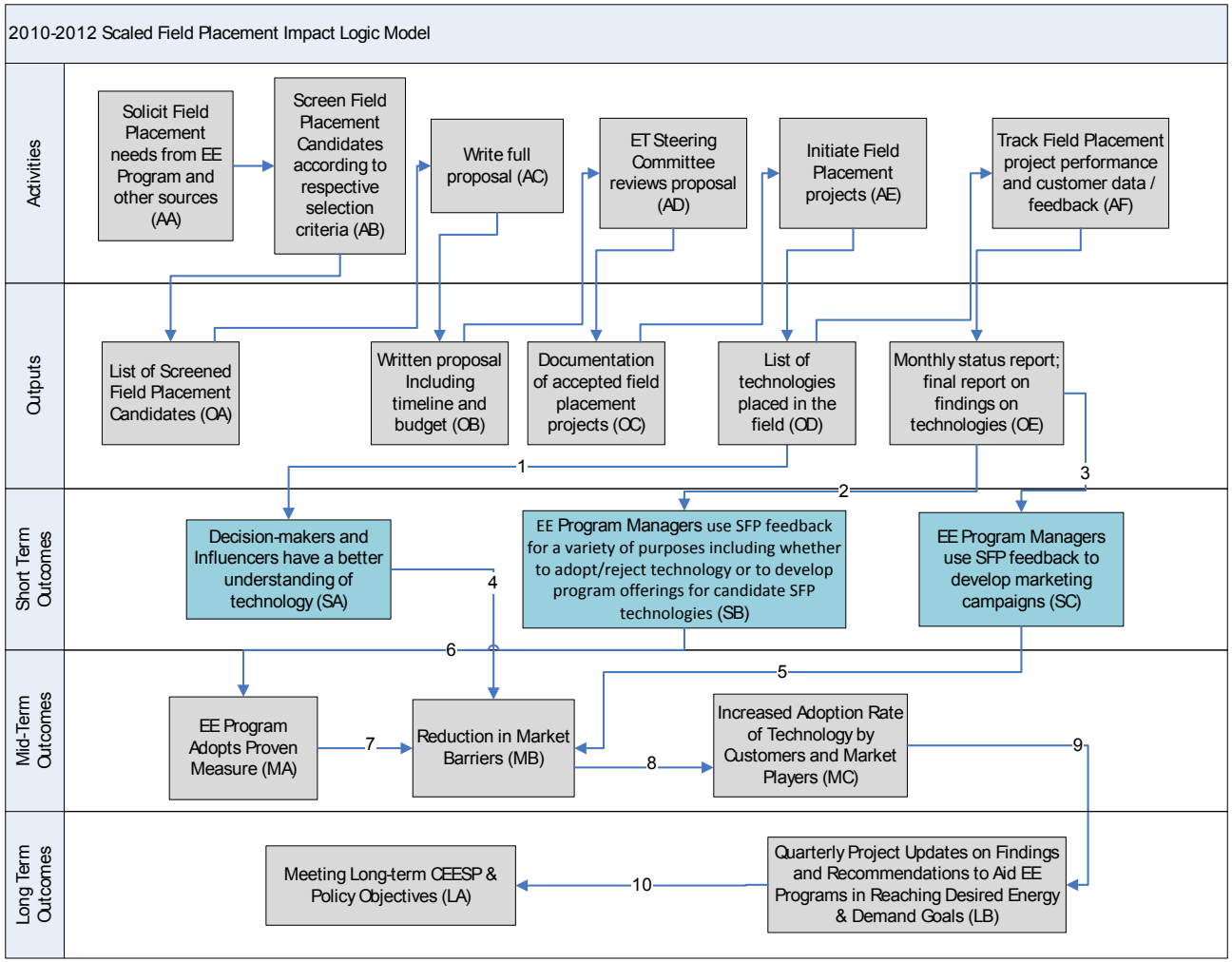
Theory #1a – Information on emerging technologies can be difficult to find and customers are uncertain that the potential savings a new technology could provide is worth the cost. Often salesmen provide specific information on emerging technologies, and customers can be reluctant to believe the marketing. Additionally, the customer may not know possible maintenance ramifications of emerging technologies (hidden costs). For all these reasons, many customers do not readily accept new types of measures. First-hand experience with a new technology reduces performance uncertainty and can identify hidden costs. When a trusted source such as the IOU provides the new technology, the customer is more willing to try it. Once the customer tries a new technology and finds it to work well in their setting, they will purchase more of the same measure in the future. Similarly, for under-utilized technologies in the energy efficiency portfolio, SFP will help identify additional market barriers that make customer reluctant to use the technology.

Theory #1b – Market actors, such as installers, specifiers, engineers, city planners, trade associations, and contractors, influence the types of equipment purchased by customers. Information on emerging technologies can be difficult to find, and these market actors are uncertain that the potential savings a new technology could provide is worth the cost. Often salesmen provide specific information on emerging technologies, and these market actors can be reluctant to believe the marketing. Additionally, these market actors may not know possible maintenance ramifications of emerging technologies (hidden costs). For all these reasons, many of the market actors do not readily recommend new types of measures to their customers. First-hand experience with a new technology reduces performance uncertainty and can identify hidden costs. When a trusted source such as the IOU provides the new technology, the market actors are more willing to try it. Once a particular market actor tries a new technology and finds it to work well in customer settings, they will have information to help sell future customers on the new technology as well as recommend the measure to end users more often.

Theory #2 – Information from a single technology assessment is not always sufficient for energy efficiency program managers to add a new measure into their portfolio. Energy efficiency program managers sometimes need more evidence of savings and comfort in the fact that customers do not find the new measure objectionable. Technology assessments can be costly. Having several customers use a new measure and provide feedback regarding the measure is less costly than multiple technology assessments.

1.25.2 LOGIC MODEL

Figure 14. SFP Element Impact Logic Model – Draft



1.25.3 POTENTIAL PERFORMANCE INDICATORS AND SUCCESS OUTCOMES

Below we present Scaled Field Placement potential performance indicators and success outcomes.

Table 37. SFP Potential Performance Indicators and Success Criteria

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[48]
1	High	Understanding of Scaled Field Placement technology	A majority of Scaled Field Placement customers rate (> 3 on a scale from 1 to 5, disagree to agree) for an increased awareness of Scaled Field Placement technologies
2	High	Level of knowledge regarding performance of technology - Use of Scaled Field Placement feedback by energy efficiency program managers for a variety of purposes including whether to adopt/reject technology or to develop program offerings for candidate SFP technologies	IOUs to provide % of energy efficiency Program manager rate (> 3 on a scale from 1 to 5, disagree to agree) that they are more certain of the performance (or lack of performance) of the technology based on Scaled Field Placement feedback than before
3	High	Use of Scaled Field Placement feedback	IOUs to provide % of energy efficiency program

[48] These success criteria are used for measuring statewide performance and not for each individual IOU, unless indicated.

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[48]
		in marketing by energy efficiency program managers	managers rate (> 3 on a scale from 1 to 5, disagree to agree) that Scaled Field Placement feedback report helps them to develop marketing campaigns, if they are involved in developing marketing campaigns
4	High	a. Level of knowledge of performance about technology b. Level of awareness of the technology c. Ease of finding information about technology	a. IOUs to provide % of customers or influencers with installed Scaled Field Placement state that they are more certain of the performance (or lack of performance) of the technology (>3 on a scale from 1 to 5, disagree to agree) b. IOUs to provide % of customers or influencers with installed Scaled Field Placement state that ease of finding information about technology (>3 on a scale from 1 to 5,disagree to agree)
6	High	Number of technologies into the EE portfolio that come from Scaled Field Placement	At least one technology is considered for the EE portfolio that come through Scaled Field Placement in PY2010-2012
8	Medium	Adoption rates of transferred technologies	Number of installations/adoptions for technologies from ETP in the EE portfolio increase annually, calibrating for measures that move to Codes & Standards

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[48]
9	Medium	Impact of technologies that were transferred from ETP and were installed through EE programs	Lifecycle energy gross savings for technologies transferred from ETP to the EE portfolio increase annually.
10	Medium	Achievement of long-term CEESP & policy objectives	Alignment of technology with CEESP end-uses as outlined in Goal 3, Objective 3.1 in the PIP

Table 38. SFP Potential Performance Indicators and Success Criteria (Not evaluated) [49]

Linkage	Evaluation Priority	Potential Performance Indicator
5	None	Marketing messages about Scaled Field Placement technology increase awareness and knowledge of new technologies (transferred from ETP) in EE portfolio by customers
7	None	Change in market barriers experienced by customer

[49] No potential success criteria are outlined as these criteria are listed as having no evaluation priority and will not be evaluated.

1.26 DEMONSTRATION SHOWCASES

1.26.1 PROGRAM THEORY

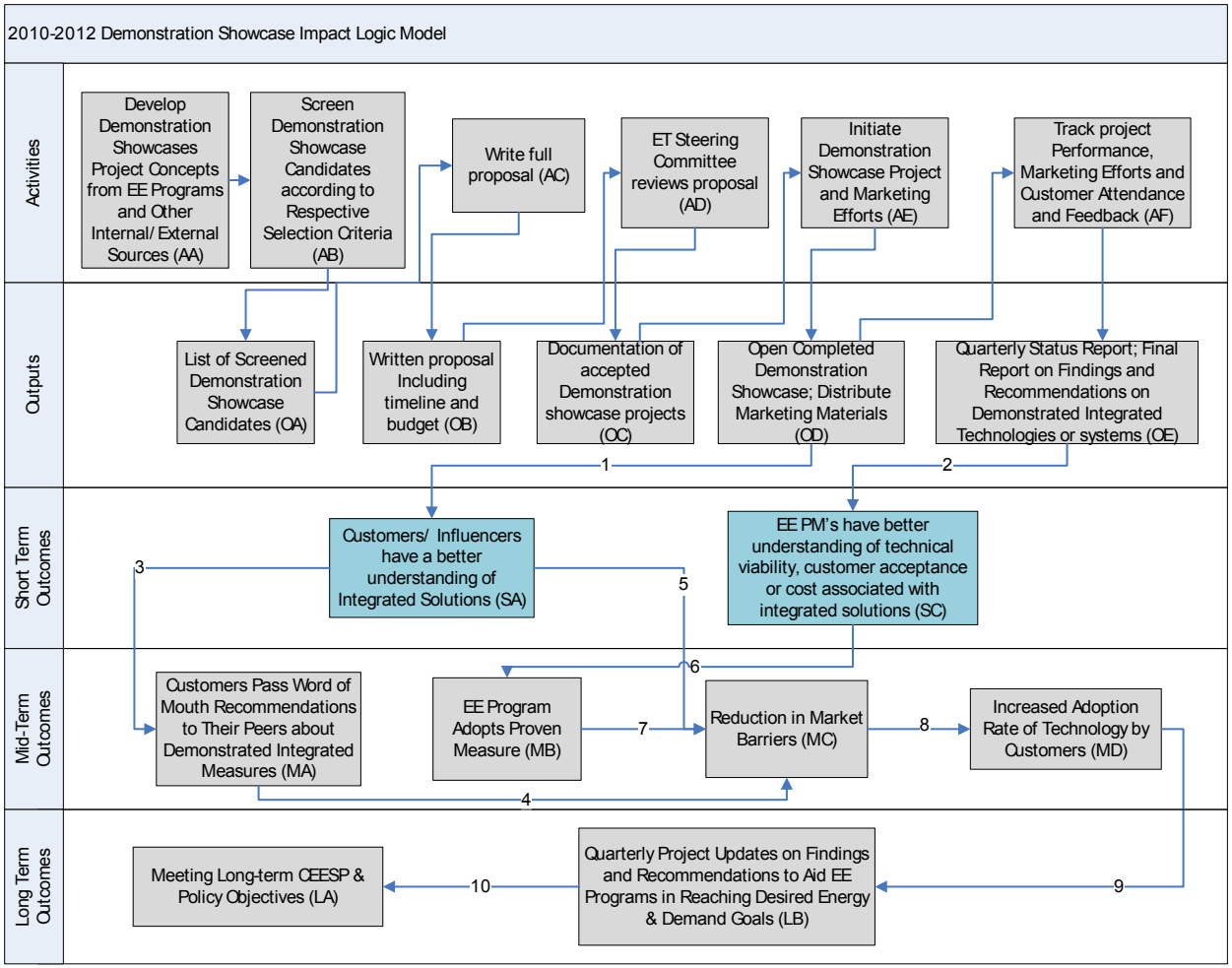
Based on the PIP and discussions with the program managers, there appear to be two different theories about this element. We provide them here for further discussion.

Theory #1 – Information on emerging technologies can be difficult to find and customers are uncertain that potential savings from a new technology or integrated solutions is worth the cost. Often information regarding a single technology is available, but how these systems interact with each other is not available. Additionally, a customer may not have the ability to experience the new technology/solutions first-hand in a real-world setting. For these reasons, many customers do not readily accept new types of measures or solutions. First-hand experience with a new system reduces performance uncertainty and can identify hidden costs. When a trusted source such as the IOU demonstrates new technologies, the customer is more willing to consider purchasing it. Once the customer visits a demonstration showcase, their knowledge about the potential savings and integrated solutions is increased and they can make a more informed decision to both purchase or tell their counterparts about the technologies.

Theory #2 – Information from a single technology assessment is not always sufficient for energy efficiency program managers to add new integrated solutions into their portfolio. Often information regarding the interactive savings between a number of measures is needed to accept a new type of measure or solution. Energy efficiency program managers sometimes need more evidence of the viability and customer acceptance of these integrated solutions to request these measures. Having information about demonstrated new integrated solutions provides energy efficiency program managers with the additional knowledge needed to adopt or reject a new technology.

1.26.2 LOGIC MODEL

Figure 15. Demonstration Showcase Element Impact Logic Model – Draft



1.26.3 POTENTIAL PERFORMANCE INDICATORS AND SUCCESS OUTCOMES

Below we present Demonstration Showcase potential performance indicators and success outcomes.

Table 39. Demonstration Showcase Potential Performance Indicators and Success Criteria

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[50]
1	High	Level of awareness of Demonstration Showcase technologies	IOUs to provide % of Demonstration Showcase customers rate (> 3 on a scale from 1 to 5 disagree to agree) for an increased understanding of Demonstration Showcase technologies
2	High	Use of Demonstration Showcase feedback by EE program managers	IOUs to provide % of energy efficiency program managers rate (>3 on a scale from 1 to 5 disagree to agree) for an increase in their understanding of the viability and customer acceptance of technologies based on Demonstration Showcase feedback than before as a result of receiving reports
3	High	Word of Mouth Recommendations	40% of residential customers and 50% of commercial

[50] These success criteria are used for measuring statewide performance and not for each individual IOU, unless indicated.

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[50]
			influencers who attend a Demonstration Showcase indicate (> 3 on a scale from 1 to 5 disagree to agree) that they plan to inform their colleagues/peers regarding the demonstrated measures[51]
4	High	Dissemination of information from attendees to peers regarding technology	Attendees who shared information with others indicate that they shared information regarding performance uncertainty and information
5	High	a. Level of knowledge of performance of bundled technologies b. Ease of finding information about technologies	a. IOUs to provide % of customer or influencers who attend a Demonstration Showcase state (> 3 on a scale from 1 to 5 disagree to agree) that they have more knowledge of the bundled technologies after the Demonstration Showcase experience than before b. IOUs to provide % of customer or influencers who attend a Demonstration Showcase state (> 3 on a scale from 1 to 5 disagree to agree) that they had

[51] This metric is based on survey results as documented in the memo prepared for the CPUC detailed in "Indirect Impact Evaluation of the Statewide Energy Efficiency Education and Training Program. Volume IV: Early Feedback Memos. - CG2 Wave 1 Survey Results: Behavior Change" pp 130, dated July 22, 2009.

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[50]
			ease of finding information about technology before their Demonstration Showcase experience
6	High	Number of technologies into the EE portfolio that come from Demonstration Showcase	At least one technology within the three-year program cycle is considered for the EE portfolio that come through Demonstration Showcase
8	High	Adoption rates of transferred technologies	Number of installations/adoptions for technologies from ETP in the EE portfolio increase annually, calibrating for measures that move to Codes & Standards.
9	Medium	Impact of technologies that were transferred from ETP and were installed through EE programs.	Lifecycle energy gross savings for technologies transferred from ETP to the EE portfolio increase annually.
10	Medium	Achievement of long-term CEESP & policy objectives	Alignment of technology with CEESP end-uses as outlined in Goal 3, Objective 3.1 in the PIP

Table 40. Demonstration Showcase Potential Performance Indicators and Success Criteria (Not evaluated)[52]

Linkage	Evaluation Priority	Potential Performance Indicator
7	None	Change in market barriers experienced by customer

[52] No potential success criteria are outlined as these criteria are listed as having no evaluation priority and will not be evaluated.

1.27 MARKET & BEHAVIORAL STUDIES

1.27.1 PROGRAM THEORY

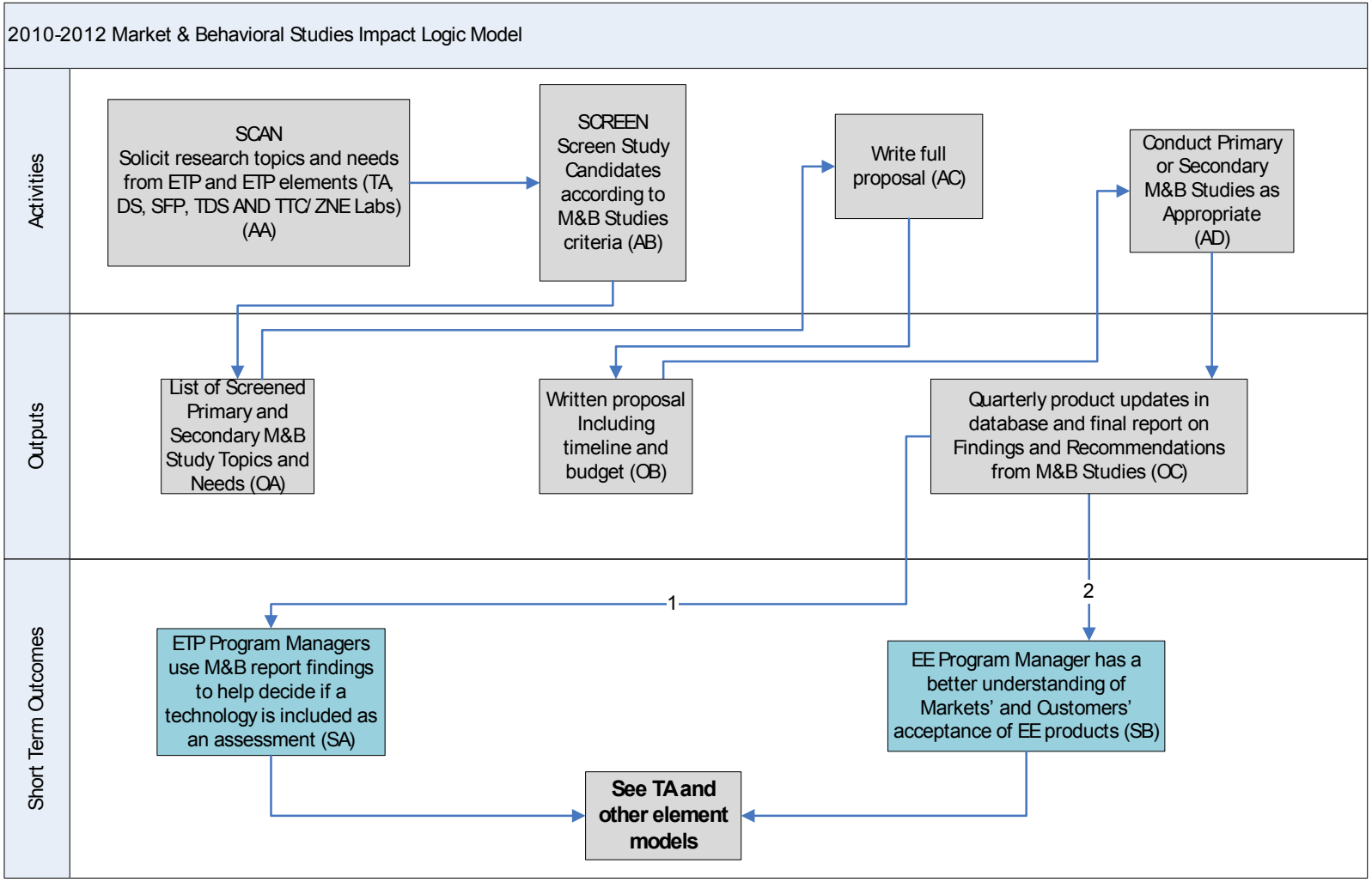
Based on the PIP and discussions with the program managers, there appear to be two different theories about this element. We provide them here for further discussion.

