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California Nonresidential Program Assessments Study

IOU Core Calculated Program Group Report

Final Report

Program Years 2010-2012

Prepared for
The CPUC and the California IOUs

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Executive Summary

This final report presents the results of Itron's and ERS's research into the California investor-owned utilities' (IOU) twelve commercial, industrial and agricultural core calculated (calculated) programs. This research is part of the Non-residential Program Assessments Study, a joint effort of the California Public Utilities Commission (CPUC) and the IOUs to assess the performance of a large portion of the state's non-residential portfolio of programs. The reviews invoke the Best Practices framework and are designed to capture lessons learned and new best practices over a broad range of program attributes.

This assessment of the IOUs' calculated programs is based on extensive reviews of secondary source material and interviews with eight individuals at Pacific Gas & Electric (PG&E) and Southern California Edison (SCE), two of the IOUs who implement six of the twelve programs in the scope of this study. Note that these six programs represent 80% of the overall calculated program budget across the four IOUs. Sempra utilities, which includes San Diego Gas & Electric (SDG&E) and Southern California Gas Company (SCG), declined to participate in this study, since they had just completed a full process evaluation of their non-residential programs. However, the process evaluation reports and interview results were made available to Itron and ERS for integration into this report.

This document includes feedback from IOU and CPUC staff who attended webinars on the draft findings on April 19, 2012, as well as from IOU and CPUC comments on two early draft memos circulated March 30, 2012 and April 30, 2012.

The material in this report is the evaluation team's synthesis and interpretation of the perspectives offered by individuals holding a variety of implementation-related roles. These perspectives are tempered with as much context and quantitative data as could be assembled, but there are important caveats. First, this study was conducted mid-cycle and before final impact and cost effectiveness figures were available, limiting the ability to triangulate perceptions of success with metrics of success. Additionally, the study incorporated only the IOU and implementation staff perspectives and is missing the voice of the participating customer, the rate-payer, and the legislator or regulator.

As in previous best practices studies, the findings and conclusions presented here are not based on a prescribed algorithm or a statistical model. They represent the evaluation team's expertise

and judgment in synthesizing all of the available data and information. As such these findings are not inarguable fact, but a combination of observations, opinions and interpretation. Results should be interpreted and applied appropriately.

1.1 Program Group Summary

The statewide non-residential calculated programs provide customers incentives based on calculated savings, as well as technical and calculation assistance, to influence the design and installation of energy-efficient equipment and systems in both retrofit and added load applications. The programs seek to overcome information, technical, and financial barriers. The calculated programs are primarily designed to achieve energy savings through measure implementation, but they also provide non-incentive elements, such as technical assistance to help customers identify which specific energy efficiency actions are needed and to estimate their associated energy savings and payback.

The programs are typically used for non-standard measures. This includes projects where a rebate is not available through the statewide deemed programs, projects with conditions that require customized calculations to provide the most accurate savings estimates, or projects with interactive effects that are best captured through whole building or whole system modeling. Calculated incentives, which are statewide, are end-use specific and are capped at 50% of project cost. Because the programs provide a customized calculation method that can consider system and resource interactions, they are considered the preferred approach for supporting the integrated, whole system, and multi-resource management strategies of the CPUC Strategic Plan.

1.2 Key Findings

The results of this study characterize the current practices of the calculated programs, while also modifying and updating a set of best practices. The original best practices are drawn from Volume NR5 of the National Energy Efficiency Best Practices study that was completed in 2004 for the non-residential comprehensive program area. The characterization and best practices are organized into to a decomposition model which breaks down the lifecycle of implementing these programs into its component parts:

- Program theory and design
- Program management
- Reporting and tracking
- Quality control and verification
- Marketing and outreach
- Participation process and customer service

- Installation and delivery mechanisms
- Evaluation and adaptability

For each subcomponent, observations of existing practices are provided and analyzed for advantages and disadvantages, considered against potential alternatives, and compared against known best practices, which are drawn from best practices report noted above. Finally, the known best practices are modified and updated to reflect shifting circumstances and innovative or unique programmatic elements. The full results are provided in the Assessment Results section of this report. Broad themes and key findings are presented below followed by a summary of the modified and updated best practices in table format.

1.2.1 Program Theory and Design

The calculated programs have a broad mandate within the overall energy efficiency (EE) portfolio. They are intended to be inclusive programs serving all customers within an IOU's territory that pay the Public Goods Charge. The program design allows for a broad range of technologies and significant flexibility in how the program is applied. The calculated programs' broad design complements the more rigid core deemed programs.

While they have a broad agenda for whom to serve and how they serve them, the Calculated programs operate primarily in service of a *singular objective* that is cost-effective resource acquisition. Alternative policy objectives such as deployment of emerging technologies or serving hard-to-reach markets are not strongly reflected in the program design. That is not to say the Calculated Programs avoid emerging technologies or harder-to-reach customers; those are incorporated as they support cost effective resource acquisition.

Finally, with respect to innovation, the design of the calculated programs is deliberately stable, and changes tend to be gradual and incremental. While this limits innovation, programmatic constancy and consistency was repeatedly cited as one of the greatest assets of the calculated programs across the IOUs.

1.2.2 Program Management

The management structures at the IOUs have evolved over time. Each IOU organizes their program staff members in a unique fashion, but there are trends that are common among the approaches.

One major trend is the shift towards functional organizations, which is most pronounced at PG&E, but is also occurring at SCE. Rather than dividing staff members by program, as is still done by the Sempra utilities, or by market, as PG&E did in the previous cycle, employees are organized by function: project processing, measure development, marketing, etc. The exact details vary by utility, but the basic principle is that this organizational method achieves economies of scale. Another important ramification is the separation of day-to-day

responsibilities from strategic considerations, which allows greater emphasis on long-term thinking. While PG&E and SCE are pursuing this trend enthusiastically, it can also be seen at SDG&E where, the consolidated Marketing Strategy Team is involved across the programs and elevates strategic marketing thinking above day-to-day program responsibilities.

Another positive emerging trend is end-to-end management of projects which results in more efficient processing and an improved experience for the participating customer. End-to-end management refers to a process where a single IOU staff member follows a project from its beginning to its end. At SCE and PG&E, this responsibility is housed in their project processing groups, with single staff members taking ownership of projects as they come through the group. At SDG&E and SCG, this management style is embodied by the account executives (AE) who are the dedicated points of contact for all interactions between customers and the utility EE programs. A major difference between these models concerns project ownership. In the PG&E/SCE model, the project office staff member has ownership over projects and communications responsibilities whereas in the SDG&E/SCG model, the AE is responsible for end-to-end management of communications while the ownership of the project resides in the program management office.

The allocation of staff talents and knowledge, both organizationally and geographically, is an important issue at all of the IOUs. SCE's and PG&E's function-oriented models help allocate talents effectively; respondents at both IOUs highlighted their pre-sales functions as an example of this. At the same time, the transition to a function-oriented model can scatter talent; for example, the substantial reorganization at PG&E made it challenging for staff members to identify where market knowledge had moved. Geography is another important factor in terms of skills allocation. For example, SCG relies on outsourced engineering and verification talent housed at SDG&E, and this arrangement can lead to problems since the SDG&E staff, based in San Diego, only makes trips to the northern part of SCG territory once per month.

1.2.3 Reporting and Tracking

The four California IOUs have very different reporting and tracking systems despite common challenges and requirements. The following discussion highlights the features and comparative advantages of the SAP-driven enterprise management system. SCE recently transitioned to this system following a major overhaul and consolidation.

Horizontal systems integration refers to integration across separate systems and databases that track essential IOU program and customer information. Typically, this term describes the integration of program/project, customer, and invoicing systems. Only SCE has fully integrated their systems, though all the utilities are moving this direction.

It is important that these systems be integrated, up-to-date, and comprehensive. In theory, system updates should be real time; SCG staff reported tracking system issues caused by old customer data. In addition to up-to-date data, the comprehensiveness of a system's tracking capabilities is essential. Fully comprehensive data tracking systems must record static and dynamic program, project, customer, and payment attributes, while enabling attachments of supplemental files such as emails and calculations. However SDG&E staff reported developing offline spreadsheet repositories for key information, which further complicates integration and diminishes the inherent value of a fully comprehensive system.

Vertical systems integration ensures that the systems merge seamlessly with upstream and downstream program partners and stakeholders. Upstream activities include application processing, lead tracking and generation, and pipeline projections. Downstream activities include process alerts, evaluation, and regulatory filings.

Since all the IOUs still use a manual application processing method, they present a potential opportunity to implement vertical systems integration. SCE is taking big steps towards achieving vertical systems integration; PG&E and the Sempra utilities haven't made significant changes to this end. Currently, SCE is working on enhancements to electronically link the online application directly to the program operations database; this reduces costs by eliminating labor necessary to enter the data and eliminates transcription errors. Similarly, these types of automatic data dumps can make downstream integration with evaluators and data requests less time consuming by reducing transaction steps in the transfer of data and more seamless by providing evaluators direct access to utility data at the discretion of the utility.

SCE's new system also includes project management functions. The advantages of a system that incorporates workflow management include confirming that all program requirements are met before allowing a project through to the next step and ensuring that activities occur in a timely manner and that no projects slip through the cracks.

SCE's transition to a new SAP-driven enterprise management system highlights the challenges of a large organization adapting to a new system. The transition costs are high, both in terms of real dollar costs of installing and customizing the new system, but also in terms of the significant cultural changes that the company must undergo to achieve successful transition. The advantages are compelling, but the challenges must also be acknowledged.

1.2.4 Quality Control and Verification

The evaluations of PY2006-2008 industrial and commercial programs uncovered various problems leading to low gross savings realization rates including errors in baseline determination, inadequate basis for savings claims, inadequate enforcement of program and

policy rules, and insufficient consideration of total system energy analysis. The evaluations made several recommendations for how to address them, some of which have been adopted.

IOU comments on this topic highlighted the addition of new review procedures put in place to improve the completeness and quality of data in applications and the accuracy of related ex-ante savings estimates.

Ex ante savings are estimated by a combination of outside vendors and internal staff. All estimates are reviewed internally. Savings estimates are developed using standard IOU tools and procedures (for example, the SPC Calculator). To ensure a greater level of uniformity across similar projects, SCE has recently codified its procedures in the new *Customized Calculated Savings Guidelines* publication, updated in March 2012. In general, the IOUs use a very detailed process for performing savings verification. Both PG&E and SCE use outside expert reviewers for verification, and then have internal staff review their work. With respect to pre- and post-installation inspections, the rules have changed a bit since the 2006-2008 cycle when SCE conducted post-installation inspections of all projects. Post installation inspections are reportedly common[1]. Utility Administrators reserve the right to apply discretion with regard to project eligibility and approvals, and may in some circumstances waive pre- and/or post-installation inspections. In general, the verification approach is tailored to the project's size and complexity. A cost-effective strategy directs sufficient quality control (QC) resources to larger projects, while using a more simplified approach for smaller, less complex projects. IOUs are confirming participant or measure eligibility on a project-by-project basis, dictated by the program rules that govern each type of measure.

Dual Baseline Procedure

The CPUC's Energy Efficiency Policy Manual (August 2008) requires that a "dual baseline" be utilized for measures which are replaced before the end of their useful life. The "dual baseline" analysis utilizes both the pre-existing equipment baseline during an initial remaining useful life (RUL) period and also a code requirement/industry standard practice baseline for the balance of the expected useful life (EUL) of the new equipment. The Energy Division (ED) and the IOUs have been engaged in weekly meetings for nearly a year to develop a detailed dual baseline methodology.

At the time of the interviews, the IOUs reported that very little had changed as a result of the new dual baseline procedure; however, SCE indicated that it is now applying this procedure, to the extent possible. The dual baseline approach is still evolving. Interviewees noted that RULs

[1] The specific percentage of projects receiving post-installation inspections at each IOU is not known. Post installation inspection status is not in the statewide tracking system. Sometimes it is in the paperwork submitted to evaluators, but not always. Rates of post-installation inspection were not requested of the IOUs for the purposes of this research.

are not typically collected and that gathering that information for more complex projects might present significant challenges. Currently, savings are calculated for only one of the two baselines. Some of the outstanding issues surrounding implementation include that IOUs are unclear on how to use RULs and that IOUs are unsure how ex ante savings claims will be affected, given that they only claim year one savings now.

Ex-Ante Review Procedure

An ED "early review" procedure (ex ante review or EAR) was adopted in July 2011[2] for a subset of calculated projects. There is still much uncertainty over the current process and its impacts.

Energy Division Perspective[3]

In Decision 11-07-030, the CPUC adopted policies that require ED review of custom ex ante savings estimates prior to their approval of the IOUs' savings claims. ED reviews the methodology and savings from selected custom project applications. The ex ante review process is intended to bring, through a collaborative process, the gross realization rate (GRR) for custom projects closer to the CPUC's default GRR of 0.9. ED reviews take place in parallel with utility internal reviews. The IOUs are required to deliver at least bi-weekly, lists of projects at the application stage.

Over the past eight months, the IOUs have submitted approximately 10,000 applications for ED's review, of which 91 have been selected for ex ante review. Of the 91 selected applications, the IOUs had already converted 16 applications into customer agreements before ED was provided the required application documentation. Those applications not selected for ex ante reviews are automatically reduced by 10%, reflecting a .9 GRR, which is a change from how the CPUC has valued previous IOU savings claims.

IOU Perspective

In general, IOU staff opinions of the EAR procedure are diverse and often vocal and spirited. Views range from grave and pessimistic, to consternation and even include confidence and optimism. Pessimism and concern is expressed primarily the areas of customer relationship and project management. IOU staff consternation surrounds the parameters and intent of the process. Optimism reflects an appreciation of the process benefits in terms of reduced risk associated with ex post evaluation reductions.

2 As described in Appendix B to the CPUC's decision D.11-07-030.

3 This summary is based on Ex-Ante Review activity through April 2012.

1.2.5 Marketing and Outreach

Recent evolutions in program management structures at the IOUs have had impacts on marketing and outreach efforts. The trend to toward function-oriented organization has led to dedicated marketing groups at PG&E, SCE, and SDG&E that work across programs. This leads to a greater emphasis on marketing since it no longer has to compete with day-to-day responsibilities for attention and time from staff members. At the same time, the IOUs are attempting to develop greater market-specific expertise by creating roles such as segment advisors and sector leads. These individuals are responsible for gathering and distributing market intelligence to program and marketing managers.

All IOUs indicated that AEs are still the most important element of the calculated programs' marketing and project development approach. AEs are responsible for direct selling the calculated program offerings to some of the IOUs' largest and most energy-intensive customers. Successful strategies for reaching unassigned accounts include leveraging the vendor and trade ally community, hosting and attending industry events, and making use of traditional marketing techniques. The IOUs have recognized that AEs, vendors, and trade allies have primary responsibilities that are separate from promoting calculated offerings; for this reason, IOUs have placed an emphasis on making it easy for them to understand and advertise the program. Multiple IOUs have started programs like SDG&E's Vendor Alliance Program, which codifies vendor participation. Efforts have been made to keep AEs, vendors, and trade allies up-to-date on requirements via educational events and periodicals; examples of these strategies include SCE's Contractor Connection newsletter and Authorized Participant Guidelines. While there has been improvement, at some IOUs there is opportunity for ramping up these efforts.

In addition to direct sales and other outreach methods**,** standard marketing collateral is an essential underlying element to the overall marketing strategy. All the IOUs have well developed websites that explain program participation requirements and provide application forms and brochures. These are an effective mechanism for broadly informing the market.

1.2.6 Participation Process

The calculated programs' participation processes and customer service elements are similar. The basic process steps are as follows, although they might be named and ordered slightly differently at each IOU:

1. Pre-sales support (if any) or pre-program project development
2. Application packaging and submission
3. Policy review
4. Pre-inspection
5. Engineering review
6. Approval and project package

7. Installation
8. Post-inspection
9. Measurement and verification (M&V) if necessary
10. Savings refinement
11. Incentive payment

Improving the participation process requires holistic evaluation of the current process as well as the commitment of substantial programmatic resources to drive significant change. All four of the IOUs have recently implemented improvements to their participation processes. Process integration is one type of improvement that has the benefits of achieving economies of scale by reducing redundancies associated with separate processes and improving customer satisfaction. Two main types of process integration are occurring:

1. The consolidation of all types of calculated projects being reviewed through one "processing engine." In this framework, all projects are reviewed by the same group, regardless of the type of program involved.
2. The integration of calculated programs with demand response (DR) and distributed generation (DG) programs. This type of program integration is an explicit policy goal of the CPUC. At least two IOUs reported moving towards more integrated program offerings. Combined applications are a positive first step towards formal programmatic integration.

Administrative integration is a continued challenge. SCE has attempted to address this issue and has successfully piloted an integrated review for combined EE/DR projects. However, administrative integration efforts should be expanded. Divergent funding streams for EE, DR, and DG, along with misaligned program cycles continue to create significant challenges for delivering integrated offerings.

1.2.7 Installation and Delivery Mechanisms

The calculated programs rely primarily on two installation and delivery strategies: technical assistance and financial incentives. The latter plays a greater role at time of installation. The IOUs offer technical assistance, which might include savings and project development assistance. For example, field engineers and AEs can help identify measures through low-rigor audits. Also, preferred calculation tools are bundled into the application to customer in developing the best savings estimates. In large part, the programs are not involved during the project installation phase, which presents some lost opportunities. Support and participation by program staff through execution provides greater control and possible opportunities to steer projects toward greater efficiency.

Additionally, the calculated programs leverage incentives as an important installation and delivery mechanism. The incentive amount is based on the approved ex ante energy savings. The

formula for deriving the incentive varies based on the type of equipment installed, and caps are also applied to total allowable incentive. Incentives are paid only after installation and M&V, when needed, are complete, which encourages project completion and helps keep efficiency at the forefront of the project. The proximate result of the incentives is to drive down the project payback so that it falls within the customer's required range, and thus promotes a project that would otherwise not have happened in the absence of the incentives.

The reliance on incentives as the primary mechanism influencing projects at the time of installation illustrates the calculated programs' primary objective – as described in multiple interviews with IOU staff – of cost-effective resource acquisition. The programs' objectives may expand to incorporate additional CPUC priorities including comprehensive and deep retrofits, long-term savings, promotion of emerging technologies, pursuit of hard-to-reach market segments, and portfolio integration. Incorporating these additional goals will require revision and expansion of program intervention strategies. This topic is explored in greater depth in the full Installation and Delivery section later in the report.

1.2.8 Evaluation and Adaptability

California's energy efficiency programs are evaluated on a regular basis. Impact and process evaluations are typically conducted every two to three years. During the program manager interviews, the IOUs indicated they had implemented a number of new procedures to respond to each of the problem areas identified during the previous evaluation cycle[4]. These responses are described below.

Recommendation from previous evaluation: Improve baseline specification.

Current IOU practice: SCE's *Customized Calculated Savings Guidelines* are in part a response to this recommendation. PG&E uses code requirements or industry standard practice to define the baseline. If neither of these are readily available, the program relies on outside expert consultants to determine the proper baseline.

Recommendation from previous evaluation: Increase enforcement of program eligibility and policy rule requirements.

Current IOU practice: Both PG&E and SCE have implemented various procedures to address this issue. SCE cited its standard program processing guidelines which require that measures that customer apply for are eligible for rebates (based on an approved solution code).

[4] As set forth in the following reports: 2006-2008 Evaluation Report for PG&E Fabrication, Process and Manufacturing Contract Group (February 2010) and 2006-2008 Evaluation Report for the Southern California Industrial and Agricultural Contract Group (February 2010).

Recommendation from previous evaluation: Put measures with inadequate empirical basis for savings estimates in the emerging technologies program until more reliable information is developed.

Current IOU practice: This issue was not explored in the program manager interviews.

Recommendation from previous evaluation: Aggregate and approve fuel switching and distributed generation-related projects in one or more explicit programs or clearly identified program elements. All multi-fuel project applications need to follow the three-prong test set forth in the CPUC's Policy Manual as well as any other regulatory agency requirements.

Current IOU practice: SCE has recently implemented a process for multi-fuel cost-effective screening by applying a pre-screening adjustment. PG&E uses the three-prong test.

Recommendation from previous evaluation: Increase the capability of the program to materially influence customer adoption of calculated program efficiency improvements.

Current IOU practice: To reduce free ridership, both SCE and PG&E are already performing some pre-screening of customers. Program managers reject customer applications if it is discovered that customers have already procured equipment or were part-way through the installation process when they contacted the program. Very specific guidelines around sequencing guidelines are provided in the Statewide Customized Policy Manual and internal Customized Policy and Procedures Manuals. Another example of utility efforts is the industry standard practice studies being performed by SCE. These studies focus on more common technologies and attempt to document measures that would typically be installed outside of any energy efficiency programs.

Early Evaluation Findings

Early results of the Custom Impact Low Rigor Assessment and the Net-to-Gross Assessment efforts provide additional perspective on IOU-reported program developments in the current cycle.

Low Rigor Assessment (LRA)

As part of the custom evaluation, a 'low rigor' assessment was performed of the underlying engineering methods and assumptions used to evaluate projects. This assessment was conducted between April 2012 and July 2012. The majority of these assessments are based on desk reviews performed by the evaluation team. The LRA sample was drawn from projects implemented between January 1, 2010 and June 30, 2011.

Across all program groups, 300 reviews were performed. There was wide variation in the number of reviewed projects ***by utility***, reflecting differences in the number of completed projects in the population by IOU. Half of the reviewed projects were for PG&E (146 of 300), another 30% were for SCE (88 of 300) and approximately 10% each were for SDG&E (39 of 300) and SCG (27 of 300), respectively.

Findings for each sampled LRA site were summarized in a common data template. The template is organized to report on three key areas of interest, which need improvement as documented in the previous evaluation: the appropriateness of the selected baseline/assumptions; the appropriateness of the impact calculation methodology; and the degree of compliance with various program rules.

In some cases an issue was impossible to assess with desk review or information available in the specific desk review. When this occurs, the project is excluded from a category of assessment. However, even where an issue can be assessed, the assessment remains a lower rigor one and thus is not absolute or complete.

With custom projects, critical particulars are often only apparent with a deeper look. Combine this attribute with a large variance in project size, and there is potential for custom impact evaluation outcomes to diverge from what is implied by lower rigor results. Again the intention of lower rigor results is to flag what is apparent with a desk review. In general the lower rigor assessments may miss or only partially identify issues that would be fully addressed with an M&V approach.

Two examples help to illustrate how the lower rigor review is useful and why its results need to be interpreted with appropriate caveat. One lower rigor review found a project that used an in-situ baseline, but was a new construction project. In this case, a clear problem with the baseline was caught by the desk review. In another case, a project appeared to have a reasonable baseline on paper and was given a 'good' rating based on the desk review. During follow up interviews that were done as part of M&V, it quickly became a clear case of industry standard practice determination. This latter project is a relatively large one, and will have notable consequences to the final evaluation outcome.

Some general observations are:

- Among the 281 projects that were able to be assessed, 10% or 28 projects had apparent program rule violations.
- Among the 28 projects that did not meet program rules, many had more than one rules violation. The most problematic issue was that the project involved a **routine equipment repair** (11 projects,); therefore, ineligible for program rebates.

The LRA reviews also involved a deeper examination of specific issues identified in the PY2006-2008 Industrial evaluations. Across all programs subject to the LRA review, the following conclusions were drawn:

- **Appropriate Measure and Baseline Specification.**
  - *Appropriate Baseline.* There were 273 projects for which there was a low rigor assessment of the baseline. Among these, 52 projects (or 19%) were found to have apparent problems in the baseline selection.
  - *Project Documentation and Tracking Data Quality/Completeness.* Documentation was found to be either incomplete or inaccurate for 72 of 298 projects, or about one-fourth of all assessments. **Program tracking data quality** was determined to be lacking in important ways for 22% of projects reviewed.
  - *Early Replacement Claim.* About one-third of projects reviewed in this area (55 of 156) were found to have made an invalid claim with respect to RUL and EUL assumptions.
- **Appropriate Calculation Method**
  - *Appropriate Impact Calculation Method.* Over three-fourths of reviewed projects were rated either Good or Neutral indicating the calculation method was not determined incorrect based on the low rigor review. One-fifth, or 49 projects were found to have used a Poor calculation method.
  - *All Relevant Inputs Considered.* Among the 270 projects assessed on this issue, 48 (18%) were determined to be missing relevant inputs.
  - *Adequate Values for All Inputs.* Reviews revealed 50 of 265, or 19% had specified inadequate values for inputs. Due in part to the limitations of lower rigor approach, most projects received a neutral rating (45%). Over 1/3 received a good rating.
  - *Appropriate Interactive Effects Calculation Method.* Methods used for HVAC and non-HVAC measures were reviewed separately. HVAC methods did not perform well though the sample is small, 9 of 12 projects, 75% received a 'poor' rating. The opposite was found for non-HVAC technologies, where three-fourths of reviewed projects (40 of 53, 75%) received a 'good' rating.
  - *Project Used Post-Installation M&V.* There is substantial room for improvement with respect to this issue 112 of 296 projects, or 38% received a 'poor' rating.
- **Compliance with Program Rules**
  - Overall, the lower rigor reviews showed a majority of projects complied with program rules. Issues that continue to pose particular challenges are with respect to projects involving fuel switching or multiple fuel/energy source impacts.
  - *Measures are IOU Program Eligible.* Nearly all projects (99%) reviewed include measures not specifically excluded from program eligibility.
  - *Fuel Switching or Multiple Fuel/Energy Source Impacts.* This area involves only a small number of reviewed projects but continues to need improvement. Only about half of the reviewed projects involving multiple fuel impacts had them properly

accounted for. Further, with respect to the proper accounting of non-IOU fuel and ancillary impacts, Only 19 of the 79 reviewed projects (24%) received a 'good' rating.

- *Customer Installation Meets Program Rules.* Ten percent (or 27 of 281) projects reviewed were found to have violated at least one program rule.

LRA findings were also analyzed separately by IOU, Customer Sector Program Grouping, and by Individual Program, in cases where 8 or more projects were reviewed. Appendix A provides detailed tables containing findings for each of these various subgroups of interest.

Net-to-Gross (NTG) Assessment

Early results of the custom impact net-to-gross efforts provide additional perspective on current cycle program improvements. Early findings indicate that free ridership[5] in calculated custom projects may not be substantially changed from previous cycles**.** To date, a total of 441 NTG surveys have been completed. Although the largest number of surveys has been completed for PG&E, a significant number have also been completed for the other three utilities.

Since the evaluation process is only partially completed at this point, it is not possible to calculate a program NTG ratio (NTGR) or net realization rate. An alternative is to examine the distribution of project level NTGRs across specified intervals. Results by utility of the frequency and percentage of evaluated projects with an NTGR value of 0.50 are below:

- **PG&E:** 54% of evaluated projects (146 of 268) have NTGR values below 0.51.
- **SCE:** 52% of evaluated projects (62 of 118) have NTGR values below 0.51.
- **SCG:** 52% of evaluated projects (12 of 23) have NTGR values below 0.51.
- **SDG&E:** 71% of evaluated projects (23 of 32) have NTGR values below 0.51.

The number of completed surveys for both SCG and SDG&E is relatively small, and these results could change significantly upon eventual completion of a much greater number.

In addition, Project-level NTGRs were analyzed by program group, with the following results:

- **Third Party:** 47% of projects (48 of 102) have NTGR values below 0.51.
- **Core-Calculated:** 59% of projects (137 of 233) have NTGR values below 0.51.
- **Local Government Partnerships:** 60% of projects (30 of 50) have NTGR values below 0.51.
- **New Construction:** The number of completed interviews is too small to draw a meaningful conclusion.

[5] The California Energy Efficiency Evaluation Protocols define a free rider as "a program participant who would have implemented the program measure or practice in the absence of the program".

- **Institutional Partnerships:** 49% of evaluated projects (26 of 53) have NTGR values below 0.51.

Additionally, program design changes recommended in past evaluations to improve program influence and reduce free ridership have not been adopted. These suggestions include:

- Adopting a minimum payback threshold, which might involve excluding projects for which the payback time is less than one year.
- Increasing incentives for measures with longer paybacks, particularly for emerging technologies
- Providing a bonus for first-time participants
- Setting a minimum percentage for incentive payments to insure that the program is providing a meaningful incentive amount to each project.

1.3 Best Practices

The following table summarizes the updated best practices. The best practices build upon the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004, but differ in key ways.[6] First, this study and these practices are California-specific, whereas the 2004 study considered programs nationwide. Second, this study – occurring mid-cycle – had far fewer quantitative data sources at its disposal. Consequently, conclusions relied to a greater extent on the perspectives of those interviewed as well as the judgment of the research team. Additionally, where appropriate, best practices have been modified and updated to reflect shifting circumstances and innovative or unique programmatic elements.

6 http://eebestpractices.com/Summary.asp?BPProgID=NR5

Table 1-1: Summary of Best Practices and Rationale

Best Practice	Rationale
Program Theory and Design	
Anticipate and tackle large non-residential market challenges directly.	The large non-residential market poses unique challenges because these end users and their suppliers are very sophisticated and their projects are often very complex. As a result, certain challenges, such as free ridership and gaming, are present in this market and should be expected and planned for whether a program is new or mature.
Link the mix of program features to policy objectives and resource constraints.	Programs that put support of the private sector energy services industry high on their list of objectives will likely have different participation features and administrative functions than those that do not. Programs with smaller budgets relative to market size and concerns over equity may have lower maximum incentive caps than programs with fewer constraints. Prioritizing objectives and taking stock of resource constraints helps clarify among competing design choices.
Develop a sound program plan, if possible have a clearly articulated program theory.	Articulate a program theory that clearly states the target for the program, program timing and the strategic approach whether resource acquisition or market transformation. Even a relatively simple statement of program logic can reveal gaps in program focus or effort and assure that everyone involved knows what the program seeks to accomplish and why.

Best Practice	Rationale
Balance the need for programmatic constancy and consistency with the need for fundamental program innovation over time.	Programmatic constancy and consistency is an important element of maintaining market awareness and ensuring program partners have up-to-date information. Changing slowly or not at all can ensure that marketing keeps up with program changes. On the other hand, constancy and consistency cannot come at the expense of fundamental program innovation over time. Programs must adapt in transformative ways to shifting policy objectives and market features as well as in response to improved understanding over time of how the design elements have impacted the deployment of EE technology.
Program Management	
Develop and maintain clear lines of responsibility and communication.	Programs with multiple entities involved, such as technical support contractors, must ensure that lines of responsibility and communication protocols are clear. Usually technical support contractors work with participants to review applications and assist them in meeting program requirements; however, program administrators make the final decisions on whether to accept a project and how much incentive to pay. Subcontracting out too many responsibilities to too many different players can pose a challenge. Whatever the mix of responsibilities, the process should appear integrated and seamless to participants.
Use well-qualified engineering staff.	Projects in large facilities are often extremely complex and unique to individual sites. A high level of engineering expertise is needed to assess project validity, estimate or measure savings, and assure proper implementation. Staff requirements typically include many years of experience with project development and savings analyses, particularly in the industrial sector, combined with a professional engineering license (PE).

Best Practice	Rationale
Motivate field staff and efficiency service providers.	Field staff are an important asset to successful program operation in many of the programs reviewed. In utility-run programs, account executives typically maintain customer contact, follow market trends, take an active role in end user recruitment, and work with the customer throughout the implementation process. In other programs, such as California's SPC, NYSERDA's C/I Performance, and Xcel's Bidding program, private sector energy-efficiency service providers also play an active and important role in developing end user projects and carrying out program participation requirements on behalf of their customers. In either case, it is important to have a motivated pool of marketing and engineering talent to prospect for projects and ensure a smooth participation experience.
Maintain consistency in personnel over time.	Maintaining consistent administration and support service personnel is important to cost-effectively managing customer specific projects in the large non-residential market. Many of these efficiency projects can take several years to implement from the initial project prospecting to final installation. Various implementers reported that high staff turnover inhibits timely implementation of the program process as new staff must come up the learning curve on what are often complex projects.
Delegate responsibility based on risk versus reward.	Program management activities are extensive for these types of programs due to the complex, site-specific nature of projects. Although many activities require more expensive and experienced staff and contractor resources, other appropriate activities can be delegated to less costly personnel. Delegation of responsibility should be based on balance of risk and rewards associated with the individual projects or administrative function (i.e., low-risk tasks to more junior or less technical employees, high-risk tasks and decisions to upper management). Risks and rewards for these types of programs are often tied to the size of a project, the type of project, and the level of uncertainty associated with project savings.

Best Practice	Rationale
Effectively allocate staff geographically and organizationally to meet the needs of customers.	Staff must be allocated to the places where they and their skills are needed most. This is important geographically and organizationally. Field staff should be located near the facilities that they serve to encourage timely interaction and visits. Organizationally, scarce skills should be placed in functional roles where those skills can be most effectively utilized and cultivated. Furthermore, scarce skills should be utilized during the portion of the process where they can be most valuable, whether that is pre- or post-sales.
Give primary responsibility for a project to a single individual from beginning to end.	Custom projects are complex, requiring significant and sustained engagement with the customer over a prolonged period of time. By consolidating ownership for a project with a single staff member, that individual can help drive the process to completion. Additionally, this simplifies the process for the customer by initiating a single point of contact. Consistent staffing supports better communication and a shared understanding between customer and IOU with regards to program rules and project specifics.
Separate day-to-day and strategic management functions.	Program managers who must oversee to day-to-day operations while also providing long-term, strategic guidance to programs are faced with often conflicting responsibilities. Day-to-day operations tend to take precedence, squeezing the time that is left for long-term planning. By separating these two functions, programs can ensure strategic factors receive attention that is warranted.

Best Practice	Rationale
Reporting and Tracking	
Horizontally integrate systems inclusive of all program and project data as well as cross-program databases, customer relationship management systems, and invoicing systems.	By their nature, large non-residential comprehensive efficiency programs have the most challenging reporting and tracking issues. Although it takes more preparation and effort to track data for these programs as compared to some other program models, the size of the programs and their generally high level of cost-effectiveness make the effort necessary and worthwhile. Experience shows that taking early short cuts that involve utilizing balkanized and non-standardized project tracking systems is counterproductive. Similarly, the program database should not reside entirely outside of other program administrator data systems. Integration across functions such as invoicing and customer management eliminate data entry redundancies and unlock opportunities.
Vertically integrate systems with upstream and downstream stakeholders including customers, AEs, vendors, third-parties, evaluators and the CPUC to improve program visibility.	Vertical integration – both upstream and downstream – can increase program visibility, both internally and externally. Projects should be identified and tracked at the concept stage to ensure that program information and resources are directed at opportunities early enough in the customer's design and decision-making process to influence adoption of high-efficiency measures; this is accomplished through upstream integration. Downstream integration with evaluators and regulators can smooth and shorten the evaluation process so that recommendations are more timely and without frustrating back-and-forth.

Best Practice	Rationale
Use automated workflow management to achieve close monitoring and management of project progress.	Because these types of projects often require multiple levels of approval, long ordering lead times, and coordination with facility maintenance schedules to install, the time it takes to move from program application to final installation and commissioning can last several years. In addition, some projects may cancel during this process without the applicant notifying the program administrator (sometimes keeping reserved funds unavailable to other applicants). As a result, it is important for program administrators to keep close tabs on project progress. Programs with large numbers of applicants should utilize regular check-in and progress milestones to ensure that project status is known on a timely basis. Automated notification procedures can help manage this process for large programs. These can be tied to programmatic requirements for milestone achievement so that projects do not prematurely advance through the process.
Balance the level of tracking against resource availability.	Despite our emphasis on comprehensive and real-time tracking in the best practices suggestions above, we recognize that there is a legitimate tradeoff between the level of detail tracked, the extent of data entry burden, and the amount of time available from staff who are otherwise busy conducting program activities (particularly for programs with very limited budgets for program management and implementation). A comprehensive tracking system that staff does not have adequate time to support is of little value.

Best Practice	Rationale
Quality Control and Verification	
Require *post*-inspections and commissioning for all large projects and projects with highly uncertain savings.	As incentive levels increase, so does the motivation and potential negative impacts of gaming or fraud. For small projects, random inspections on a significant percentage of projects also can be used cost-effectively for projects with well-established types of efficiency measures and baselines that are well known on average. Invoices should be required and reviewed for all projects, including small ones and particularly those that do not receive post-inspections. Very large and complex projects should also require some level of commissioning to establish that the new equipment or process is not only installed but operating and functioning as designed.
Require *pre*-inspections for large projects with highly uncertain baseline conditions that significantly affect project savings.	Savings cannot be reliably estimated for some types of projects on purely an ex post basis. Pre-inspections are an important part of developing defensible savings for projects such as complex compressed air, retrocommissioning and industrial process retrofits.
Conduct either in-program measurement or measurement through an impact evaluation on the very largest projects and those that contribute most to uncertainty in overall program savings.	Measurement for the largest projects is usually cost-justified given the project's contribution to overall savings and the size of an individual application's potential incentive check. In addition, pre-measurement should be utilized for large, complex measures that cannot otherwise be reliably quantified with only ex post data. For some projects, pre-installation measurement is the only defensible way to develop reliable savings estimates and extract adequate value from post-installation measurements.

Best Practice	Rationale
Tailor measurement rigor, including the use of sampling, to each project's contribution to the cumulative uncertainty in estimated savings for the program overall	Fitting the rigor of M&V to match the type of project is an effective way to lower overall M&V costs. When it comes to M&V, one size certainly does not fit all. Overly complicated M&V procedures for simple measures with well-known savings can result in unnecessary costs and be an irritant to program participants. Conversely, allocating more time and resources to M&V on unfamiliar projects and those with highly uncertain savings provides important quality control. In addition, using sampling techniques within or across an individual applicant's sites is also usually much more cost-effective than requiring a census of measures installed, while still providing high levels of reliability and a check on gaming.
Limit the use of multi-year, in-program measurement of savings.	Experience shows that it is difficult in practice for program administrators, third-party energy services providers, and end users to maintain the institutional memory and financial motivation necessary to develop, submit, and review detailed measurement reports for more than a year or two. A full year of post-installation measurement is usually adequate to develop a reasonable estimate of savings. Subsequent years worth of measurement may be desirable to some applicants on an optional basis if they are convinced a single or particular year is unrepresentative. Multi-year measurement of impacts for resource planning can be accomplished through retention studies using representative samples.

Best Practice	Rationale
Carefully consider tradeoffs associated with in-program M&V versus ex post impact evaluation.	Some program managers believe that in-program M&V is an important defining characteristic of the program itself, is most cost-effective, and is less intrusive to the applicants than either an independent impact evaluation or a combination of in-program measurement and impact evaluation. On the other hand, other program managers with extensive experience with in-program measurement have concluded that in-program measurement is overly burdensome to administration of the program and takes too many resources away from other program implementation activities. Hybrid approaches may be effective (e.g., program evaluators working with program staff to design and implement measurement plans on representative samples of projects) but coordination is critical to minimizing participant burden that can come from having to provide the same types of information and facility access to multiple parties.
Consider using third-party M&V contractors to oversee or conduct M&V.	Utilization of firms specializing in program-related M&V was repeatedly cited as very effective in the success of the reviewed programs. Contracting out the M&V task for the entire program allowed program participants to be free from the responsibility and financial burden of M&V. Additionally, because of the similar types of projects going through the program, the M&V contractor may be able to achieve consistency in M&V procedures and produce results more cost-effectively than can individual applicants. Utilizing third-party firms for these functions can help administrators balance workloads across peaks and valleys, obtain multiple engineering perspectives and peer-to-peer review, and keep costs down by paying for work performed rather than maintaining full-time employee levels sized to meet peak application loads.

Best Practice	Rationale
Tie staff performance to independently verified results.	Creating a clear connection between performance reviews and bonuses of program- and field staff to verified gross savings as reported through an independent M&V or impact evaluation process is likely to increase project quality and the accuracy of initial savings estimates. Net savings should also be presented to the staff in a regular feedback, but performance links are stronger and more manageable when they target gross savings Marketing staff, in particular, should have financial incentives tied in some way to gross savings that are independently verified.
Marketing and Outreach	
Dedicate staff to the development of marketing strategy and materials.	Program-dedicated staff often cannot put appropriate amounts of time towards marketing strategy and materials. By housing marketing strategy and materials development in one organizational group, the process can be streamlined and can receive the resources that will support effective marketing strategy.
Use the program's website to broadly inform the market and attract participation.	Because the large non-residential market is made up of a small population of well-informed customers and efficiency service providers, driving prospective participants to a comprehensive program website is often effective without significant other investments in traditional advertising.
Leverage the extensive marketing efforts of the private sector, particularly of ESCOs.	The large non-residential market typically receives significant private sector marketing attention with respect to energy efficiency prospecting. In this market, ESCOs, trade allies, vendors, and other service providers that believe the program will help close deals are natural and effective marketing partners. However, care and oversight by program staff is required to ensure program offerings are introduced at an appropriate stage of project development. Supporting their efforts by providing simple, up-to-date information about the program can magnify their impact by helping them sell the program.

Best Practice	Rationale
Keep energy efficiency service providers well informed about program features and changes through seminars, training sessions, trade shows, and annual meetings of key groups.	To keep private sector marketing efforts effective, it is important to provide outreach and offer training on both on-going program details and periodic program updates. Where possible, keep a two-track process, with deep training specific for newly participating vendors and ongoing information provided to veteran participants that is limited to changes in the program.
Market energy efficiency options directly to large end users through AEs at the earliest decision-making stage for major equipment or facility modifications.	AEs can play a critical role in identifying large equipment and facility changes early. This helps ensure efficiency opportunities are appropriately considered and maximizes chances of program influence. Utilization of sales or related tracking systems helps prevent projects from becoming lost opportunities.
Identify and address industry-specific barriers and issues.	Segment and sector specialists can support marketing efforts by researching industries and providing information to relevant marketing strategists. This will improve marketing effectiveness and drive greater participation.
Develop and disseminate case studies of key technologies and segment applications.	Large customers, particularly industrial, can be very risk averse with respect to new technologies. At the same time, they are very concerned about staying competitive and keeping up with industry trends. Case studies help to facilitate the diffusion of new ideas and practices.
Conduct on-going training of account managers and other marketing staff to keep abreast of the latest efficiency technologies and practices.	Keeping staff members, particularly AEs, up to date with the latest technical information is critical to maintaining credibility among large end users and their service providers.
Utilize data to maximize the effectiveness of marketing efforts.	As reporting and tracking systems evolve and become more advanced, all available data should be leveraged to gauge segment-level participation, vendor and contractor participation patterns, and campaign effectiveness.

Best Practice	Rationale
Participation Process and Customer Service	
Keep the application process and forms from being overly complex and costly to navigate while at the same time not being over-simplified.	Large comprehensive incentive programs require more significant levels of site-specific application data than do other types of programs because the measures implemented are often site-specific and savings are very sensitive to baseline conditions. Nonetheless, data requirements and associated forms should be well designed to ensure they focus on the most critically needed savings and verification inputs.
Tailor the degree of formality and extent of program rules and requirements to the size of the program, the size of the market being addressed, and the level of expertise of in-house staff.	Large programs in large service territories with large numbers of applicants and turnover among in-house staff tend to require more detailed and formal program rules and application rigor. This is because it becomes virtually impossible in practice for a group of staff to consistently communicate and enforce program participation requirements informally when there are large numbers of applicants. On the other hand, there are excellent examples of how one can combine strong, multi-year in-house staff expertise with a relatively small target market and program size to achieve excellent program effects through informal processes (see, for example, the discussion of Informal incentive level setting by administrators of smaller programs in the next section).
Provide technical assistance to help applicants through the process.	Technical expertise should not be limited to the program application and review process but also should be offered to applicants to help them prepare their applications correctly the first time.
Develop a cadre of trade allies who can then assist customers through the process.	Because trade allies typically assist multiple customers participating in large C&I programs over multiple years, developing a strong trade ally infrastructure can help program administrators to increase the ease of customer participation over time.

Best Practice	Rationale
Try to maintain some availability of program funds throughout most of the program year.	Approaches utilized to stretch program funds include customer or per site incentive caps, staging the release of funds throughout a program year, and penalties (e.g., reduced incentives) for projects that are not installed within a pre-set period of time (e.g., several administrators use 18 months). Maintaining funds throughout most of the program year gives trade allies the confidence that they can sell the benefits of participation without concern that their customers will make a decision to install a project based on the program only to find out that funds are unavailable. It also provides customers with the confidence that they can apply for the program at the appropriate point in their decision-making process, rather than feeling pressured to apply quickly simply to reserve funds.
Installation and Delivery Mechanisms	
Use incremental costs to benchmark and limit payments.	Limiting payments so that they do not exceed a pre-determined portion of average or customer-specific incremental cost estimates is critical to avoiding grossly overpaying for savings.
Set incentive levels to maximize net not gross program impacts.	Free riders dilute the market impact of program dollars. Incentive levels should be set based on the program strategies and goals. Although specific objectives may vary across jurisdictions (e.g., the relative importance of encouraging industrial process versus commercial HVAC impacts), all programs should strive to maximize net savings and minimize free ridership. Payback period minimums and increasing incentives with increasing payback periods are one approach. Another is to tie incentive levels to individual measures or types of measures that are known to have extremely high or low naturally occurring adoption levels.
Adjust incentives levels based on market demand.	When program funds are severely over or under subscribed, adjusting incentive levels may be necessary. However, incentive levels should not be based strictly on market demand and should not be altered in patterns that appear random to market participants.

Best Practice	Rationale
Limit or exclude incentive payments to known free riders.	Several of the approaches discussed above are focused on trying to minimize free-ridership through indirect programmatic rules and requirements. The advantages of such approaches are that the rules and requirements are codified and apply equally to all customers. Disadvantages of all of the approaches above are that they are based on correlations between project characteristics and free-ridership for which there are always exceptions. When program administrators are incented and permitted to simply exclude known free riders, program funds can be redirected to projects that provide net benefits.
Design installation and delivery mechanisms to meet program objectives.	Installation and delivery mechanisms must be tied directly to the objectives the program intends to achieve. Both non-incentive and incentive mechanisms must be designed with those objectives in mind. Cost-effective resource acquisition may be best achieved through low-cost non-incentive mechanisms or none at all. Alternative objectives may require more involved non-incentive mechanisms as well as complex incentive structures to achieve them.
Program Evaluation and Adaptability	
Conduct both process and impact evaluations routinely.	This best practice ensures that managers of calculated customer programs are provided timely feedback to enable them to make improvements on a regular basis. These programs tend to be the largest programs in an administrator's portfolio and hence require close monitoring.
Stagger the timing of process and ex post impact tasks so that process evaluations can be conducted and results communicated on a relatively real-time basis.	Evaluations typically occur after the end of a multi-year program cycle. Because of the long lag after program participation in the calculated program, it is useful to conduct some evaluation tasks on an interim or ongoing basis. These evaluation tasks should focus on identifying structural or operational issues that hamper program performance, from a marketing, satisfaction perspective as well as application or verification issues that may eventually hinder the achievement of ex-post net impact. This will enable problems to be identified and remedied in a timely manner.

Best Practice	Rationale
Involve impact evaluators in projects that may require pre-installation measurement.	Given that final ex post savings measurements considerably lag project installations, it is useful to involve impact evaluators up-front during project review so that any necessary pre-installation measurements can be agreed upon and carried out.
Include estimation of free-ridership and spillover.	Although measuring free-ridership and spillover can be difficult and contentious, there is critically important knowledge gained about program effectiveness through these analyses. A key challenge is to develop a measurement framework that is able to capture the complex decision making inherent in the nature of the projects developed through calculated programs.
Develop realization rates by end use or measure type and utilize these to improve savings estimates over time.	Because savings from custom measures are intrinsically difficult to estimate, it is important to use ex post measurement of savings to develop realization rates by end use, measure type, or other key segments, so that program implementers can make appropriate adjustments to their savings calculations.

2

Programs and Context

The following sections describe the context of the calculated program group including information on program origins, the policy environment, market and technology context, and issues specific to the group.

2.1 Program Group Strategy, Objectives, History and Evolution

Incentive programs for comprehensive non-residential projects in existing facilities have been in existence since the earliest days of energy efficiency programs dating back to the 1970s and 1980s. This program category is described in Volume NR5 of the National Energy Efficiency Best Practices Report (Non-residential – Large Comprehensive Incentive Programs), a national review of energy efficiency programs:

These programs tend to focus primarily on the end user and are historically operated primarily by utilities. Typically, utility account managers and engineering staff play active and important roles in working with customers to identify projects, assess technical feasibility, and move them through the program and implementation process. Incentives are often paid on a cents-per-first-year kilowatt-hour saved basis. These incentives are typically either set at a single level for all types of projects or vary based on end use or load shape impacts. Utility personnel typically perform installation verification. Savings are typically measured for samples of projects to produce estimates of savings at a program level, often by third-party evaluation firms.[7]

The California statewide core calculated incentive programs follow this model. The calculated programs represent a substantial portion of the overall energy efficiency portfolio budget (13% of portfolio budgets and 12% of spending overall). Individually for each IOU, the Core Calculated programs have similarly substantial roles in budgets and accomplishments for each IOU. Table 2-1 below shows the percent of each IOU portfolio that is made up by the Core Calculated programs. For SDG&E, Core Calculated is a smaller percentage. The emphasis within SDG&E in the nonresidential sector is on a third party program, the Nonresidential BID program, which makes up 12% of budgets and about 17% of installed kWh.

[7] Volume NR5 – Non-residential – Large Comprehensive Incentive Programs – Best Practices Report, December 2004, page NR5-17

Table 2-1: Core Calculated Spending and Savings as Percent of IOU Energy Efficiency Portfolio

	Total EE Portfolio Budget	(% by IOU) Total EE Portfolio Spending (% by IOU) Commitments to date, Gross kWh	(% by IOU) installed kWh	(% by IOU) Commitments to date, gross therms	(% by IOU) Installed Therms	(% by IOU)
SCE	12%	10%	20%	11%	-	-
PG&E	13%	15%	55%	10%	21%	60%
SCG	23%	20%	0%	-	97%	41%
SDG&E	4%	4%	14%	7%	-3%	43%

The Core Nonresidential Statewide programs, including both Core Calculated and Deemed make up 25% of portfolio budgets and spending, and 29% of installed kWh, and 58% of installed therms. The Calculated and Deemed programs are key to the utilities' efforts to achieve their resource acquisition goals.

The importance of the calculated programs relative to the overall portfolio is not limited to their contribution to savings goals. The calculated infrastructure – application processing and technical review – supports the third-party programs and local government and institutional partnership programs indirectly. Their projects are funneled through shared project processing mechanisms, illustrating the importance of sound practice in the implementation of the calculated programs since it can affect other utility EE programs.

The core programs historically formed a greater portion of the overall portfolio than other types of programs. They were the original method by which the utilities achieved significant savings reductions. The core programs still remain the "first-choice" for customers seeking to implement EE projects. The third-party and local government partnership programs evolved in response to the inability of the core programs to serve certain segments and offer certain measures effectively. While those programs have expanded, the core programs continue to retain an important place in the overall portfolio.

The best practices report highlighted above identifies the following common challenges for calculated programs:

- Reducing uncertainty in savings estimates
- Minimizing risks of gaming and fraud
- Managing costs of measurement and verification

- Keeping application requirements simple and manageable yet effective enough for detailed tracking, verification, and payment
- Distributing funds equitably and evenly throughout the program year
- Minimizing free riders/maximizing net impacts, and
- Supporting the private sector ESCO and energy efficiency services market

The non-residential calculated programs face these same challenges. While they are a mature set of programs and tend to evolve slowly, they do change incrementally in part to address challenges, such as those highlighted above. Noteworthy recent changes include:

- The implementation of the ex ante review process and dual baseline reporting
- Structural reorganizations at multiple utilities
- The implementation of a $100/kW kicker
- Increased pre-sales savings development interventions

These and other aspects of the programs will be assessed in light of known best practices, program outcomes, and utility experience in this report.

2.2 Policy Environment

This section explores the evolution of the policy environment within which these programs exist and operate. Consideration is given to key changes in relevant policy, important program design trends within the state, and other program design models that have been tried elsewhere.

2.2.1 Shifting from Resource Acquisition to Diversified Goals

California's energy efficiency programs are seeing a shift from primarily resource acquisition-focused goals to a broader consideration of a portfolio of policy objectives, including market transformation, comprehensive retrofits, integration of demand response and distributed generation, and promotion of emerging technologies.[8] For the preceding decade or so, the majority of program efforts have been geared toward resource acquisition as the sole or primary policy objective. As program lifecycles and the policy environment mature, attitudes have shifted toward a broader set of objectives that seek to impact deeper, longer-lasting savings, partially in response to macro policy factors. In particular, California's ambitious greenhouse gas emissions reduction targets, its renewable portfolio standard, and updates to the state building and appliance standards have been instrumental in shifting the focus toward other goals besides resource acquisition. The state also has recently shown interest in zero net energy buildings.

This all indicates a growing interest in goals that emphasize market transformation as well as emerging technologies. California's long-term goals are also at play in diversifying the policy

[8] As indicated in CPUC decisions D.07-10-032 and D.12-05-015

objectives of energy efficiency programs; California Executive Order S-3-05 requires that California achieve an 80% GHG emissions reduction from 1990 levels by 2050. Continuous energy improvement programs are also gaining traction, which similarly suggests a diversification in policy goals. According to the California's Clean Energy Future Implementation Plan, additional areas of interest influencing the shift from resource acquisition to other goals include, innovative financing, emerging technologies research, workforce training, marketing and outreach, integrated demand-side management, water efficiency, efficiency community planning, and benchmarking tools.[9]

Across the spectrum of programs this is becoming a more relevant issue as individual programs attempt to integrate and accommodate broader policy objectives. The calculated programs, as standard resource-based programs, do not offer obvious, unique opportunities for integration of these broader objectives in the way that, say, third-party programs do. Calculated programs are, for example, larger and, by definition, more standardized making integration of complicating elements a greater challenge than with smaller, unique programs that can adapt more readily. As core programs, however, it is important to understand how these large-scale programs can absorb the most successful creative and new ideas from third-party programs in this regard.