Theory #1 - Customers may perceive underutilized and/or newly emerging technologies differently, causing them to not accept the technology as readily as standard technologies. EE program managers need comfort in the fact that customers do not find the new measure objectionable and that customers have a likelihood of adopting the measure if placed into the EE portfolio. Research that systematically gathered evidence around customer acceptance and perception of the new technology would assure EE managers that customers will likely adopt a measure coming from ETP.

Theory #2 – At times, ETP staff needs additional information to determine whether a specific technology assessment would be worthwhile to pursue. Some market potential or viability information will help the staff decide whether to assess a specific technology as well as provide information on viable adoption of technology once it passes the ETP screen.

1.27.2 LOGIC MODEL

Figure 16. Market & Behavioral Studies Element Impact Logic Model – Draft



1.27.3 Potential Performance Indicators and Success Outcomes

Below we present Market and Behavioral Studies potential performance indicators and success outcomes.

Table 41. Market and Behavioral Studies Potential Performance Indicators and Success Criteria

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Criteria[53]
1	High	Use of Market and Behavioral Study results by ETP program managers	IOUs to provide % of ETP Program managers state (> 3 on a scale from 1 to 5, disagree to agree) that they are able to use the Market and Behavioral Study results to help them decide to include a specific technology into the ETP portfolio of technology assessments or not
2	High	Understanding of market and customer acceptance	IOUs to provide % of energy efficiency program managers state (> 3 on a scale from 1 to 5, disagree to agree) that their understanding of specific market and customer acceptance of technology increased after hearing Market and Behavioral Study results

[53] These success criteria are used for measuring statewide performance and not for each individual IOU, unless indicated.

1.28 TECHNOLOGY DEVELOPMENT SUPPORT

1.28.1 PROGRAM THEORY

Emerging energy efficient products are limited (supply) in the market and in the energy efficiency portfolio, and technology developers have limited access to market intelligence, testing facilities, and customer feedback to develop their products. The IOUs developed the Technology Development and Support element to provide feedback to both private product developers and organizations such as ASHRAE and AHRI. This feedback is intended to help develop performance specifications for new technologies or baseline performance levels for existing technologies as well as give one-on-one feedback regarding product development and market orientation. This will help reduce product and service unavailability by developing standard test procedures and establishing baseline performance levels for emerging technologies to appropriately verify potential energy savings.

The evaluation team requires additional efforts to understand TDS program design and implementation, as well as understand how TDS activities and outputs result in stated outcomes. As such, the PTLM development for this program element will be deferred to a later date until better understanding of the program as implemented is determined via evaluation research conducted during Phase II.

1.29 BUSINESS INCUBATION SUPPORT (TRIO)

1.29.1 PROGRAM THEORY

The marketplace of emerging technology entrepreneurs and investors lacks a comprehensive understanding of how to work with IOUs as well as how working with the IOUs could potentially increase the sales of their products. Entrepreneurs and investors are not aware of the IOU's areas of interest or needs for innovative solutions in the effort to meet their energy efficiency goals. The IOUs could benefit from a greater understanding of the technologies entrepreneurs are working on that could fit into EE portfolios. Additionally, entrepreneurs lack access to investors interested in energy efficiency technologies. Further, investor community may not be aware of the market created by the interest that IOUs have in bringing innovative emerging technologies into their EE portfolios and the effect this may have on their investment opportunities.

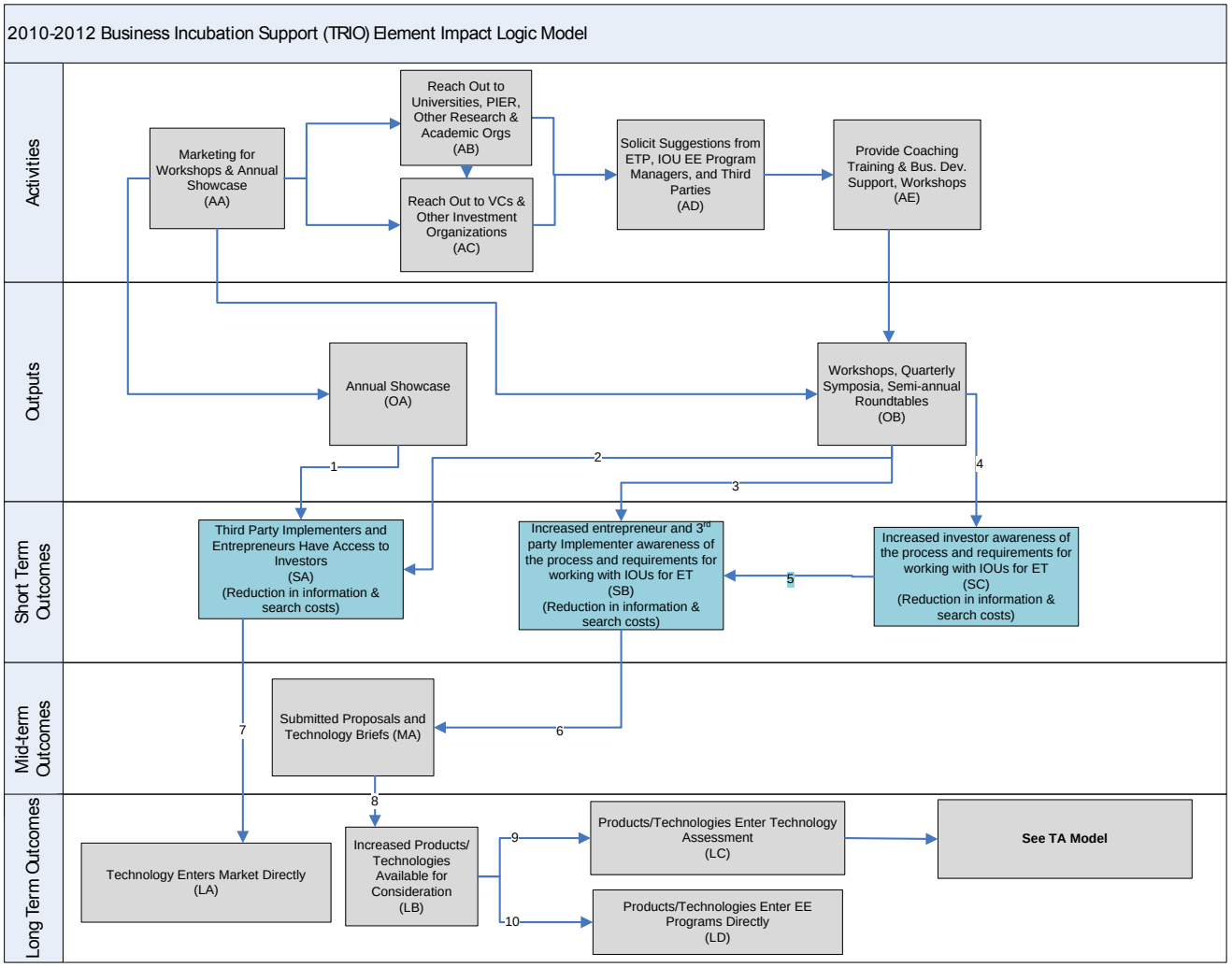
TRIO also encourages innovative program delivery methods by providing third-party implementers with the same support provided to entrepreneurs: education on the interests and needs of the IOUs, and networking opportunities with investors. TRIO provides a bridge to increase different program delivery methods and designs.

One objective of the ETP is to scan for other opportunities to find emerging technologies. TRIO acts as one of the links between emerging technology market actors (e.g., entrepreneurs and investors) to provide information to help to increase the number of potential emerging technologies of which ETP staff are aware. Furthermore, once entrepreneurs understand the program processes, they will see the advantage of participating in ETP and are more likely to consider submitting proposals and technology briefs to ETP at some point in the future. Increasing the pool of measures of which ETP staff is aware and increasing the number of proposals and technology briefs submitted by entrepreneurs may

increase the number of measures available for Technology Assessments. As investors become more aware of the market created by IOU EE portfolios, they may see additional value in building relationships with entrepreneurs and/or third-party program implementers.

1.29.2 LOGIC MODEL

Figure 17. Business Incubation Support (TRIO) Element Impact Logic Model – Draft



1.29.3 PERFORMANCE INDICATORS AND SUCCESS OUTCOMES

Below we present TRIO performance indicators and success outcomes.

Table 42. TRIO Potential Performance Indicators and Success Criteria

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Outcome[54]
1	High	Entrepreneurs and third party implementers who attend annual showcase indicate they were able to exchange business card with an investor	IOUs to provide % of entrepreneurs and third party implementers rank (>3 on a scale from 1 to 5, disagree to agree) for satisfaction with access to investors
2	High	Entrepreneurs and third party implementers who attend workshops, quarterly symposia, semi-annual roundtables indicate access to investors	IOUs to provide % of entrepreneurs and third party implementers rank (>3 on a scale from 1 to 5, disagree to agree) for satisfaction with access to investors and IOUs
3	High	Entrepreneurs and third party implementers who attend workshop, quarterly symposia, semi-annual roundtable indicate increased awareness of the process and requirements for working with IOUs for Emerging Technologies	IOUs to provide % of entrepreneurs and third party implementers rank (>3 on a scale from 1 to 5, disagree to agree) that activities increased knowledge regarding process and requirements for working with IOUs

[54] These success criteria are used for measuring statewide performance and not for each individual IOU, unless indicated.

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Outcome[54]
4	High	Investors who attend workshop, quarterly symposia, semi-annual roundtable indicate increased awareness of the process and requirements for working with IOUs for Emerging Technologies	IOUs to provide % of investors rank (>3 on a scale from 1 to 5, disagree to agree) that activities increased knowledge regarding process and requirements for working with IOUs
5	Medium	Number of investors that work with entrepreneurs and 3rd party implementers	IOUs to provide % of investors work with entrepreneurs and / or 3rd party implementers on product development
6	Medium	Entrepreneurs submit technologies for ETP consideration	Entrepreneurs submit at least 4 proposals / technology briefs in a program cycle
8	Medium	Products/technologies are available for consideration in ETP	ETP staff scores at least 1 technology as having potential for consideration
7	Medium	Emerging technology enters market outside of IOU programs	Technology developers who attend TRIO indicate that technology enter market directly outside of the EE programs
9	Medium	Number of projects included as a Technical Assessment in ETP	Number of assessments for technologies from entrepreneurs involved in TRIO in the ETP portfolio increase each plan cycle

Linkage	Evaluation Priority	Potential Performance Indicator	Potential Success Outcome[54]
10	Medium	Number of projects added directly to energy efficiency program	Technology developers who attend TRIO indicate that technology enter directly enter the EE programs

1.30 TECHNOLOGY TEST CENTER (ZNE TEST CENTER) (SCE ONLY) [55]

We note that the program managers chose to discontinue the Residential ZNE Facility in 2012.

1.30.1 PROGRAM THEORY

Based on the PIP and discussions with the program managers, there appear to be two different theories about this element.

Theory #1 – The IOUs have access to a limited number of testing facilities that assess emerging technologies as integrated systems of solutions. In particular, the IOUs do not have access to Zero Net Energy (ZNE) testing facilities, which support the Strategic Plan's goal of increasing Zero Net Energy capabilities in California. The Technology Test Centers (TTCs) evaluate the performance of new integrated solutions of technologies through impartial laboratory testing and analysis in state-of-the-art testing facilities in a lab setting. These testing facilities help determine potential energy savings for emerging lighting, HVAC refrigeration, and ZNE technologies. They also increase information available about technologies and reduce performance uncertainties in a lab setting. Further, testing technologies can contribute to the commercialization of these technologies.

Theory #2 – The IOUs lack information regarding new emerging energy efficient technologies. The TTC staff, through their assessments of these technologies and technical information and expertise, can share and disseminate information with Energy Efficiency and Emerging Technology program staff as well as other interested parties. This information can be used to promote the evaluated technologies by increasing awareness of energy efficiency within the IOU as well as for California residents.

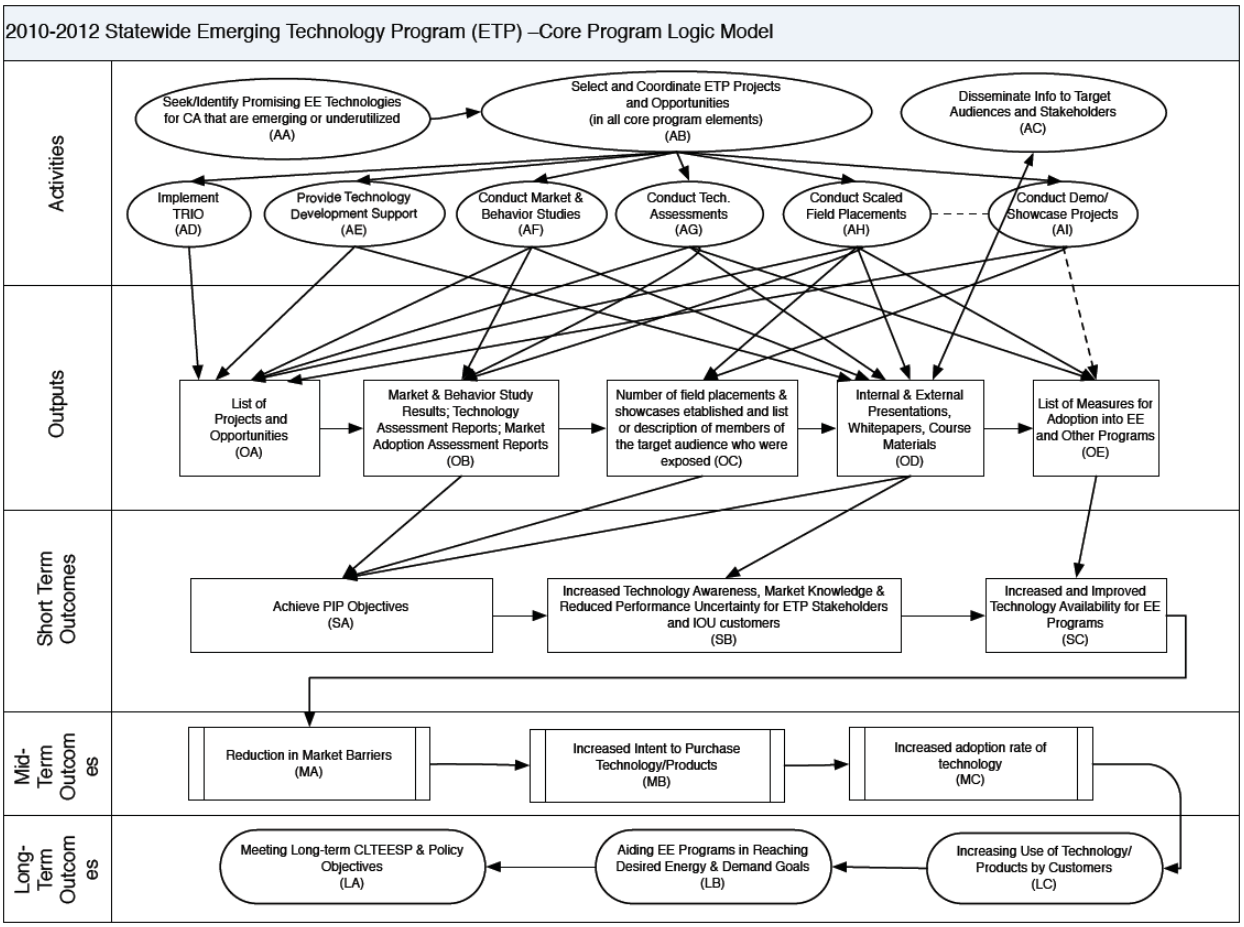
The sole impact outcome for this element is to complete construction of the ZNE Testing Center and have it operational by 1/2013. Additionally the Program Managers chose to discontinue the Residential ZNE facility in 2012. As such, the PTLM for this element has been removed from this memo.

1.31 2010-2012 PIP LOGIC MODELS

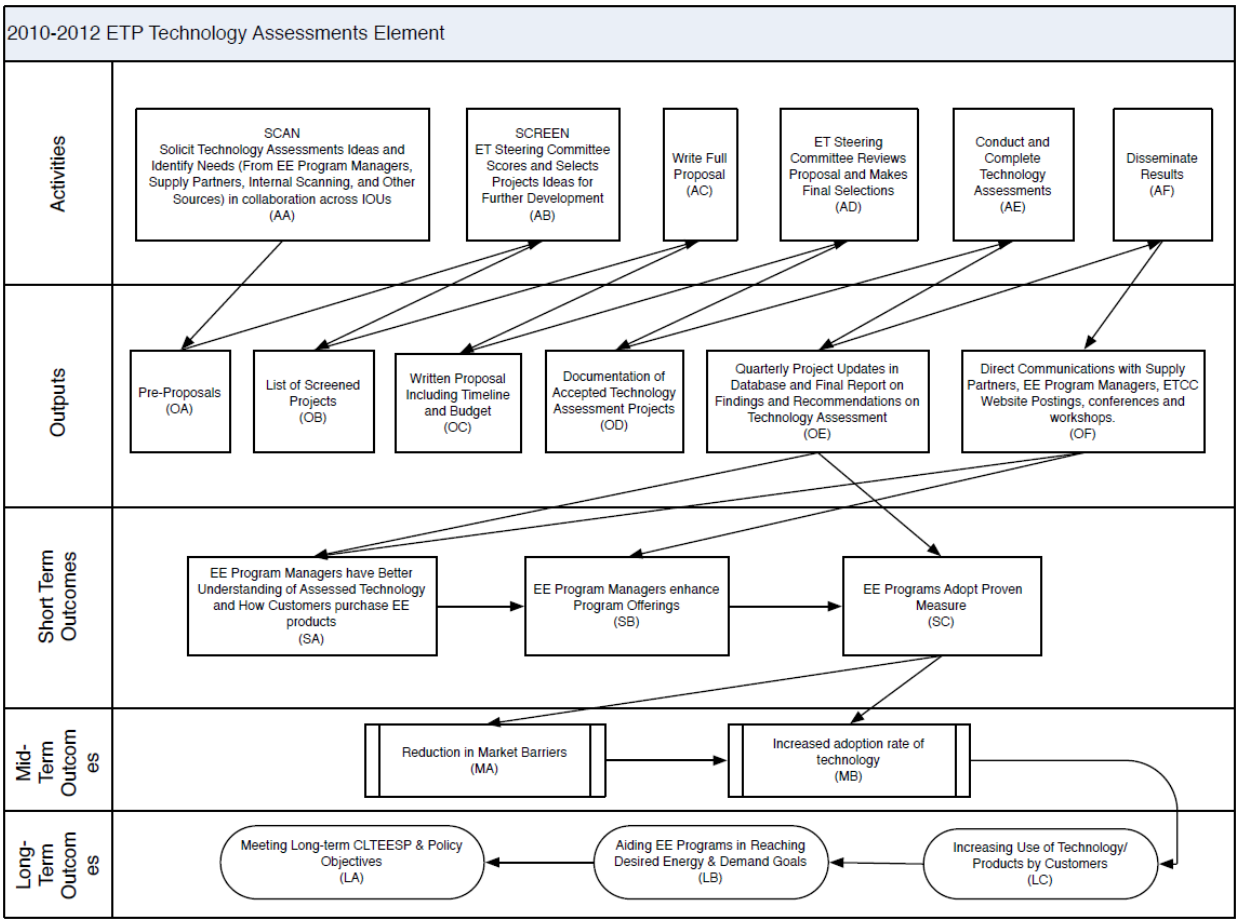
On December 2, 2010, the Commission issued Resolution E-4385, approving Program Performance Metrics (PPMs) for Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company and San Diego Gas and Electric Company for 2010-2012 statewide energy efficiency programs and subprograms. In addition, this Resolution approved updated logic models for the statewide programs. Below are the approved logic models for the Emerging Technologies Program.