2.2.2 Free Ridership

Free ridership is a universal programmatic issue facing energy efficiency programs, and the California program implementers have not acted aggressively to mitigate it. Understanding how programs effectively address free ridership is an important practice area for consideration in this study. Previous evaluation efforts have identified significant shortcomings in the programs' effectiveness in limiting free ridership. Identifying improvements and assessing their scalability, while at the same time observing continued reasons for failure is an important component of this study.

2.2.3 Defining Standard Practice

Related to the issue of free ridership, standardizing the definition of standard practice has been a challenge facing the energy efficiency policy environment since programs began. In particular, in industrial process settings, this can be a major challenge, with significant differences in baselines and savings estimates for similar measures across programs and utilities. Understanding how programs deal with this issue can contribute to efforts to standardize definitions of accepted practice while also shedding light on program practices that may result in over-counting or under-counting of savings. This was identified as a problem area in previous evaluations of these programs and observing progress and understanding its scalability will be important.

9 http://www.cacleanenergyfuture.org/documents/CCEFImplementationPlan.pdf

2.2.4 Policies of Note

This section highlights a handful of specific policies that may be relevant to program design and implementation.

Assembly Bill 32 (AB32)

California Assembly Bill 32 (AB32), the Global Warming Solutions Act of 2006, put forth greenhouse gas emissions reduction targets for 2020.[10] The bill requires reporting and verification of greenhouse gas emissions, provides for enforcement, and allows the state to adopt a greenhouse gas emissions limit equal to greenhouse gas emissions in 1990, which should be achieved by 2020. The bill emphasizes cost-effective reduction strategies and market-based compliance mechanisms.

One of the main impacts from AB32 is the cap-and-trade program. The program will likely drive energy rates up, which in turn will create a favorable environment for energy efficiency programs by improving cost-effectiveness. This rate impact is not separate from the above projection on energy rates. An additional impact of note is that a small set of the very largest industrial producers in the state will be required to implement carbon reduction plans, which will likely rely heavily on energy efficiency.

Title 24

California Title 24 belongs to the California Code of Regulations and, with Title 20, makes up California's Energy Efficiency Standards.[11] There are a number of mandatory measures outlined for residential and non-residential buildings. Non-residential buildings measures and standards include indoor and outdoor lighting upgrades, building envelope upgrades, refrigeration upgrades, and others for new construction projects. Compliance documents will be required to show that buildings meet the standards. The codes and standards are updated frequently and increase the efficiency standards. Across the board, program energy savings will decrease as baseline efficiencies increase. An understanding of how programs anticipate their adaptation to increasing standards may be useful for informing longer-term thinking and planning about allocating program resources.

ISO 50001

The International Organization for Standardization (ISO) is "the world's largest developer and publisher of International Standards.[12] ISO 50001 is a new industrial protocol that focuses on

[10] Official AB32 Resource: http://www.arb.ca.gov/cc/ab32/ab32.htm/

[11] Official Title 24 Resource: http://www.energy.ca.gov/title24/

[12] About ISO: http://www.iso.org/iso/about.htm

strategic energy management.[13] This standard focuses on continuous energy improvement, conservation, behavioral change, and continuous commissioning, and thus has little to no impact on programs primarily focused on capital upgrades, as is the focus of the Core Calculated programs. However, retrocommissioning is likely to take a greater role in the overall savings portfolio due to a diminishing role for historically significant sources of savings (e.g., T12 fixture replacements). This standard may be leveraged for programmatic credibility and standardization.

Energy Independence and Security Act of 2007

In 2007, the federal government passed the Energy Independence and Security Act (EISA).[14] On December 9, 2011, a provision of the EISA outlawed the manufacturing of motors with efficiencies less than those prescribed as NEMA Premium efficiency motors[15]. Though the EISA does not change the code or outlaw the sale of non-NEMA motors, it does effectively raise the baseline allowed by programs to an efficiency level that had historically been prescribed by programs as the "measure" efficiency. It is believed that inventories of the older, less efficient, motors still exist, but that they are dwindling. Motors play a significant role in program process upgrades. Programs must adapt to this new environment and an understanding of their perception of this issue can inform program design moving forward. Failure to adapt could lead to incentivizing free ridership or a loss of major program savings potential.

Department of Energy Regulations Regarding the Manufacture of T12s

Beginning with the Energy Policy Act of 2005, a series of regulations regarding the manufacture of T12 fixtures were drafted and began coming into effect.[16] This series of regulations will culminate in July of 2012 with the Department of Energy outlawing the manufacture of T12 magnetic ballasts. This action will effectively eliminate T12 fixtures as standard practice, instead supplanting the typical new construction baseline with T8s. While retrofit baselines may still be able to claim T12s for some time, as the existing stock turns over in the next few years, programs will eventually be forced to raise their baseline.

Also, this trend will impact the programmatic savings that can be claimed. Raising standard practice increases savings baselines and reduces claimable savings. Lighting is small, but still substantial portion of savings in this program group. These programs will be impacted and will have to make up the savings in other areas during the next program cycle and beyond.

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13 Official ISO 50001 summary: http://www.iso.org/iso/iso_50001_energy.pdf

14 Official EISA resource: http://www1.eere.energy.gov/femp/regulations/eisa.html

15 Official NEMA Premium motors resource: http://www.nema.org/Policy/Energy/Efficiency/Pages/NEMA-Premium-Motors.aspx

16 Official Energy Policy Act resource: http://www1.eere.energy.gov/femp/regulations/epact2005.html

2.2.5 Program Design Trends

The following subsections discuss pertinent program design trends relevant to this study.

Integration

One of the emerging trends among successful energy programs across the country is the effective integration of programs and services. Historically, the energy industry has developed a program-based menu of options leaving the customer to navigate through the choices in order to meet their needs. This is often referred to more broadly as the "silo effect." As program offerings increase along with the number of different entities that are responsible for managing programs, the customer often has an even more difficult time understanding their choices and participation in some of the more narrowly focused programs lags.

Utilities and administrative managers are embracing strategies that help them better integrate programs and maximize their relationship with the customer. This usually necessitates the breaking down of communication barriers, flexibility in managing/distributing budgets, increased training, realignment of goals and incentives that might promote unproductive competition, and customization of matrix-management strategies.

California utilities face challenges on how to integrate their program offerings so they can maximize their relationship with the customer and integrate options for energy efficiency, demand response, and distributed resources. Two approaches are being considered: (1) integrated programs that would encourage all programs to have the expertise necessary to offer one-stop-shop advice and solutions to customers and (2) integrated programs that would find ways to more effectively link customers to appropriate, distinct programmatic options where they could find the appropriate expertise.

These changes can be difficult to make. For example, during the 2006-2008 program cycle, SCE took a bold step toward integrating their nonresidential energy efficiency offerings with their Business Incentives and Services (BIS) program. This program was different from previous cycles in its intent to integrate deemed, calculated and audit offerings A process evaluation of that program[17] revealed weaknesses in the linkages between offerings pointing to organizational and information system barriers that present obstacles. However, since that time SCE has revamped information systems and applications processing, and has shown promise with their success in combining energy efficiency and demand response elements in a single application and even a single inspection.

[17] Process Evaluation of Southern California Edison's Business Incentives and Services Program, Program Year's 2006-2008, Energy Market Innovations, November 25, 2009.

Understanding the limitations and abilities of calculated programs, in their current set up, to adapt to a new integrated environment will be an important avenue of investigation.

Scalability

Another current industry trend considers the need to identify which energy programs and services are highly "scalable." Scalability becomes important to respond to rapidly changing policy agendas, dramatically increasing climate-change reduction goals, variability in goal achievement among different programs, and short-term weather induced emergencies, among others.

Third-party programs are widely regarded as incubating innovative policy design and program ideas. The core calculated program group offers opportunities to rapidly scale best practices from smaller third-party programs that are successful. Investigating the challenges associated with scaling ideas as well as understanding the abilities of the calculated programs to scale ideas will be an important investigative area in this study.

2.2.6 Relevant New Approaches from Other States

This section highlights relevant new approaches to energy efficiency program design and implementation. These are offered as brief observations on new approach, and not as comprehensive treatments of the topics.

Self-Directed DSM Programs

A self-directed DSM program option could cut down on free ridership, if properly designed. This approach allows customers to 'opt-out' of traditional programs, and earmarks their contribution to the Public Goods Charge toward a separate fund which they can then use to upgrade their facilities. The best self-directed program designs require the customer to conduct a full facility energy efficiency assessment, and to implement all cost effective energy efficiency recommendations within a specified time period. By requiring participants to engage in a project discovery phase and only funding projects identified through this phase, free ridership concerns are mitigated. This type of program structure was evaluated in detail in an October, 2011 paper by Anna Chittum of ACEE entitled, *Follow the Leader: Improving Large Customer Self-Directed Programs*. The paper ultimately concludes that while effective self-directed programs are challenging to develop, they do exist and can be achieved through thoughtful design and a proper understanding of industrial customer decision making. The paper does not thoroughly compare the relative value of traditional EE programs and self-directed programs.

RFP Programs

Another approach which is becoming more common for large commercial and industrial customers is an RFP program. Under such a model, the program administrator has certain funds

set aside to support customer-bid projects in the program. Such projects must compete against one another in each round of bidding conducted. The most cost-effective project bids are funded up to the maximum amount set aside for the bid cycle. The competitive aspect of the program provides an incentive for bids to be cost-effective relative to the competition, or else they won't get funded.

Dual Baseline Methodology

Utilizing a dual baseline approach has developed as a topic of interest for programs in many states, with a handful having adopted it in the past few years. The approach is inherently more complicated than standard first-year savings reporting, which can create challenges for the programs that implement the approach and their customers and contractors. New York has undertaken this approach and developed a set of look up tables to help simplify the conversion of full savings and costs to incremental savings and costs. Note that the process is new and, as of yet, has not been fully implemented. In a certain sense, the development of this simplifying methodology replaces the challenges of developing project-specific values with the different, but substantial challenges of developing program-wide values. Nonetheless, if successfully implemented New York's method could reduce administrative burden and is worth watching as the process evolves and is implemented and evaluated.

2.3 Market and Technology Context

This section discusses relevant market and technology trends and their impacts on the programs.

2.3.1 General Market Trends

The following subsections highlight relevant trends related to general market conditions.

Economic Conditions

California's gross domestic product increased 1.8% in 2010 to $1.9 trillion, a sign that the state's fragile recovery took hold last year. The state's growth was led by strength in durable goods manufacturing, information, and professional and technical services.[18] Government, construction, and non-durable goods manufacturing dragged down the state's output. GDP for 2010 was slightly lower than 2008. Estimated GDP growth for 2011 is 3.2%, for 2012 is 4.6%, for 2013 is 5.9% and for 2014 is 6.0%, which suggest a growth in investment ahead.[19]

[18] LA Times, Money & Company, June 7, 2011) http://latimesblogs.latimes.com/money_co/2011/06/california-gdp.html

[19] The State of California's Economy, Chase, March 31, 2012 https://www.chase.com/online/commercial-bank/document/California.pdf

Related, in the next 10 years, electric energy use is expected to grow 1.31% annually, while demand is expected to grow 1.45% annually, which is in line with growth over the previous 20 years excluding the 3% dip in 2008-2010. Gas usage is expected to grow 0.83% annually. Of all sectors, however, industrial has the lowest expected energy growth rate of 0.16%.[20]

In the 3 years of a slow economy (2008-2010) businesses limited expenditures, particularly capital expenditures that did not improve productivity or return an immediate profit. This may have created a pent-up demand for energy efficiency investments. It should be expected that the next program cycles will find the economic environment more favorable for investments in efficiency projects, which should improve program performance across the board.

At the same time, the downward economic trend might lead some projects that were executed to result in fewer savings than were predicted at time of application. This would be the result of reduced run hours at industrial facilities or higher levels of vacancy. In extreme cases, closed plants or commercial facilities would lead to zero realized savings. This may negatively impact overall realization rates for this program cycle.

Target Market Dynamics

The core calculated programs target all commercial customers in the utility service areas. As a measurement of demographics, recent job growth in California has been broad-based across most commercial sectors, with informational services, business and professional services, and education and health leading the way. Leisure and hospitality as well as the construction industry are also on the rebound. Government Services is the only sector that is not expected to grow jobs in the near term. Additionally, the State projects a large increase in the Hispanic population (projected to account for 64.5 percent of the state's population growth between 1990 and 2020) which will increase jobs and services targeted to meet the needs of this growing population.

California's green economy is one of the few areas of the economy that is growing in the current downturn. From January 2008 to 2009, the most recent observable year, jobs in the green sector grew more than three times faster (three percent) than total employment in California (one percent). The rate of growth of green jobs has been similar to that of software jobs since 2005. We can expect moderate increases in participation in the core calculated programs over the next 3-5 years given expected growth in targeted customer sectors.

Energy Prices

According to the California Energy Commission (CEC) 2011 Preliminary Forecast, low demand scenarios will see prices for both electricity and natural gas rise at higher rates compared to mid

[20] California Energy Commission, Draft Staff Report, CEC-200-2011-011-SD, Aug 2011. pp2, 11-21. http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

demand and high demand scenarios. California AB32's requirements for a cap-and-trade program and California's 33% renewable portfolio standard for electric utilities will likely lead to higher retail electric rates. Table 2-2 shows the projected rates for electricity and gas over the next decade. Though the picture is somewhat mixed by demand scenario and there is significant uncertainty involved, the overall trend is for rates to increase at fairly substantial rates.

Table 2-2: Growth in Energy Rates, CEC 2011 Preliminary Forecast

Time Period	% Change, Low Demand Scenario	% Change, Mid Demand Scenario	% Change, High Demand Scenario
Electricity			
2010-2015	9.6	1.9	-1.8
2010-2020	18.8	8.8	2.3
Natural Gas			
2010-2015	28.0	10.6	-8.6
2010-2020	34.4	19.2	-8.6

Source: California Energy Commission 2011

Undoubtedly, increasing energy prices will improve the cost-effectiveness of individual projects. This should improve participation rates and offer the opportunity for programs to expand savings opportunities. In particular, the natural gas side will see great increases, which will lead to a natural expansion of investment and interest in gas efficiency upgrades and program offerings.

Customer Values

Customer values vary significantly among different types and sizes of commercial businesses and industrial sectors. For example, the dairy industry – often considered an operation with historical family ties and subject to the vagaries of climate/weather patterns and market prices – has a track record of conservative investments and aversion to risk. On the other hand, the wine industry or the high-tech businesses in California often address the needs of their markets through more adventurous investments in technological advances with attention to futuristic market trends. Large industrial decision-makers continue to value financial stability, long-term planning timelines, clear and consistent regulatory guidelines, and well-established/trusted relationships with vendors.

Newer trends in customer/business values include increased investment in clean technology to reduce carbon footprint, emergence of "sustainable profitability" as an economic motivator, resurgence of a "thriftiness" mindset coming out of the recent economic recession, and significant value placed on the benefits of e-commerce strategies. In addition, baby boomers are remaining in the workforce longer, and their continued presence sustains the impact that the values of their generation might have on business decisions. Finally, as access to information

continues to grow at a rapid pace, customers increasingly value and demand simple messaging and easy online access to information and services.

Most of the identified trends in customer values seem to project increased demand for energy efficiency and renewable energy services. Increased awareness of the benefits of energy efficiency will drive customers to seek out opportunities. Calculated programs may see increased participation from customers seeking deeper savings and in-depth audits. Industries interested in pursuing more advanced technologies also may look to the calculated program, where custom analyses can be performed.

Climate Issues

Climate change is a complex process with many causes and impacts. Two major climate change impacts receiving attention in California are global warming and shifts in Pacific Ocean surface temperatures. California is getting warmer and dryer.

Model simulations over the South Coast Air Basin of California based on the past 35 years of data support observations that large-scale warming is occurring in inland areas. As California temperatures climb, heat waves have become more frequent.[21]

The 1999-2009 period has been remarkably dry in California, which was subjected to one of the worst droughts in an approximately 500-year record. This 10-year period saw historic low water levels in several Colorado River reservoirs. These low levels are of concern since these reservoirs remain a major source of water for California. Another major source of California water is the Sierra Nevada snowpack. Warming has led to earlier snowmelt and water runoff in these mountains, which means less water remains to meet the needs for the dry summer season.

Climatic changes over coastal California from 1951 to 1997 will impact the agricultural sector most directly. They have benefited the premium wine industry. The warming trend in this region has produced higher quality wines and larger grape yields due to the lengthened growing season. The warming trend has the same effect on other crops across the agricultural sector when adequate water resources are available. On the other hand, warmer temperatures produce more stress on livestock requiring more water and more ventilation. Where irrigation is required for produce production, warmer temperatures will require more water and more pumping. These changes will expand the opportunity for energy efficiency in some agricultural sectors.

Commercial users will see increased cooling equipment run hours, which improves the cost-effectiveness of efficient technologies. Cooling load growth scenarios may also result. These two

[21] Lebassi-Habtezion, B., J. González, and R. Bornstein (2011), Modeled large-scale warming impacts on summer California coastal-cooling trends, J. Geophys. Res., 116, D20114, doi:10.1029/2011JD015759.

trends will drive greater HVAC opportunities in the commercial sector as a result of changes in climate.

The direct impacts of climate change on industrial users are relatively minimal and are limited, mostly, to facility space cooling, which makes a small portion of energy use in this sector.

2.3.2 Technology Trends

Energy efficiency programs must constantly adapt to evolving technologies as they make their way into the marketplace. The following subsections discuss a few of the more pertinent trends that will impact effective program design and implementation.

Light Emitting Diodes

Light emitting diodes (LEDs) have long been known for their role in electronics, but have in more recent years begun to play a part in the space lighting arena. While most major energy efficiency programs have already offered LED incentives in specific applications, such as street lighting and refrigerator cases, programs across the country are beginning to recognize their value in a greater number of situations. Wallpacks, area lights, and other more common applications are now cost-effective opportunities for LEDs in some cases. At a time when high-efficiency fluorescents are moving into the latter half of the market lifecycle and programs across the country are considering making them their baselines, LEDs offer a way of continuing to find savings in the important efficiency category of lighting.

Programs must adapt in this rapidly changing environment. As the cost of LEDs drops dramatically, their cost-effectiveness increases just as quickly. The superior savings of LEDs offer an opportunity for programs to expand the lighting-based savings at the same time that other trends may be eroding them. Programs that emphasize adaptability and flexibility will be most able to seize this opportunity. The core calculated programs must be able to scale the recently-proven, emerging technologies in this area.

Motor Rewind

The EISA of 2007 (see Section 2.2.4 above) effectively made NEMA Premium efficiency motors the new market standard. While inventories of older motors exist, programmatic baselines for motor efficiency must reflect this standard. Given the change in baseline, motor rewind becomes an attractive, cost-effective alternative to ensure efficient operation. Similarly, programs looking to replace the lost savings from EISA have begun to consider incentivizing motor rewind as a way of making up at least a portion of the savings at a similarly small portion of the cost, including Energy Trust of Oregon, Rocky Mountain Power, and Pacific Power.[22]

[22] All participants in the Green Motors program, which offers quality rewind: http://www.greenmotors.org/

The impact on the industrial and agricultural segment of the calculated program group is fairly substantial. These programs depend to a significant degree on the savings they glean from motor measures. Ensuring a smooth transition to a new savings paradigm in this realm will be critical to their continued success. Investigating their understanding of the EISA baseline and their attitudes toward rewind will be a relevant avenue of inquiry.

2.4 Other Challenges and Issues of Note

In addition to the above policy, technical, and market elements, the core calculated programs face challenges and issues specific to the handful of programs being assessed by this study. These include:

- The ex-ante review process being implemented jointly by the CPUC and IOUs.
- Analysis of calculated EE projects using dual baseline methodologies.
- The adaptation of core calculated programs to champion secondary policy objectives including comprehensive savings, long-term savings, emerging technologies, market transformation, and pursuit of hard-to-reach markets.
- The integration of core calculated programs with other offerings such as Demand Response and Distributed Generation programs.
- The improvement of realization rates and reduction of free ridership.

While no single issue highlighted above is the focus of this study, these elements will be assessed as they relate to the various components of program design, management, implementation, and evaluation.

3

Program Characterization

This section explores and discusses the key features of core calculated programs. It also includes an analysis of relevant overarching quantitative metrics.

3.1 Design and Delivery Features

The statewide non-residential core calculated programs provide customers technical and calculation assistance, as well as incentives based on calculated savings, to influence the design and installation of energy efficient equipment and systems in both retrofit and added load applications. Because they provide a customized calculation method that can consider system and resource interactions, they are considered a preferred approach for supporting the integrated, whole system, and multi resource management strategies of the strategic plan.

The calculated programs are primarily incentive programs designed to achieve energy savings through measure implementation. However, they also provide such non-incentive measures as technical and calculation assistance to help customers develop projects and navigate the application process. This includes various types of audits or design assistance, funds for technical studies, facility benchmarking, training and the availability of energy analysis tools.

This set of programs is used for non-standard measures and projects where a rebate is not available through the statewide deemed programs and where project conditions require customized calculations to provide the most accurate savings estimates or where a project has interactive effects that are best captured through whole building or whole system modeling. Incentives, which are statewide, are end-use specific and are capped at 50% of project cost.

3.1.1 Policy Objectives

All three calculated sub-programs address California's strategic plan goals and objectives in different ways, as discussed below.

Commercial

The calculated incentives program will support this effort by employing two of the five market transformation policies identified in the strategic plan. Specifically, the program will use financial incentives to help drive the marketplace towards energy efficiency. The calculated

programs also provide education and informational resources through marketing and program outreach efforts. These program elements will work in concert to transform the market into one that emphasizes sustained, long-term energy savings. The program will help to achieve the following near-term strategic goals, as stated in the Program Implementation Plan[23]:

- 2-3: Ensure compliance with minimum Title 24 codes – The calculated program only provides incentives for projects that exceed current Title 24 minimum baselines. Incentive mechanisms are designed to ensure deeper levels of energy reductions, such as providing incentives to reduce energy usage 25 percent below Title 24-2005 baselines.
- 2-5: Develop tools and strategies to reduce energy consumption in commercial buildings – The calculated program directly supports this effort by collecting data and conducting energy use and efficiency studies that, when collected over multiple IOU service territories, will be very helpful in supporting statewide efforts to establish a robust and useful knowledge base for the commercial sector.
- 2-7: Develop business models that deliver integrated energy management solutions – The calculated program will implement incentive mechanisms that will "reward comprehensive energy management retrofits" such as incentives for reaching certain stretch goals that produce significant energy savings beyond an established baseline.
- 2-8: Improve utilization of plug load technologies – The existing incentive structure pays for energy reductions through plug load measures. Additional incentives that encourage greater penetration of plug load technologies may be required and will be developed to support technologies recommended by PIER, the Office of the Future Consortium.

Industrial

In accordance with the strategic plan, the goals for industry are as follows:

- Support California industry's adoption of energy efficiency by integrating energy efficiency savings with achievement of greenhouse gas (GHG) emissions goals and other resource goals. To address this objective, the primary strategy is to develop an interagency framework that combines energy efficiency incentives to achieve measured performance improvements in resource management, including water, air quality, GHG emissions, and energy efficiency. One example could be to integrate AB32 requirements to allow industries to use energy efficiency to meet or exceed regulatory requirements for GHG emission reductions.
- Build market value and demand for continuous improvement in industrial efficiency through branding and certification. This goal focuses on companies that want to exceed a minimum regulatory requirement by actively managing their energy use over time. To

[23] For example, as stated in SDG&E's 2010–2012 Energy Efficiency Programs Statewide Commercial Energy Efficiency Program Implementation Plan at p. 43

this end, this program offers CEI options that include participation in a recognized national effort to certify industrial facilities for energy efficiency.

- Provide centralized technical and public policy guidance for California industrial energy and resource efficiency. The primary goal is to provide a clearinghouse of technical knowledge and information so that industry personnel can access information on emerging technology and industry specific research, by leveraging secondary sources on energy efficiency, such as reports and studies developed by organizations such as the DOE and the EPA.

Agricultural

The calculated agriculture program design aggressively supports the goals and strategies within the strategic plan. Specifically, the following actions were advanced during the 2010-12 program cycle, as stated in the Program Implementation Plan[24]:

- Goal 1: Energy Efficiency Knowledge Database
- 1.1 Develop knowledge base of efficiency solutions. Conduct an energy use characterization and efficiency potential study for the statewide agricultural market. Include potential for waste streams to offset energy consumption. Collect data on key programs and measures, best practices for energy efficiency in the agricultural sector.
- 1.2 Ensure workforce has information and training necessary to apply efficiency solutions. Conduct workforce training needs assessment and next steps. Develop training curricula and modules identified by needs assessment.
- 1.3 Conduct research & development of new technologies and practices for agricultural efficiency. Conduct an Energy Technologies/ RD&D gap analysis. Identify and prioritize needed RD&D/ET projects. Coordinate research activities across government, utilities, agricultural extension and university programs, and equipment manufacturer proprietary efforts.
- 2.1 Set objectives and framework for agriculture to attain multi-resource management goals. Establish a task force to coordinate resource management policies, action goals, and program designs targeting California's agricultural sector. Identify where goal conflicts arise and resolve these conflicts. Assess potential for integrated approaches.
- 2.2 Coordinate technical assistance, funding, and incentive mechanisms. Identify the programs and major funding sources affecting the management of energy, air and water resources, and climate change. Create a collaborative forum to facilitate sharing of information and coordination of programs.
- 3.1 Make information on efficiency solutions readily available to motivate efficiency improvements. Develop benchmarking resources, tools and methods for the agricultural

[24] For example, as stated in SCE's 2010–2012 Agriculture Energy Efficiency Program Implementation Plan at p. 366

sub-sectors. Design and launch focused program for irrigation efficiency, refrigeration, and process heating (12/2011).

- 3.2 Conduct marketing & outreach to stimulate efficiency actions. Develop ME&O strategy, addressing communication channels, partners, and effective messaging. Begin pilot implementation.
- 3.3 Resolve metrics for embedded energy in water savings. Update evaluation measurement & verification protocols to define energy impacts of water efficiency actions. Design and conduct appropriate water/energy efficiency pilots for agriculture.

3.1.2 Target Markets

Commercial

Targeted end users include all commercial sub-segments such as distribution warehouses, office buildings, hotels, motels, restaurants, schools, trade schools, universities, colleges, hospitals, retail facilities, entertainment centers, and smaller customers that have similar buying characteristics.

Industrial

Customer types include printing plants, plastic injection molding facilities, component fabrication plants, lumber and paper mills, cement plants and quarries, metals processing plants, petroleum refineries, chemical industries, assembly plants, and water and wastewater treatment plants, among others.

Agricultural

Market sub-segments in this Program vary widely and require targeted strategies. They include: Irrigated Agriculture, Greenhouses, Dairies and Confined Animal Feeding Operations, Post-Harvest Processing Facilities, Food Processing-General, Food Processing-Wineries, and Food Processing-Refrigerated Warehouses.

3.1.3 Eligible Measures

Eligible measures for both the commercial and industrial sub-programs are identical. The agricultural sub-programs contain a slightly different list of eligible measures. Below are brief descriptions of the types of measures that pertain to each sector, followed by the full list of technologies applicable to both sectors.