[55] We note that the program managers chose to discontinue the Residential ZNE Facility in 2012.

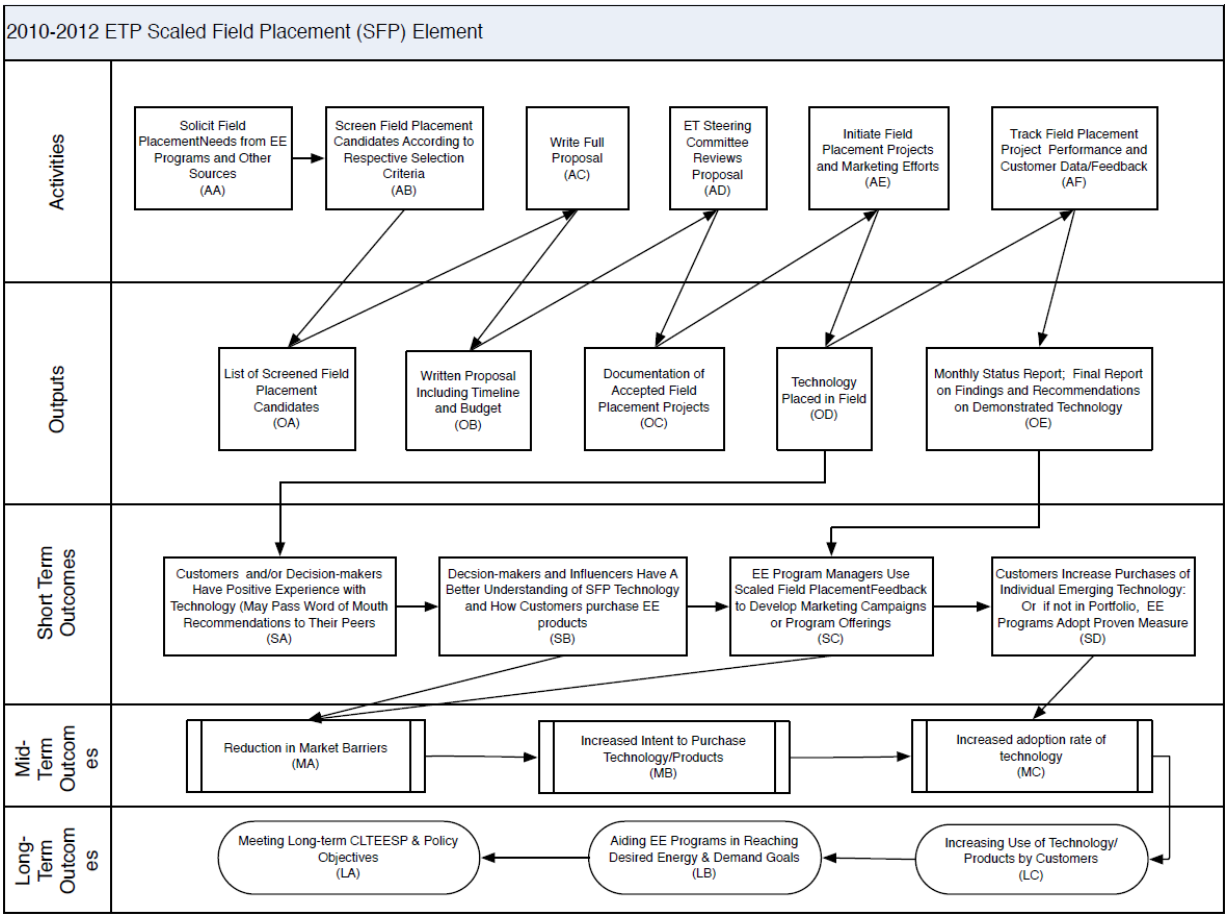
ETP 2010-2010 Core Program Logic Model



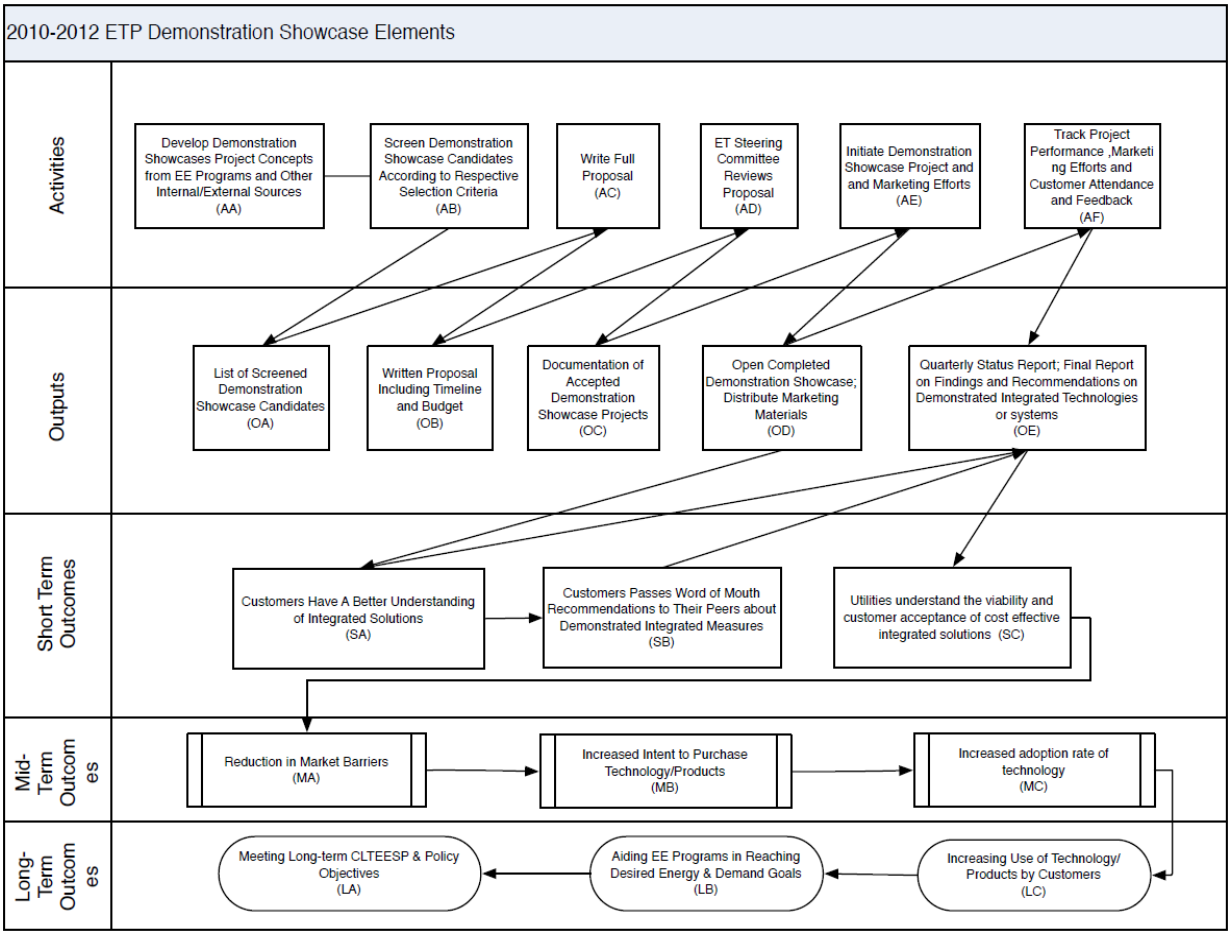
Technology Assessments



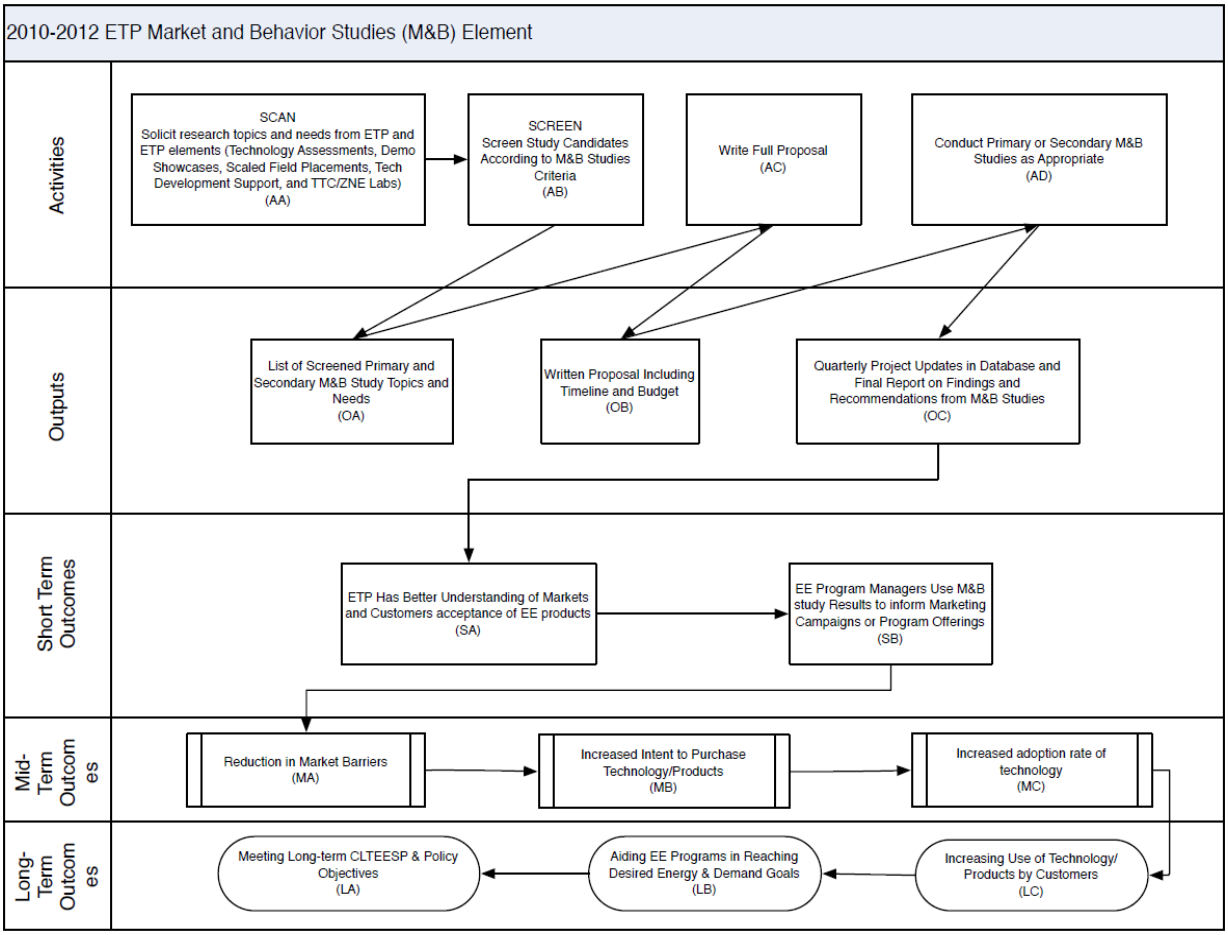
Scaled Field Placements



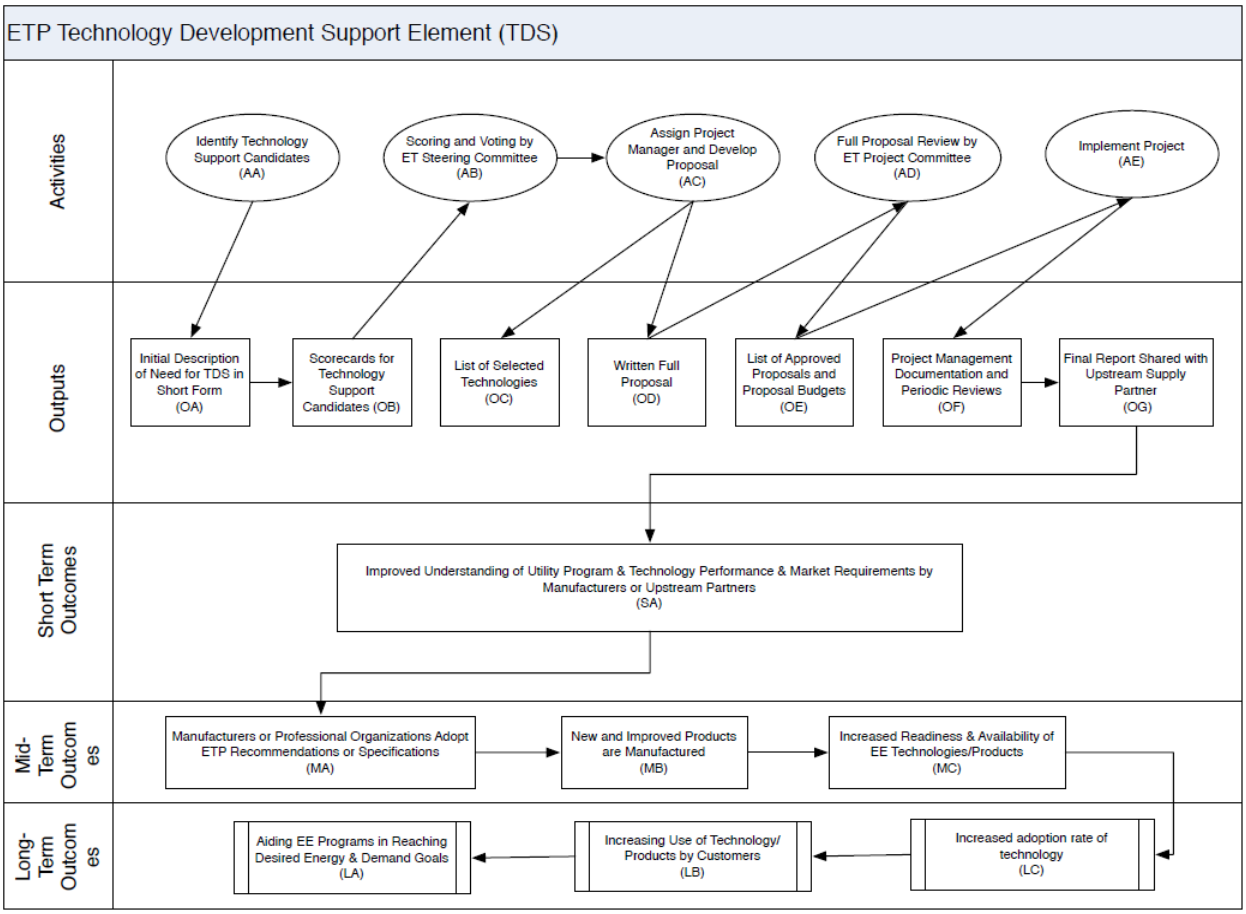
Demonstration Showcases



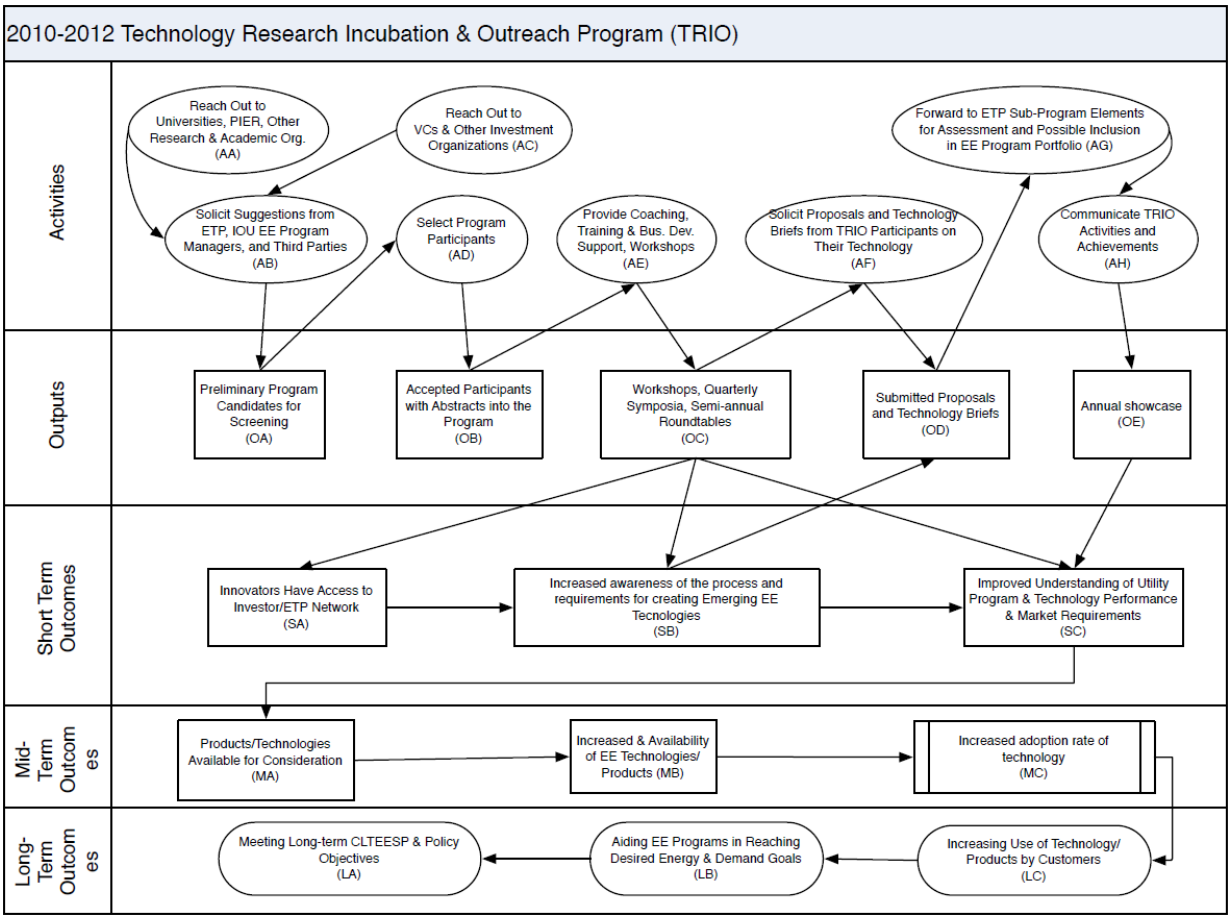
Market and Behavioral Studies



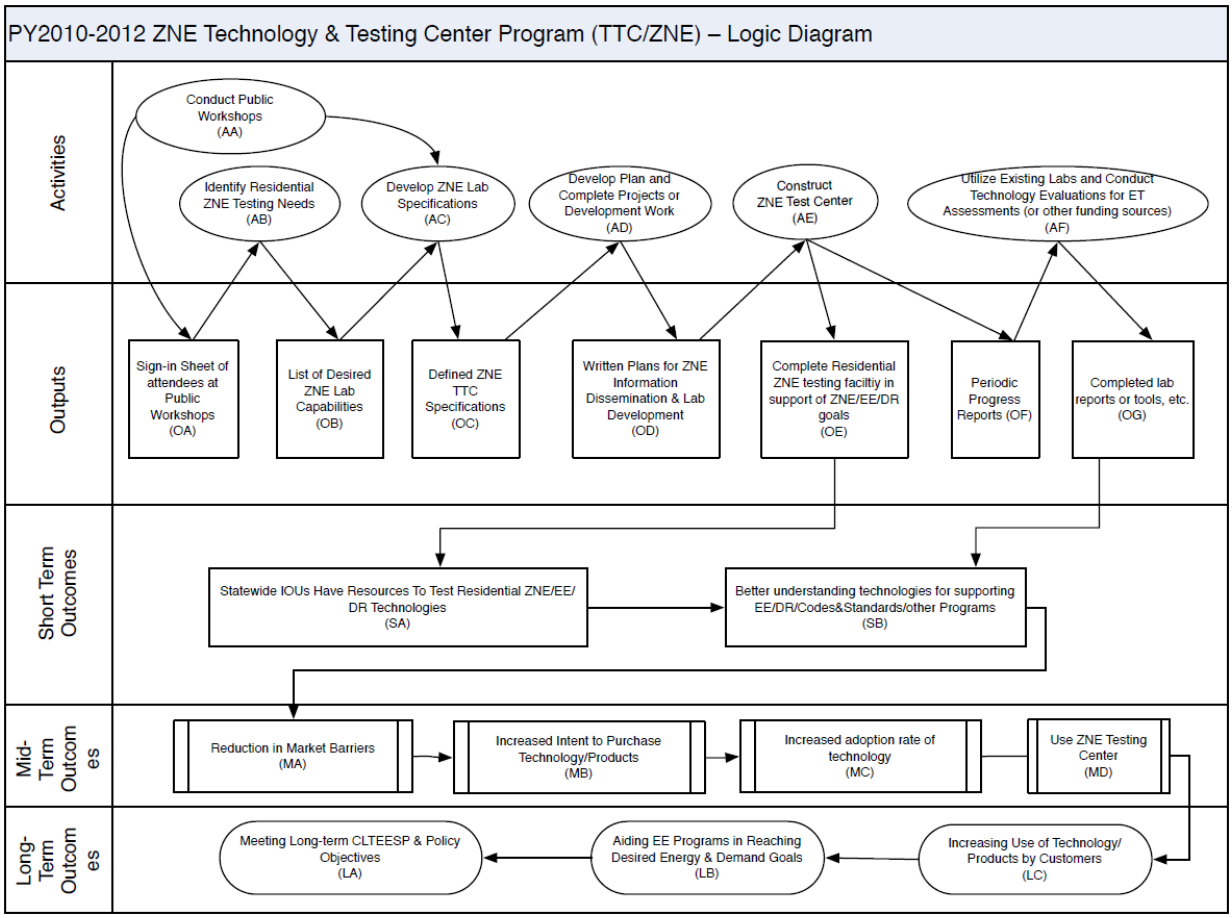
Technology Development and Support



Business Incubation Support (TRIO)



Technology Test Centers (Zero Net Energy Center)



1.32 THEORY FROM PY2006-2008 PROGRAM

The PY2006-2008 ETP Evaluation[56] included the program theory and logic model for the technology assessment element that was active during that program cycle. Below is the entirety of the report copied over for purposes of comparison between the current PTLM and the previous PTLM for this element.

Technology Assessment Program Theory

The theory statements that follow were agreed to by ETP staff early in the evaluation (before the first interim report) and have not been changed. Use of program theory is generally based on a "means-end" type of thinking. An intervention is put in place to create a change (the ends) through specific activities (the means). The policy-relevant ends for the ETP (adoption of a given technology by customers) are distal to the actual program and not under the full control of ETP managers or staff. However, achieving those outcomes that are closer to the program (i.e., the proximal outcomes) provides the necessary but not sufficient conditions for meeting the resource acquisition goals that are the ultimate reason for the existence of the 2006-2008 ETP.

Theory Statement

The short version:

New measures are needed by the resource acquisition programs to enable the IOUs to meet energy efficiency goals set by the CPUC. The ETP produces/acquires knowledge about measures[57] *that are new to the marketplace or have not gained widespread market use. The knowledge is transferred to the EE program managers and causes the resource acquisition programs to include the ETP measures in their portfolios.*

The longer version:

(Evaluator's note: much of the longer version of theory is implementation type information. The ***bolded*** *sections in the write up show more of a theory behind why the activities occur.)*

The ETP is constantly looking for possible energy savings measures$_{33}$ to include in the IOU resource acquisition portfolios (i.e., EE portfolio). The ETP needs to be forward looking to assure that the energy efficiency goals set by the CPUC can be met. As such, ETP staff looks to measures that are new to the marketplace or have not gained widespread market use. Within the IOUs, a first cut at potential measures for inclusion in ETP (i.e., the scanning phase) is a low-data situation. ETP managers make choices here based on knowledge of technologies or a market segment for a technology and an initial assessment of the level of interest among EE program partners (i.e., EE program managers). Promising measures emerging from this first phase of program activity undergo more detailed review, specifically a more detailed assessment of the possible energy savings, the needs of the EE portfolio, the market potentials, and market

[56] California Public Utilities Commission Energy Division Final Report of the California Statewide Emerging Technologies Program. February 3, 2010

[57] A measure can be a widget (technology) or a process that leads to energy impacts.

barriers. Choices made during the opportunity screening phase are based on an expanded data set and a subset of promising technologies is eventually selected for formal assessment.

Assessment of candidate measures can occur through testing at a customer site, benchmarking in a laboratory setting, or through a paper review. The choice of location for customer site assessments is based on the specific measure and access to host sites. In some cases, a single site is expected to yield sufficient data for the assessment. If the results of a demonstration project (i.e., in-situ testing) are inconclusive, a decision is made by ETP staff regarding the appropriate next step, which could include additional in-situ testing at a different location to collect sufficient data. In some cases, the output of the assessment is a calculation tool.

The assessment of a given measure provides ETP staff with additional information that is used to determine how, or whether, to include the measure in the EE portfolio. The assessments also reduce the uncertainty regarding energy and demand impacts. *Once this information is known, ETP staff share their knowledge with the IOU EE program managers.*

The way that information is disseminated varies by IOU. For SEMPRA, this is generally through informal face-to-face interactions. SCE creates fact sheets and reports that can be shared with EE program managers as well as having formal face-to-face interactions. PG&E has reports, fact sheets, and other communications on each project as well as informal and formal face-to-face interactions.

What occurs after information is disseminated from the ETP to EE program managers also differs by IOU.

ETP staff at PG&E may continue to work with others in the company in a supportive role while the project moves through an energy efficiency program process (developing incentives, rebates, workpapers, and marketing to deliver the product to its customers). Playing this supportive role increases the chances that the measure is appropriately understood by others in the EE programs and helps to answer questions as marketing materials are generated. While most projects go through this process, not all do. If the information gained through the ETP assessment is sufficient to easily include the measure into the EE portfolio without further interaction with ETP staff, then this is done. Generally projects that do not go through the longer process are based on calculator-derived assessment information. PG&E also communicates the information to its EE program partners and throughout the company so all possible channels for energy savings are informed.

SCE disseminates information to both internal clients and external customers with a majority of effort focused on internal clients. Work with internal clients provides useful information about new technologies so that they can accurately describe the new measure to SCE customers. In a small subset of cases, the SCE ETP staff also creates data for workpapers in support of EE programs for measures outside of those in the ETP (e.g., those referred by the EE staff). While a small effort, ***each seminar targeted at external customers attempts to persuade them to adopt a new technology****. Additionally, SCE creates reports and fact sheets, which are made available to SCE account managers and representatives to help them sell the new measures to customers.* ***The information provided directly to the customer by the SCE representatives increases the customer's confidence that adoption of the measure will save energy and perform as expected.***

By working directly with EE program managers, SEMPRA increases the awareness of managers about the savings potential of assessed measures. ***This increased awareness persuades EE managers to include these measures in their programs.***[58]

The IOUs interact collaboratively with the California Energy Commission (CEC) through quarterly meetings of the Emerging Technology Coordinating Council. These meetings provide another avenue for dissemination of information among the IOUs and with the CEC.

[58] The process of working with internal clients is under revision at SCE and SEMPRA, but this is the current theory underlying the logic model at this point.

GOAL E: ASSESS QUALITY AND AVAILABILITY OF DATA IN ETP ETP DATABASE

The evaluation team reviewed the ETP database residing on the EEGA website three times. The review in April 2011 provided a look at what was present at the time of the review. The November 2011 review updated that initial review. A February 2012 review provided comments on how to streamline the ETP database. Included here are the three memos with results from each review.

Y. ETP DATABASE REVIEW APRIL 22, 2011

As of 4/19/2011, there are 106 unique technical assistance projects in the Emerging Technologies (ET) database (Table 43) with close to one-third (32) of projects completed.

Table 43. Number of Projects in ET Database
(PY 2009 and 2010-2012 only)

IOU	Program Year when TA begun		Total
	2009	2010-2012	
PG&E	20	1	21
SCE	9	32	41
SoCalGas		26	26
SDG&E		18	18
Total	**29**	**77**	**106**

Note: As of Q4 2010 for SCE, SCG, and SD&E; and Q2 2010 for PG&E

Of the 32 completed projects, 18 have been recommended for inclusion into the Energy Efficiency (EE) portfolio, 4 have not[59], and 10 do not indicate a recommendation in the database. Of the 18 recommended for inclusion, 14 were accepted into the portfolio, 1 is planned to be a demonstration showcase, and 3 have an unknown status. None of those accepted into the portfolio have an EE number in the database.