Commercial

Technologies addressed through this program effort are varied, and include, but are not limited to, lighting, HVAC, refrigeration, food service equipment, boilers, vertical transportation, motors, and plug load controls.

Industrial

The key technology categories addressed through the Statewide Industrial Program are pumping, motors, heat recovery systems, process steam, loads, and heating, air compressors, hot water systems, insulation, and lighting.

Below, in Table 3-1, is a listing of all core calculated measures for commercial and industrial customers grouped by measure category for all IOUs.

Table 3-1: Core Calculated Measures for Commercial and Industrial Customers

End-Use	Measures
ASD	HVAC Compressor Motors
	Others
Heat Recovery Equipment	Process
	Space Conditioning
HVAC	Chiller
	Complete Subsystem Replacement/Upgrade
	Heat Pump
	Other
	Package Unit
Motors Project	HVAC Compressor
	Non-HVAC Compressor
Process	Chiller
	Complete Subsystem Replacement/Upgrade
Refrigeration	Rapid Closing Door
	Complete Subsystem Replacement/Upgrade
	Other
Other	Air Compressor System Replacement Upgrade
	Building Shell Improvements
	Carbon Monoxide Sensors
	Controls – Non-Lighting
	Equipment – Other not specified
	Extruder System Replacement/Upgrade
	Fan and Pump System Upgrades
	Furnace/Energy Efficient
	Injection Molding Machine Replacement/Upgrade
	Insulation
	Lighting
	Lighting Controls
	Pre-cooling Equipment
	Professional Wet Cleaning
	Pumping System Replacement/Upgrade
	Series to Parallel Street Lighting
	Special Window Glazing and Glazing Treatments
	Vacuum Systems
	Window Replacement

Agricultural

Technologies addressed through this program effort are diverse. They include pumping, refrigeration, process loads, process heating, and lighting. Examples of specific measures supported by this sub-program include: High efficiency water heating, greenhouse curtains and infrared films, pipe and tank insulation, steam traps, irrigation, and other nonstandard technologies applicable to this sector.

3.1.4 Incentive Strategy

For the calculated offerings, statewide incentive levels are shown below. These incentives are commonly applied across all three sub-sectors. The incentive is first calculated based on the rates below, and the resulting value is then capped at 50% of incremental project costs.

Table 3-2: Incentive Rates by Measure Category

Category	Rate	Included Measures
Lighting	$0.05/kWh	Interior and exterior lighting and controls
Air Conditioning & Refrigeration I	$0.15/kWh	Major system replacements
Air Conditioning & Refrigeration II	$0.09/kWh	Reduced load measures such as controls or shell improvements
Other Electric	$0.09/kWh	Motors, VSDs, compressed air, process, RCx, and others
Peak Demand Reduction	$100/kW	Permanent load reductions
Natural Gas	$1.00/therm	All natural gas saving measures

3.1.5 Delivery Strategy

The calculated program is delivered uniformly across the IOUs using the same application materials and energy savings calculation to ensure consistency. The program is delivered to customers through a combination of utility and trade ally marketing efforts. Utility marketing efforts might include program promotion through AEs, as well as educational opportunities and other outreach activities; some third-party programs also drive some customers to the calculated programs.

Marketing activities target business customers, ESCOs, trade associations, local business groups and government entities to generate interest and program participation. The programs engage in direct customer contact through AEs or demand response program outreach; they use phone and e-mail as the primary media for direct customer support services.

The calculated program managers also partner with the programs offered by California Energy Commission (CEC), Air Resources Board (ARB), air quality management districts, and other government agencies to capitalize on opportunities to deliver program information to a broader range of customer. To reach customers interested in water conservation and potentially EE, utility program managers will partner with the local water districts to co-brand marketing collateral, attend trade shows, and co-release notices for programs with interactive water and energy effects. Similarly, with ARB and air quality management districts, IOUs offer customers calculated program incentives for energy efficient equipment that may also reduce air and GHG emissions.

In addition, the program delivery is coordinated with the following activities or programs: continuous energy improvement (CEI), integrated demand-side management (IDSM), benchmarking, emerging technologies, codes and standards, and workforce education and training.

3.1.6 Technical Assistance

The primary types of technical assistance offered by these programs include a range of facility audits, savings development assistance, technical review, design assistance, funds for technical studies, technical training, and assistance with using energy analysis tools.

3.1.7 Marketing Approach

Marketing efforts incorporate a variety of marketing tactics/activities to promote the calculated incentives sub-programs. Education, awareness and outreach efforts rely on a combination of mass media communication channels and targeted communication channels to ensure the messages reach the intended audiences with enough frequency to motivate attitude and behavior changes. The marketing strategies include, but are not limited to, a mix of print, direct mail, e-mail, personal contact, trade shows, trade association meetings, customer workshops and seminars, energy related and other community events and partnerships with business and industry organizations, specialized collateral, case studies, website links and information with regular updates, bill inserts, press releases, and newspapers.

3.1.8 Market Barriers and Intervention Strategies

The calculated programs must address certain market barriers in each sub-sector in order to successfully deliver their program offerings. These barriers and intervention strategies are described in the Program Implementation Plans (PIPs), and summarized below.

Commercial

The calculated program addresses a significant number of barriers to energy efficiency for commercial customers such as:

- Tendency to build to code (Title 24) and to stay with known and familiar equipment and designs.
- Lack of awareness and experience with high efficiency emerging technologies leading to a slow rate of adoption, and lost energy efficiency opportunities.
- Insufficient access to information about energy efficiency best practices with respect to technologies and maintenance practices. Lack of awareness of impacts of an energy efficiency project on emissions, resource consumption, or waste discharge streams.

The programs address the above barriers with the following strategies:

- To encourage savings that go beyond code, the programs provide incentives to buildings that exceed code by a specified percentage, and provide up-to-date information on emerging technologies to help bridge the information gap.
- To spur the adoption of newer and emerging technologies, the programs offer incentives for technologies that are proven but not widely adopted (e.g., solid state lighting, advanced lighting controls).
- The programs also provide technical assistance and publications to help address information needs regarding energy efficiency best practices.

Industrial

There are many unique institutional and behavioral barriers that prevent industrial customers from achieving their full technical or economic potential in energy efficiency including the following:

- Limits on capital expenditure due to industry reluctance to invest in projects with greater than two year payback.
- Lack of awareness of energy efficiency opportunities and difficulty in accessing industry specific technical assistance.
- Unavailability of plant personnel trained in energy use management.
- Prioritization of production over energy management.
- Aversion to the risk of investing in new technologies and processes with unknown impacts to industrial output or quality.
- Limited capital and labor resources for assessing and implementing energy efficiency projects.

The programs address the above barriers with the following strategies:

- Calculated incentives were designed specifically to enable projects to meet the two year payback threshold in order to address capital expenditure issues. The incentives also help to address the barrier of limited capital.

- To address lack of awareness on the importance of energy efficiency, a statewide centralized clearinghouse is being developed to give customers access to industry relevant technical assistance, baseline studies, case studies, tools and computer based training.
- Education, training and audits are all available through related sub-programs that customers can access in order to gain a better understanding of energy efficiency opportunities.
- Industrial customers are also eligible for the CEI program. The CEI program features energy efficiency audits or in-depth facility assessments to help overcome technical information barriers described above. Additionally, the IDSM approach offers education and outreach to create awareness on energy efficiency and promote continuous energy efficiency improvements. Both of these complementary programs are cross-promoted through the calculated sub-program.
- The programs also offer technical publications such as case studies in order to address aversion to risk regarding implementing energy efficiency projects.
- Additionally, technical review and assistance provided by IOUs and third-party reviewers help provide industrial customers with needed bandwidth to properly evaluation and scope projects.

Agricultural

Market barriers in the agricultural segment are numerous and include the following:

- General agricultural barriers:
  - The agricultural sector is diverse and geographically widespread, dependent on regional resources for information, and traditionally resistant to change.
  - Capital constraints, combined with variable commodity pricing, limit the availability of funds for investing in projects.
  - Low energy costs relative to other operating expenses reduces the motivation to invest in energy efficiency.
  - Regulatory compliance issues further strain limited internal resources.
  - Lack of awareness of the benefits of energy efficiency, and uncertainty and skepticism over long-term energy and cost savings hinders investment.
- Food processing and industrial refrigeration barriers:
  - Few firms maintain facility level energy managers, and finding technically qualified staff is an ongoing challenge.
  - Regulatory compliance issues further strain limited internal resources.
  - International competition drives facilities to a short-term survival attitude as opposed to a long- term continuous improvement approach.
  - The industrial refrigeration industry lacks design standards and best practices, resulting in substandard design and maintenance.

- Huge capital outlay requirements in industrial refrigeration can delay or offset efficiency projects.
- Efficient design alternatives can be lost in low-cost bidding scenarios.
- Whole system opportunities are often missed by individual equipment vendors.
- Customers are often not aware of systems operating sub-optimally.

The statewide agriculture program considers these barriers in all aspects of program design. The program offers a mix of incentives, retrocommissioning, technical assistance and education and training in order to specifically address these challenges. In addition, the program works closely with trade allies to inform them about efficiency technologies, practices, programs, and rebates via a combination of training and marketing/outreach activities.

3.2 Quantitative Features Summary

This section summarizes the quantitative features of the core calculated programs including budgets, goals, savings by measure, and savings by project size. These figures are shown in some cases by sector and in other cases by utility.

3.2.1 Funding Levels and Adequacy

Program funding levels are adequate to meet savings goals. Statewide and utility-specific budgets for Program year 2010-2012 core calculated commercial, industrial and agricultural program segments are shown below in Table 3-3. These were obtained from Program Implementation Plans filed with the CPUC.

Table 3-3: Program Funding Levels by Utility

Utility	Commercial	Industrial	Agricultural	Total Budget Calculated
PG&E	$77,344,484	$55,201,746	$34,039,892	$166,586,122
SCE	$51,369,662	$74,763,433	$16,694,293	$142,827,388
SDG&E	$4,248,850	$11,704,376	$3,830,683	$19,783,909
SCG	$7,970,900	$52,350,450	$5,886,576	$66,207,926
Total	$140,933,896	$194,020,005	$60,451,444	$395,405,345

3.2.2 Participation and Tracking Data Analysis

Calculated program tracking data through Q2 2011 were analyzed in detail to learn the characteristics of participants to-date. Specifically, the data were sorted by measure type or end-use, business type and size to reveal the predominant measures or end-uses being installed, and the market segments and sizes of customers most active in the program. To simplify the analysis, data were sorted on the project incentive variable, since this is a common metric across electric

and gas projects. The incentive is a good proxy for energy savings since it is directly calculated from a $/unit savings formula.

By Measure Group or End-Use

Tables 3-4 through Table 3-7 show total incentives by end-use category for each utility through June 2011.

Table 3-4: PG&E Incentives by End-Use Category (as of June 2011)

End-Use Category	Incentives (dollars)	Percent of Total
Process	19,930,962	51%
Hvac	8,161,651	21%
Lighting	3,244,467	8%
Refrigeration	1,914,339	5%
Retrocommissioning	1,720,841	4%
Pocs	1,150,765	3%
Ag pump	1,079,061	3%
Building Envelope	937,411	2%
Tank Insulation	557,290	1%
Pipe Insulation	199,481	1%
Steam Trap	180,914	0%
Pool Pump	88,296	0%
Whole Building	72,164	0%
Water Heating	22,048	0%
Total	39,259,691	100%

For PG&E, the most predominant end-use is Process. Most of the tracked projects and savings in this category (69%) are in the Industrial program. Other important end-uses include: HVAC, lighting, refrigeration, retrocommissioning (RCx), pump-off controllers (POCs) and building envelope.

By program, the most important end-uses are as follows. The percentages shown reflect proportion of program Incentives

- PGE21011 (Commercial) – HVAC (48%), Lighting (17%), Process (23%), RCx (8%)
- PGE21021 (Industrial) – Process (88%), HVAC (4%), RCx (4%)
- PGE20031 (Agricultural) – Process (35%), Refrigeration (18%), Pumps (13%)

Table 3-5: SCE kWh Savings by End-Use Category (as of June 2011)

End Use	Incentives	Percent of Total
Process	9,352,323	40.0%
Hvac	4,563,005	19.5%
Lighting	4,126,977	17.7%
Refrigeration	2,395,158	10.3%
Ag Pump	2,047,212	8.8%
Other Motor Replacement	537,848	2.3%
Pool Pump	110,157	0.5%
Retrocommissioning	78,722	0.3%
Building Envelope	75,924	0.3%
Pocs	45,069	0.2%
Tank Insulation	33,336	0.1%
Plug Load Desktop Computer	320	0.0%
Water Heating	282	0.0%
Total	23,366,334	100%

For SCE, the most predominant end-use is also Process. Most of the tracked projects and savings in this category (79%) are in the Industrial program. Other important end-uses are: HVAC, lighting, refrigeration, agricultural pumping and other motor replacements.

By program, the most important end-uses are as follows. The percentages shown reflect proportion of program Incentives.

- SCE-SW-002B (Commercial) –Lighting (34%), HVAC (27%), Process (20%), Refrigeration (15%)
- SCE-SW-003B (Industrial) – Process (62%), HVAC (17%), Lighting (8%), Refrigeration (8%)
- SCE-SW-004B (Agricultural) – Agricultural Pumping (87%)

Table 3-6: SDGE kWh Savings by End-Use Category (as of June 2011)

End Use	Incentives	Percent of Total
Hvac	1,090,738	44%
Process	463,738	19%
Lighting	440,168	18%
Refrigeration	244,494	10%
Other	173,488	7%
Whole Building	59,600	2%
Total	2,472,226	100%

For SDG&E, the most predominant end-use is HVAC. Most of the tracked projects and savings in this category (88%) are in the Commercial program. Other important end-uses are: process, lighting and refrigeration.

By program, the most important end-uses are as follows:

- SDGE3105 (Commercial) – HVAC (45%), Lighting (20%), Process (17%), Refrigeration (11%)
- SDGE3109 (Industrial) – HVAC (41%), Process (30%)

Table 3-7: SCG Incentives by End-Use Category (as of June 2011)

End Use	Incentives	Percent of Total
Process Other	4,204,813	52%
Whole Building NRNC	1,226,681	15%
Process Heat Recovery	1,079,475	13%
Process Boiler	675,404	8%
Hvac Furnace	620,745	8%
Other	259,165	3%
Food Service	79,958	1%
AG Pump Overhaul	7,291	0%
Total	8,153,530.58	100%

For SCG, the most predominant end-use is process-other, which accounts for just over half of the activity to-date. Most of the tracked projects and savings in this category (81%) are in the industrial program. Other important end-uses are: whole building NRNC (15%) and process-heat recovery (13%).

By program, the most important end-uses are as follows:

- SCG3607 (Commercial) – Process Other (66%), Process Boiler (14%), Whole Building NRNC (13%)
- SCG3611 (Industrial) – Process Other (49%), Whole Building NRNC (16%), HVAC (16%)
- SCG3602 (Agricultural) – HVAC Furnace (44%), Process Other (34%)

Average Size and Overall Distribution of kWh By End-Use

Figure 3-1 below shows the distribution of kWh savings by end use for each IOU and the total portfolio as of December 2011. Overall HVAC and Process account for more than half the savings, though lighting is not an insubstantial third, at about 20% of the portfolio. SCE has a greater emphasis on Process measures. For SCE HVAC, Process and Lighting account for almost 90% of kWh savings. For SDG&E, HVAC and Lighting make up most of the savings.

Figure 3-1: Distribution of kWh Savings by IOU and End-Use

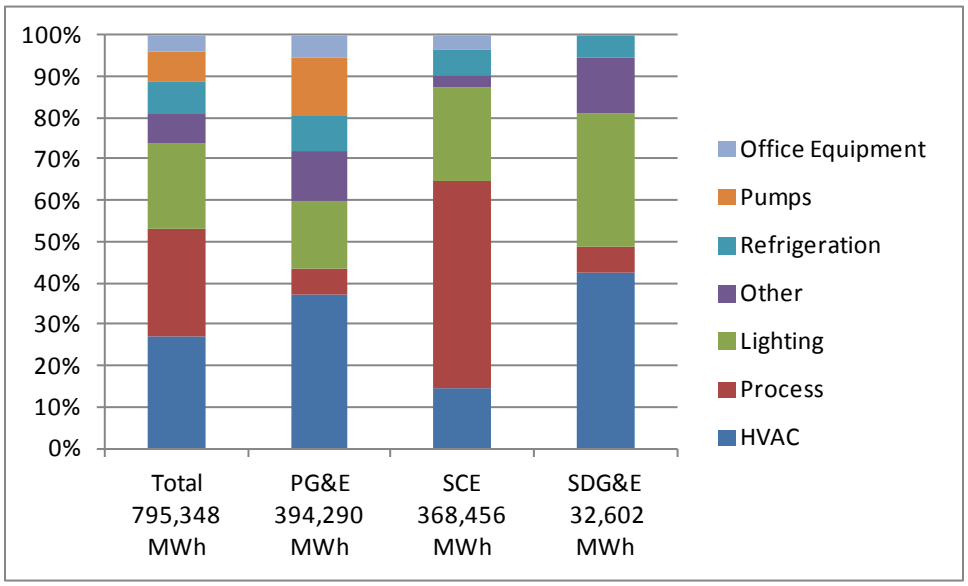
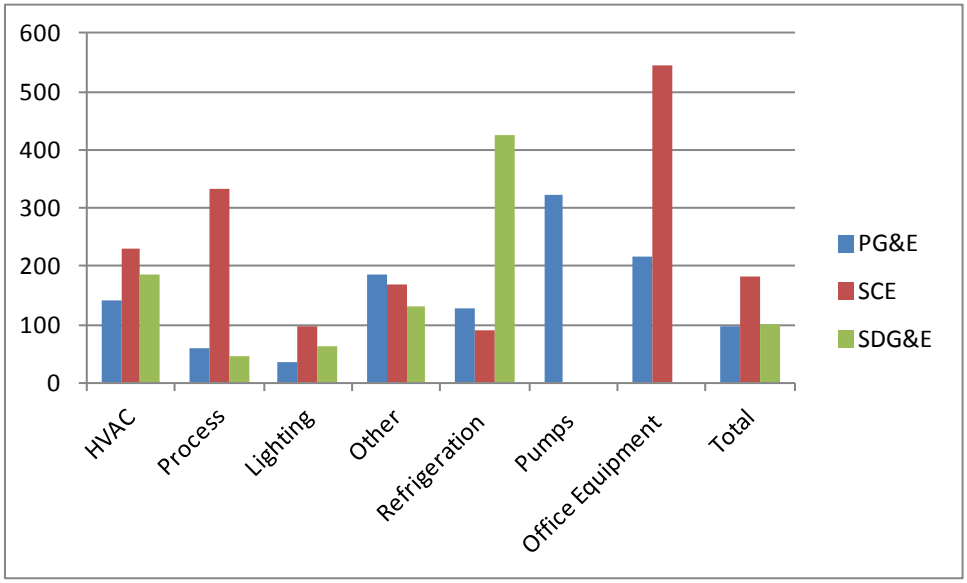


Figure 3-2 below shows average savings by IOUI and end-use on a per-site basis, as well as overall by IOU. The figure underscores differences across the IOUs in emphasis and patterns. SCE has by far the largest average project size overall, and in nearly every end use category where it has participation (except Other and Refrigeration). The biggest difference between SCE and PG&E/SDG&E is in the process end use where SCE average project size is about 6 times larger than the others.

Figure 3-2: Average Per-Site kWh Savings by IOU and End-Use



4

Assessment Results

This section assesses the current state of the calculated programs run by the IOUs. The findings are organized into a program decomposition model that is drawn from the best practices study sited previously: Volume NR5 of the *National Energy Efficiency Best Practices Study – Non-Residential Large Comprehensive Incentive Programs Best Practices Report.* The decomposition model breaks down the lifecycle of implementing these programs into its component parts:

- Program theory and design
- Program management
- Reporting and tracking
- Quality control and verification
- Marketing and outreach
- Participation process and customer service
- Installation and delivery mechanisms
- Evaluation and adaptability

For each subcomponent, observations of existing practices are provided and analyzed for advantages and disadvantages, considered against potential alternatives, and compared against known best practices, which are drawn from the *National Energy Efficiency Best Practices Study* report noted above. Finally, the known best practices are modified and updated to reflect shifting circumstances and innovative or unique programmatic elements.

4.1 Program Theory and Design

Program theory and design is the first stage in the programmatic lifecycle. For the calculated programs, which are statewide, key defining features such as eligible measures and incentive rates are common to all programs. Execution of the programs in terms of management structure and participation process falls under the subsequent sections of this report.

4.1.1 Current Practices

This section examines the current practices in program theory and design as related to the calculated programs. The discussion on program theory and design includes programmatic objectives, innovation in design, and barriers to implementation.

Programmatic Objectives

The calculated programs have a broad mandate within the overall EE portfolio. The program design allows for a broad range of technologies, and significant flexibility in how the program is applied. The calculated programs are "one size fits all" and complement the core deemed programs; the former handles lower-volume, higher-savings, higher-complexity, higher-risk projects, whereas the latter handles higher-volume, lower-savings, lower-complexity, lower-risk projects. The interplay between calculated and deemed programs allows the IOUs to cover a broad range of project opportunities through both program paths. The calculated programs are specifically design to support a range of project types including routine maintenance projects, improvements to meet standard practice, and projects that have already been initiated. Prior evaluations have found that this flexibility can come at a cost since each of the situations mentioned above results in little or no program-induced savings.

Advantages of Flexibility

Drawbacks aside, flexibility helps the programs achieve their programmatic objectives and goals. The calculated programs' main goal is resource acquisition or achieving cost-effective energy savings. The primary metrics for measuring achievement of resource acquisition goals are expressed in terms of kWh, kW, and therm savings. The programs are set up well to achieve those goals by incentivizing customers on a per-unit-saved basis.

Furthermore, in service of cost-effective energy savings, there is flexibility in the calculated incentive rates; incentive amounts per unit saved are a function of the types of equipment being replaced. This helps to ensure program dollars are well spent. For example, lighting is a measure that typically pays back in a relatively short period of time, which suggests that customers do not need as much of an incentive to drive installation. For this reason, the Core Calculated programs pay \$0.05/kWh[25] for lighting projects as compared with \$0.15/kWh for capital HVAC projects, which tend to have longer payback times.

Similarly, the flexibility to provide differing levels of scrutiny to different projects enables the programs to distribute limited program review resources effectively in an effort to control costs. For example, lighting measures are fairly simple, with little risk in savings. They receive less scrutiny in terms of M&V requirements in the review process than comparatively complex industrial process measures. M&V and review details are addressed in the Quality Control and Verification section below.

[25] This incentive applies to measures incented through the Calculated program and categorized as lighting. http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/ief

Alternative Policy Objectives

Alternative policy objectives such as deployment of emerging technologies or serving hard-to-reach markets are not key components of the calculated program design. The broadness of the calculated programs' scope of customers and important role in the larger EE program portfolio require that the programmatic design elements be geared primarily towards resource acquisition instead of other secondary goals. These alternative objectives are likely pursued more rigorously in other portions of the portfolio. For instance, third-party programs were developed to reach underserved and hard-to-reach markets; there are also specific programs dedicated to increasing the adoption of emerging technologies.

However, the calculated program staff are currently at an advantage compared with third-party programs in the pursuit of secondary objectives, particularly qualitative ones such as market transformation. This advantage stems from the fact that they are closer to the policy-setting process than third-parties who are one degree removed and less familiar with important policy decisions; additionally, the calculated programs do not have as much of a personal monetary stake in the achievement of resource acquisition goals as compared with third-parties who are paid primarily on a pay-for-performance basis. For example, the market transformation objective is often expressed as a desire to instill principles of energy management amongst the largest commercial and industrial customers. However, this is a cultural artifact rather than a hard element of program design. If, for instance, the third-party program contracts were redrawn to include secondary objectives, they would redesign their programs to include elements that would achieve the stated objectives.

Barriers to Implementation

The programs have been designed with the barriers to implementation in mind. All Program Implementation Plans (PIPs) are required to include barriers to implementation as part of the design process. While the PIPs are typically not revamped substantially from cycle to cycle, they do include consideration for these barriers and force the IOUs to build the programs around them. Key barriers from the PG&E statewide PIP include the following:

- Limits on capital expenditure due to industry reluctance to invest in projects with greater than two year payback
- Lack of awareness of energy efficiency opportunities
- Difficulty in accessing industry specific technical assistance
- Unavailability of plant personnel trained in energy use management
- Prioritization of production over energy management
- Aversion to the risk of investing in new technologies and processes with unknown impacts to industrial output or quality

- Limited capital and labor resources for assessing and implementing energy efficiency projects

A brief review of these barriers suggests that some, but not all, are being addressed by calculated programs in full. For instance, barriers related to limited capital and labor resources are addressed, at least partially, by program incentives. Barriers regarding lack of awareness on energy efficiency and lack of trained facility personnel are addressed, at least partially, by the technical assistance provided by in-house and contracted staff both pre- and post-sales. Clearly, not all barriers are addressed completely by the calculated programs. Many of these challenges are addressed by other elements of the overall portfolio, which supplement the offerings of the calculated program. For instance, some of these challenges are also being addressed by the third-party industrial programs in addition to the calculated programs, which may not offer the depth of expertise that third-party programs might offer. The audit programs support overcoming lack of awareness on energy efficiency. This is not necessarily a shortcoming of the calculated programs, per se, but it is an important conclusion. The calculated programs are not designed to overcome all the barriers to energy efficiency, but rather serve as a broad-based solution to some of the most key informational, technical, and financial barriers to implementation of EE projects.

Innovation in Program Design

The calculated program is a mature program, which has been in place for more than two decades. For this reason, changes tend to be incremental and there is very little innovation in program design occurring. Interviewees expressed that this is intentional. Programmatic constancy and consistency was repeatedly cited as one of the greatest assets of the calculated programs across the IOUs. Keeping key stakeholders including AEs, vendors, and customers up to date on program requirements is an important aspect of program marketing and a major challenge; having a consistent program makes that effort much easier for program staff.

It was also noted by interviewees that the program design process is incremental. It is not "once-per-cycle" as one interviewee put it, but rather an ongoing process that occurs through regular meetings where program adjustments and changes are considered and adopted over time. Deployment of smart meter technologies, more precise energy usage statistics, and predictive energy usage models may help drive innovation in the future.

Incremental changes over time can be challenging operationally. For example, changes may include the occasional removal of measures from programs. Typically changes to measure eligibility affect all programs equally and at the same time, and can be most challenging for measure focused 3P programs that have fewer options to fall back on. For the IOU Calculated programs, such a change may force Account Executives to disappoint some customers, but overall the program is able to absorb these changes well due to its size and comprehensiveness.

Statewide Programs and Innovation

While the IOUs do have latitude with regards to certain design elements and how they execute the program, the core design elements are intentionally the same since the calculated programs are statewide. Consequently, it should be no surprise that changes are incremental. IOUs do not have the authority to completely overhaul the program on their own. Rather, they focus on subcomponents of program design; for example, SCG recently overhauled their application process. Since the core elements of program design are standardized across the state, IOUs primarily do not make sweeping changes to fundamental program design.