1.32.1 DETAILED TABLES OF VARIABLES

The IOUs are required to update the database every quarter. The latest upload date was Q4 2010 for SCE and SEMPRA and Q2 2010 for PG&E. A short discussion with PG&E indicated that two more projects began in 2010 (by Q4). This data will be uploaded soon.

Our analysis was based on information from the reports shown on the EEGA website that draws from the IOU data. Data is uploaded into the ETP DB as an Excel file. There are seven tabs in each file with a total of 149 variables. Two-thirds of the variables (100 variables) require some sort of data in the cell at the time the data are uploaded. Of the remaining third, about half are required to be filled in at some point dependent upon the value of a related variable. There is a validation scheme in place to assure that the required variables contain data. However, this validation scheme does not appear to be working well as there are only four variables that are consistently filled in.

[59] Three were not recommended due to non-positive results from the assessment while one showed that overall cost-effectiveness was a barrier.

Not all fields included in the IOU data template are included in the current ETP database[60]. While not an exhaustive list, known variables not included in a report are listed in Table 45. The ETP database reports currently have 111 variables (77 of which are required).

On the next page we present information on these 111 variables currently with reports in the ETP database. The following tables identify each known data variable, the number of completed cells for that variable, whether the variable is required to be completed, if the completion is conditional, and whether the conditional variable is filled in based on that condition.

1.32.2 FUTURE RESEARCH EFFORTS

The research plan will include tasks which will delve deeper into the issues around missing data as well as review any issues regarding the validation scheme. Future research will include the following:

- Identify causes and develop solutions to reduce instances of missing data
- Improve validation scheme to ensure sufficient data

Under the current research planning effort, we will:

- Conduct interviews with ETP program managers to assess issues regarding the database, including, but not limited to: data entry, uploading, etc.
- Review information included in reports to determine how well the data can support an aggregate analysis.

[60] Updating the EEGA database as needed will be included as a task in the research plan.

Table 44. Count of Variables Present in Overall ETP Database

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
1	IOU	106	100%	Yes	NA	NA	NA
2	Project Number	106	100%	Yes	NA	NA	NA
3	Project Name	106	100%	Yes	NA	NA	NA
4	Funding Cycle	106	100%	Yes	NA	NA	NA
5	Description	105	99%	Yes	NA	NA	NA
6	Is Prototype	105	99%	Yes	NA	NA	NA
7	Is Doc Tech Background	105	99%	Yes	NA	NA	NA
8	Is Doc Funding Proposal To Assess	105	99%	Yes	NA	NA	NA
9	Is Primary Research	104	98%	Yes	NA	NA	NA
10	Project Manager	104	98%	Yes	NA	NA	NA
11	Sector	104	98%	Yes	NA	NA	NA
12	End Use	104	98%	Yes	NA	NA	NA
13	Is Doc Contract	103	97%	Yes	NA	NA	NA
14	Estimated Complete	103	97%	Yes	NA	NA	NA
15	Project Source	102	96%	Yes	NA	NA	NA
16	Status	102	96%	Yes	NA	NA	NA
17	Estimates Units	101	95%	Yes	NA	NA	NA
18	Progress Points	101	95%	Yes	NA	NA	NA
19	Skills Needed	100	94%	Yes	NA	NA	NA
20	Infrastructure Requirements	100	94%	Yes	NA	NA	NA
21	Is Doc Workpaper	100	94%	Yes	NA	NA	NA
22	Is Doc Contractor Writeup	100	94%	Yes	NA	NA	NA
23	Is Doc Final Project Writeup	100	94%	Yes	NA	NA	NA
24	Is Doc Journal Article	100	94%	Yes	NA	NA	NA
25	Is Doc Mass Distribution	100	94%	Yes	NA	NA	NA

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
26	Advantages	99	93%	Yes	NA	NA	NA
27	Subprogram	97	92%	Yes	NA	NA	NA
28	Audience	97	92%	Yes	NA	NA	NA
29	Is Doc Other	96	91%	Yes	NA	NA	NA
30	Unit Type Pre	96	91%	Yes	NA	NA	NA
31	Estimated Annual Kwh Savings	93	88%	Yes	NA	NA	NA
32	Annual Kwh Savings Pre	93	88%	Yes	NA	NA	NA
33	Peak kW Savings Pre	93	88%	Yes	NA	NA	NA
34	Primary Research Source	91	86%	Conditional	If IsPrimaryResearch = TRUE	91	100%
35	Estimated Peak kW Savings	91	86%	Yes	NA	NA	NA
36	Estimated Annual Therm Savings	91	86%	Yes	NA	NA	NA
37	Annual Therm Savings Per Unit Pre	88	83%	Yes	NA	NA	NA
38	Estimated Cost Low	87	82%	No	NA	NA	NA
39	Estimated Cost High	87	82%	Yes	NA	NA	NA
40	Sites Number Pre	80	75%	Yes	NA	NA	NA
41	Sites Percent Useful Pre	77	73%	Yes	NA	NA	NA
42	Internal Source Area	73	69%	No	NA	NA	NA
43	Parent Project Notes	67	63%	Yes	NA	NA	NA
44	Information Source Market Pen Pre	67	63%	Yes	NA	NA	NA
45	Useful Life Years Pre	66	62%	Yes	NA	NA	NA
46	Is Recommended For EE	65	61%	No	NA	NA	NA
47	First Sale Timing	64	60%	Conditional	If IsPrototype = FALSE	97	66%
48	Is Manufacturer Still Pursuing	63	59%	No	NA	NA	NA

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
49	Estimated Penetration Level Pre	63	59%	Yes	NA	NA	NA
50	Contractor Manager	59	56%	No	NA	NA	NA
51	Information Source Pre	56	53%	Yes	NA	NA	NA
52	Audience Other	24	23%	Conditional	If Audience = AUD07	0	#DIV/0!
53	Unit Type	23	22%	No	NA	NA	NA
54	Annual Kwh Savings	23	22%	No	NA	NA	NA
55	Peak Kw Savings	23	22%	No	NA	NA	NA
56	Annual Therm Savings Per Unit	23	22%	No	NA	NA	NA
57	Information Source	22	21%	No	NA	NA	NA
58	Process Type	19	18%	Conditional	If EndUse = END40	2	950%
59	Subprogram Other	19	18%	Conditional	If Subprogram = TY5 or TY11	7	271%
60	Useful Life Years	19	18%	No	NA	NA	NA
61	Information Source Market Pen	19	18%	No	NA	NA	NA
62	Project Source Other	18	17%	Conditional	If ProjectSource = PR16	23	78%
63	Recommended For EE Program	18	17%	Conditional	Is Recommended for EE = TRUE	51	35%
64	Estimated Penetration Level	18	17%	No	NA	NA	NA
65	Sites Number	16	15%	No	NA	NA	NA
66	Sites Percent Useful	15	14%	No	NA	NA	NA
67	EE Program Transferred To	14	13%	Conditional	Status = Complete, EE measure implemented	12	117%
68	Sector Other	10	9%	Conditional	If Sector = SE29, SE41, or SE53	11	91%
69	Primary Research Source Other	7	7%	Conditional	If PrimaryResearchSource = PS04	4	175%
70	End Use Other	6	6%	Conditional	If EndUse = END50	7	86%
71	Energy Center Other	5	5%	Conditional	If EnergyCenter = EC08	0	#DIV/0!
72	Non-Recommend Reason	5	5%	Conditional	Is Recommended for EE = FALSE	14	36%
73	Keywords	5	5%	No	NA	NA	NA

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
74	Non-Transfer Reason	4	4%	Conditional	Status = Complete, EE measure will not be pursued	4	100%
75	Cancellation Reason	4	4%	Conditional	Status = On hold or stopped	6	67%
76	Cancellation Reason Other	3	3%	Conditional	CancellationReason = Other	3	100%
The data below here are suspected to be based on incomplete DB implementation and not data provided by the IOUs. We have found some data in the original files that do not show up here. This will be explored further. For example, variable Nos. 83-111 are supposed to be pulled from the Business Risk Assessment but are all blank in the DB report, yet we found at least one instance of data present in the original information from the IOU.							
77	Parent Project Number	0	0%	Yes	NA	NA	NA
78	Company Size	0	0%	Yes	NA	NA	NA
79	Energy Center	0	0%	Yes	NA	NA	NA
80	EE Measure Number	0	0%	Conditional	Status = Complete, EE measure implemented	12	0%
81	Outreach Events	0	0%	No	NA	NA	NA
82	Target Customer	0	0%	Yes	NA	NA	NA
83	Statement of Customer Need	0	0%	Yes	NA	NA	NA
84	Product	0	0%	Yes	NA	NA	NA
85	Recognized Product Category	0	0%	Yes	NA	NA	NA
86	Statement of Key Benefit	0	0%	Yes	NA	NA	NA
87	Primary Competitive Alternative	0	0%	Yes	NA	NA	NA
88	Statement of Primary Differentiation	0	0%	Yes	NA	NA	NA
89	Statement of Incremental Effect	0	0%	Yes	NA	NA	NA
90	Statement of Incremental Cost	0	0%	Yes	NA	NA	NA
91	Quantification of Benefits	0	0%	Yes	NA	NA	NA
92	Target Customer Prime Source	0	0%	Yes	NA	NA	NA

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
93	Statement of Customer Need Prime Source	0	0%	Yes	NA	NA	NA
94	Product Prime Source	0	0%	Yes	NA	NA	NA
95	Recognized Product Category Prime Source	0	0%	Yes	NA	NA	NA
96	Statement of Key Benefit Prime Source	0	0%	Yes	NA	NA	NA
97	Primary Competitive Alternative Prime Source	0	0%	Yes	NA	NA	NA
98	Statement of Primary Differentiation Prime Source	0	0%	Yes	NA	NA	NA
99	Statement of Incremental Effect Prime Source	0	0%	Yes	NA	NA	NA
100	Statement of Incremental Cost Prime Source	0	0%	Yes	NA	NA	NA
101	Quantification of Benefits Prime Source	0	0%	Yes	NA	NA	NA
102	Target Customer Sec Source	0	0%	Yes	NA	NA	NA
103	Statement of Customer Need Sec Source	0	0%	Yes	NA	NA	NA
104	Product Sec Source	0	0%	Yes	NA	NA	NA
105	Recognized Product Category Sec Source	0	0%	Yes	NA	NA	NA
106	Statement of Key Benefit Sec Source	0	0%	Yes	NA	NA	NA
107	Primary Competitive Alternative Sec Source	0	0%	Yes	NA	NA	NA

No.	Variable name	Counts	% Present	Required?	Condition (if applicable)	Conditional Count	Conditional % Present*
108	Statement of Primary Differentiation Sec Source	0	0%	Yes	NA	NA	NA
109	Statement of Incremental Effect Sec Source	0	0%	Yes	NA	NA	NA
110	Statement of Incremental Cost Sec Source	0	0%	Yes	NA	NA	NA
111	Quantification of Benefits Sec Source	0	0%	Yes	NA	NA	NA

* Some conditional open-end fields were filled in when the conditional variable is blank), leading to a % present over 100%.

Table 45. Variables Listed in Template That Are Not Recorded

N	Variable Names	Description	Required?
1	IsSecondaryResearch	Does this project entail secondary research?	Yes
2	OrganizationRef	What is the organization that is being partnered with/providing the In-Kind Service?	Conditional
3	ManagerRef	Manager or main point of contact at partner organization	Conditional
4	PartnerIouProjectNumber	If partnering with another IOU, what is the project number at that IOU? This number stays with the project for its lifetime.	Conditional
5	PartnerIouProjectName	Descriptive name of project at other IOU	Conditional
6	Years	Year or years that In Kind Service is provided	Conditional
7	Description	Describe the nature of the partnership or the service provided.	Conditional
8	ContractorOrganizationRefs	Contractor Organization	No
9	Event Ref	Event Ref	No
10	PresentationTitle	Title of presentation	No
11	EventDate	Date presented	Conditional
12	IsExternal	Is the presentation made to an audience outside of to the IOU?	Conditional
13	City	City	Conditional
14	OrganizationRef	Organization that host conference	Conditional
15	ConferenceName	Conference Name	Conditional
16	AttendeesNumber	Number of attendees at presentation	Conditional

Z. ETP DATABASE REVIEW NOVEMBER 9, 2011

As of October 10, 2011, there are 158 unique program activities in the ETP database. These activities support five of the ETP program elements, including Technology Assessments, Scaled Field Placements, Demonstration Showcases, Market and Behavioral Studies, and Technology Development and Support activities.

Table 46. Number of Program Activities in ET Database (PY 2009 and 2010-2012 only)

IOU	Program Year When Activity Began		Total
	2009	2010-2012	
PG&E	20	9	29
SCE	9	59	68
SoCalGas	0	31	31
SDG&E	0	30	30
Total	**29**	**129**	**158**

Note: As of Q2 2011 for SCE, SCG, and SD&E, and Q3 2011 for PG&E.

Of the 158 program activities in the database as of October 2011, 54 program activities are new since our last review[61]. Overall, these findings show a ramping up in activities, as 54 new activities have been included in the database within a 6-month period.

Over one-third (41) of program activities have been completed as of October 2011. This is an increase from our April 19, 2011 database review, which found a total of 106 program activities in the ET database and 32 program activities completed.

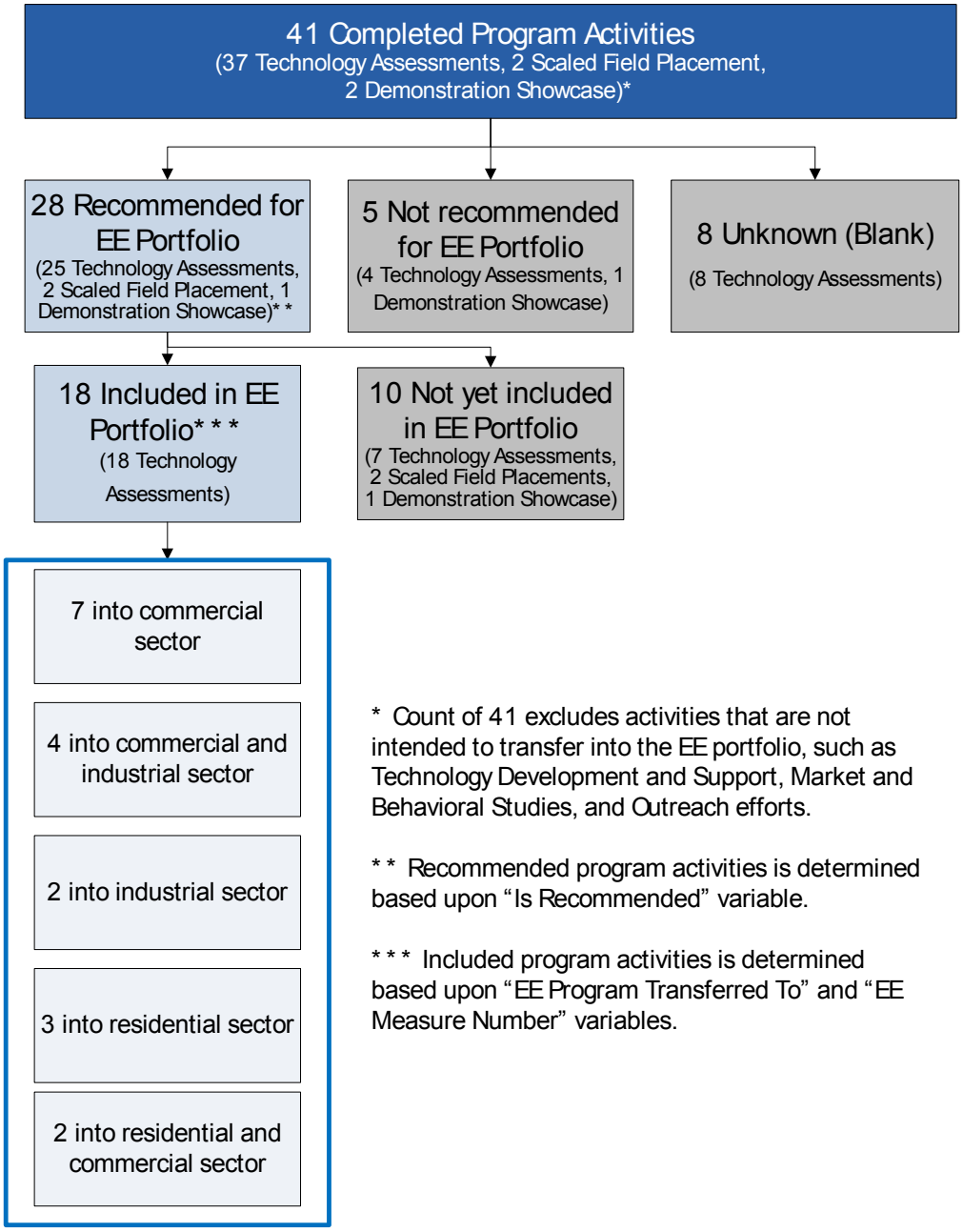
Of these 41, there were five program activities not recommended for the EE portfolio; three were not recommended due to non-positive results from the assessment, one showed that overall cost-effectiveness was a barrier, and one reported that the assessment was not aimed at program inclusion. Four of the 17 program activities accepted into the portfolio have an Energy Efficiency Program Measure ID number in the database[62] (see Figure 18)

These results indicate that the ETP database allows for tracking of progress/transfer to portfolio in most cases. However, 8 of these fields are blank. In addition, from our discussions with the IOUs and data requests, we understand that there are no completed demonstration showcases or scaled field placements. As such, while we present the information here, the activities presented in the database do not reflect program activities in real-time.

[61] New activities are those that were completed since the April 2011 memo that reviewed program activities.

[62] All four of these are SCE projects.

Figure 18. Program Activities into EE Portfolio as of Q2 2011 for Sempra and SCE and Q3 for PG&E



We also reviewed the number of program activities by ETP program element. We found that several activities (i.e., a single record) can fall into multiple elements, particularly among the Technology Assessment program activities, which we outline in detail in Table 47.

Most of the program activities continue to be within the Technology Assessment program element, followed by Demonstration Showcases (12), Market and Behavioral studies (6), and Technology Development and Support (3). Notably, this considers number of activities, not level of investment of resources.

Table 47. Number of Program Activities by Program Element (2009-10/10/2011)

Program Elements	Technology Assessments	Scaled Field Placements	Demonstration Showcases	Market & Behavioral Studies	Technology Test Centers	Business Incubation (TRIO)	Technology Development Support	Outreach and Training [a]	Total
Technology Assessments	121 [a]	1	3	2	0	0	3	-	130
Scaled Field Placements	-	3	0	0	0	0	0	-	3
Demonstration Showcases	-	-	12	0	0	0	0	-	12
Market & Behavioral Studies	-	-	-	6	0	0	0	-	6
Technology Test Centers	-	-	-	-	0	0	0	-	0
Business Incubation (TRIO)	-	-	-	-	-	0	0	-	0
Technology Development Support	-	-	-	-	-	-	3	-	3
Outreach and Training [a]	-	-	-	-	-	-	-	4	4
Total	121	4	15	8	0	0	6	4	158

[a] Shading indicates the number of program activities that fall into one element only.

We found that the total count of Demonstration Showcase program activities provided in the quarterly reports and the ETP database does not match the number of program activities described in the utility data requests for the ETP evaluation.

Table 48: Demonstration Showcase Activities (2010-2012)

IOU	ETP Evaluation Data Request (As of 9/15/2011)	ETP Database Review (As of 10/10/2011)
PG&E	1	0
SCE	8	4
SCG	0	1
SDG&E	0	10[a]

[a] Three of these program activities are also cross-listed under Technology Assessments.

The current database does not provide accurate real-time counts of program activities for evaluation and suggests the need for performing quality assurance activities.

ETP Database Structure Findings

Overall, the database needs some clarification to ensure that all data is clear and standardized across the four participating utilities. We found three opportunities for improvement when reviewing the ETP database variables. These include correcting data translation errors, standardizing variable contents, and pre-coding select open-ended variables. The translation of IOU reports into the ETP database causes some of the information to be difficult to understand, misclassified, or incorrect. As a result, we found that:

- The ETP database, in its current form, does not always correctly translate data from the utility quarterly reports to the database. We recommend that Navigant work with the IOUs to correct these issues.
- Clarification is needed regarding what is required for a handful of fields so that the IOUs can provide the needed amount of information on their information sources. We recommend that the Navigant work with the IOUs to standardize certain variable contents.
- We found that for some fields, the database could provide additional pre-codes (such as those found in the Subprogram, Primary Research Source, and Project Source fields) for ease of data entry. We found that for these fields, the program activities often list very similar data that could be turned into new codes. We suggest that Navigant consider these pre-codes for helping to streamline data entry for the IOUs.

In addition, as part of our review we found that PG&E has had technical difficulties uploading its quarterly reports after Q2 2010 to the master ETP database. However, PG&E and the ETP database administrators are currently in contact to resolve this issue. For our analysis, we obtained the raw data from the quarterly reports in Excel format directly from PG&E.

Utility Quarterly Report Findings

We identified six opportunities that the IOUs can take to help improve the information in the database: cumulative reporting, unique program activity IDs, naming conventions, progress point reporting, data ranges, and variable completion rates.

- Our analysis of the quarterly reports found that the four utilities provide information in their quarterly reports differently. Overall, each IOU has the following cumulative total: PG&E (9), SCE (58), SCG (31), SDG&E (30). However, the Sempra utilities do not enter their reports cumulatively leading to difficulty understanding the total number of program activities that have occurred.

- We found data entry errors for some program activity IDs, which mean that evaluators cannot assess program activity progress points or identify timelines for program activities.

- We examined how utilities are reporting progress points in the quarterly reports. We found that the overall timeline of progress points is not always clear, such as progress points do not follow the timeline of a program activity (e.g., complete in 2009, when program activities were initiated in 2010). We found that very few (1%) of program activities were missing progress points.

- We conducted an analysis of the 21 numeric ranges of the data provided.[63] Of the fields that provide numeric ranges, we found that nearly four in five (79%) cells that were completed had valid data (that is, values other than the "-99" value that indicated missing information).

- Since the April 2011 review, many important variables are increasing in completion rate (e.g., progress points went from 95% to 99% present). There are a few variables with a double-digit reduction, most of which will not hinder the evaluation team's future aggregate analysis. However, for some required variables such as "*cancellation reason,"* data are present less than half of the time. These findings indicate that the ETP database does not fully describe the ETP portfolio in the way it was originally intended.

1.32.3 DETAILED FINDINGS

Below we present detailed findings and recommendations regarding 1) the ETP database findings that the database contractor can address, and 2) the utility quarterly reports that the IOUs can address.

ETP Database Findings

Below we provide detailed findings regarding the database structure, which we recommend conveying to Navigant to explore once they initiate the contract.[64] Notably, the IOUs cannot address the following items.

[63] This analysis pertained to the technology assessment program activities only, and only those program activities that provided data under the variables.

We found three opportunities for improvement when reviewing the ETP database variables: 1) correcting data translation errors, 2) standardizing variable contents, and 3) pre-coding select open-ended variables.

Correct Data Translation Errors

The ETP database, in its current form, does not always correctly translate data from the utility quarterly reports to the database. We review these cases below.

Tracking of program activities' current progress (Variable Name: Progress Points): There are 25 program activities with progress point descriptions that have dates in the incorrect format. The fields below provide examples of the errors (emphasis added):

PP01: Preliminary proposal created and decision made **40424**

PP01: Preliminary proposal created and decision made **40455**

PP01: Preliminary proposal created and decision made **40463**

These program activities were entered correctly in the original quarterly reports, but appear incorrect in the ETP master database only. These errors are likely the result of formatting errors, such as dates being converted to a number format during the translation from the original quarterly report Excel format into the ETP database format.

Program element description outside of the subprogram pre-codes (Variable Name: Subprogram Other): The "Subprogram" variable lists the program element for program activities using a list of pre-codes, such as "TY01 – Technology Assessment (Lab Study)" or "TY08: Market & Behavioral Study." For program activities that do not fall into one of the existing pre-coded types, they are classified using the open-ended variable "Subprogram Other." However, this variable includes 10 values that should be entered under the standard "Subprogram" variable instead. These values are entered as "TY01" and "TY02," the existing pre-codes that indicate program elements under the "Subprogram" field, while the "Subprogram" variable is left blank. We believe that this is an issue in translation from the quarterly reports to the ETP database, as all but one of these errors occurred in program activities from 2009, when the database was still being developed.

Standardize Variable Content

When the database was created, Navigant planned to provide additional training to the IOUs. However, due to timing issues, this training did not occur, which has led to the following opportunities for improvement.

We reviewed the data provided for any variables where the values indicated that the utilities did not have a common understanding of why data was placed in a specific variable. We found that several variables may need to be standardized and clarified: *Information Source Pre*, *Information Source*, *Information Source Market Pen Pre*, and *Information Source Market Pen*. These four variables collect

[64] The CPUC is in the process of initiating a contract with Navigant, Inc. for the maintenance of and revisions to the current ETP EEGA database structure.

information for secondary sources consulted and used in the development of the program. Some entries in these fields provide lengthy formal citations of information sources, while others provide very informal or one-word descriptions of information sources. The following are some examples of the variety of values listed:

- Consultant
- industry
- Conversations with Andy Redding, President and CEO at Trumpf Medical Systems, Inc.
- Itron, Inc. "California Commercial End-Use Survey", CEC report #400-2006-005, March 2006, Picklum, R.E., Nordman, B and Kresh, B. "Guide to Reducing Energy Use in Office Equipment, LBNL, March 20, 1999, "Environmental Comparison of the Relevance of PC and Thin Clinet Desktop Equip for the Climate, 2008" Fraunhofer Institut Umwelt-, Sicherheits Energietechnic UMSICHT, Steve Blanc, PG&E, http://h40059.www4.hp.com/campaigns/discovery/greener_education.html

We suggest that Navigant work with the IOUs, the CPUC and evaluators to clarify what is required for this field so that they can provide the needed amount of information on their information sources.

Pre-Code Open End Variables

We also reviewed the data to see where the database could provide additional pre-codes (such as those found in the Subprogram, Primary Research Source, and Project Source fields) for ease of data entry. We found that in the following open-ended fields, the program activities often list very similar data that could be turned into new codes:

Table 49: Suggested Pre-Codes for Open End Variables

Variable Name	Rationale	Suggested Pre-Code(s)
Internal Source Area	In these fields, there are a finite number of sources within the utility and these were listed multiple times	Emerging Technologies Teams, including the Lighting Team, the Mass Markets Team, the Industrial Team, and the Commercial Team Energy Efficiency Program Managers, including both Commercial and Residential
Recommended for EE Program and EE Program Transferred To	In these fields, a relatively small list of programs were listed multiple times	Data entry for these program activities could be simplified as codes: IDSM (Integrated Demand Side Management), Calculated Measures, Express Solutions, Mass Markets, Business and Consumer Electronics Program

Variable Name	Rationale	Suggested Pre-Code(s)
Unit Type	Most program activities that included this information included similar categories of information (such as "*Residential*"). However, some program activities listed broader categories under unit type (such as "*Commercial*") than others (such as "*Hospitality and Food Service*").	Review items for most frequent unit type and create pre-codes.

Overall, the database needs some clarification to ensure that all data is clear and standardized across the four participating utilities.

Utility Quarterly Report Findings

We reviewed the content of each utility's quarterly reports. SCE and the Sempra utilities have provided updated quarterly reports through Q2 2011, while PG&E has provided reports through Q3 2011. For our analysis, we obtained the raw data from the quarterly reports in Excel format directly from PG&E due to the difficulties mentioned above. For the remaining utilities, we used the quarterly reports available on the EEGA website. At the time of our database extract, the utilities were required only to report their programs through Q2 2011 on the EEGA website, so all of the utilities have provided their reports on schedule.