Small changes are made at times to the statewide calculated program elements. For instance, the IOUs have implemented a $100/kW kicker to encourage projects with greater demand reduction. This example highlights an important point; the changes made are largely incremental, not a fundamental recasting of the system. The calculated incentive structure – incentive rates based on end use – has not changed in multiple cycles. Such wholesale changes are difficult because so many stakeholders are involved in and are affected by the design process. The merits of changing the incentive structure, specifically, are discussed later in the Installation and Delivery section. Fundamentally, though, concern with program stability over the short- to mid-term is justifiable; however, program consistency comes at the cost of long-term innovation.

Ideas for Change from Program Staff Members

Although sweeping changes do not often occur, program design changes are definitely considered. In fact, interviewees cited a number of specific and interesting program adaptations that they personally had been considering. The scope of these ideas covered a broad range of topics and they are highlighted where relevant in the sections that follow. Regardless of the topic, the magnitude of the number of changes being considered is substantial, suggesting there are ideas brewing within the IOUs that could reshape the programs should they gain sufficient momentum and endorsement. Because it is a statewide program, calculated program designs need to retain elements of consistency across IOU, adding to challenges of establishing enough agreement to institute major changes.

4.1.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Anticipate and tackle large non-residential market challenges directly.

As part of the process of submitting PIPs, managers of the IOUs' calculated programs are required to consider and document the key barriers addressed by the programs. The incentives and technical assistance provided by these programs meet some, but not all, of the non-residential market challenges that are recognized throughout the EE industry. This approach is reasonable and desirable given that the core calculated programs have a broad-based role to play and cannot effectively meet every barrier all at once. Other elements of the portfolio (e.g., third-party industrial programs) have been tapped to meet some of the barriers that the core calculated programs only partially or ineffectively address.

Link the mix of program features to policy objectives and resource constraints.

The IOUs' calculated programs effectively achieve their primary objective of cost-effective resource acquisition. One of the programs' primary design elements – flexibility – is tied to many of the functions that enable the programs to achieve this objective within the programmatic resource constraints. However, the calculated programs have very few elements that directly align the programs with alternative policy objectives such as market transformation, deployment of emerging technologies, and pursuit of hard-to-reach markets. This, again, is reasonable and, to a degree, desirable in that the program is broad-based and cannot pursue all objectives at once. Many of these other objectives have been outsourced to other portions of the portfolio such as emerging technologies programs and third-party programs.

Develop a sound program plan, if possible have a clearly articulated program theory.

All programs are required to submit PIPs, which include justification of the program design and the theory behind its development. It is unclear, however, the extent to which these plans are understood or read by program staff. Since most staff interviewed were not involved directly in the planning stages, it seems that many individuals were not exposed to information pertaining to the origin, evolution, and justification of key design elements.

4.1.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices inclusive of the previous known best. A brief description follows the list below.

Program Management: Project Management – Best Practices (Existing and New)
Existing ■ Anticipate and tackle large non-residential market challenges directly. ■ Link the mix of program features to policy objectives and resource constraints. ■ Develop a sound program plan, if possible have a clearly articulated program theory. New ■ Balance the need for programmatic constancy and consistency with the need for fundamental program innovation over time.

- **Anticipate and tackle large non-residential market challenges directly.** The large non-residential market poses unique challenges because these end users and their suppliers are very sophisticated and their projects are often very complex. As a result, certain challenges, such as free ridership and gaming, are present in this market and should be expected and planned for whether a program is new or mature.
- **Link the mix of program features to policy objectives and resource constraints.** Programs that put support of the private sector energy services industry high on their list of objectives will likely have different participation features and administrative functions than those that do not. Programs with smaller budgets relative to market size and concerns over equity may have lower maximum incentive caps than programs with fewer constraints. Prioritizing objectives and taking stock of resource constraints helps clarify among competing design choices.
- **Develop a sound program plan, if possible have a clearly articulated program theory.** Articulate a program theory that clearly states the target for the program, program timing and the strategic approach whether resource acquisition or market transformation. Even a relatively simple statement of program logic can reveal gaps in program focus or effort and assure that everyone involved knows what the program seeks to accomplish and why.
- **Balance the need for programmatic constancy and consistency with the need for fundamental program innovation over time.** Programmatic constancy and consistency is an important element of maintaining market awareness and ensuring program partners have up-to-date information. Changing slowly or not at all can ensure that marketing keeps up with program changes. On the other hand, constancy and consistency cannot come at the expense of fundamental program innovation over time. Programs must adapt in transformative ways to shifting policy objectives and market features as well as in response to improved understanding over time of how the design elements have impacted the deployment of EE technology.

4.2 Program Management: Project Management

The management of calculated projects is uniquely challenging. Projects are larger and more complex than on the deemed side, and they require a greater level of scrutiny. Program rules are, as a result, similarly complex and more numerous. Application development and savings estimation can be a complicated and lengthy process. Technical review and pre- and post-installation verification are substantially more involved than in other program offerings such as the deemed programs. These fundamentals require a greater level of customer and program engagement as a project evolves from concept to implementation.

The project management functions must be designed and organized to tackle these challenges. Functional structure becomes a critical element of project management as the information flows among in-house staff, contractors, vendors, and customers. An effective structure is what ensures that a project moves forward successfully.

The IOUs each take somewhat different, though not wholly divergent, approaches to their internal organization and project management functions. The current frameworks for management structure and policies have evolved from the structures used in previous cycles. This aspect is important as skills, knowledge, relationships, and culture evolve more slowly than the structures that govern roles and responsibilities.

4.2.1 Current Practices

Below are brief high-level descriptions of each IOU's organization followed by discussion and characterization of key aspects of the various models, including their merits and associated challenges. The organization structures range from a function-oriented model (at PG&E) to a more traditional, program-oriented model (at SDG&E). In the case of PG&E and SCE, the descriptions are based on staff interviews regarding management structure; for SDG&E and SCG, the description is based on the Sempra Process Evaluation.

PG&E

The PG&E organizational structure has evolved substantially through the last three cycles. In the 2004-2005 cycle, the structure was program-oriented with staff delineated between new construction projects and retrofit projects. This structure changed in the next cycle to a market-oriented model, with staff dedicated to a specific market; in this model staff members are responsible for dispersed elements of program management such as technologies, policy, marketing, and project stewardship. While this is credited with enabling a deeper engagement with customer needs, it was ultimately replaced by the current function-oriented model. The functional model divides staff by task function – project processing, technology and measure development, policy operations, marketing, etc. – and has those staff across all programs. For instance, the project office processes all applications.

SCE

The SCE model is similar to PG&E's, but did not evolve the same way. SCE did not focus on market segments the way PG&E did in the previous cycle, but rather was more consistently program-oriented. The organization is similarly function-oriented, now, though with less granularity of functional responsibility than at PG&E. SCE has similar dedicated processing functions. They've also developed the Energy Engineering Group, which is responsible for tracking all technologies and measures that come through a program to ensure compliance with current policy and discourage those that appear to be standard practice.

SCG/SDG&E

SCG and SDG&E employ very similar program management models. The models are still program-oriented. Unlike SCE and PG&E, there are staff members dedicated to managing a program, as opposed to managing a function that supports multiple programs. The managers often oversee more than one program and are responsible for day-to-day activities as well as strategy. One noteworthy change from previous cycles is that AEs are now the sole point of contact for customers engaging with programs.

Transitioning to Functional Organizations

The new function-oriented models in use at PG&E, and to a lesser extent SCE, offer distinct advantages as well as challenges. The primary motivation of moving to a function-oriented model is the economies of scale that come from consolidating functions across programs. For instance, PG&E's old market-focused model led to redundant efforts at measure development, as similar measures are needed across market segments. By consolidating technical work in one group – the Technical Product Solutions group – they eliminate those redundancies. They also gain from having experience and technical expertise shared within a close-knit group; skills and knowledge development are magnified. This consolidation is valuable across programs and not just in vertical markets. Staff at SCE spoke of consolidation of the calculated project processing engine across the third-party, partnership, and calculated programs. This eliminates redundancies as in the above example, and also helps ensure that rules are consistently applied. There are many benefits of consolidation, depending on the particular nature of the function being affected.

Staff also reported challenges with the function-oriented model; chief among them is a lack of clarity around roles and responsibilities. One knowledgeable staff member noted: "It's a lot to keep straight!" Specialization offers advantages, but the more specialized the various groups become, the more numerous they are. During various interviews, staff members were confused about various acronyms and their meanings. There was also confusion about which roles and responsibilities were housed in which groups. This confusion was particularly evident at PG&E where the changes have been the most dramatic and rapid. At the time of the interviews, the changes were only two years old. While that is not a short period of time, the substantial nature

of the changes places quite a burden on staff to adapt to a moving organizational target as things are tweaked until the organizational structure is fully adopted.

Additionally, many staff members reported that certain aspects, particularly market-oriented ones, get less attention than is necessary as a result of this function-orientation. This was emphasized at PG&E, but mentioned also by staff at SCE, though less directly. At PG&E the legacy of the 2006-2008 market-oriented organization still lingers; staff who were focused on one market or another still have that knowledge and expertise, but have been shifted to be in a cross-cutting role. These staff members are often denoted market "leads." Over time, the knowledge and expertise of these leads may degrade as they are replaced and their day-to-day duties (which relate to one function or another) swamp their interest in markets. Parallel sentiments were expressed by SCE staff regarding a lack of emphasis on customer-specific, niche-specific markets. Note that this issue is not necessarily specific to a function-oriented model. SDG&E and SCG staff were not interviewed, but the program-oriented model they follow is similar to that of PG&E during the 2004-2005 cycle, which led to the development of the market-oriented model in response to the shortcomings of that cycle.

End-to-End Management of Projects

Dedicated end-to-end management of projects was highlighted in a number of interviews and in the Sempra process evaluation as an important evolution in project management. Organizationally, this is accomplished through different mechanisms with varying results.

At SCE and PG&E, there is an office dedicated to the processing of applications and projects. Their sole responsibility is to manage the day-to-day tasks necessary to support a particular project. They handle all paperwork and logistics, though major non-logistical functions (e.g., technical review) are outsourced to other groups.

At SDG&E and SCG, the AEs are the dedicated point of contact for all interaction between the customer and the utility EE programs. At SCG, the AEs have taken on many of the roles that the project processing groups do at SCE and PG&E, such as generating customer agreements and final incentive worksheets. At SDG&E, these functions are still handled by program staff members who have dual roles of processing projects and handling strategic issues. It is unclear whether the AEs actually drive the process or simply act as a conduit for the program staff members who drive the process; the latter is the more likely scenario. Not all accounts have dedicated AEs, though, which raises the question of whether the non-AE accounts are receiving adequate attention.

Customer Confusion

Regardless of how it is accomplished, end-to-end management should, if executed correctly, reduce customer confusion. Previously, customers have reported being confused about who to contact at the IOUs regarding projects and what each person's responsibilities are. By funneling communications through one point of contact, customers should in theory see one representative of the IOU. In practice, this is challenging to execute because the customer must necessarily support technical review by enabling reviewers to walk through the facility or by providing data and back-up. Coordinating these types of events or funneling this type of information through a single contact can be burdensome and slow down the process as compared to direct coordination and information sharing between a customer and technical reviewer. Typical project management gets short-circuited this way. Ultimately, so long as the AE or project processing office staff member stays updated and involved in the project – even if at the periphery – this can still accomplish the goal of reducing customer confusion. This is done by providing them a single contact who can respond to their issues, even if that simply involves referring them to the appropriate person.

Project Ownership vs. Communications

The issues with customer confusion and short-circuited management highlight another important topic: project ownership. This is a key difference between the PG&E/SCE and SDG&E/SCG models. In the former, the project office staff member has ownership and responsibility for the project from the moment it enters that office until the moment the customer receives their incentive check. Their success and achievements are measured based on their ability to drive projects through to completion. Continuity and consolidation of ownership has been credited by interviewees with improving cycle time and project quality while reducing "dropped" projects (projects that apply, but are ultimately not completed). However, this could not be directly verified. On the flip side, AEs are responsible for end-to-end management of *communications* while the primary responsibility and ownership of the project exists in the program management office. At SCG, some formal responsibilities have migrated to the AEs, which helps with project communications. Still the overall project ownership resides with the program managers, which creates a problem in that communications and ownership are split.

Separation of Day-to-Day and Strategic Activities

A consequence of the functional model and, more specifically, the consolidation of project processing, is that program managers no longer split duties between day-to-day and strategic activities. Day-to-day activities center on project-specific issues such as resolving baseline questions and determining free ridership for a specific application. Strategic issues are more forward-looking and revolve around broader questions such as how to assimilate programs to CPUC policies, improve program uptake and expand the business. Each set of activities is

important in its own way, but when responsibilities for both are shared by the same person or set of people, the day-to-day activities will, according to interviewees, consistently take precedence. The reason is that day-to-day activities tend to take the form of "firefighting": responding to the moment's mini-crisis. Strategy is systematically pushed to a later time, when the moment of crisis has subsided; however, new crises continually arise, and thus strategy is continually pushed to the side. As a result of separating day-to-day and strategic activities, both PG&E and SCE staff have reported significant benefits from the increased attention toward long-term strategic issues. This should enable the IOUs to better align their programs with CPUC policies while also increasing day-to-day accomplishments.

Staff Allocation

The allocation of staff talents and knowledge, both organizationally and geographically, is important to effective project management. The IOUs' staff resources are limited and must serve a large volume of customers. Each of the IOUs exhibited unique characteristics in this regard.

Organizational Staff Allocation

At SCE and PG&E, the function-oriented model supports effective staff allocation by enabling talents to be put where they are needed most. In particular, engineering talent is concentrated in high-value areas within the organization, both pre- and post-sales, within the Customer Sales Operations (CSO) at PG&E (which does pre-application savings development) and the Business Customer Division Field Engineering Group and Customer Energy Efficiency and Solar (which perform site surveys, energy savings estimation, and project scoping) and the Energy Engineering Group at SCE (which does pre- and post-application savings review for policy issues). By consolidating these resources, the IOUs can better afford to have specialists and experts. Additionally, by focusing on functional roles, scarce engineering talent does not need to do double-duty on other responsibilities.

Also at SCE and PG&E, engineering talent has been put right on the front line, helping to develop savings estimates. This is done through Tier II processing at SCE and via CSO at PG&E. These groups are partially a result of the functional orientation of their structures, but also the result of deliberate choices to move engineering talent to pre-sales roles. Allocating this talent at pre-sales serves as an effective way to assimilate projects to program policies and savings methodologies. It helps set expectations and avoids customer disappointment from results post-review that incorporate significant reductions in savings estimates. It also ensures that the applications are more complete and accurate. In the case of CSO, the talent is not simply technical; staff also have specific market segment knowledge.

Geographic Staff Allocation

Geography is also important element of skills allocation. SCG reported significant problems with their review processes because they relied on outsourced engineering and verification talent that was housed at SDG&E. The SDG&E staff is located in San Diego and makes trips to the northern part of SCG territory only once per month. This profoundly slows the process and upsets customers. SCG is working to bring this talent in-house to better cover their service territory, which highlights the importance of considering geographic coverage when deciding where to locate talent. PG&E's AEs and CSO staff demonstrate a useful practice regarding this issue; they are geographically dispersed to provide coverage of all of PG&E's territory effectively. Moreover, the AEs and CSO are in the same location and in some cases even have project processing and review staff on-site as well. This facilitates rapid communication and interaction among PG&E staff as well as between PG&E staff and customers.

Use of Contractors

Contractors play an important role in project management. While all utilities maintain control of program management and processing, key technical responsibilities are outsourced. This contracted engineering help is similar to third-party programs, but is not nearly as comprehensive. In this case, while contracts are in place for a long period of time, specific task orders are drawn up on a project-by-project basis and only as necessary.

Outsourcing of technical resources occurs for both pre- and post-sales roles. For instance, PG&E's CSO hires contractors to help develop savings calculations. All the IOUs use contractors to help with technical review. Typically, contractors are called in for one of two reasons. The first, and most common, justification is that they have specialized expertise and skills that the IOU lacks. It is cheaper for the IOUs to outsource more complex projects than to develop the in-house skills necessary to tackle them on a regular basis. Second, project volume tends to ebb and flow. The IOUs can rely on contractors to make up that slack during periods of high volume.

The management of contractors becomes an important element of project management when they are relied upon frequently in the program cycle. SCE staff highlighted this issue the most. Multiple staff spoke to the importance of understanding the difference in IOU and contractor motives. To that end, SCE has converted all review contractors payments to fixed-price milestone-based contracts. This helps align the incentives of the contractor and IOU by highlighting the relative value of various tasks. Additionally, SCE has developed the Contractor Connection Newsletter, which keeps contractors in the loop about major changes and ensures they are consistent with the IOU. SCE was not alone in these sorts of management activities, but these best highlight the importance of keeping contractors closely aligned with IOU needs and objectives.

4.2.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Develop and maintain clear lines of responsibility and communication.

This practice is still relevant. IOU practices in this area need significant improvement, particularly at PG&E where substantial changes to organizational structure have blurred these lines. Compliance with this practice has been further compromised by attempts to make the AE a single point of contact for a project, while maintaining project ownership elsewhere in the organization.

Use well-qualified engineering staff.

All IOUs have made it a priority to use well-qualified technical staff. Where this is not possible, contractors are hired to fill knowledge gaps. The new function-oriented models also help to concentrate this talent, which also facilitates the development of skills and expertise internally.

Motivate field staff and efficiency service providers.

The AEs in all cases have EE goals, which help to motivate them in terms of the whole project development process. Similarly, efforts have been made (e.g., the fixed-price contracts at SCE) to better align the incentives of the contractors and those of the IOU.

Maintain consistency in personnel over time.

All IOUs struggle with this practice. This was called out as a specific problem area in the Sempra process evaluation. It was also highlighted in interviews with PG&E and SCE. Their staff members tend to change jobs many times. The constant reorganizations, particularly at PG&E, continue to make this a challenge.

Delegate responsibility based on risk versus reward.

This practice is exhibited in a number of ways. Technical resources are outsourced when internal skill cannot match up to the complexity of a project. In terms of the functional model, less technical or risky roles are consolidated and staffed by less technical or more junior staff.

4.2.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices, inclusive of the previous known best practices. A brief description follows the list below.

Program Management: Project Management – Best Practices (Existing and New)
Existing ■ Develop and maintain clear lines of responsibility and communication. ■ Use well-qualified engineering staff. ■ Motivate field staff and efficiency service providers. ■ Maintain consistency in personnel over time. ■ Delegate responsibility based on risk versus reward. New ■ Effectively allocate staff geographically and organizationally to meet the needs of customers. ■ ■ Separate day-to-day and strategic management functions.

- **Develop and maintain clear lines of responsibility and communication.** Programs with multiple entities involved, such as technical support contractors, must ensure that lines of responsibility and communication protocols are clear. Usually technical support contractors work with participants to review applications and assist them in meeting program requirements; however, program administrators make the final decisions on whether to accept a project and how much incentive to pay. Subcontracting out too many responsibilities to too many different players can pose a challenge. Whatever the mix of responsibilities, the process should appear integrated and seamless to participants.
- **Use well-qualified engineering staff.** Projects in large facilities are often extremely complex and unique to individual sites. A high level of engineering expertise is needed to assess project validity, estimate or measure savings, and assure proper implementation. Staff requirements typically include many years of experience with project development and savings analyses, particularly in the industrial sector, combined with a professional engineering license (PE).
- **Motivate field staff and efficiency service providers.** Field staff are an important asset to successful program operation in many of the programs reviewed. In utility-run programs, account executives typically maintain customer contact, follow market trends, take an active role in end user recruitment, and work with the customer throughout the implementation process. In other programs, such as California's SPC, NYSERDA's C/I Performance, and Xcel's Bidding program, private sector energy-efficiency service

providers also play an active and important role in developing end user projects and carrying out program participation requirements on behalf of their customers. In either case, it is important to have a motivated pool of marketing and engineering talent to prospect for projects and ensure a smooth participation experience.

- **Maintain consistency in personnel over time.** Maintaining consistent administration and support service personnel is important to cost-effectively managing customer specific projects in the large non-residential market. Many of these efficiency projects can take several years to implement from the initial project prospecting to final installation. Various implementers reported that high staff turnover inhibits timely implementation of the program process as new staff must come up the learning curve on what are often complex projects.
- **Delegate responsibility based on risk versus reward.** Program management activities are extensive for these types of programs due to the complex, site-specific nature of projects. Although many activities require more expensive and experienced staff and contractor resources, other appropriate activities can be delegated to less costly personnel. Delegation of responsibility should be based on balance of risk and rewards associated with the individual projects or administrative function (i.e., low-risk tasks to more junior or less technical employees, high-risk tasks and decisions to upper management). Risks and rewards for these types of programs are often tied to the size of a project, the type of project, and the level of uncertainty associated with project savings.
- **Effectively allocate staff geographically and organizationally to meet the needs of customers.** Staff must be allocated to the places where they and their skills are needed most. This is important geographically and organizationally. Field staff should be located near the facilities that they serve to encourage timely interaction and visits. Organizationally, scarce skills should be placed in functional roles where those skills can be most effectively utilized and cultivated. Furthermore, scarce skills should be utilized during the portion of the process where they can be most valuable, whether that is pre- or post-sales.
- **Give primary responsibility for a project to a single individual from beginning to end.** Custom projects are inherently complex, requiring significant and sustained engagement with the customer over a prolonged period of time. By consolidating ownership for a project with a single staff member, that individual can help drive the process to completion. Additionally, this can reduce customer confusion by initiating a single point of contact. Furthermore, by reducing staff hand offs, there is a consistent, shared understanding between customer and IOU with regards to program rules and project specifics.
- **Separate day-to-day and strategic management functions.** Program managers who must oversee to day-to-day operations while also providing long-term, strategic guidance to program are faced with often conflicting responsibilities. Day-to-day operations tend to take precedence, squeezing the time that is left for long-term planning. By separating

these two functions, programs can ensure strategic factors receive attention that is warranted.

4.3 Program Management: Reporting and Tracking

Reporting and tracking is an essential function of program implementation. While systems had previously been program-specific, they are now evolving to be more integrated across programs within a portfolio while retaining the flexibility and comprehensiveness necessary to track data appropriate to each type of program. In the case of the calculated program, the features must be robust. The projects are more complex and require custom calculations and incentive payments, which increases the demands on the program to keep track of various data and information. Documentation of program influence to mitigate concerns of free ridership as well as documentation of baseline and calculation assumptions are desired features. Invoicing is important both in terms of tracking incentive payments to customers and also payments to contractors who support the calculated program. Additionally, the steps and requirements for advancement in the project process are numerous and substantial; the tracking system can help drive this process. Finally, reporting requirements to the CPUC are an underlying driving force behind what gets tracked. Monthly aggregated data and quarterly measure-level data are reported to EEGA. This influences the shape and responsiveness of the system as well.

4.3.1 Current Practices

The IOUs have very different reporting and tracking systems despite the shared challenges and requirements. The Sempra utilities are, not surprisingly, most similar. SCE's systems recently underwent a major overhaul and consolidation. They have been migrated to a SAP-driven enterprise management system. The organization is still in transition to this new system – organizational culture and processes always adapt slowly to a changing system – which means that much of the benefits have yet to be captured. However, the new SAP system is very promising, embodying much of what the ideal system should include. The following discussion highlights the comparative advantages of such a system.

Horizontal Systems Integration

Horizontal systems integration refers to integration across the often disparate systems that track essential IOU program information. In the case of these IOUs, this refers to the integration of program/project, customer, and invoicing systems. The program and project systems refer to those that keep essential programmatic information such as project details, calculations, savings totals, measure types, and so on; these systems often include applicant information that is redundant to the customer tracking systems. Customer information systems are those databases that house utility customer information such as contact and billing information. Finally, invoicing systems are often separate accounting systems for accounts payable and receivable,

including incentive payments and contractor payments for those that support the programs in question. It's worth noting that sometimes even the project/program tracking databases diverge: one for tracking projects and another for tracking program aggregate performance.

Only SCE has fully integrated these systems with their latest consolidation, though all the utilities are moving in this direction. For example, the Sempra Process Evaluation suggests that both SCG and SDG&E maintained separate systems for program tracking, project tracking, invoicing, and customer information and that there were no formal linkages; staff expected movement towards consolidation, though no formal plans were discussed. Integration is advantageous for a few reasons. First, it allows seamless integration of data for analytical purposes; separate reports don't need to be run and then cross-checked. Second, it avoids redundant processing and data-entry; if there are separate systems, the same data may need to be entered multiple times. Third-party implementers interviewed as part of the industrial and agricultural third-party program group study who worked at both SCE and PG&E reported having to upload materials to PG&E's systems multiple times. While they characterized this as a "lost documentation" problem on the part of PG&E, it may actually be attributable to the redundant systems issue. Finally, a combined database gives program stakeholders access to a wider range of data than they would previously have had. This visibility can be important for illuminating inconsistencies, troubleshooting problems, or identifying opportunities.

Up-to-Date and Comprehensive Data

It is important that these systems, in addition to being integrated, be up-to-date and comprehensive. In theory, system updates should be in real time; integrated systems should accomplish this sort of updating seamlessly as data is updated. For un-integrated systems, propagating data throughout the organization becomes a challenge. The Sempra Process Evaluation reported that the SCG calculated program experienced challenges because the customer data that it was working off of was two to three years old; integrated systems can help bring those systems up to date. For SCE, this was an arduous process at first, since that process involved migrating data, but now that it is complete, all changes moving forward are in real time and propagate instantly.

In addition to timeliness of data, comprehensiveness of the systems tracking capabilities is essential. The Sempra Process Evaluation noted that SDG&E program staff find their core tracking system to be inadequate for the tasks of running a calculated program. As such, they developed offline, excel spreadsheet tracking systems as a workaround. This further disaggregates their reporting and leads to greater inefficiencies and lost opportunities. For the reasons highlighted in this example, fully integrated, but inadequate systems can be burdened by the same issues as un-integrated systems. Fully comprehensive data tracking must track a number of static and dynamic program, project, customer, and payment attributes as well as enable attachments of emails and other files such as those containing savings calculations.

Vertical Systems Integration

Vertical systems integration is ensuring that the systems integrate seamlessly with up and downstream program partners and stakeholders. These partners and stakeholders include customers, AEs, third-parties, evaluators, and the CPUC. Upstream activities include application processing, lead tracking and generation, and pipeline projections. Downstream activities include process alerts, evaluation, and regulatory filings.

Application processing is, across the board, still handled by hand, entering information from an application that a customer, AE, vendor, or a third-party has filled out, even at SCE. This of course creates administrative work and can lead to errors in data entry. It also delays the processing of projects by creating an extra step. SCE indicated that they would very soon like to automate this process. This would involve a web-based application that automatically enters into the database.

Other upstream integration includes pre-application lead tracking and generation as well as pipeline projections. With SCE's integrated system, AEs are able to funnel leads into the system, which some calculated program managers can then view and track. Similarly, as part of the pre-application Tier II processing that supports savings development for large projects, the SCE system tracks those savings estimates and the evolution of those projects at the pre-application stage. This can help track program influence while also providing a real time look "above the funnel" and improves pipeline projections. PG&E's CSO group's estimates, on the other hand, seem to exist outside the system until it reaches the application stage. Enabling these sorts of features can also tie in third-party program projections, since they are often developing savings well in advance of submitting their applications and projects to the system.