Below we provide a review of findings regarding the quarterly reports that the IOUs can address, including 1) cumulative reporting, 2) unique program activity IDs, 3) naming conventions, 4) progress point reporting, 5) data ranges, and 6) variable completion rates.

Cumulative Reporting

Our analysis of the quarterly reports found that the four utilities provide information in the reports differently. Table 50 lists the number of program activities included in each utility's reports per quarter and in the ETP master database. In their quarterly reports, PG&E and SCE provide cumulative progress of all program activities for the 2010-2012 program cycle, and each quarterly report integrates data from all previous quarters along with the latest data. SDG&E, however, provides program activities that are new for the current quarter (e.g., Q1 2010 had 2 new program activities, while Q2 2010 has 4 additional new program activities, for a cumulative total of 6 for the two quarters). SCG has provided only one quarterly report per program year (Q4 2010 and Q2 2011), which provide the list of program activities for that year only.

Table 50. Number of Program Activities Included Per Quarter by IOU (Where Available)

IOU	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Cumulative Total[a]

IOU	Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Cumulative Total[a]
PG&E	1	1	2	2	5	7	9	9
SCE	-	25	29	33	41	58[b]	*	58[b]
SCG	-	-	-	13	-	18	*	31
SDG&E	2	4	3	1	22	12	*	30

*Indicates reports that have not yet been required to be uploaded to the ETP database.

[a] The cumulative totals are calculated differently for each utility. In their quarterly reports, PG&E and SCE provide cumulative progress of all program activities for the 2010-2012 program cycle, and each quarterly report integrates data from all previous quarters along with the latest data, so the cumulative total is the same as the number of program activities in the most recent quarterly report. SDG&E, however, provides program activities that are new for the current quarter, so the cumulative total is the sum of the program activities from all quarterly reports. SCG has provided only one quarterly report per program year (Q4 2010 and Q2 2011), which provide the list of program activities for that year only, so the cumulative total is also the sum of all program activities from the two reports.

[b] The SCE Q2 2011 report removed one program activity, ET10SCE1310, that was tracked in the ETP database but is not included in any of the quarterly reports provided. The ETP database records this program activity as complete and implemented into the SCE portfolio, so it is unclear if this was supposed to be included in Q2 2011.

Unique Program Activity IDs

One key issue that we found that may be a training issue is that in the Sempra utility reports both utilities provide unique program activities identifiers under the Parent Project number rather than the Project Number, the tracking variable used by SCE and PG&E. However, the ETP master database tracks unique program activities by Project Number, not Parent Project number, and does not currently transfer the Parent Project number from the quarterly reports to the master ETP database. Additionally, only a few Sempra program activities have Parent Project numbers listed in their quarterly reports. Because there are no unique Project Numbers, the Sempra utility reports contain program activities with duplicate Project Numbers in the ETP database, which creates multiple problems in terms of program tracking. The ETP database has reprogrammed some duplicate Project Numbers to process new program activities with duplicate numbers. We list these program activities in Appendix B.

We recommend that the two utilities work with Navigant to determine how to update the current records so that a new list of unique tracking program activity IDs in the Project Number format can be created that will reduce the risk of tracking duplicate program activity records or losing program activity records altogether.

Program Activity Code Naming Conventions

The four participating utilities do not have common naming conventions for providing information on their program activities in their quarterly reports. We note this inconsistency for documentation purposes, but it does not affect the IOUs' abilities to track unique program activities over time. However, it makes it difficult for a user of the database to understand the actual cumulative numbers.

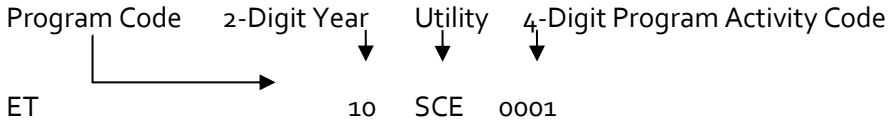
- The PG&E and SCE reports (on the "Projects" tab) are cumulative, and each quarterly report includes both new and previously reported program activities.
- SCG has provided two quarterly reports, one in each program year. The Q4 2010 report included only program activities from 2010, while the Q2 2011 report included only program

activities from 2011.

- SDG&E appears to have changed its reporting process in 2011. In 2010, the quarterly reports only included the new program activities for the quarter. In Q1 2011, the report included all program activities (although 5 program activities were new program activities with duplicate Project Numbers of previous program activities). In Q2 2011, the reports only included 2011 program activities.

We recommend that SCG and SDG&E use the cumulative approach currently used by PG&E and SCE to report activities. This means that each quarterly report will be progressively larger each submittal. By doing so, the evaluation team can analyze the progress points from past submittals and follow activities over time, a component of the aggregate analysis.

The program activities are numbered in the ETP database and the quarterly reports using the same general convention:



However, we found that the four utilities have different conventions for creating the 4-digit project codes:

- The Sempra utilities number each program activity consecutively for the year; the first program activity is number 0001, the second 0002, etc.

  We also found that although the reporting requirements say that utility codes must only be three letters, SDG&E Project Number use four-letter utility codes (e.g., ET10SDGE0008 rather than ET10SDG0008). Thus far, however, this has not appeared to produce any issues in data tracking or reporting, but may cause any issues for any database extracts that allow for only a total of 11 characters in the Project Number field.

- SCE appears to use the first digit of the program activity code to indicate program element:

  1 = Technology Assessment (One Study Type)

  2 = Demonstration Showcase

  3 = Technology Assessment (Multiple Study Types)

  4 = Market and Behavioral Study

  5 = Technology Development Support

  The following two digits indicate the program activity count (with increasing values for each new program activity), and the final digit is always zero.

- PG&E uses the two-digit year for the first two digits of the program activity code, while the second two digits are the program activity count for the year, with increasing values for each

new program activity.

Progress Point Reporting

We also examined how utilities are reporting progress points in the quarterly reports. Progress points are one of the key measurements for the ETP evaluation, as they provide tracking data on program activities and should be updated each quarter as needed as each program activity reaches a new progress milestone or remain at the same progress point. While some utilities (SCG, SDG&E) update program activity lists with all new program activities every quarter, the progress points list is always cumulative. However, we also found that the overall timeline of progress points is not always clear. For the specific utilities, we found:

- We cannot analyze the progress points for SCG based on the data provided. SCG has progress points for 2011 program activities that do not fit a possible timeline (e.g., ET10SCG0018, which has a 2010 program activity code but indicates that the program activity was completed in 2009). However, this is likely related to reuse of Project Numbers.

- Because of the reused Project Numbers in the quarterly reports, 2010 program activities are no longer tracked with the same progress points in 2011: e.g., ET10SCG0001 is reported at PP05 ("complete") in 2/2010 and at PP03 ("Data/information collection starts") in 6/2011 – however, these are actually different program activities with the same Project Number. Another issue is that some program activities were not completed in 2010, such as ET10SCG0012, which had a progress point of PP3 ("Data/information collection starts") for 7/2010, and then PP01 ("Preliminary proposal created and decision made") for 5/2011. It is possible that Sempra will need to recreate both the progress points and Project Numbers.

- SDG&E has the same issue as SCE with progress points in different months. However, because some Project Numbers are duplicates (though fewer than SCG) the issue may be around duplicate Project Numbers rather than progress points.

Finally, we examined which utilities are missing progress point information from their quarterly reports. The ETP database indicates that 99% of program activities have progress points listed. In the quarterly reports, we only found one program activity without any listed progress points:

- ET10SCE1420. This program activity is new in the Q2 2011 report, but has a 2010 Project Number, indicating that there may have been a data processing or data entry error with this program activity.

Data Ranges

We conducted an analysis of the 21 numeric ranges of the data provided. This analysis pertained to the technology assessment program activities only. Many of these data ranges have the same data input before the technology assessment (i.e., those with a "pre" at the end of the variable name) and after the assessment. Of the fields that provide numeric ranges, we found that nearly four in five (79%) technology assessment cells that were completed had valid data (that is, values other than the "-99" value that indicated missing information).

- The database has eight program activities with estimated kWh savings greater than 10,000,000 kWh. All eight of these program activities are from PG&E, and seven of these program activities

are from 2009. Six of these program activities are listed as complete, and five of these program activities have ex post assessed savings at 100% of their estimated savings, while one program activity had 0%. Three of these program activities have been accepted into the portfolio. As the savings variables are supposed to reflect technical potential (i.e., savings if the technology was installed where technically feasible), the high values are not entirely out of the realm of possibility.

- The database also has seven program activities with estimated kWh savings less than 100 kWh (but greater than 0 kWh). Three of these program activities are SCE, two are SDG&E, and two are PG&E. All but one are from the 2010-2012 program cycle. Of these program activities, three are listed as complete, but none have been accepted into a utility portfolio. Only one has ex post assessed kWh savings, which were 100% of estimated savings. It is unclear if the savings reflect per unit values or for all units. The IOUs and Navigant should clarify this issue once Navigant is available to continue working with structural and maintenance issues.

The variation of the technical potential values is of concern, not specifically the values presented. By having both very large and very small values here, it appears that there is lack of clarity as to whether the variable is to be a per-unit value or a total value. A similar issue was identified for the kW and therm variables. We recommend that Navigant include the specifics needed for these variables in any future data entry training.

Table 51 shows the variables in the ETP DB that require numerical information. The database indicates that there are currently 49 completed technology assessments, but the variables with savings for completed program activities (i.e., variables 17-19 in Table 51) have only 25 values. Similar to our recommendation above, when Navigant begins working with the IOUs, we recommend that they revisit the data entry for variables leading the technical potential.

Table 51. Summary of Technology Assessment Data Ranges (Where Available)

#	Variable	Count of Total Tech Assessment Values	Count of Valid Tech Assessment Values	Lowest Valid Value [a]	Highest Value	Mean Value
1	Estimated Cost Low	113	90	$0 (5)	$800,000	$23,283
2	Estimated Cost High	113	90	$0 (5)	$1,000,000	$39,128
3	Estimated Annual kWh Savings	125	102	0 kWh (30)	1,193,000,000 kWh	16,606,447 kWh
4	Estimated Peak kW Savings	124	94	0 kW (51)	26,000 kW	539 kW
5	Estimated Annual Therm Savings	117	87	0 therms (69)	91,200 therms	2,901 therms
6	First Sale Timing	85	47	1959	2010	2004
7	Estimated Complete	129	129	0% (23)	100%	50%
8	Sites Number Pre	96	73	0 (2)	298,000,000	10,231,350
9	Sites Percent Useful Pre	98	75	3%	100%	59%
10	Annual kWh Savings Pre	123	100	0 kWh (28)	211,000,000 kWh	5,808,011 kWh
11	Peak kW Savings Pre	123	93	0 kW (47)	28,000 kW	728 kW
12	Annual Therm Savings Per Unit Pre	115	85	0 therms (67)	91,200 therms	3,026 therms
13	Useful Life Years Pre	98	72	1 year	25 years	12 years
14	Estimated Penetration Level Pre	95	77	0% (26)	100%	10%
15	Sites Number	18	16	0 (1)	3,868,385	742,475
16	Sites Percent Useful	17	15	0 (2)	100%	48%

#	Variable	Count of Total Tech Assessment Values	Count of Valid Tech Assessment Values	Lowest Valid Value [a]	Highest Value	Mean Value
17	Annual kWh Savings	25	24	0 (3)	200,000,000 kWh	13,547,567 kWh
18	Peak kW Savings	25	24	0 (8)	251,000 kW	22,337 kW
19	Annual Therm Savings Per Unit	25	24	0 (22)	10,000 therms	637 therms
20	Useful Life Years	21	20	0 (3)	15 years	10 years
21	Estimated Penetration Level	20	18	0% (6)	50%	6%

[a] A number in parentheses indicates the number of 0 values for the variable (where 0 is the lowest valid value).

Variable Completion Rates

The IOUs are required to update the database every quarter. The latest upload date was Q2 2011 for SCE and the Sempra Utilities, and Q3 2011 for PG&E.[65]

On the next page, we present information on the 77 variables that contain information in the ETP database.[66] The following tables identify the included data variable, the number of completed cells for that variable, and whether the variable is required to be completed. For cells that have conditional requirements for completion, we also include a description of the condition for completion, and the number of cells that should be completed based on that condition.

We also present for comparison the corresponding data from the April review, as well as the change in the percentage of completed cells (delta) since April. Variables with an increase of more than 0.5% are marked in green, variables with a decrease of more than 0.5% are marked in red, and variables with less than 0.5% change in either direction are marked in yellow.

Since the April 2011 review, many important variables are increasing in completion rate (e.g., progress points went from 95% to 99% present). There are a few variables with a double-digit reduction, most of which will not hinder the evaluation team's aggregate analysis. However, for some required variables such as "*cancellation reason,"* data are present less than half of the time. These findings indicate that the ETP database does not fully describe the ETP portfolio.

[65] Note that due to technical issues, PG&E has been unable to upload quarterly reports since Q2 2010 to the master EEGA database. The findings below include data from the PG&E program activities that was provided from the quarterly reports only.

[66] Note that there are 111 total variables in the database. Of this 111, there are 34 variables included in the database that do not contain any information and are not expected to as the database is not yet fully functional; these 34 variables are not included in the analysis below. Further note that there is one variable with data in the 10/10 review that did not have data in the 4/19 review ("EE Measure Number").

Table 52. Count of Variables Present in Overall ETP Database

#	Variable name	10/10 (Current) Review						Comparison to April Review			
		A. Number of Cells with Values Present N=158	B. % of Present (A/158)	C. Required, Not Required, or Conditional	D. Condition	E. # of Cells meeting Condition	F. Condi-tional % Present * (A/E)	G. April analysis % Present	H. October analysis Delta (B-G)	I. April Condi-tional % Present	J. October analysis Delta (F-I)
1	IOU	158	100%	Required	NA	NA	NA	100%	0.0%	100%	NA
2	Project Number	158	100%	Required	NA	NA	NA	100%	0.0%	100%	NA
3	Project Name	158	100%	Required	NA	NA	NA	100%	0.0%	100%	NA
4	Funding Cycle	158	100%	Required	NA	NA	NA	100%	0.0%	100%	NA
5	Description	158	100%	Required	NA	NA	NA	99%	0.9%	99%	NA
6	Is Prototype	157	99%	Required	NA	NA	NA	99%	0.3%	99%	NA
7	Estimated Complete	157	99%	Required	NA	NA	NA	97%	2.2%	97%	NA
8	Progress Points	157	99%	Required	NA	NA	NA	95%	4.1%	95%	NA
9	Is Doc Contract	155	98%	Required	NA	NA	NA	97%	0.9%	97%	NA
10	Is Primary Research	154	97%	Required	NA	NA	NA	98%	-0.6%	98%	NA
11	Sector	153	97%	Required	NA	NA	NA	98%	-1.3%	98%	NA
12	Status	153	97%	Required	NA	NA	NA	96%	0.6%	96%	NA
13	End Use	152	96%	Required	NA	NA	NA	98%	-1.9%	98%	NA
14	Subprogram	151	96%	Required	NA	NA	NA	92%	4.1%	92%	NA
15	Skills Needed	151	96%	Required	NA	NA	NA	94%	1.2%	94%	NA
16	Estimates Units	150	95%	Required	NA	NA	NA	95%	-0.3%	95%	NA
17	Is Doc Tech Background	150	95%	Required	NA	NA	NA	99%	-4.1%	99%	NA
18	Unit Type Pre	150	95%	Required	NA	NA	NA	91%	4.4%	91%	NA
19	Advantages	149	94%	Required	NA	NA	NA	93%	0.9%	93%	NA
20	Infrastructure Requirements	148	94%	Required	NA	NA	NA	94%	-0.7%	94%	NA

#	Variable name	10/10 (Current) Review						Comparison to April Review			
		A. Number of Cells with Values Present N=158	B. % of Present (A/158)	C. Required, Not Required, or Conditional	D. Condition	E. # of Cells meeting Condition	F. Condi-tional % Present * (A/E)	G. April analysis % Present	H. October analysis Delta (B-G)	I. April Condi-tional % Present	J. October analysis Delta (F-I)
21	Estimated Annual KWh Savings	147	93%	Required	NA	NA	NA	88%	5.3%	88%	NA
22	Annual KWh Savings Pre	147	93%	Required	NA	NA	NA	88%	5.3%	88%	NA
23	Peak KWSavings Pre	147	93%	Required	NA	NA	NA	88%	5.3%	88%	NA
24	Project Source	146	92%	Required	NA	NA	NA	96%	-3.8%	96%	NA
25	Estimated Peak KW Savings	146	92%	Required	NA	NA	NA	86%	6.6%	86%	NA
26	Is Doc Funding Proposal To Assess	142	90%	Required	NA	NA	NA	99%	-9.2%	99%	NA
27	Estimated Annual Therm Savings	141	89%	Required	NA	NA	NA	86%	3.4%	86%	NA
28	Is Doc Work paper	140	89%	Required	NA	NA	NA	94%	-5.7%	94%	NA
29	Is Doc Contractor Writeup	140	89%	Required	NA	NA	NA	94%	-5.7%	94%	NA
30	Is Doc Final Project Writeup	140	89%	Required	NA	NA	NA	94%	-5.7%	94%	NA
31	Is Doc Journal Article	140	89%	Required	NA	NA	NA	94%	-5.7%	94%	NA
32	Is Doc Mass Distribution	139	88%	Required	NA	NA	NA	94%	-6.4%	94%	NA
33	Annual Therm Savings Per Unit Pre	138	87%	Required	NA	NA	NA	83%	4.3%	83%	NA
34	Is Doc Other	135	85%	Required	NA	NA	NA	91%	-5.1%	91%	NA
35	Estimated Cost Low	133	84%	Not Required	NA	NA	NA	82%	2.1%	82%	NA
36	Estimated Cost High	133	84%	Required	NA	NA	NA	82%	2.1%	82%	NA
37	Information Source Market Pen Pre	124	78%	Required	NA	NA	NA	63%	15.3%	63%	NA
38	Sites Percent Useful Pre	120	76%	Required	NA	NA	NA	73%	3.3%	73%	NA

#	Variable name	10/10 (Current) Review						Comparison to April Review			
		A. Number of Cells with Values Present N=158	B. % of Present (A/158)	C. Required, Not Required, or Conditional	D. Condition	E. # of Cells meeting Condition	F. Condi-tional % Present * (A/E)	G. April analysis % Present	H. October analysis Delta (B-G)	I. April Condi-tional % Present	J. October analysis Delta (F-I)
39	Useful Life Years Pre	118	75%	Required	NA	NA	NA	62%	12.4%	62%	NA
40	Audience	117	74%	Required	NA	NA	NA	92%	-17.5%	92%	NA
41	Sites Number Pre	117	74%	Required	NA	NA	NA	75%	-1.4%	75%	NA
42	Primary Research Source	116	73%	Conditional	If IsPrimaryResearch = TRUE	124	94%	86%	-12.4%	100%	-6.5%
43	Estimated Penetration Level Pre	115	73%	Required	NA	NA	NA	59%	13.4%	59%	NA
44	Information Source Pre	105	66%	Required	NA	NA	NA	53%	13.6%	53%	NA
45	Project Manager	101	64%	Required	NA	NA	NA	98%	-34.2%	98%	NA
46	First Sale Timing	99	63%	Conditional	If IsPrototype = FALSE	145	68%	60%	2.3%	66%	2.3%
47	Is Recommended For EE	97	61%	Not Required	NA	NA	NA	61%	0.1%	61%	NA
48	Is Manufacturer Still Pursuing	87	55%	Not Required	NA	NA	NA	59%	-4.4%	59%	NA
49	Internal Source Area	72	46%	Not Required	NA	NA	NA	69%	-23.3%	69%	NA
50	Contractor Manager	70	44%	Not Required	NA	NA	NA	56%	-11.4%	56%	NA
51	Parent Project Not Requiredtes	49	31%	Required	NA	NA	NA	NA	NA	NA	NA
52	Process Type	42	27%	Conditional	If EndUse = END40	2	2100%	18%	8.7%	950%	1150.0 %
53	Primary Research Source Other	37	23%	Conditional	If PrimaryResearchSource = PS04	4	925%	7%	16.8%	175%	750.0%
54	Sector Other	34	22%	Conditional	If Sector = SE29, SE41, or SE53	12	283%	9%	12.1%	91%	192.4%
55	End Use Other	30	19%	Conditional	If EndUse = END50	16	188%	6%	13.3%	86%	101.8%