Process alerts are a downstream integration capability that can support customer and stakeholder satisfaction. By automatically alerting customers, AEs, vendors, and third-parties to the status of projects that are moving through the process, this can increase their engagement with the process and eliminates a step whereby the manager of a given project must react to a step being completed and send a note, which delays the notification and takes effort.

Evaluation and regulatory filings are another area of potential for downstream integration. For regulatory filings, with its integrated databases, SCE can run automated reporting functions that support rapid development of the necessary monthly and quarterly filings. In the case of the Sempra IOUs, the un-integrated systems require separate reporting that must then be manipulated by hand to meet the filing requirements. For evaluation, none of the IOUs allow real time, seamless access by evaluators to their systems. All data must be acquired through an often-lengthy data request process that can require multiple back-and-forth requests before appropriate data is provided. Implementers of other energy efficiency portfolios outside of California have

tracking systems that integrate the data systems downstream, which avoids this time consuming and frustrating process.

In the case of all integration activities that involve non-IOU partners, customer confidentiality must be considered carefully and will act as a barrier to implementation.

Project Management vs. Program Management

IOU tracking and reporting systems are typically set up in response to regulatory filing requirements and tend to approach the system needs from the angle of program management. This is true in the case of the IOUs, with the exception of SCE's new system. The Sempra Process Evaluation indicated that both SCG and SDG&E's systems lack workflow management capabilities that can drive projects. PG&E's systems included project status tracking, but do not seem to have the robust, automated notifications that SCE's system includes. This workflow management can ensure that all program requirements are met before allowing a project through to the next step. It also ensures that activities occur in a timely manner and that no projects slip through the cracks.

Transition Costs

SCE's transition to the SAP-driven enterprise management system highlights the challenges of adapting a large organization to a new system. The transition costs are high, both in terms of real dollar costs of installing and customizing the new system, but also in terms of the sweeping cultural changes that the company must undergo to achieve successful transition. There were indications of frustration with the new system from IOU staff as well as related third-party staff who were interviewed as part of the industrial and agricultural third-party program group. These are expected to be temporary. Given that the system was only finalized less than a year ago, the major changes are still fresh. Staff members are still adapting, and the benefits are not yet being realized in full. This suggests that near-term complaints when integrating systems should be taken into account, but also considered in the full context of a transitional period. Leadership must express steadfast commitment, and systems must be given time to take hold before they can be judged as successful or not.

4.3.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Integrate all program data, including measure-level data, into a single database.

This alludes to the integration and comprehensiveness of both project and program databases. While all utilities must track measure-level data, systems are set up to seamless integrate program and project data at SCE. Other utilities have opportunity for improvement here.

Integrate or link with other appropriate systems such as cross-program databases, customer information systems (CIS) and marketing or customer relationship management (CRM) systems.

This best practice alludes to the integration and comprehensiveness of all horizontal systems including program/project management, customer tracking, and invoicing. Only SCE has fully integrated systems, while the other utilities have loose or nonexistent linkages. This practice should be updated to emphasize the importance of full integration as opposed to casual linkages and should be combined with the above practice into an overall horizontal systems integration practice.

Use automated or otherwise regularly scheduled notification to achieve close monitoring and management of project progress.

Only SCE attempts to fully leverage automated notifications. PG&E has less robust status tracking that does not tie advancement to meeting milestone requirements. Sempra tracking systems do not include workflow at all. These are all opportunities for improvement. This practice must also be updated to reflect advancement in systems architecture such that automation should be the best practice and the norm.

Utilize electronic workflow management and web-based communications.

This practice is redundant to the previous and should be combined. The workflow management component is captured above, and web-based communications, such as email, are now the norm.

For programs with proactive marketing efforts, track program prospects early and drive program intervention around major equipment-related events.

This practice is best exemplified by SCE's upstream integration with AEs. No other utility has as robust an upstream integration, and this can be viewed as an opportunity for improvement. More broadly, this practice should be generalized to vertical up and downstream integration, which is an area of improvement across the board.

Balance the level of tracking against resource availability.

This best practice should still be considered alongside the urging above for greater reporting and tracking capabilities. It seems in the case of PG&E and the Sempra utilities, that the benefits of integrated reporting and tracking are undervalued relative to the resource constraints of the programs. These are large programs at large IOUs; systems integration would be beneficial and is justifiable.

4.3.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices inclusive of the previous known best practices as well as a couple new ones. A brief description follows the list below.

Program Management: Reporting and Tracking – Best Practices (Existing and New)
Existing ■ Horizontally integrate systems inclusive of all program and project data as well as cross-program databases, customer relationship management systems, and invoicing systems. ■ Use automated workflow management to achieve close monitoring and management of project progress. New ■ Vertically integrate systems with upstream and downstream stakeholders including customers, AEs, vendors, third-parties, evaluators and the CPUC to improve program visibility. ■ Balance the level of tracking against resource availability.

- **Horizontally integrate systems inclusive of all program and project data as well as cross-program databases, customer relationship management systems, and invoicing systems.** By their nature, large non-residential comprehensive efficiency programs have the most challenging reporting and tracking issues. Although it takes more preparation and effort to track data for these programs as compared to some other program models, the size of the programs and their generally high level of cost-effectiveness make the effort necessary and worthwhile. Experience shows that taking early short cuts that involve utilizing balkanized and non-standardized project tracking systems is counterproductive. Similarly, the program database should not reside entirely outside of other program administrator data systems. Integration across functions such as invoicing and customer management eliminate data entry redundancies and unlock opportunities.

- **Vertically integrate systems with upstream and downstream stakeholders including customers, AEs, vendors, third-parties, evaluators and the CPUC to improve program visibility.** Vertical integration – both upstream and downstream – can increase program visibility, both internally and externally. Projects should be identified and tracked at the concept stage to ensure that program information and resources are directed at opportunities early enough in the customer's design and decision-making process to influence adoption of high-efficiency measures; this is accomplished through upstream integration. Downstream integration with evaluators and regulators can smooth and shorten the evaluation process so that recommendations are more timely and without frustrating back-and-forth.
- **Use automated workflow management to achieve close monitoring and management of project progress.** Because these types of projects often require multiple levels of approval, long ordering lead times, and coordination with facility maintenance schedules to install, the time it takes to move from program application to final installation and commissioning can last several years. In addition, some projects may cancel during this process without the applicant notifying the program administrator (sometimes keeping reserved funds unavailable to other applicants). As a result, it is important for program administrators to keep close tabs on project progress. Programs with large numbers of applicants should utilize regular check-in and progress milestones to ensure that project status is known on a timely basis. Automated notification procedures can help manage this process for large programs. These can be tied to programmatic requirements for milestone achievement so that projects do not prematurely advance through the process.
- **Balance the level of tracking against resource availability.** Despite our emphasis on comprehensive and real-time tracking in the best practices suggestions above, we recognize that there is a legitimate tradeoff between the level of detail tracked, the extent of data entry burden, and the amount of time available from staff who are otherwise busy conducting program activities (particularly for programs with very limited budgets for program management and implementation). A comprehensive tracking system that staff does not have adequate time to support is of little value.

4.4 Program Management: Quality Control and Verification

For the core calculated programs, quality control and verification processes are essential to documenting the program's success in meeting its quantitative energy savings goals. These processes are designed to address the following, as noted in the previous *Non-residential Comprehensive Program Area Best Practices* report:

- **Uncertainty in savings estimates**. Projects in the calculated program group involve large, complex non-standard equipment of a highly-customized nature. Project savings

are extremely dependent on site-specific characteristics that are difficult to estimate reliably. As a result, there is a high degree of uncertainty in ex ante savings estimates.

- **Risk of gaming and fraud**. The current energy efficiency framework includes ambitious 'stretch' goals and provides IOUs with a financial incentive for exceeding those goals. Projects developed in calculated programs tend to be among the largest in the portfolio, and some have incentives exceeding $1 million. These large projects are vital to the IOU's ability to meet or exceed goals and therefore may be prone to having inflated savings estimates, overly-optimistic installation dates, and so forth.
- **The costs of measurement and verification.** These costs can be considerable, and therefore, it is in the implementer's best interests to define an M&V strategy that balances the cost of conducting the M&V versus the benefits of producing realistic savings claims.
- **The program model itself**. In the past, statewide calculated programs used a much more conservative approach and required measured savings to be used on 100% of projects. However, there was concern that an M&V census was a conservative but possibly not optimal approach. In addition, many participants objected to the extent of the M&V requirements. The current program model is designed to ease participation requirements by allowing a calculated approach, with engineering calculations made by or approved by the administrators. The program relies on ex post impact evaluations to develop overall estimates of program savings and provide feedback on savings estimation methods that are then used to true up engineering calculations and assumptions. This highlights the importance of ex post M&V procedures to documenting the program's success in achieving stated energy savings goals.

In addition to those items above, the evaluations of PY 2006-2008 industrial programs uncovered various problems leading to low gross savings realization rates (i.e., evaluated ex post savings estimates significantly below the ex ante estimates). Those related to quality control (QC) and verification included the following: errors in baseline determination; inadequate basis for savings claims; inadequate enforcement of program and policy rules; and insufficient consideration of total system energy analysis. The evaluation reports made several specific recommendations for how to address these problems, some of which have been adopted by the IOUs as discussed below.

4.4.1 Current Practices

IOU comments in this area highlighted the addition of new review procedures put in place to improve the completeness and quality of data in applications and the accuracy of related ex ante savings estimates. In general, IOUs view their QC and verification procedures as already very complex and comprehensive, even prior to the introduction of the newer CPUC-directed dual

baseline and early review procedures. SCE's establishment of a new Energy Engineering Group is a reflection of the continued increase in complexity of technical review of calculated projects.

Ex Ante Savings Estimation

Ex ante savings are estimated by a combination of outside vendors and internal staff and submitted as part of an application. All such estimates are subject to review by internal staff. Vendors and/or internal pre-sales staff (whether SCE's Tier II staff or PG&E's Customer Solutions Group) develop project specific estimates and submit them, they are then internally reviewed and adjustments are made if appropriate.

Savings estimates are developed using IOU tools and procedures (for example, the SPC Calculator). The specific algorithm used is chosen based on the type of measure installed and the specific application it is being used for. To ensure a greater level of uniformity across similar projects, SCE has codified its procedures in a publication that is new this cycle called *Customized Calculated Savings Guidelines for Non Residential Programs* dated March 2012, though this is not the first iteration. The document states, "The purpose of these guidelines is to establish standardized electric energy savings and demand reduction estimation and verification methods that are compatible with existing California energy efficiency policy, as well as to document lessons learned and interpretations from past program cycles."

Savings Review

In general, the IOUs use a very detailed process to do savings verification. Both PG&E and SCE use outside expert reviewers to perform verification, then have internal staff review their work. In the case of SCE, there are two internal teams performing reviews, one for engineering analysis and savings and the other for policy. PG&E has one internal group (TPS or Applied Technology Services) that performs this function.

Post installation inspections are completed for a high percentage of installed projects. SDG&E currently completes these for 100% of projects. SCE requires post-installation inspections for all custom projects that have an estimated savings greater than 100,000 kWh or 80 kW. These represent all large projects. In addition, random post-installation inspections are performed on 10% of projects with estimated savings less than 100,000 kWh and 80 kW that meet certain criteria

The QC and verification approach is tailored based on the project's size and complexity. A cost-effective QC and verification strategy calls for the utilities to channel sufficient resources to those larger projects to confirm savings, while using a more simplified, less costly approach on smaller and less complex projects. In support of that goal, SCE uses a process that involves three levels of verification. For simple projects, it involves comparison of submitted installation reports against key criteria including the following: IR Submitted kWh compared with PA

Approved kWh, invoices, presence of "high risk" measures, program discretion. For more complex projects there is short-term M&V that is performed, usually a few weeks of monitoring both before and after to support calculations and verify real savings. The most complex projects undergo a year's worth of monitoring and there are progress payments. The key is to balance the time and cost of doing the M&V with complexity and getting real savings. PG&E conducts post-inspection on a small percentage of projects, and a larger percentage are pre-inspected, based on the project's size. They use a streamlined approach for "lower-risk" measures; these projects have a pre-inspection, and the post-inspection simply involves examining invoices rather than going on-site.

IOUs are confirming participant or measure eligibility on a project-by-project basis and based on the program rules that govern each type of measure.

Dual Baseline Procedure

The CPUC's energy efficiency policy manual (Version 4, Page 8, Footnote 9) requires that a "dual baseline" be utilized for measures which are replaced before the end of their useful life. This requirement was added to the policy manual in August 2008 (D 11 07 030, p. 23). The dual baseline analysis utilizes the pre-existing equipment baseline during an initial remaining useful life (RUL) period and a code requirement/industry standard practice baseline for the balance of the expected useful life (EUL) of the new equipment. ED's approach to baseline determinations is set forth in Appendix A to Decision 11-070-030, available at http://docs.cpuc.ca.gov/published/FINAL_DECISION/139860.htm.

ED recognizes that calculation of a dual baseline is a complex process. ED and the IOUs have been engaged in weekly meetings since the decision was adopted, in order to arrive at a methodology for the use of dual baselines in calculating savings estimates.

At the time of interviews, IOUs reported that very little had changed in ex ante estimation as a result of adoption of the new dual baseline procedure. Since that time, SCE reports that it has begun requiring dual baseline on all projects, where possible. The dual baseline approach is still evolving. The IOUs are currently in discussions with ED staff and their subcontractors regarding application of dual baseline procedures. At the time of the interviews, RULs were not collected and, particularly in more complicated process projects, there was concern that collecting them would be challenging. Historically, savings have been calculated for only one of the two baselines, except in cases where the customer is being paid on the end-of-life baseline, but the customer is interested in understanding what energy savings they will see on their bill (which must be separately calculated using the in-situ baseline); in these cases, only the end-of-life baseline is reported to and recorded by the IOU, but the necessary savings information is being calculated for both baselines. It is more common for vendors and third-parties to calculate these dual savings values than for the IOUs themselves to do it.

Some of the significant issues surrounding implementation of dual baseline include the following:

- **IOUs are not clear on how to use the RULs.** The IOUs need more clarity from ED on how to determine RUL and who should determine it. In particular, industrial process measures pose a challenge in determining RUL.
- **It is unclear how dual baseline will affect ex ante savings claims.** One utility mentioned that to-date they had only claimed year one savings, and none for an RUL in excess of one year. Therefore, they expected their savings to increase under a dual baseline approach. Similarly, savings are often calculated already on an end-of-useful-life basis, which is the lower of the two possible baselines. In each case, though, the additional savings would be marginal, but would increase the workload significantly as two sets of savings will need to be calculated.

Ex Ante Review Procedure

An ED "early review" procedure (Ex ante review or EAR) was adopted in early 2012 for a subset of calculated projects.

Process Overview

The EAR procedure was adopted by the CPUC in July 2011.[26] The principles that guide this procedure, articulated in the decision[27], are stated below:

- Energy savings are the paramount priority of custom measures and projects.
- The customer measure and project review process is intended to allow Energy Division (ED) to review customer projects in parallel with the IOUs, thereby allowing for maximum customer convenience and program oversight.
- When possible and practical custom measure and project calculation methodologies shall be based upon Database Energy Efficiency Resources (DEER) methodologies as frozen for 2008 DEER version 2008.2.05 or upon methodologies documented within the most current Energy Division reviewed and approved IOU non-DEER deemed workpapers.
- IOUs are responsible for effective record keeping such that calculation tools, documentation of how those tools were applied to custom measures and projects, and documentation of custom project ex ante savings calculations are submitted electronically to the Energy Division.

[26] As described in Appendix B to the CPUC's decision D.11-07-030.

[27] Ibid, page B2

Energy Division Perspective on Ex Ante Review

Below is a status of the process as of April, 2012, supplied by ED:

Procedures adopted by the Commission in Decision 11-07-030 (the Decision) require ED review of custom (i.e. calculated) ex ante savings estimates prior to the IOUs' approval of the project applications (the "custom project ex ante value review process" or "EAR"; see D 11-07-030, Attachment B). Under this process, Energy Division reviews the methodology and savings from selected custom project applications. The ex ante review process is intended to bring, through a collaborative process, the gross realization rate (GRR) for custom projects closer to the default GRR of 0.9 allowed by the CPUC.

Energy Division reviews take place in parallel with utility internal review prior to the approval of a project application. In order to accomplish this, the IOUs are required to deliver at least bi-weekly, lists of projects at the application stage. The "Project List Submission Start Month" column in Table 4-1 below shows when the IOUs began to deliver the required lists after the Decision was released, the number of applications disclosed by the IOUs, and the number of applications ED selected for ex ante review. Over the past eight months, the IOUs have submitted approximately 10,000 applications for ED's review, of which 91 have been selected for ex ante review. Of the 91 applications ED selected, the IOUs have converted 16 applications into customer agreements before ED was provided application documentation as required by the Decision.

Table 4-1: Timing and Number of Custom Project Applications Submitted to ED and Selected for Review

	Proj. List Submission Start Month	No. of Archive Submittals	No. of Applications Submitted	No. of Applications Selected	Selected Projs. Signed before ED Review Completed	Voluntary Referrals by IOUs Before 11-07-030	Policy-Related Opinions Requested by IOUs
Dec. 11-07-030 Release	Jul-11						
PG&E	Dec-11	10	803	29	0	1	1
SCE	Feb-12	7	5,945	20	3	1	0
SDG&E	Sep-11	14	1,294	24	1	2	0
SCG	Sep-11	14	2,816	18	12	1	0
Total		**45**	**10,858**	**91**	**16**	**5**	**1**

Custom project applications not selected by ED for ex ante review are passed through at a 0.9 GRR on the IOUs' estimated savings. Table 4-2 below shows when the IOUs started submitting the list of third party applications and the number of third party projects selected by ED for ex ante review.

Table 4-2: Submission and Selection of Third Party Calculated Projects

Utility	Submission Timeline	Third Party Projects Selected for Review	ED Comments
SDG&E	No third party projects included in lists	One third party project reviewed at SDG&E's request	
SoCal Gas	Third party projects submitted without identifiers	None	
SCE	February 2012	3 TP projects	The list of TP projects appears incomplete
PG&E	April 16, 2012	None	The list of TP projects appears incomplete

Baseline determination is also an important focus of the ex ante review process. Determination of the proper baseline during the application phase of a project provides certainty with respect to savings estimates for implementers and customers.

IOU Perspective on Ex Ante Review

In general, IOU staff opinions of the EAR procedure are diverse and often vocal and spirited. Views range from grave and pessimistic, to consternation and even include confidence and optimism. Pessimism and concern is expressed primarily the areas of customer relationship and project management. IOU staff consternation surrounds the parameters and intent of the process. Optimism reflects an appreciation of the process benefits in terms of reduced risk associated with ex post evaluation reductions. .

EAR impacts on customer relationships include the following points:

- **It is recognized that managing customer expectations presents new challenges.** One utility indicated the criticality of managing customer expectations in the presence of an EAR process since some project savings/incentives may be eliminated or reduced significantly as a result of the screening.

- **It is critical to minimize delays, impact on customers and projects.** A key challenge in implementing this process is to provide timely feedback and avoid delays that could jeopardize customer project timetables and critical milestone dates. Project managers need to be able to keep projects moving when on critical path. This is the primary concern raised by program staff when discussing EAR and should be a primary focus.
- **There is also recognition of importance of training account reps on this process and its outcomes, since they 'own' the relationship with their assigned customers.** One utility spoke to the importance of making it very clear to the account reps how this process works. Transmitting information is critical on topics such as what the process is itself, its impact on timing, and likely outcomes. Specific guidance on how to manage customer expectations should also be provided.

Clarity of EAR purpose and scope includes the following issues:

- **There is concern that the true purpose of reducing back-end EM&V risk is not being fulfilled.** Some IOU staff stated that they believed anecdotal evidence suggests that ED is reserving the right to change savings estimates after the fact. Program staff views this as adding review time and delays to the project, without providing the savings/baseline certainty upfront that it was supposed to in exchange for that delay.
- **There is a perception that the EAR is being used as a vehicle to police free ridership.** Some staff at SCE suggested that questions asked about projects have moved into the realm of free ridership and away from baseline characterization and savings. It is their impression that the true purpose of EAR is unrelated to free ridership and the effort is being recast with greater scope than agreed to.
- **There is a perception among some staff that every project will be reviewed.** The process is still evolving, and some worry that the early review process will extend to every project.

Despite the concerns and confusion surrounding the new process, some IOU staff members perceive the early review process positively**.** Some IOU staff suggested that this is a "win-win" process designed to reduce the risk associated with ex post evaluation reductions in savings estimates by screening projects up-front. Note that these individuals were staff working in areas or at utilities (e.g. PG&E) that have yet to implement the process in earnest. This view is consistent with the CPUC's first guiding principle that speaks to the importance of the accuracy of ex-ante savings estimates for Custom projects.

Evaluator's Perspective on Ex Ante Review

The process is still evolving, and there is still much uncertainty over the current process and its impacts. We offer the following responses *in italics* to the issues raised in interviews.

Impact on Customer Relationships:

- **Managing customer expectations.** As with any major change to the project review process, there will be an impact to the customer experience. ED and the IOUs should work to develop a consistent process, so that the IOUs can inform their customers of the EAR process and its implications.
- **Minimizing delays, impact on customers**. The adopted procedure was intended to provide for a timely review and feedback process, adhering to stated data submittal and review timelines as stated in the CPUC Decision 11.07.030. It can be reasonably expected that with experience, process response timeliness will improve. All parties share the goal of achieving a timely process that minimizes impacts on customers. All stakeholders should work actively towards achieving that goal.
- **Training account reps on this process and its outcomes.** Training of account reps is critical to communicating this process completely and accurately to customers and to their managing customer expectations about the process in real-time as their projects are being reviewed. ED and the IOUs should work to develop a consistent process so that account reps will have a consistent message to convey to customers.

Clarity of EAR Purpose and Scope:

- **Concern that the true purpose of reducing back-end EM&V risk is not being fulfilled.** The post installation review by ED is in partnership with the IOU review process, and any changes made will generally be associated with adjustments made by the utility following installation of a project. This study did not investigate verify whether this principle was being followed.
- **Concern that the EAR is being used as a vehicle to police free ridership.** An important element of the EAR process is on the verification of an appropriate project baseline. Industry standard practice sits at the intersection of free ridership and baseline selection, and questions relating to industry standard practice may be causing this concern. This is a genuinely gray area, and industry standard practice may best be addressed directly so that a clear line is drawn between baseline selection and free ridership.
- **Concern that every project will be reviewed.** The budget for EAR reviews is limited and the intent is to address larger and more complex projects, with some attention to random selection of typical or simple projects.

An emphasis on **consistent ongoing communication among involved parties** – ED, the IOUs, and both parties' contractors – may help to reduce uncertainty and create a greater shared understanding of the process and the perspectives of those involved.

4.4.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Require post-inspections and commissioning for all large projects and projects with highly uncertain savings.

Current IOU practices predominantly reflect this requirement. IOUs report that post-installation inspections are done on a census of large projects and a significant percentage of smaller projects. The latter have focused on well-established types of efficiency measures and baselines that are well known on average. IOUs also perform invoice reviews for all projects, including small ones and particularly those that do not receive post-inspections. However, it is not clear that post-installation commissioning is being performed consistently on very large projects. Commissioning has the benefit of going beyond M&V to ensure installed equipment is functioning as expected. Commissioning uses a greater range of techniques than M&V and is interactive in that when discrepancies are identified there is an effort to fix them where possible.

Require pre-inspections for projects with highly uncertain baseline conditions that significantly affect project savings, particularly large projects.

All the IOUs include pre-inspection for this type of project as part of the application review process. Also, the new EAR process is intended to provide early reviews on a sample of projects, which include pre-inspections on certain types of projects for which savings cannot be reliably estimated. Examples include complex compressed air and industrial process retrofits.

Conduct either in-program measurement or measurement through an impact evaluation on the very largest projects and those that contribute most to uncertainty in overall program savings.

Both the IOUs' reported in-program measurement strategy and current ex-post evaluation practices are consistent with this approach. Either short term or longer-term metering is done for the largest projects and those with the most uncertain savings Measurement for the largest projects is usually cost justified given the project's contribution to overall savings and the size of an individual application's potential incentive check. In addition, pre-measurement is being utilized for a small number of large, complex measures that cannot otherwise be reliably quantified with only ex post data.

Tailor measurement rigor, including the use of sampling, to each project's contribution to the cumulative uncertainty in estimated savings for the program overall.

In program M&V practices are generally consistent with this approach. For example, SCE reported conducting three types of metering: for simple and predictable technologies, it's just an observation without measuring; for some there is short-term M&V that is done usually a few weeks of pre- and post- monitoring to support calculations and verify real savings; and a few large projects undergo a year's worth of monitoring.

Limit the use of multi-year, in-program measurement of savings.

In-program measurement for up to one year was reported by IOUs suggesting that multi-year measurement is not happening. A full year of post-installation measurement is usually adequate to develop a reasonable estimate of savings.

Carefully consider tradeoffs associated with in-program M&V versus ex post impact evaluation.

This Best Practice calls for careful coordination and planning between in-program M&V efforts and those of program evaluators. Although this is not in practice in California, it is the case that impact evaluators leverage the data collected and analyzed through in-program M&V.

If in-program M&V is utilized exclusively (as opposed to independent impact evaluation), results should be periodically aggregated and summarized to produce realization rates and lessons learned.

This recommendation is not applicable in California, since in-program M&V is not relied on exclusively.

Consider using third-party M&V contractors to oversee or conduct M&V.

IOUs use a combination of outside contractor experts and in-house staff to perform M&V. Generally, outside contractors perform pre- and post-installation assessments and their work is then reviewed by in-house staff.

Tie staff performance to independently verified results.

Program manager interviews did not explore this topic; therefore, it is unclear whether IOU energy efficiency staff performance is assessed based on ex-post impact evaluation results.

4.4.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. In this area, no new best practices are identified. Existing best practices are retained with only minor modification, and presented below.

Program Management: Quality Control and Verification – Best Practices (Existing)
Existing ■ Require *post*-inspections and commissioning for all large projects and projects with highly uncertain savings ■ Require pre-inspections for large projects with highly uncertain baseline conditions that significantly affect project savings ■ Conduct either in-program measurement or measurement through an impact evaluation on the very largest projects and those that contribute most to uncertainty in overall program savings ■ Tailor measurement rigor, including the use of sampling, to each project's contribution to the cumulative uncertainty in estimated savings for the program overall ■ Limit the use of multi-year, in-program measurement of savings ■ Carefully consider tradeoffs associated with in-program M&V versus ex post impact evaluation ■ Consider using third-party M&V contractors to oversee or conduct M&V ■ Tie staff performance to independently verified results

- **Require *post*-inspections and commissioning for all large projects and projects with highly uncertain savings.** As incentive levels increase, so does the motivation and potential negative impacts of gaming or fraud. For small projects, random inspections on a significant percentage of projects also can be used cost-effectively for projects with well-established types of efficiency measures and baselines that are well known on average. Invoices should be required and reviewed for all projects, including small ones and particularly those that do not receive post-inspections. Very large and complex projects should also require some level of commissioning to establish that the new equipment or process is not only installed but operating and functioning as designed.
- **Require pre-inspections for large projects with highly uncertain baseline conditions that significantly affect project savings.** Savings cannot be reliably estimated for some types of projects on purely an ex post basis. Pre-inspections are an important part of developing defensible savings for projects such as complex compressed air and industrial process retrofits.
- **Conduct either in-program measurement or measurement through an impact evaluation on the very largest projects and those that contribute most to uncertainty**

in overall program savings. Measurement for the largest projects is usually cost-justified given the project's contribution to overall savings and the size of an individual application's potential incentive check. In addition, pre-measurement should be utilized for large, complex measures that cannot otherwise be reliably quantified with only ex post data. For some projects, pre-installation measurement is the only defensible way to develop reliable savings estimates and extract adequate value from post-installation measurements.