#	Variable name	10/10 (Current) Review						Comparison to April Review			
		A. Number of Cells with Values Present N=158	B. % of Present (A/158)	C. Required, Not Required, or Conditional	D. Condition	E. # of Cells meeting Condition	F. Condi-tional % Present * (A/E)	G. April analysis % Present	H. October analysis Delta (B-G)	I. April Condi-tional % Present	J. October analysis Delta (F-I)
56	Unit Type	28	18%	Not Required	NA	NA	NA	22%	-4.0%	22%	NA
57	Annual KWh Savings	28	18%	Not Required	NA	NA	NA	22%	-4.0%	22%	NA
58	Peak KW Savings	28	18%	Not Required	NA	NA	NA	22%	-4.0%	22%	NA
59	Annual Therm Savings Per Unit	28	18%	Not Required	NA	NA	NA	22%	-4.0%	22%	NA
60	Information Source	27	17%	Not Required	NA	NA	NA	21%	-3.7%	21%	NA
61	Audience Other	26	16%	Conditional	If Audience = AUD07	0	NA	23%	-6.2%	NA	NA
62	Recommended For EE Program	25	16%	Conditional	Is Recommended for EE = TRUE	69	36%	17%	-1.2%	35%	0.9%
63	Useful Life Years	24	15%	Not Required	NA	NA	NA	18%	-2.7%	18%	NA
64	Information Source Market Pen	24	15%	Not Required	NA	NA	NA	18%	-2.7%	18%	NA
65	Estimated Penetration Level	23	15%	Not Required	NA	NA	NA	17%	-2.4%	17%	NA
66	Sites Number	21	13%	Not Required	NA	NA	NA	15%	-1.8%	15%	NA
67	Subprogram Other	20	13%	Conditional	If Subprogram = TY5 or TY11	4	500%	18%	-5.3%	271%	228.6%
68	Project Source Other	20	13%	Conditional	If ProjectSource = PR16	21	95%	17%	-4.3%	78%	17.0%
69	Sites Percent Useful	20	13%	Not Required	NA	NA	NA	14%	-1.5%	14%	NA
70	EE Program Transferred To	15	9%	Conditional	Status = Complete, EE measure implemented	19	79%	13%	-3.7%	117%	-37.7%
71	Keywords	15	9%	Not Required	NA	NA	NA	5%	4.8%	5%	NA

#	Variable name	10/10 (Current) Review						Comparison to April Review			
		A. Number of Cells with Values Present N=158	B. % of Present (A/158)	C. Required, Not Required, or Conditional	D. Condition	E. # of Cells meeting Condition	F. Condi-tional % Present * (A/E)	G. April analysis % Present	H. October analysis Delta (B-G)	I. April Condi-tional % Present	J. October analysis Delta (F-I)
72	Not-Recommend Reason	13	8%	Conditional	Is Recommended for EE = FALSE	29	45%	NA	NA	NA	NA
73	Cancellation Reason	10	6%	Conditional	Status = On hold or stopped	22	45%	4%	2.6%	67%	-21.2%
74	Cancellation Reason Other	7	4%	Conditional	CancellationReason = Other	7	100%	3%	1.6%	100%	0.0%
75	Energy Center Other	7	4%	Conditional	If EnergyCenter = EC08	0	NA	5%	-0.3%	NA	NA
76	EE Measure Number	6	4%	Conditional	Status = Complete, EE measure implemented	19	32%	0%	3.8%	0%	31.6%
77	Non-Transfer Reason	4	3%	Conditional	Status = Complete, EE measure will Not be pursued	9	44%	NA	NA	NA	NA

* Some conditional open-end fields were filled in when the conditional variable is blank, leading to a % present over 100%.

Note: Variables with an increase of more than 0.5% are marked in green, variables with a decrease of more than 0.5% are marked in red, and variables with less than 0.5% change in either direction are marked in yellow.

1.32.4 HISTORY OF THE ETP DATABASE

The ETP database is a new component of the ETP in the 2010-2012 program cycle. The database was developed by Navigant Consulting, Inc., who led the program evaluation for the 2006-2008 cycle. The ETP database was created as a tool to aid in future evaluations, with input from the CPUC, participating investor owned-utility (IOU) program staff, and members of the evaluation team. The database programming was done by Pinnacle Consulting, who manages the overall EEGA website, which includes databases for other CPUC energy programs in addition to ETP.

The database was created specifically to provide more insight on the program activities at the individual program activity level and in real time. In previous program cycles, evaluators would receive lists of program activities from each IOU at the end of the funding cycle, thus collecting them after the fact, making it difficult to track program activity progress, expenditures, how thoroughly the program activities were vetted, or how utilities selected program activities to become part of the portfolio.

In past evaluations, the evaluation team created a data collection instrument for each program activity to provide information to address these issues, but these data collection instruments were long, and program staff had difficulty finding time to complete them. In 2010-2012, the program instead developed the database to track similar information in real time, so that program activities could provide reports based on current rather than past activities.

In an interview, Navigant staff stated that there have been three primary challenges in the development and maintenance of this database:

- Program staff turnover making ongoing tracking of information difficult.
- Building consensus among the various stakeholders in balancing what information is needed and what information is practical to provide.
- Lack of staffing for various stakeholders making it difficult to have enough time for ongoing records of program activities / maintenance of the ETP database.

1.32.5 PROJECT NUMBER ISSUES

Table 53 details the changes between the Sempra utility quarterly reports and the ETP database for these program activities.

Table 53. Detailed Changes between Quarterly Reports and ETP Database for Duplicate Project Numbers

Utility	Reporting Project #	ETP Project #	Notes
SDG&E	ET10SDGE0006	ET10SDGE0006 & ET10SDGE1006	These represent cases where two separate projects are under the same project name in the quarterly reports; however, in the ETP database, they are recorded separately.
	ET10SDGE0007	ET10SDGE0007 & ET10SDGE1007	
	ET10SDGE0008	ET10SDGE0008 & ET10SDGE1008	
	ET10SDGE0009	ET10SDGE0009 & ET10SDGE1009	
SCG	ET10SCG0003	ET10SCG0003 & ET10SCG003	
	ET10SCG0006	ET10SCG0006 & ET10SCG006	
	ET10SCG0008	ET10SCG0008 & ET10SCG008	
	ET10SCG0009	ET10SCG0008 & ET10SCG008	
SDG&E & SCG	ET10SDGE0010	ET10SDGE0010	These are two program activities from the quarterly reports, but only one is recorded in the ETP database. The program activity originally classified was overwritten with the new program activity in 2011.
	ET10SCG0010	ET10SCG0010	
	ET10SCG0011	ET10SCG0010	
	ET10SCG0012	ET10SCG0012	
	ET10SCG0013	ET10SCG0013	
SDG&G	ET10SDGE0001	ET10SDGE0001& ET10SDGE1001	This is a case where one program activity from the quarterly reports received two different Project Numbers in the ETP database and is thus double-counted.
	ET10SDGE0002	ET10SDGE0002 & ET10SDGE1002	
	ET10SDGE0003;	ET10SDGE0003 & ET10SDGE1003	
	ET10SDGE0004;	ET10SDGE0004 & ET10SDGE1004	
	ET10SDGE0005	ET10SDGE0005 & ET10SDGE1005	

Utility	Reporting Project #	ETP Project #	Notes
SCG	ET10SCG0001	ET10SCG0001, ET10SCG001, & ET10SCG004	Two program activities received the same Project Number – one in 2010 and one in 2011. These are two separate projects that are under the same project name in the quarterly reports. In the ETP database, they are recorded separately. However, the program activity that received the Project Number in 2011 was already in the ETP database under the Project Number in 2010, so this program activity is also double-counted in the ETP database.
	ET10SCG0002	ET10SCG0002, ET10SCG002, & ET10SCG005	
	ET10SCG0004	ET10SCG0004, ET10SCG004 & ET10SCG0001	
	ET10SCG0005	ET10SCG0005, ET10SCG005 & ET10SCG0002	
	ET10SCG0007	ET10SCG0007, ET10SCG007 & ET10SCG0014	

1.32.6 BACKGROUND INFORMATION ON THE QUARTERLY REPORTS

Navigant produced an example of the quarterly reports to demonstrate how to fill out the report and explain which fields are required. The complete explanation is available online at http://eega.cpuc.ca.gov/Docs/Extract-documentation-example-v1.7.xls. All quarterly reports include the following tabs:

- **General Notes**: Rules for entering information the reports. This information stays the same in all reports across all utilities.
- **Projects**: Basic information on the program activities. Updated quarterly by each utility.
- **Organizations**: Contact information for outside organizations (often contractors and implementers) that partner with utilities on their program activities. Updated as needed by the utility.
- **Contacts**: IOU contact persons. Updated as needed by the utility.
- **OutreachEvents**: Any outreach events conducted in the current quarter. Updated quarterly by the utility.
- **PartnersAndInKindSvcs**: Outside partner organizations used for specific program activities. Updated quarterly by the utility.
- **SavingsPotential**: Estimated, ex ante, and ex post savings for each project. Updated quarterly by utility.
- **ProgressPoints**: Cumulative progress points for each project. Updated quarterly by each utility.
- **ETP Data Dictionaries**: Provides value lists for the codes used in the reports. This information stays the same in all reports across all utilities.

Table 54. Utility Data Table Summary

Tab Name	Description of Information Provided	ETP DB Report Tabs	# Variables	# Required Variables
Projects	Basic information on program activities, including project name, description, development information, and some information from other tabs (such as savings information). Also includes short-hand references to information on other tabs, such as Organizations, Contacts, and Outreach Events.	Basic Information, Status Report, Value Proposition, Savings Estimates	92	68
Organizations	Reference list for all outside organizations participating in project development. Provides a numeric value for each Organization's contact information that can then be used on other tabs including Projects, Contacts, and Outreach Events.	Organizations and Contacts	8	4
Contacts	Reference list for all internal IOU employees participating in project development. Provides a numeric value for each employee's contact information that can then be used on other tabs including Projects and Partners and In-Kind Services.	Basic Information, Organizations and Contacts	10	6
Outreach Events	Reference list for all internal IOU employees participating in project development. Provides a numeric value for each employee's contact information that can then be used on other tabs including Projects and Partners and In-Kind Services.	None	8	6
Partners and In-Kind Services	Uses organization references from Organizations tab to list partner organizations for each project	Organizations and Contacts	7	6
Savings Potential	Savings estimates in kW, kWh, and therms, as well as estimated market penetration, both pre-assessment and post-assessment	Savings Estimates	21	11
Progress Points	Progress point codes and months reached for each project	Status Report	3	3

Table 55. Listed and Required Variables on Each Tab

Header	Required for acceptance into validator
PROJECTS	

Header	Required for acceptance into validator
IOU	X
ProjectNumber	X
ProjectName	X
Description	X
ParentProjects	X
ParentProjectNotes	X
ProjectTypeCodes	X
ProjectTypeOther	
IsPrimaryResearch	X
IsSecondaryResearch	X
PrimaryResearchSourceCodes	X
PrimaryResearchSourceOther	
ProjectManagerRef	X
ContractorManagerRef	
ContractorOrganizationRefs	
FundingCycleCode	X
ProjectSourceCodes	X
InternalSourceArea	
ProjectSourceOther	
EstimatesUnits	X
EstimatedCostLow	
EstimatedCostHigh	Required - If unknown, use -99
EstimatedAnnualKwhSavings	Required - If unknown, use -99
EstimatedPeakKwSavings	Required - If unknown, use -99
EstimatedAnnualThermSavings	Required - If unknown, use -99
Advantages	X
SkillsNeeded	X
InfrastructureRequirements	X
TechOwningCompanySizeCode	X
IsPrototype	X
FirstSaleTiming	
SectorCodes	X
SectorOther	
EndUseCodes	X
EndUseOther	
ProcessType	
CancellationReasonCode	

Header	Required for acceptance into validator
CancellationReasonOther	
IsManufacturerStillPursuing	
AudienceCodes	X
AudienceOther	
EnergyCenterCodes	X
EnergyCenterOther	
IsRecommendedForEe	
RecommendedForEeProgram	
NonRecommendReasonCodes	
EeProgramTransferredTo	
EeMeasureNumber	
NonTransferReasonCodes	
OutreachEventRefs	
IsDocTechBackground	X
IsDocFundingProposalToAssess	X
IsDocContract	X
IsDocWorkpaper	X
IsDocContractorWriteUp	X
IsDocFinalProjectWriteUp	X
IsDocJournalArticle	X
IsDocMassDistribution	X
IsDocOther	X
StatusCode	X
EstPercentComplete	X
Keywords	
TargetCustomer	X
StatementOfCustomerNeed	X
Product	X
RecognizedProductCategory	X
StatementOfKeyBenefit	X
PrimaryCompetitiveAlternative	X
StatementOfPrimaryDifferentiation	X
StatementOfIncrementalEffect	X
StatementOfIncrementalCost	X
QuantificationOfBenifits	X
TargetCustomerPrimSource	X

Header	Required for acceptance into validator
StatementOfCustomerNeedPrimSource	X
ProductPrimSource	X
RecognizedProductCategoryPrimSource	X
StatementOfKeyBenefitPrimSource	X
PrimaryCompetitiveAlternativePrimSource	X
StatementOfPrimaryDifferentiationPrimSource	X
StatementOfIncrementalEffectPrimSource	X
StatementOfIncrementalCostPrimSource	X
QuantificationOfBenifitsPrimSource	X
TargetCustomerSecSource	X
StatementOfCustomerNeedSecSource	X
ProductSecSource	X
RecognizedProductCategorySecSource	X
StatementOfKeyBenefitSecSource	X
PrimaryCompetitiveAlternativeSecSource	X
StatementOfPrimaryDifferentiationSecSource	X
StatementOfIncrementalEffectSecSource	X
StatementOfIncrementalCostSecSource	X
QuantificationOfBenifitsSecSource	X
ORGANIZATIONS	
Ref	X
TypeCode	X
Name	X
Street	
City	
State	
Zip	
Phone	X
CONTACTS	
Ref	X
OrganizationRef	X
FirstName	X
MiddleName	
LastName	X
Affiliation	
Department	

Header	Required for acceptance into validator
Position	
PhoneNumber	X
Email	X
OUTREACH EVENTS	
Ref	
PresentationTitle	
EventDate	X
IsExternal	X
City	X
OrganizationRef	X
ConferenceName	X
AttendeesNumber	X
PARTNERS AND IN-KIND SERVICES	
ProjectNumber	
OrganizationRef	X
ManagerRef	X
PartnerIouProjectNumber	X
PartnerIouProjectName	X
Years	X
Description	X
SAVINGS POTENTIAL	
ProjectNumber	X
UnitTypePre	X
SitesNumberPre	X
SitesPercentUsefulPre	X
AnnualkWhSavingsPerUnitPre	X
PeakKwSavingsPerUnitPre	X
AnnualThermSavingsPerUnitPre	X
UsefulLifeYearsPre	X
InformationSourcePre	X
EstimatedPenetrationLevelPre	X
InformationSourceMarketPenPre	X
UnitType	
SitesNumber	
SitesPercentUseful	
AnnualkWhSavingsPerUnit	

Header	Required for acceptance into validator
PeakKwSavingsPerUnit	
AnnualThermSavingsPerUnit	
UsefulLifeYears	
InformationSource	
EstimatedPenetrationLevel	
InformationSourceMarketPen	
PROGRESS POINTS	
ProjectNumber	X
ProgressPointCode	X
PPMonthYear	X

AA. ETP DATABASE REVIEW FEBRUARY 29, 2012

The ETP database[67] is a new component of the ETP in the 2010-2012 program cycle. Navigant Consulting, Inc. developed the ETP database during the 2006-2008 cycle as a tool to aid in future evaluations, with input from the CPUC, participating IOU program staff, and members of the evaluation team.[68] Pinnacle Consulting performed the database programming. Pinnacle manages the overall ETP database website, which includes databases for other CPUC energy programs in addition to ETP.

Navigant created the database specifically to provide more insight on the program activities at the individual program activity level in real time. In previous program cycles, evaluators would receive lists of program activities from each IOU at the end of the funding cycle, thus collecting them after the fact, making it difficult to track program activity progress, expenditures, how thoroughly the program activities were vetted, or how utilities selected program activities to incorporate into the EE portfolio.

The ETP information on the ETP database site comprises two types of files:

- Utility quarterly reports in Excel format. Each IOU is required to submit a new report each quarter, so these files provide the historical record of each program's development for each utility.
- The ETP component of the ETP database (http://eega.cpuc.ca.gov) is a relational database that translates data from these quarterly reports into a combined and complete online ETP database.

The ETP database website contains both the ETP database and the utility quarterly reports. This information provides a key tool for evaluation, as it allows evaluators, CPUC staff, and IOUs to have common information and track data statewide throughout the program cycle.

Proposed Reporting Functionality

Discussions with both the IOUs and CPUC indicate a need for better reporting capabilities. The IOUs have their own internal tracking tools that they use for project management. As such, they currently use the ETCC database on the ETP database website as a repository of information. According to one program manager, "*…puts a structure around keeping the data that's required by the CPUC and it gives us a structure in which to ask information for when we do an assessment or scaled field placement or demonstration project, but as a project manager …[it's] not necessarily any more than a repository*."[69]

[67] The ETP EEGA database http://eega.cpuc.ca.gov contains information related to ETP and is administered by Pinnacle Consulting for the California Public Utilities Commission.

[68] This effort took approximately one year and was not fully complete before the Navigant contract was over in December 2010.

[69] In-depth interview conducted in May 2011 as part of early evaluation activities. These findings were included in the "ETP Program Staff InterviewsMemo_2011_06_10_FINAL.docx".

Currently, the database provides data regarding the ETP program projects. However, the database could be improved if it provided more opportunities to summarize the data into reports. The evaluation team suggested the following reports to support reporting capabilities. During the meeting on 2/27/12, Ayat indicated that these are desired reports, plus there is a need to understand project budgets.

1) **Program element performance by program cycle**: Track program activity against goals as provided in the PY2010-2012 Program Implementation Plan. See Appendix A for a list of proposed goals.