- **Tailor measurement rigor, including the use of sampling, to each project's contribution to the cumulative uncertainty in estimated savings for the program overall.** Fitting the rigor of M&V to match the type of project is an effective way to lower overall M&V costs. When it comes to M&V, one size certainly does not fit all. Overly complicated M&V procedures for simple measures with well-known savings can result in unnecessary costs and be an irritant to program participants. Conversely, allocating more time and resources to M&V on unfamiliar projects and those with highly uncertain savings provides important quality control. In addition, using sampling techniques within or across an individual applicant's sites is also usually much more cost-effective than requiring a census of measures installed, while still providing high levels of reliability and a check on gaming.
- **Limit the use of multi-year, in-program measurement of savings.** Experience shows that it is difficult in practice for program administrators, third-party energy services providers, and end users to maintain the institutional memory and financial motivation necessary to develop, submit, and review detailed measurement reports for more than a year or two. A full year of post-installation measurement is usually adequate to develop a reasonable estimate of savings. Subsequent years' worth of measurement may be desirable to some applicants on an optional basis if they are convinced a single or particular year is unrepresentative. Multi-year measurement of impacts for resource planning can be accomplished through retention studies using representative samples.
- **Carefully consider tradeoffs associated with in-program M&V versus ex post impact evaluation.** Site-specific M&V can provide a wealth of important knowledge and lessons learned but only if realization rates are developed for the individual sites and the results across sites are aggregated and included in segmentation analyses. Program implementers are often skilled at site-specific engineering and measurement analyses but have less experience with, and motivation to design, cross-site and statistically aggregated analyses.
- **Consider using third-party M&V contractors to oversee or conduct M&V.** Utilization of firms specializing in program-related M&V was repeatedly cited as very effective in the success of the reviewed programs. Contracting out the M&V task for the entire program allowed program participants to be free from the responsibility and financial burden of M&V. Additionally, because of the similar types of projects going

through the program, the M&V contractor may be able to achieve consistency in M&V procedures and produce results more cost-effectively than can individual applicants. Utilizing third-party firms for these functions can help administrators balance workloads across peaks and valleys, obtain multiple engineering perspectives and peer-to-peer review, and keep costs down by paying for work performed rather than maintaining full-time employee levels sized to meet peak application loads.

- **Tie staff performance to independently verified results.** Tying performance reviews and bonuses of program staff to verified savings as reported through an independent M&V or impact evaluation process is likely to increase project quality and the accuracy of initial savings estimates. Marketing staff, in particular, should have any financial incentives tied to savings that are independently verified.

4.5 Program Implementation: Marketing and Outreach

The marketing and outreach approach for calculated programs is a reflection of both the types of projects developed through the program and the characteristics of those in the market segments targeted by the program. Calculated offerings are necessarily complex compared with deemed offerings. They tend to draw in larger projects from larger customers. Consequently, the programs lend themselves to a deeper level of engagement with fewer customers as opposed to more shallow engagement with a broader audience. The marketing and outreach efforts reflect this aspect.

An additional contextual point is that these programs are well established and have been a fixture in the EE marketplace for over two decades. Consequently, a main emphasis of marketing is to maintain awareness and keeping stakeholders informed of the latest changes in the program.

4.5.1 Current Practices

The IOUs' marketing and outreach for calculated programs tend to follow similar patterns, though often with differences of degree in execution. The IOUs face many of the same challenges including driving a coherent marketing strategy, reaching unassigned accounts, and keeping AEs and vendors up to date on the program. The discussion below chronicles the various marketing and outreach practices.

Organizational Structure

Historically, program marketing strategy was driven at the program-level, with program-dedicated staff responsible for all aspects of the program including marketing efforts. Increasingly, the IOUs are moving away from program-oriented organizational structures, though at different paces and to different degrees. This has supported a movement toward more strategic marketing. At PG&E, where this shift towards functional groupings is the most

significant and complete, there is the Marketing Solutions Group, which is an end-to-end EE marketing machine that drives strategy and produces content. At the other extreme is SCG, where very little movement away from the program-oriented model has occurred. The Sempra Process Evaluation notes that the marketing strategy is still program-driven. Program managers consider strategy and the Customer Communications Group produces the material (e.g., websites and pamphlets) for them. This is problematic since the program managers have so many other responsibilities. SDG&E's architecture is somewhat in between: the Customer Communications Group still produces content, but there is a dedicated staff called the Marketing Strategy Team that takes the burden off of the program managers, while still consulting them.

Segment Advisor and Sector Leads

At all IOUs, a new role has developed over the past few years that supports sector-specific marketing and knowledge. While slightly different at each IOU, it serves a generally similar purpose. This role is known at the Sempra Utilities as the segment advisor. These segment advisors are responsible for learning about market segments and distributing that knowledge to AEs and program managers; they are dedicated to this role. Sector leads, as they are known at PG&E, are similar, but work at a less granular level than segments, rather focusing on large groups like commercial or industrial. They are also not dedicated to this role; it is a secondary function after their day-to-day responsibilities. Both the segment advisors and sector leads fill the same function, which is to ensure that segment- and sector-specific needs are met. This cuts across marketing as well as other functions, but is central to marketing. In all cases, these roles are intended to be filled by individuals experienced in those sectors. PG&E has had an easier time doing this because of its history in the 2006-2008 cycle with market-oriented groups. Sempra has had a challenge finding these individuals and will have to develop the expertise. This knowledge can also be developed through outside research through consultants, as in the case of SCE's industrial market characterization studies that were performed by KEMA.

Responsibility Structure and Program Speed

The marketing function, by nature, is highly collaborative with feedback and input coming from a large number of stakeholders. These groups include the sector- and segment-specific leads, program managers, researchers, AEs, marketing design staff, and legal teams. This decentralized structure, with so many involved, results in a slow process that hampers the IOUs' abilities to provide timely updates to marketing materials as the programs evolve. Program stakeholders, such as AEs and vendors, have historically lamented their inability to keep up with program changes; the Sempra Process Evaluation noted that SCG AEs report finding out about program changes from customers. While this study did not examine this issue in depth with regards to PG&E, it is expected that the shift towards having one group drive and deliver marketing solutions should help them speed up the marketing process and react more quickly to disseminate information about program changes.

Loss of Expertise due to Transition

A specific concern that was voiced during interviews with PG&E staff included loss of expertise due to staff transitions. Organizing the staff members by markets during the 2006-2008 cycle helped drive certain expertise in segment- and sector-specific needs. That expertise has been relocated to other portions of the company, with sector leads reassigned to different roles throughout the EE organization. Interviewees noted that, at least for now, the individuals with segment-specific knowledge are broadly known and the organization is able to access their expertise. There is a concern, though, that over time this knowledge will dissipate due to turnover and lack of continued exposure since the current sector leads have primary duties not related to segment knowledge. It may be worth setting up segment advisors, as at Sempra, where their one and only responsibility is researching and disseminating information on segment needs.

Account Executives

Across interviewees and in the Sempra Process Evaluation, AEs were consistently credited as the single most important element of the calculated programs' marketing strategies. AEs are responsible for direct selling the calculated program offerings to some of the IOUs' largest and most energy-intensive customers. The AEs are more likely to have large projects that align with the calculated programs' incentive structure as well as the wherewithal necessary to meet the programs' requirements. As gatekeepers for these customers, the AEs play an unusually large role in drawing customers into the program.

Given their role, it is important that the programs take all available steps to make marketing the program easier. This is particularly true, given the AEs many other responsibilities. While they do have goals for EE they must meet individually, the AEs are also tasked with meeting customer needs along a number of the IOU's other core business-related dimensions. Interviewees stressed the importance of keeping program documentation simple and keeping AEs up-to-date by inviting them to attend workshops and other events where program material is disseminated. The Sempra Process Evaluation suggests that SCG and SDG&E AEs desire more professionally designed and simpler documentation of the basic program requirements.

Unassigned Accounts

While AEs are well suited to sell the program directly to large customers, not all customers have dedicated AEs. According to the Sempra Process Evaluation, 80% of SDG&E's accounts are unassigned. These are, of course, more likely to be small, less high-savings accounts than the typical assigned account, but these are not all small customers. In fact, SCG estimates that 1,000 of their large customers are not assigned to AEs. AEs will reach a large portion of the savings potential, but certainly not all, and the unassigned accounts require a distinct marketing and outreach strategy.

Reaching unassigned accounts cost-effectively can be a challenge. Successful strategies used at utilities around the country as well as in CA include leveraging the vendor and trade ally community, hosting and attending industry events, and making use of traditional marketing techniques. Each of these techniques and strategies is discussed in greater depth in the following sections.

Vendors and Trade Allies

Making good use of private sector marketing efforts is a tried and true method to cost-effectively expanding a program's reach. The IOUs' efforts in this regard vary in terms of their formality and scope.

SCG has, perhaps, the least developed relationship with vendor and trade ally communities. According to the Sempra Process Evaluation, there is only one staff member with responsibility for these relationships across the entire portfolio. There is no formal program for vendor or trade ally participation. At SDG&E, on the other hand, they have developed a formal program, known as the Vendor Alliance Program, to disseminate program information to the vendors. The Sempra Process Evaluation surveyed program participants, asking from whom they had heard about the program. While only 7% said vendors at SCG, 26% - nearly four times – said the same at SDG&E. While it was a small sample, the wide gap shows the impact that formal vendor programs can have.

According to interviewees at both IOUs, SCE and PG&E both have formal vendor participation programs. SCE's is a more recent development, with resources now dedicated for the program. In both cases, the network is used to float ideas and solicit feedback. Vendors are invited to trainings on program processes. An SCE staff member pointed out two interesting features of their program. First, they have tracked program participation to see who is using only the deemed program and then attempt to steer those individuals towards the calculated program. Second, they have a two track program: the first track is for vendors who are new to the programs and need in-depth training; the second is for veterans who need only information on program updates and changes. These changes are communicated via the Contractor Connection newsletter that SCE distributes. PG&E and SDG&E also utilize newsletters to reach their vendors with updates.

It's worth noting that vendors, like AEs, have responsibilities other than delivering EE solutions to their customers. While AEs have quotas that they must meet – so that participation in the calculated program is directly beneficial – vendors have no such quotas and interpret participation as being only indirectly beneficial, as it may encourage a customer to purchase more expensive equipment. While this study did not survey or interview vendors, the Sempra Process Evaluation heard anecdotal responses from vendors that suggest they do not always feel that it is worth their time and effort to participate in the calculated program given how

complicated it is to convey the requirements. This was seconded by IOU staff at SCE and PG&E in interviews conducted for this study. Similar to the case of AEs, supporting vendor and trade ally marketing efforts with simple brochures and other program materials can help lessen the burden of having to learn and disseminate the details of the program.

Outreach Events

Hosting and participating in various industry events is a good, cost-effective way to reach a larger audience at one time, particularly for unassigned accounts who concentrate in market segments, which are large in volume of customers, but small on savings and thus cannot justify direct sales efforts. All utilities participate to one degree or another in various industry conferences and trade shows. They also often collaborate with industry groups such as the California Association of Food Processors to host events, such as workshops, to educate relevant members of that trade community about the program offerings from the IOUs.

These events are not only good for reaching customers, but can also be great for connecting with vendors, contractors, and AEs. Specifically, PG&E and SCE both touted their hosted events as a way that they connect relevant stakeholders to the information they need while also cross-pollinating success stories and gaining feedback on problems. These regularly hosted events help magnify other efforts described throughout this section.

Marketing Collateral

In addition to direct sales and other outreach methods, standard marketing collateral is an essential underlying element to the overall marketing strategy in the case of all the IOUs. All the IOUs have well developed websites that spell out program participation and house important documentation such as applications. These are an effective mechanism for broadly informing the market. It is important that they not be neglected. The Sempra Process Evaluation notes that SCG's website underwent a major renovation at the end of 2011 that was met with widespread approval and satisfaction. Other forms of marketing collateral include basic handouts and pamphlets. Neither the Sempra Process Evaluation nor the interviews of PG&E and SCE staff yielded substantial discussion on case studies, though it sounded as if all programs do these on occasion.

The Value of Data

Robust data analytics can support marketing efforts by helping marketing strategists understand who should be targeted as well as which methods are most successful. The first step, however, is to collect the necessary data. The Reporting and Tracking Section of this report highlights gaps in the systems that could support further marketing, but they're worth noting here as well. By simply tracking which customers have and have not participated in various programs, program managers, segment advisors, and other relevant staff members can understand trends at the

macro level. Such a tracking system can reveal which segments are not participating, which size of customers are not participating, and other indicators. This sort of understanding can help the IOUs alter their marketing plans to be more successful. While all the IOUs do these sorts of analytics to some extent, they are limited by the robustness of their tracking systems. SCE has the most advanced tracking system, which enables the most advanced analytics. SCE staff members reported the practice, noted above, of tracking which programs vendors participate in and using that data to drive those not participating in the calculated program to use that program. The Sempra Process Evaluation, on the other hand, noted that SCG and SDG&E staff specifically lamented not tracking which vendors submitted which projects. This leaves them unable to do the more advanced analytics on vendor participation that could drive further participation.

4.5.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Use the program's website to broadly inform the market and attract participation.

All of the programs use their websites to effectively inform the market and attract participation. SCG had been lacking in this department, but their recent website update has been well received.

Leverage the extensive marketing efforts of the private sector, particularly of ESCOs.

PG&E, SDG&E, and SCE have all developed formal participation programs for vendors and other trade allies such as ESCOs. These programs enable the IOUs to engage these key partners and cost-effectively reach a large number of unassigned accounts. SCG is the only utility that does not have a formal program and is, consequently, having a tough time reaching unassigned accounts.

Keep energy efficiency service providers well informed about program features and changes through seminars, training sessions, trade shows, and annual meetings of key groups.

SCE and PG&E are particularly effective in this regard, hosting multiple annual meetings for AEs, trade allies, vendors, and third-party program staff. These seminars and training sessions are a critical venue for sharing program changes, soliciting feedback, and encouraging cross-relationships among these groups. SDG&E also sponsors these events, though to a lesser extent. SCG is lagging in this, partly as it has fewer resources dedicated to vendors who are a key reason for hosting these events.

Market energy efficiency options directly to large end users at the earliest decision making stages of major equipment or facility modifications.

In the case of all IOUs, AEs are a cornerstone of marketing efforts, directly selling the program to critical decision makers as effectively as possible. AEs do their best to stay aware of their customers' capital budgeting and equipment/facility updating cycles.

Use personal marketing, where cost effective, to identify and address customer-and industry-specific barriers and customer issues.

Similar to the previous best practice, the AEs help bridge the gap by leveraging their personal marketing to understand customer issues. Also, industry-specific barriers may be addressed by the new segment advisors or sector leads who research and understand the target markets.

Develop and disseminate case studies of key technologies and segment applications.

All IOUs seem to make use of case studies, although it was deemphasized as a critical strategy.

Conduct on-going training of account managers and other marketing staff to keep abreast of the latest efficiency technologies and practices.

AEs are the critical link in all the IOUs' marketing strategies and efforts are made to keep their understanding up to date. This engagement is limited to the program literature and does not technology updates and other information. PG&E and SCE also hold regular meetings with various program stakeholders, which include technology and efficiency specialists in the form of vendors and third-parties. These sessions allow stakeholders to brainstorm and share ideas with AE and marketing staff.

4.5.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices, inclusive of the previous known best. A brief description follows the list below.

Program Management: Marketing – Best Practices (Existing and New)

- Use the program's website to broadly inform the market and attract participation.
- Leverage the extensive marketing efforts of the private sector, particularly of ESCOs.
- Keep energy efficiency service providers well informed about program features and changes through seminars, training sessions, trade shows, and annual meetings of key groups.
- Market energy efficiency options directly to large end users at the earliest decision making stages of major equipment or facility modifications.
- Use personal marketing, where cost effective, to identify and address customer-and industry-specific barriers and customer issues.
- Develop and disseminate case studies of key technologies and segment applications.
- Conduct on-going training of account managers and other marketing staff to keep abreast of the latest efficiency technologies and practices.

New

- Dedicate staff to the development of marketing strategy and materials.
- Utilize data to maximize the effectiveness of marketing efforts.

- **Dedicate staff to the development of marketing strategy and materials.** Concentration of this responsibility to as few staff as possible, given the FTE needed to get the job done has a number of advantages. It lowers probability of redundancy; it makes coordination easier; it elevates the importance of the activity among those that are engaged in; specialized staff can be selected rather than staff that need to fit more general needs.
- **Use the program's website to broadly inform the market and attract participation.** Because the large non-residential market is made up of a small population of well-informed customers and efficiency service providers, driving prospective participants to a comprehensive program website is often effective without significant other investments in traditional advertising.
- **Leverage the extensive marketing efforts of the private sector, particularly of ESCOs.** The large non-residential market typically receives significant private sector marketing attention with respect to energy efficiency prospecting. In this market, ESCOs, trade allies, vendors, and other service providers that believe the program will help close deals are natural and effective marketing partners. Supporting their efforts by providing simple, up-to-date information about the program can magnify their impact by helping them sell the program.
- **Keep energy efficiency service providers well informed about program features and changes through seminars, training sessions, trade shows, and annual meetings of key groups.** To keep private sector marketing efforts effective, it is important to provide outreach and offer training on both on-going program details and periodic program

updates. Where possible, keep a two-track process, with deep training specific for newly participating vendors and ongoing information provided to veteran participants that is limited to changes in the program.

- **Market energy efficiency options directly to large end users through AEs at the earliest decision-making stage for major equipment or facility modifications.** AEs can play a critical role in identifying large equipment and facility changes early. This helps ensure efficiency opportunities are appropriately considered and maximizes chances of program influence. Utilization of sales or related tracking systems helps prevent projects from becoming lost opportunities.
- **Identify and address industry-specific barriers and issues.** Segment and sector specialists can support marketing efforts by researching industries and providing information to relevant marketing strategists. This will improve marketing effectiveness and drive greater participation.
- **Develop and disseminate case studies of key technologies and segment applications.** Large customers, particularly industrial, can be very risk averse with respect to new technologies. At the same time, they are very concerned about staying competitive and keeping up with industry trends. Case studies help to facilitate the diffusion of new ideas and practices.
- **Conduct on-going training of account managers and other marketing staff to keep abreast of the latest efficiency technologies and practices.** Keeping staff members, particularly AEs, up to date with the latest technical information is critical to maintaining credibility among large end users and their service providers.
- **Utilize data to maximize the effectiveness of marketing efforts.** As reporting and tracking systems evolve and become more advanced, all available data should be leveraged to gauge segment-level participation, vendor and contractor participation patterns, and campaign effectiveness.

4.6 Program Implementation: Participation Process and Customer Service

Calculated programs require substantially more input from and engagement with customers as compared with the deemed programs. This puts an emphasis on the importance of program participation processes and customer service. The complexity of the projects compels substantial quality control, through review and M&V, that must be balanced with the need to keep the process simple and the customer satisfied. This tension between balancing effective quality control with a smooth and simple process is the central challenge to implementing calculated programs.

4.6.1 Current Practices

The calculated programs' participation processes and customer service elements are generally similar. The following sections discuss the key elements of this topic area including the basic process steps, improving the process, pre-sales support, applications, process integration, and tiered processing.

Basic Process Steps

The basic process steps are driven by the quality control and M&V requirements associated with calculated projects. Since the programs face the same regulatory requirements and have broadly similar quality control and M&V requirements, the processes are largely the similar. Through the interviews and by reviewing the Sempra Process Evaluation, it can be seen that the programs have different naming conventions or classification schemes. However, the processes can be summarized in these basic steps:

1. Pre-sales support (if any) or pre-program project development
2. Application packaging and submittal
3. Policy review
4. Pre-inspection
5. Engineering review
6. Approval and project packaging
7. Installation
8. Post-inspection
9. M&V (if necessary)
10. Savings refinement
11. Incentive payment

Not all of these steps are necessarily driven by the IOUs. For instance, installation is entirely the domain of the customer. Similarly, step 1 may be driven by a vendor or the customer themselves in the case where no pre-sales support (such as savings development assistance) is required or provided.

Also, not all steps happen in exactly the same order for all projects. Steps 3 through 5, for example, may occur in a different order depending on the nature of the project. In the case of a complex process measure with an unclear baseline, site inspection may be necessary to perform policy review.

Steps may be performed differently depending on the utility, as well. For instance, SCE's review team is organized differently such that policy review is handled separately from the typical review track in some cases by the Energy Engineering Group (EEG), whereas PG&E has only one group that handles internal review.

Improving the Process

Improving the participation process often requires holistic evaluation of the process combined with substantial programmatic resources to drive real substantial change.

SCG's efforts this past cycle demonstrate this trend. Substantial resources were committed on a regular basis to evaluate the process and consider changes. AEs, program staff, and policy staff all participated in monthly meetings on the topic. Engineering, inspection, and quality control teams were all consulted. The results were substantial improvements to the process, particularly surrounding paperwork. First, the letter of interest was combined with the application before ultimately being removed after it was determined to be redundant to the application itself. Second, the final incentive worksheet was eliminated after it was found to be redundant to the customer agreement, M&V documentation, and the delivery of the incentive itself. Finally, and importantly, electronic signatures were allowed. This reduced the paperwork load and eliminated the need to mail documents, saving time, effort, and money for the customer. Although these improvements streamlined the participation process, there are still remaining issues to be resolved; for instance, the Sempra Process Evaluation noted that SCG projects were often delayed by post-inspection. The reason is that SDG&E is responsible for much of SCG's post-inspection work, but the inspector only comes up to SCG territory about once a month. This highlights the importance of not just streamlining paperwork, but other required process activities as well. Ultimately, the goal is to improve customer satisfaction.

To that end, SCE reported that it has taken a hard look at the work of key stakeholders – contracted third-party reviewers – to see if there aren't opportunities for improvement in program activity. First, as part of their contracts, SCE has established service level agreements surrounding cycle time and quality. For the first time, they began measuring and collecting data on these metrics to determine overall process quality. Second, they have established milestone-based payments for their contractors. This was done not as a cost-cutting move, but rather to align the incentives of the third-party reviewers with those of the programs. When paid on a fixed-price, a contractor is incentivized to move through a project quickly, rather than working slowly to rack up hours on a time-and-materials-based contract. While this study did not have access to hard data that would confirm or deny improvements, the incentives do appear better aligned for process streamlining. This, though, demonstrates the key challenge noted earlier: streamlining the process may expose the process to weaker quality control. SCE has countered the adjustments with the addition of the aforementioned EEG, which is designed particularly for specialized policy reviews on complex projects. The combination of these two changes –

contracting based on milestones and the addition of EEG – effectively redistributes review resources to complex projects, which may ultimately be a worthwhile tradeoff, though this study does not have the detailed data to support a conclusion one way or another.

Similarly, PG&E's structural reorganization supports improved participation processing and customer service. As noted in the Project Management section, PG&E now has a dedicated project office, which includes staff who carry a project from inception to end. This sort of end-to-end management can help ease the customer's burden of participation by having a single, consistent point of contact that fully understands the project and its place in the process at any given time. SCG and SDG&E's new policy of having the AEs guide projects accomplish a similar goal.

Pre-Sales Support

The IOUs all provide some level of pre-sales support. Across the board, the trend is for increased pre-sales support, particularly at PG&E and SCE. Pre-sales support refers to technical assistance, savings development, and other support provided by the program or the portfolio prior to a customer's official participation via a completed application.

Some of this comes in the form of standalone audit programs, which help customers identify measures, prioritize projects, and develop savings estimates. AEs have also traditionally done site visits and, when they have enough expertise, very basic walk-throughs to identify measures for further study. They have also helped streamline participation by explaining program requirements to customers and setting realistic expectations.

These sorts of pre-sales support efforts have become more formalized over the years. PG&E's Customer Solutions Operations team, including Energy Solutions Managers and Energy Solutions Engineers, is a great example. This is a new team this cycle that provides pre-sales support to customers. While they can funnel projects through any program, they report that they tend to spend most of their time on calculated projects. They help customers in a variety of ways: developing savings estimates, filling out paperwork, and helping customers think through strategic planning issues. These improved levels of service also help streamline downstream processing and improve levels of quality control. This is accomplished by their convincing customers to develop realistic savings estimates (based on appropriate baseline assumptions) and setting clear expectations of program requirements. When the applications come in they are also better documented and understood by the program, which reduces turnaround time between the customer and the project office. SCE accomplishes similar improvements through its Tier II processing and other early engineering interventions. By acclimating participants and their projects to program requirements before the application stage, pre-sales support can effectively balance the need for smooth processing and robust quality control.

Integration of Processes

Process integration can achieve two goals. First, when the process integration is substantive and real, it achieves economies of scale by reducing redundancies introduced by separate processes. Second, if the process integration is superficial – that is, the internal processes are still separate, but appear as one to the customer – this may not improve resource efficiency, but can improve customer satisfaction. Two main types of process integration seemed to be occurring.

Consolidating the Calculated "Processing Engine"

The first is the consolidation of all types of calculated projects being reviewed through one "processing engine," as one interviewee put it. While only SCE explicitly acknowledges this change, discussions with PG&E and SCG staff suggest that the same change is happening at these other utilities as well. In this framework, calculated projects – regardless of whether they come from institutional partnership programs, third-party programs, or calculated programs – should be reviewed the same way. Thus, the calculated programs' infrastructure – the "processing engine," which reviews projects – is now shared across all of these programs. This consolidation should, in theory, increase economies of scale, improve cost effectiveness, and contribute to consistency in quality control across the portfolio. The scope of this study was not broad enough to be able to assess whether those outcomes are occurring, but they were reported by interviewees as a result of this consolidation.

Integration with Non-EE Programs

The second form of consolidation refers to the integration of calculated programs with demand response (DR) and distributed generation (DG). This is an explicit policy goal of the CPUC. Based on interviews with PG&E and SCE, it appears that they are moving towards more integrated program offerings at the very least. The Sempra Process Evaluation did not address this topic.

Combined applications are a positive first step towards formal programmatic integration. For example, PG&E offers a combined custom retrofit/demand response application. SCE's application includes deemed as well. Movement towards a single, integrated application should foster further project integration by making every applicant aware of the various program offerings. Similarly, pre-sales support was emphasized in interviews as a critical element of shifting the responsibility for finding the right program for a customer away from the customer and onto the utilities' staff. AEs and pre-sales support groups such as the CSO at PG&E help accomplish this.