2) **Project Summaries:** We propose six distinct reports that provide a summary of projects.

    a. A summary of projects begun and completed by element type (e.g. number of Technology Assessment's, number of Demonstration Showcases, etc.).

    b. A summary of end-use and sectors information by program element for projects that have begun. (this is a breakdown from a. into end use and sector)

    c. A summary of completed program activities that reflects CEESP specific initiatives (i.e., using a new category that maps directly to the CEESP initiatives areas. (this is a breakdown from a. into CEESP areas)

    d. A summary of the technical potential for completed by end use and whether the project was accepted into the EE Portfolio.

    e. A summary of element specific events that have occurred (i.e., the number of events). For example, TRIO would have X symposia or Y Roundtables while DS may have Z open houses.

    f. A project specific report that will provide time period and level of completion of each project by program element.

Putting the above reports into play will required that discussion occur around the issue of when the IOUs begin a project and when it is completed. We know there are several projects that SCE is completing in the 2010-2012 program cycle that they began in 2009. Additionally, the IOUs map their activities to budgets differently. SCE and Sempra assign budget to the program year in which they begin the effort while PG&E does not. For PG&E, a project may begin in 2009, continue into 2010, and use budget from both 2009 and 2010. For SCE, if the project began in 2009, it always uses 2009 funding, regardless of when it is completed.

Proposed Additional Variables

The evaluation team also proposes incorporating the following additional variables to support the data tracking needs for the new program elements. As of the 2010-2012 program cycle, five new program elements were added to the Emerging Technologies Program (six for SCE). These include Scaled Field Placements, Demonstration Showcases, Market & Behavioral Studies, Technology Development Support, TRIO and for SCE Technology Testing Centers. New program element activities are important to track to understand if the projects are reaching program element goals as well as to learn key information regarding project type, e.g. segment, end-use type, etc.

Table 56 lists the proposed additional or revisions to existing variables. We provide the Excel tab for the new or existing variable, a variable name, whether the variable is an existing variable that should be

updated or a new variable, and the variable purpose. In addition, we also provide the supported ETP program element, suggested pre-codes to facilitate data entry and whether the variable is conditional.

Table 56: List of Proposed Additional Variables for ETP Database

Excel Tab	Variable	Existing / New	Purpose	Supported Element	Pre-Codes	Conditional Variable
Projects	**ProjectSourceCodes**	Existing	NA	TRIO, TA	TRIO Event Attendee, ET Open Forum Attendee	No
	ProjectSourceOther	Existing	To easily track coordination efforts	TA	PIER, CEC, Universities, Entrepreneurs etc	Yes
	InternalSourceArea	Existing	To easily track specify the area of organization where the source came from	TA	ETP, IOUs, EE [12 statewide programs, other (specify)]	Yes
	Technical Potential	Existing	To track the post study technical potential of a technology	TA		Yes (if project complete and recommended)
	AudienceCodes	Existing	NA	MBS, DS, TRIO, TDS	ETP Program Manager, Market Actor - Contractor, Market Actor - Architect, Market Actor - Other, Investor, Entrepreneur, Student, University Staff, Manufacturer	No
	OrganizationType	Existing	NA	SFP, DS, TDS	SFP Customer, DS Customer, Manufacturer, Professional organization	No

Excel Tab	Variable	Existing / New	Purpose	Supported Element	Pre-Codes	Conditional Variable
	SiblingElement	New	To easily track efforts on the same ET contact (measure, contact, entrepreneur) across program elements at same time.	TA, MBS, DS, SFP, TDS, TRIO	TA, MBS, DS, SFP, TDS, TRIO, NONE	No
	StudyType	New	To provide greater granularity to type of effort performed under non-TA elements.	MBS, TDS	MBS: Market Study, Behavioral Study TDS: Product Specifications, Manufacturer Assistance	Yes
	CEESPAlignment	New	To provide information regarding alignment of ET efforts with CEESP goals.	TA, MBS, SFP, DS	Hot Dry Air Conditioner, Plug Load and Controls, Integrated Building Design, Lighting, ZNE, DR, Renewable and Storage, Building Management Systems and Diagnostics	Yes
	ShowcaseDuration	New	To provide information regarding the duration of showcase availability.	DS		Yes
	IDSM	New	To identify projects performed under IDSM banner	All	Yes/No	No
	Budget	New	To provide information regarding project specific estimated budget	All		No

Excel Tab	Variable	Existing / New	Purpose	Supported Element	Pre-Codes	Conditional Variable
	Duration	New	To provide information regarding the expected duration of project in months	All		No
	Technology CPUC Type	New	To provide information on whether technology is new, emerging or under-utilized	TA, SFP, DS	New/Unproven, Emerging/Under-utilized	No
Outreach Events	**EventName**	New	To provide name of event.	DS, TRIO		Yes
	EventDate	New	To provide date of event.	DS, TRIO		Yes
	EventAttendees	New	To provide number of event attendees.	DS, TRIO		Yes
	NumberofSites	New	To provide information regarding number of sites per project.	SFP, DS		Yes
	EventType	New	To provide information regarding TRIO event types	All	Roundtable, Symposium, Conference, Other	No
	ConferenceName	Remove	See note on EventName and EventType			NA
Progress Points	**ProgressPoint**	Existing	NA	TA, MBS, DS, SFP, TDS, TRIO	PPO6 remove, add PPO7, PPO8 (see Progress Point Matrix Tab)	No

As noted above, due to the addition of new program elements, existing variables will also need to be modified. This is especially the case for the Progress Points variable, which tracks the progress of each project over time. We outline the current use of the progress points and two new additions in Table 57.

Table 57: Progress Points by Program Element

Progress Points	Progress Point Name	Program Element				
		SFP	DS	TDS	TRIO	MBS
PPO1	Preliminary proposal created and decision made	X	X	X		X
PPO2	Funding proposal created and decision made	X	X	X		X
PPO3	Data / information collection starts	X	X			X
PPO4	Data / information collection complete	X	X			X
PPO5	Report / deliverable complete	X	X			X
PPO6 [a]	No progress points completed	X	X	X		X
PPO7 [b]	One or more events held		X		X	
PPO8 [b]	Showcase closed to public		X			

[a] Suggest dropping this point

[b] New pre-code option for Progress Point variable.

The existing Progress Points correspond to a variety of the new program elements. However, not all of them are applicable to all new program elements. For example, the TRIO program element hosts events, and as such none of the other progress points are relevant.

- We recommend that the IOUs, CPUC and Navigant work together to incorporate the additional progress points within the ETP database structure as well as the IOU Quarterly report structure.

Proposed Removal of Existing Variables

We reviewed the Navigant Excel file that listed all the variables in the ETP database. Of the 150 variables in the file, 101 were required to be included in each quarterly update (67% of the variables were required). In order to streamline the data entry for the IOUs, we propose to remove 54 variables, leaving the utilities with 96 variables in the database. Of those 96 variables, 69 are required (72% of the variables are required). When we add in the 10 new proposed variables from above, the new database would have 106 total variables, although 7 of the 10 new variables may not need to be filled in,

depending on the element (i.e., they are conditional entry).

Table 58 shows the number of variables we propose to drop in the current database and what is lost from dropping these variables. We also provide the number of required variables before and after our variable culling. We present the variable numbers by the seven Excel tabs that were data entry occurs.

We provide the listing of each dropped variable in Appendix B.

Table 58. Number of Variables Proposed to be Dropped

Tab	N - Old	N - New	N drop	Notes	N- Old required	N- New required	N dropped that were required
Projects	92	57	35	Dropped sources of information, questions regarding mature technology estimates, question about whether there is a document available that CPUC may later request	64	34	30
Organizations	8	4	4	Dropped all non-required variables (address, city, state, zip)	4	4	0
Contacts	10	8	2	Dropped middle name and department	6	6	0
OutreachEvents	8	7	1	Dropped Conference Name	6	5	1
PartnersAndInKindSvcs	7	7	0	Keep all	7	7	0
Savings Potential	22	10	12	Added one variable here, so changed N to 22, dropped all pre-TA savings potential values and added a variable to indicate if information is pre or post TA	11[a]	10	12
Progress Points	3	3	0	Keep all	3	3	0
Total	150	96[b]	54		101	69	44

[a] The database should have had all 22 variables noted to be required, but did not in the file we had.

[b] There are an additional 10 variables we propose adding as shown in the previous section to bring the actual total to 106 variables.

Review of Existing Variables

The evaluation team found that translation from the Excel file to the ETP database is not including 35 variables within the existing utility quarterly report variables. However, of those 35, we have already recommended dropping 20. There are 15 remaining variables that are present in the Excel files, but not in the ETP database. These 15 variables are presented in Table 59.

- The evaluation team suggests that the IOUs and CPUC work with Navigant to identify why these variables are not being translated and placed into the ETP database and correct these issues.

Table 59: List of Variables in Quarterly Utility Reports that Are Not Included in ETP Database

N	Variable	Variable Name	Example 1	Example 2
1	Keyword	Keywords	Energy Management Software, EMS, Software	VSD, walk-in, supermarket, grocery
2	Parent Project Number	ParentProjects	ET09PGE0915, ET09PGE0916	State of Connected Home Market 2011; ET10SCE1130
3	Company Size	TechOwningCompanySizeCode	SIZ05	SIZ04
4	Energy Center	EnergyCenterCodes	EC09	EC09
5	Outreach Events	OutreachEventRefs		OR1, OR2, OR4
6	Target Customer	TargetCustomer	agricultural businesses	Project Manager; Whole Foods; Campuses, universities, hospitals, hotels, etc.
7	Statement of Customer Need	StatementofCustomerNeed	who manage their irrigation system	improve efficiency of melting plastic media to reduce operating cost
8	Product	Product	automated irrigation optimization system	heater
9	Recognized Product Category	RecognizedProductCategory	agricultural irrigation system	process

N	Variable	Variable Name	Example 1	Example 2
10	Statement of Key Benefit	StatementOfKeyBenefit	provides precise irrigation based on the environment, soil condition and crop type to reduce pumping requirements and the associated energy consumption.	Improve efficiency of melting plastic media to reduce operating cost
11	Primary Competitive Alternative	PrimaryCompetitiveAlternative	manual irrigation management	existing technology
12	Statement of Primary Differentiation	StatementOfPrimaryDifferentiation	provides remote control system with adaptable (based on conditions) management software that monitors and learns from prior data to provide the precise irrigation requirements	Better motor control of die casting process with VSD
13	Statement of Incremental Effect	StatementOfIncrementalEffect	By monitoring soil moisture, air humidity and other environmental attribute, and by program crop irrigation requirements, the proposed system will optimize the irrigation cycle and control pumping to better manage the resources: water and electricity.	The project demonstrated that VSD can be retrofitted to an old die casting machine.

N	Variable	Variable Name	Example 1	Example 2
14	Statement of Incremental Cost	StatementOfIncrementalCost	Yes, incremental cost was considered in selecting this technology for assessment. Calculations were developed to calculate saving potentials and market potential based on market share, where 9% of PG&E residential homes used electric water heaters. Price, compared to alternative technologies o Installed Price: Approx. $1600 per unit o Federal Tax Credit: 30% of total investment and a tax credit of up to $1500. o Total Installed Cost for a 50 Gal system: Approx. $1120 • Conventional System: o Conventional Electrical Water Heater installed Price: Approx. $750 o Conventional Gas Water Heater installed Price: Approx. $850	4000; Induction technology is 5 to 15 times the cost of band heaters
15	Quantification of Benefits	QuantificationOfBenefits	34000 units, 3 billion kWh, 3.336 million kW	1.34MWh/yr, 447MWh/yr; 14 to 80 million kWh

Program Element Goals in PY2010-2012 PIP

Table 60: Program Element Goals Sourced from 2010-2012 Program Implementation Plan[70]

Program Elements	Goals			
	PG&E	SCE	SoCalGas	SDG&E
Technology Assessments				
➢ Assess measures	28	30	7	8
➢ Adopted measures into energy efficiency programs	12	15	4	4
Scaled Field Placement				
➢ Initiate and/or complete SFP	7	4	2	2
Demonstration Showcases				
➢ Initiate demonstration showcases	5	5	2	2
Market and Behavioral Studies				
➢ Initiate targeted studies of customer behavior, decision making, or market characteristics to ID potential barriers to adoption	1	1	1	1
Technology Development Support				
➢ Initiate projects	2	2	1	1
Business Incubation Support (TRIO)				
➢ 3 events per year or 9 per program cycle				
Technology Test Centers (SCE)				
		Complete ZNE test center		

[70] The PIPs of each of the individual IOU submissions are virtually identical as this is a statewide program. The PIPs are located here: http://eega.cpuc.ca.gov/Main2010PIPs.aspx with the following names: PGE2108 ET SW PIP 01-2011 no redline.pdf; 15. SCE-SW-009 Emerging Technologies.doc pp. 780; SCG SW Emerging Technologies Final.doc; SDGE SW Emerging Technologies Final.doc.

List of Variables Proposed to be Dropped

Tab	N	Variable	Field Name	Field Description
Projects	1	EstimatesUnits	Units for Estimated Mature Technology Estimates	e.g. square foot of insulation, ton of cooling, square foot of illuminated space, etc.- the following fields should be specified with respect to these units (e.g. cost per square foot of insulation)
	2	EstimatedCostLow	Estimated Mature Technology Cost – low end of range	Cost per unit for mature technology, lost cost estimate. Mature is significant market penetration.
	3	EstimatedCostHigh	Estimated Mature Technology Cost – high end of range	cost per unit for mature technology, high cost estimate. Mature is significant market penetration.
	4	EstimatedAnnualKwhSavings	Estimated Mature Technology annual kWh savings per unit	Different from Savings potential
	5	EstimatedPeakKwSavings	Estimated Mature Technology peak kW savings per unit	Different from Savings potential
	6	EstimatedAnnualThermSavings	Estimated Mature Technology annual therm savings per unit	Different from Savings potential
	7	IsDocTechBackground	Background on Technology/Specifications	If "Yes" this document may be requested by CPUC or evaluation team.
	8	IsDocFundingProposalToAssess	Funding Proposal	If "Yes" this document may be requested by CPUC or evaluation team.
	9	IsDocContract	Contract with contractor to conduct work for this project	If "Yes" this document may be requested by CPUC or evaluation team.

Tab	N	Variable	Field Name	Field Description
	10	IsDocWorkpaper	Workpaper	If "Yes" this document may be requested by CPUC or evaluation team.
	11	IsDocContractorWriteUp	Contractor Write Up	If "Yes" this document may be requested by CPUC or evaluation team.
	12	IsDocFinalProjectWriteUp	Project Assessment/Final Project Write-up	If "Yes" this document may be requested by CPUC or evaluation team.
	13	IsDocJournalArticle	Journal Article	If "Yes" this document may be requested by CPUC or evaluation team.
	14	IsDocMassDistribution	Document for Mass Distribution	If "Yes" this document may be requested by CPUC or evaluation team.
	15	IsDocOther	Other Documents	If "Yes" this document may be requested by CPUC or evaluation team.
	16	TargetCustomerPrimSource	Primary Source of Target Customer	Primary Source of Target Customer (Business Risk Assessment)
	17	StatementOfCustomerNeedPrimSource	Primary Source of Statement of Customer Need	Primary Source of Statement of Customer Need (Business Risk Assessment)
	18	ProductPrimSource	Primary Source of Product	Primary Source of Product (Business Risk Assessment)
	19	RecognizedProductCategoryPrimSource	Primary Source of Recognized Product Category	Primary Source of Recognized Product Category (Business Risk Assessment)

Tab	N	Variable	Field Name	Field Description
	20	StatementOfKeyBenefitPrimSource	Primary Source of Statement of Key Benefit	Primary Source of Statement of Key Benefit (Business Risk Assessment)
	21	PrimaryCompetitiveAlternativePrimSource	Primary Source of Primary Competitive Alternative	Primary Source of Primary Competitive Alternative (Business Risk Assessment)
	22	StatementOfPrimaryDifferentiationPrimSource	Primary Source of Statement of Primary Differentiation	Primary Source of Statement of Primary Differentiation (Business Risk Assessment)
	23	StatementOfIncrementalEffectPrimSource	Primary Source of Statement of Incremental Effect	Primary Source of Statement of Incremental Effect (Business Risk Assessment)
	24	StatementOfIncrementalCostPrimSource	Primary Source Statement of Incremental Cost	Primary Source Statement of Incremental Cost (Business Risk Assessment)
	25	QuantificationOfBenifitsPrimSource	Primary Source of Quantification of Benefits	Primary Source of Quantification of Benefits (Business Risk Assessment)
	26	TargetCustomerSecSource	Secondary Source of Target Customer	Secondary Source of Target Customer (Business Risk Assessment)
	27	StatementOfCustomerNeedSecSource	Secondary Source of Statement of Customer Need	Secondary Source of Statement of Customer Need (Business Risk Assessment)
	28	ProductSecSource	Secondary Source of Product	Secondary Source of Product (Business Risk Assessment)
	29	RecognizedProductCategorySecSource	Secondary Source of Recognized Product Category	Secondary Source of Recognized Product Category (Business Risk Assessment)

Tab	N	Variable	Field Name	Field Description
	30	StatementOfKeyBenefitSecSource	Secondary Source of Statement of Key Benefit	Secondary Source of Statement of Key Benefit (Business Risk Assessment)
	31	PrimaryCompetitiveAlternativeSecSource	Secondary Source of Primary Competitive Alternative	Secondary Source of Primary Competitive Alternative (Business Risk Assessment)
	32	StatementOfPrimaryDifferentiationSecSource	Secondary Source of Statement of Secondary Differentiation	Secondary Source of Statement of Secondary Differentiation (Business Risk Assessment)
	33	StatementOfIncrementalEffectSecSource	Secondary Source of Statement of Incremental Effect	Secondary Source of Statement of Incremental Effect (Business Risk Assessment)
	34	StatementOfIncrementalCostSecSource	Secondary Source of Statement of Incremental Cost	Secondary Source of Statement of Incremental Cost (Business Risk Assessment)
	35	QuantificationOfBenifitsSecSource	Secondary Source of Quantification of Benefits	Secondary Source of Quantification of Benefits (Business Risk Assessment)
Organizations	1	Street	Street	Street
	2	City	City	City
	3	State	State	State
	4	Zip	Zip	Zip
Contacts	1	MiddleName	MiddleName	

Tab	N	Variable	Field Name	Field Description
	2	Department	Department	
Outreach Events	1	ConferenceName	ConferenceName	ConferenceName
Savings Potential	1	UnitTypePre	Site type or other unit of measurement	Pre-assessment estimate
	2	SitesNumberPre	N Sites or units in your service territory	Pre-assessment estimate
	3	SitesPercentUsefulPre	Percent of population in your service territory who could use this technology	Pre-assessment estimate
	4	AnnualkWhSavingsPerUnitPre	Annual kWh / site or unit	Pre-assessment estimate
	5	PeakKwSavingsPerUnitPre	Peak kW Savings / site or unit	Pre-assessment estimate
	6	AnnualThermSavingsPerUnitPre	Annual Therm Savings / Year	Pre-assessment estimate
	7	UsefulLifeYearsPre	Estimated Effective Useful Life of the Technology in Years	Pre-assessment estimate
	8	InformationSourcePre	InformationSource	Pre-assessment estimate

Tab	N	Variable	Field Name	Field Description
	9	EstimatedPenetrationLevelPre	What is the estimated current level of penetration (% of primary market)	Pre-assessment estimate
	10	InformationSourceMarketPenPre	Source of Information	Pre-assessment estimate
	11	InformationSource	InformationSource	Estimate based on assessment
	12	InformationSourceMarketPen	Market Penetration Source of Information	Estimate based on assessment