Administrative integration is a continued challenge. The DR and EE review processes still exist in separate silos, for the most part. SCE has successfully piloted an integrated review process,

whereby a single reviewer has the skills and knowledge to review both sets of measures at once, which saves time, resources, and reduces unnecessary customer contact. Further training is needed to expand this type of dual-review process.

From a regulatory perspective, divergent funding streams for EE, DR, and DG, along with misaligned program cycles, create significant challenges for delivering the measures together. Program cycles and funding need to be integrated before true programmatic integration can occur from top to bottom.

4.6.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Keep the application process and forms from being overly complex and costly to navigate while at the same time not being over-simplified.

All the IOUs appear to be working to balance the need for streamlining the process with the need to maintain quality control. An important element of this is pre-sales support and handholding, delivered oftentimes by AEs. This enables the programs to improve the customer experience and the quality of incoming projects without sacrificing programmatic quality control.

Tailor the degree of formality and extent of program rules and requirements to the size of the program, the size of the market being addressed, and the level of expertise of in-house staff.

All of these programs are, by national standards, large programs serving sizable market segments, and they do have relatively high levels of staff turnover. For this reason, all the programs have comprehensive and well-documented program requirements and rules that facilitate successful program implementation.

Provide technical assistance to help applicants through the process.

All of the IOUs provide some form of pre-sales assistance to help customers through the process, though PG&E and SCE's efforts standout.

Develop a cadre of trade allies who can then assist customers through the process.

As noted in the marketing section, PG&E and SCE are the most adept at leveraging the trade ally community to help participants through the process. SDG&E also utilizes this channel, though to a lesser extent. SCG appeared to be lagging.

Try to maintain some availability of program funds throughout most of the program year.

None of the programs expressed issues with program funding being unavailable. The only exception was when the state legislature attempted to repurpose the gas funding. For SDG&E and PG&E this was an issue as they slowed their program processes until there was clarity on this issue. SCG pressed on with program implementation.

4.6.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices, inclusive of the previous known best. A brief description follows the list below.

Program Implementation: Participation Process and Customer Service – Best Practices (Existing)
Existing ■ Keep the application process and forms from being overly complex and costly to navigate while at the same time not being over-simplified. ■ Tailor the degree of formality and extent of program rules and requirements to the size of the program, the size of the market being addressed, and the level of expertise of in-house staff. ■ Provide technical assistance to help applicants through the process. ■ Develop a cadre of trade allies who can then assist customers through the process. ■ Try to maintain some availability of program funds throughout most of the program year.

- **Keep the application process and forms from being overly complex and costly to navigate while at the same time not being over-simplified.** Large comprehensive incentive programs require more significant levels of site-specific application data than do other types of programs because the measures implemented are often site-specific and savings are very sensitive to baseline conditions. Nonetheless, data requirements and associated forms should be well designed to ensure they focus on the most critically needed savings and verification inputs.

- **Tailor the degree of formality and extent of program rules and requirements to the size of the program, the size of the market being addressed, and the level of expertise of in-house staff.** Large programs in large service territories with large numbers of applicants and turnover among in-house staff tend to require more detailed and formal program rules and application rigor. This is because it becomes virtually impossible in practice for a group of staff to consistently communicate and enforce

program participation requirements informally when there are large numbers of applicants. On the other hand, there are excellent examples of how one can combine strong, multi-year in-house staff expertise with a relatively small target market and program size to achieve excellent program effects through informal processes (see, for example, the discussion of Informal incentive level setting by administrators of smaller programs in the next section).

- **Provide technical assistance to help applicants through the process.** Technical expertise should not be limited to the program application and review process but also should be offered to applicants to help them prepare their applications correctly the first time.

- **Develop a cadre of trade allies who can then assist customers through the process.** Because trade allies typically assist multiple customers participating in large C&I programs over multiple years, developing a strong trade ally infrastructure can help program administrators to increase the ease of customer participation over time.

- **Try to maintain some availability of program funds throughout most of the program year.** Approaches utilized to stretch program funds include customer or per site incentive caps, staging the release of funds throughout a program year, and penalties (e.g., reduced incentives) for projects that are not installed within a pre-set period of time (e.g., several administrators use 18 months). Maintaining funds throughout most of the program year gives trade allies the confidence that they can sell the benefits of participation without concern that their customers will make a decision to install a project based on the program only to find out that funds are unavailable. It also provides customers with the confidence that they can apply for the program at the appropriate point in their decision-making process, rather than feeling pressured to apply quickly simply to reserve funds.

4.7 Program Implementation: Installation & Delivery Mechanisms

Installation and delivery mechanisms refer to the ways that programs can take interested parties and turn those into installed projects. As resource-acquisition-focused programs, this is critical step as high conversion rates can improve the cost-effectiveness of all other program activities such as marketing. Delivery and installation mechanisms can be as obvious as direct-install components, but can also include technical, equipment selection, and contracting assistance as well as financing help and incentives.

4.7.1 Current Practices

The calculated programs depend primarily on incentives, which is their main intervention strategy. This section also addresses non-incentive mechanisms that are offered.

Non-Incentive Mechanisms

The calculated programs include limited non-incentive installation and delivery mechanisms, but this is in many ways a programmatic necessity. As broad-based programs intended to achieve a high volume of cost-effective savings, non-incentive elements are not a good fit because they often come with increased costs. These increased costs impact the overall cost-effectiveness of the program, which is an important component of the program objectives. Consequently, more costly non-incentive aspects are not entirely non-existent, but rather are offered more narrowly by other portions of the portfolio.

Financing

One of the core ways that programs can potentially improve the rate of project completion is by offering project financing. Similar to incentives, financing targets a monetary barrier to installation, but the two actually target different barriers. Incentives work to improve the project economics and reduce the payback period. Financing addresses the barrier of lack of capital to do a project. The calculated programs do not offer financing. This issue is addressed by the On-Bill Financing (OBF) program. Incentives for calculated projects can be bundled with OBF loan proceeds. Of course, given fixed funding, diverting money to finance programs detracts from incentive-based programs, potentially diminishing overall portfolio cost-effectiveness.

Technical Assistance

Another major non-incentive offering is technical assistance. This comes in many forms including: audits, design, equipment selection, and general contractor work. The calculated programs offer a certain amount of technical assistance in the form of savings and project development assistance. Field engineers and AEs can help identify measures through low-rigor audits. Staff members such as PG&E's Energy Solutions Managers offer strategic planning assistance as part of the pre-sales process. Also as part of the pre-sales process, SCE's Tier II processing and PG&E's Energy Solutions Engineers develop measures and their associated savings estimates both in-house and via contracted third-parties with specialized experience. While these are certainly value-added services that fall under the auspices of installation and delivery mechanisms, it should be pointed out that this is not their primary function. Rather, these efforts were primarily instituted – according to interviewees – as a method of improving the quality of savings estimates and aligning customer expectations with the requirements of the program before applications are submitted.

More in-depth technical assistance is generally not provided by the calculated program, but rather by other portions of the portfolio. For example, audits are provided by standalone audit programs, which may funnel a customer to the calculated program or to another program entirely. They include detailed findings that can help customers identify and justify the installation of worthwhile measures. Third-party programs often take it a step further by providing installation assistance as well as audits. It is not common, but certain programs offer general contracting and equipment selection assistance while also offering the necessary depth of skill to effectively support the project design process.

These sorts of assistance offerings engage the projects directly during the installation phase and maintain and, in many ways, magnify program influence as a result. For instance, if a third-party is a general contractor they can ensure that the customer executes on the plan set forth in the application and is not swayed by vendors, who have no stake in the application, to pursue the wrong piece of equipment. This highlights the main weakness of the calculated programs when it comes to installation and delivery mechanisms. Incentives can influence project installation by improving the economics of the project being considered by a customer. This is, however, an indirect method. All the programs back away from the projects during the project installation phase. Interviewees repeatedly noted that the participation process basically includes a gap between application approval, which is the point at which installation begins, and post-installation M&V, which by definition occurs after installation. The programs lose important influence over the execution of the project that includes keeping the measure selection and installation true to plan, as well as continuing to support and usher the project along. In this way, involvement during implementation is a stronger support for high gross RR and NTG ratios. This is a fundamental challenge of implementing a per-kWh calculated incentive structure. There are no easy solutions, but it is important to highlight and recognize the added challenges and risks of an implementation process that is independent of direct program involvement and oversight. The structure leaves the programs dependent on the upfront involvement in project specification and application, and the influence of the incentive and payment structures to shape the project outcomes. A design change that provides for more involved installation assistance is one option. Alternatively, a middle ground of interim and high level check-ins during implementation can offer an inexpensive stop-gap.

Incentive Structure

The calculated programs' primary installation and delivery mechanism are their incentives. They are paid based on the number of kWh, kW and therms saved. The pay rates per-kWh vary depending on the end-use category being installed. This feature ensures that fast payback measures (such as lighting) are not over incentivized; at the same time, longer payback measures (such as major HVAC system replacements), which really need the incentive to drive the project, receive larger incentives. The incentives are summarized in the following table.

Table 4-3: Incentive Rates by Measure Category

Category	Rate	Included Measures
Lighting	$0.05/kWh	Interior and exterior lighting and controls
Air Conditioning & Refrigeration I	$0.15/kWh	Major system replacements
Air Conditioning & Refrigeration II	$0.09/kWh	Reduced load measures such as controls or shell improvements
Other Electric	$0.09/kWh	Motors, VSDs, compressed air, process, RCx, and others
Peak Demand Reduction	$100/kW	Permanent load reductions
Natural Gas	$1.00/therm	All natural gas saving measures

In all cases, the incentives are capped at 50% of project cost. Project-cost caps help ensure that customers carefully consider the tradeoffs among equipment of different costs by forcing the customer to pay at least half the cost. It also helps the programs achieve cost-effective savings, by not overpaying for short payback measures, where the full incentive may not be necessary. There is also a per-site cap that limits the amount of incentive that can be paid to any one customer. This helps spread funding out over the cycle.

This general structure of per-unit energy saved incentives paid by end-use category has been in place for more than a decade. Elements have evolved over time. Rates have gone up from, for example, from $0.45/therm in 2003-05 to $1.00/therm today. The AC&R technology category bifurcated into the major systems overhauls (AC&R I) and the controls and load reducing elements (AC&R II). Additionally, requirements for comprehensiveness (e.g., lighting can represent no more than 20% of the savings) and end-use specific incentive caps (e.g., 30% of project costs for lighting) have been thrown out in an effort to streamline and simplify the overall structure.

Incentives Paid Post-Installation

A common, though noteworthy, aspect of this type of calculated incentive structure is that the program incentives are paid only after the installation and M&V are complete. Incentives are intended to overcome financial barriers, but this fact highlights, again, that the programs are unable to help bridge capital availability problems with the incentives as structured. It was noted in the third-party commercial program group for this study that at least one third-party floats the incentive to the customer; that is, they pay at least a portion of the incentive upfront to help the customer install the equipment. Later, after M&V, the incentive amount is squared away with appropriate adjustments up or down to the original payment based on ultimate reported savings. If implemented with proper mechanisms to guard against risk, this can be an especially effective way to bridge capital availability issues using the standard incentive mechanism. However, the

third-party implementers may be better positioned to deal with the element of risk. Not all customers and projects will be appropriate for this arrangement and the calculated program would have to expend significant resources to answer tough questions such as which customers and projects represent a reasonable level of risk and how much incentive should be floated. These questions are challenging and are best judged on a case-by-case basis. The calculated program sees a much higher volume of projects than the third-party programs, which further complicates the picture. Furthermore, to deal with selective projects on a case-by-case basis may not be feasible for core programs, which face equity and customer satisfaction objectives different than those faced by third parties.

Shortening Paybacks vs. Capital Availability

More than overcoming capital availability issues, the calculated incentive structure is intended to improve project economics and drive down payback periods. The calculated payback is a function of the first year energy savings and project costs. Payback periods for calculated projects can be highly uncertain. Even if the cost structure is well-known, the energy cost savings can vary widely based on the assumed baseline and energy use parameters (i.e., hours of use, the weather, facility utilization). In a sense, the programs' savings development and review processes can help provide greater certainty by putting technical resources towards generating more accurate estimates of expected savings. However, the incentive process itself may actually exacerbate uncertainty surrounding paybacks in the case of projects undergoing M&V. The Sempra Process Evaluations reported that customers felt uncertain about their expected incentive levels. While this study did not interview PG&E and SCE customers, it is reasonable to believe they feel the same way since the programs all employ the same fundamental incentive structure. This uncertainty stems from the fact that incentives must be calculated as a function of savings (which are inherently uncertain), but are exacerbated by what the customers perceive as opaque regulations regarding baselines. Additionally, while some projects do not undergo M&V, for those projects that do undergo M&V, the issue is that the calculated incentives are a function of measured and verified savings, which no one knows until after the equipment is installed. In this way, the incentive mechanism exacerbates the inherent uncertainty involved in expected savings: if the savings are less than expected this will lengthen the payback by reducing annual real dollar savings, and this, in turn, will also reduce the incentive payout, further lengthening the payback. Participant risk, rather than being mitigated by incentives, is magnified to those projects undergoing significant M&V, which happen to be the largest and most complex.

The alternative is for the program to change the incentive structure. The programs could commit to a certain payback – typically one or two years – and then calculate the incentive payment based on the costs and the savings seen on the bill. One example of this is the Comprehensive Design Approach (CDA) programs run by National Grid, NSTAR, and WMECO, which buy project costs down to a one year payback or a maximum of 75-90% of incremental cost,

whichever is less and depending on the administrating institution. These programs include minimum savings targets and minimum size and/or load requirements that go beyond the typical calculated program requirements. This sort of approach provides the customer with greater certainty surrounding the payback of the project. It also encourages comprehensive savings.

However, these come at a cost. The program bears more risk and tends to pay more per unit-savings. Savings is a function not only of measure performance but also relies on site conditions and operations. These vary in the level of customer control, but the selection of projects and the specifics of the program-customer agreement need to reasonably address and allocate all risks. For example, basic operational integrity can be included as a clause in the payment contract. Overall, the strength of the payback-guarantee incentive approach is that it offers a substantially attractive incentive package that demonstrates a bottom-line investment in the performance of measures – *on the part of the program*. It has great potential for very high rates of customer influence and NTGRs. Further, the program's financial stake in measure performance creates a natural strong desire for close alignment between ex-ante values and outcomes, reducing the need for oversight by entities outside program staff. The latter can promote greater fluidity in project and measures, and potentially reduce program oversight costs.

Tailoring Installation and Delivery Mechanisms to Meet Objectives

The CDA example highlights an important element of the design of incentive structures, along with any other installation and delivery mechanism. The mechanisms must match the objectives. In the case of the calculated programs, their prime objective is cost-effective resource acquisition. The installation delivery mechanisms – technical assistance to develop projects and incentives paid on installed projects – reflect that; the programs include almost none of the more costly non-incentive mechanisms and have an incentive structure that minimizes program outlays, while targeting savings.

The objectives are changing, though, and the mechanisms must evolve to reflect that. Multiple interviewees recognized and spoke about this trend. Specifically, staff members at both PG&E and SCE suggested that the incentive structure itself must be rethought and recast to meet the new, diverse set of objectives that are gaining traction. These include comprehensive and deep retrofits, long-term savings, promotion of emerging technologies, pursuit of hard-to-reach, and portfolio integration. These can be targeted in different ways:

- **Comprehensive and deep retrofits** can be accomplished using the CDA that includes an incentive structure designed to promote deep retrofits, as well as design assistance that directly influences the project installation. Alternative mechanisms may include paying bonuses for multiple end-uses on a single application or utilizing a progressive incentive scale that pays out more as the percentage of facility energy use saved increases.

- **Long-term savings** was identified by one interviewee as potentially targetable via persistence incentives, such as bonuses for persistent savings or a larger deferred incentive tied to the savings demonstrated one or two years out. An alternative approach is to instead pay the long-term savings upfront based on expected useful life (EUL): the total counted savings are the first-year savings times EUL. Per-unit incentives are much smaller, but a persistent measure such as a chiller upgrade will tend to pay out more because of its long EUL as compared with, say, retrocommissioning.
- **Promotion of emerging technologies** can be accomplished by paying bonus incentives for technologies that have graduated recently from the emerging technologies programs, have low penetration / adoption rates within the eligible market and/or a high net-to-gross ratio.
- **Pursuit of hard-to-reach markets** can be accomplished by paying different incentive rates to different markets. For instance, a bonus incentive can be paid to markets with a certain NAICS codes or from communities with less than a certain number of residents.
- **Portfolio integration** can be accomplished by paying kickers either on a percentage or fixed basis for projects that combine EE and DR, for example. Alternatively, programs can be designed to be comprehensive of EE and DR by only paying for projects that do both.

There are many possible approaches to accomplish these new objectives. There are two important caveats. First, targeting multiple objectives is not necessarily desirable. By combining approaches that hope to achieve multiple, different objectives, the program may become too complex and cumbersome, ultimately leaving it unable to accomplish any objectives. Second, the calculated programs may not be the most appropriate vehicle to achieve a certain objective. Other elements of the portfolio may already pursue certain objectives that the core programs are unable to: emerging technology programs, OBF, or third-party programs targeting hard-to-reach markets. The achievement of the new, diverse set of objectives may be better done through programs that complement the core offerings or a suite of programs that replace the calculated programs. The programs are unlikely going to be able to achieve all objectives at once, but if one or two goals – such as long-term and comprehensive objectives – are focused on, it should be possible to redesign the installation and delivery mechanisms to achieve these objectives. In that sense, effectively selecting the objectives is almost as important as figuring out how to achieve them.

4.7.2 Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the section on incentives in the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Use incremental costs to benchmark and limit payments.

The calculated programs cap incentive payments at 50% of incremental cost.

Set incentive levels to maximize net not gross program impacts.

The calculated programs' incentive structure employs this practice in two ways. First, the cost-cap ensures that the program does not overpay for projects that have compelling economics on their own. Second and similarly, the incentive rates vary by end-use with lighting, a fairly compelling measure on its own without incentives, receiving substantially lower payments than others. Thus, payments are distributed to where they are needed most and where there is least likely to be free ridership: projects with long paybacks.

Adjust incentives levels based on market demand.

Incentive rates have changed over the years, increasing slightly in this past cycle. The addition of the kW kicker is also in this vein. It was reported that this was partly in response to demand, although other considerations came into play. The incentives are changed so slowly that it is difficult for the programs to respond to changes in demand.

Limit or exclude incentive payments to known free riders.

Interviewees report that they have the freedom to withhold program funding at their discretion if they believe that a participant is a free rider.

4.7.3 New Best Practices

The known best practices still apply and are still fairly comprehensive. Most have been retained with only minor modification. Below are the new best practices, inclusive of the previous known best practices. A brief description follows the list below.

Program Implementation: Installation and Delivery Mechanisms – Best Practices

- Use incremental costs to benchmark and limit payments.
- Set incentive levels to maximize net not gross program impacts.
- Adjust incentives levels based on market demand.
- Limit or exclude incentive payments to known free riders.
- Design installation and delivery mechanisms to meet program and policy objectives.

- **Use incremental costs to benchmark and limit payments.** Limiting payments so that they do not exceed a pre-determined portion of average or customer-specific incremental cost estimates is critical to avoiding grossly overpaying for savings.
- **Set incentive levels to maximize net not gross program impacts.** Free riders dilute the market impact of program dollars. Incentive levels should be set based on the program strategies and goals. Although specific objectives may vary across jurisdictions (e.g., the relative importance of encouraging industrial process versus commercial HVAC impacts), all programs should strive to maximize net savings and minimize free ridership. Payback period minimums and increasing incentives with increasing payback periods are one approach. Another is to tie incentive levels to individual measures or types of measures that are known to have extremely high or low naturally occurring adoption levels.
- **Adjust incentives levels based on market demand.** When program funds are severely over or under subscribed, adjusting incentive levels may be necessary. However, incentive levels should not be based strictly on market demand and should not be altered in patterns that appear random to market participants.
- **Limit or exclude incentive payments to known free riders.** Several of the approaches discussed above are focused on trying to minimize free-ridership through indirect programmatic rules and requirements. The advantages of such approaches are that the rules and requirements are codified and apply equally to all customers. Disadvantages of all of the approaches above are that they are based on correlations between project characteristics and free-ridership for which there are always exceptions. When program administrators are incented and permitted to simply exclude known free riders, scarce program funds can instead be utilized on projects that provide net benefits.
- **Design installation and delivery mechanisms to meet program objectives.** Installation and delivery mechanisms must be tied directly to the objectives the program intends to achieve. Both non-incentive and incentive mechanisms must be designed with those objectives in mind. Cost-effective resource acquisition may be best achieved through low-cost non-incentive mechanisms or none at all. Alternative objectives may require more involved non-incentive mechanisms as well as complex incentive structures to achieve them.

4.8 Program Evaluation and Adaptability

California's energy efficiency programs are evaluated on a regular basis. Impact and process evaluations are typically conducted every two to three years. Impact evaluations commonly establish program savings, verify savings, determine realization rates, and estimate free ridership and participant spillover rates. The previous evaluations were completed approximately two years ago, and addressed programs implemented during program years 2006 through 2008. Programs offered during program years 2010 through 2012 are currently being evaluated.

The calculated programs have been well-represented in the previous and current impact evaluations because of their sheer size. They account for a large number of sampled projects and the majority of savings for the specific program groupings they are part of. Several evaluations that were conducted for the PY 2006-2008 programs addressed these calculated programs, notably those of the following contract groups: PG&E Fabrication, Process and Manufacturing; Southern California Industrial and Agricultural; Major Commercial; Specialized Commercial; and the PG&E Agricultural and Food Processing Program.[28]

These evaluations identified the following problems: improper baseline selection, lax enforcement of program rules, questionable basis for savings assumptions, improper treatment of fuel switching projects, and high free ridership (i.e., low program influence). The following are excerpts from the evaluation study detailing the major findings and associated recommendations:

- **Problem:** There are Significant Problems with Baselines Used for Claimed Savings.
- **Recommendation:** Improve Baseline Specification. End the practice of using in situ baselines as the default over the EUL of the measure as the baseline for estimating savings and paying incentives for all projects. Identify projects explicitly in program files as replace-on-burnout, natural turnover, or early replacement. For the replace-on-burnout and natural turnover cases, baselines should be based on the efficiency of alternative new equipment required by code/regulations/ISP. In the case of early replacement, provide evidence and documentation of the remaining useful life of the equipment replaced, the estimated time at which the equipment would have been replaced in the future, and the effect of the program in accelerating early replacement.
- **Problem:** Inadequate Enforcement of Program and Policy Rules.

  Recommendation: Increase enforcement of program eligibility and policy rule requirements. The CPUC should develop a process for reviewing projects for program eligibility prior to their being approved for a rebate.

[28] Ibid.

- **Problem:** Unverified and Undocumented Assumptions Used as Inputs for the Savings Calculations for Many Applications.

  Recommendation: Put measures with inadequate empirical basis for savings estimates in the emerging technologies program until more reliable information is developed. Measures with highly uncertain savings in need of detailed research to establish validity, expected savings, and repeatable algorithms and measurement protocols should be included in the emerging technologies program until they are more widely understood.

- **Problem:** Inadequate Declaration of Fuel Switching, Multi-Fuel Impacts, Distributed Generation.

  Recommendation: Aggregate and Approve Fuel Switching and Distributed Generation-Related Projects in One or More Explicit Programs or Clearly Identified Program Elements. All multi-fuel project applications need to follow the three-prong test set forth in the Commission's Policy Manual as well as any other regulatory agency requirements.

- **Problem:** High Free Ridership – Limited Program Influence.

  Recommendations: (1) Increase the capability of the program to influence industrial efficiency improvements. (2) Influence and provide incremental energy efficiency options directly to end users at the earliest decision-making stages of major equipment or facility modifications. (3) Provide Continuity in Account Representative Assignments, Particularly for the Largest Customers. (4) Consider Using Early Project NTG and Baseline Screening Prior to the Incentive Being Approved for the Largest Projects and those with Significant Policy Issues. (5) Carefully review the list of qualifying measures for each program and eliminate eligibility for those that are standard practice. (6) Consider Limiting or Excluding Incentive Payments to Known Free Riders. (7) Consider Incorporating a Payback Floor. (8) Set Incentive Levels to Maximize Net (Not Gross) Program Impacts. (8) Consider Tying Staff Performance to Independently Verified Net Results.

4.8.1 Current Practices

During the Program Manager interviews, the IOUs indicated they had implemented a number of new procedures to respond to each of the problem areas identified. Below are specific examples of current practices that respond to the recommendations made.

1. **Recommendation:** Improve Baseline Specification. **Current IOU practice:** SCE's *Customized Calculated Savings Guidelines* document, last updated in March 2012, was in part a response to this recommendation. This document establishes standardized electric energy savings and demand reduction estimation and verification methods that are compatible with existing California energy efficiency policy. Step 3 of the specific guidelines regarding savings calculations involves determining the type of retrofit and references the CPUC's decision in July 2011 with specific guidance on how to select the appropriate

baseline for given situations. PG&E indicated they are using either code requirements or industry standard practice to define the baseline. For Custom measures for which these are not readily available, they rely on reviews from outside expert consultants to determine the proper baseline.

2. **Recommendation:** Increase enforcement of program eligibility and policy rule requirements. **Current IOU practice:** Both PG&E and SCE report they have implemented various procedures to address this. SCE cited its standard program processing guidelines which require that an applied for measure is eligible for rebates (as evidenced by the existence of an approved solution code at or before the time of final project approval). Also, SCE's technical review procedures, as set forth in *Internal Customized Policy and Procedure Manual*, require the project review to validate that program requirements being met. For PG&E, most projects are developed by outside vendors and submitted for approval. All vendor projects with calculations go to an expert consultant reviewer in their Project Office who assess project eligibility as a part of their standard review.

3. **Recommendation:** Put measures with inadequate empirical basis for savings estimates in the emerging technologies program until more reliable information is developed. **Current IOU practice:** This issue was not explored in the program manager interviews.

4. **Recommendation:** Aggregate and Approve Fuel Switching and Distributed Generation-Related Projects in One or More Explicit Programs or Clearly Identified Program Elements. All multi-fuel project applications need to follow the three-prong test set forth in the Commission's Policy Manual as well as any other regulatory agency requirements. **Current IOU practice:** SCE indicated they have recently implemented a process for multi-fuel cost-effective screening by applying a pre-screening adjustment. It is a wholly separate process that was adopted in response to this recommendation. PG&E responded that they use the three-prong test. They have a specialist that runs the three-prong analysis, and screens measures for eligibility.

5. **Recommendation:** Increase the capability of the program to materially influence customer adoption of calculated program efficiency improvements. **Current IOU practice:** In order to reduce free-ridership (and thereby, increase program influence), both SCE and PG&E indicated they are performing some level of pre-screening and exclusion of projects that were planned and would proceed absent the program. Program managers report rejecting projects on this basis, in particular where customers had already procured the required equipment or were in the process of installation when they first contacted the program. However, they also noted there is a tension between the goal of screening for free ridership and the need to maintain good long-term relationships with customers. Frequent rejections will jeopardize

customer goodwill, which highlights the importance of effective expectation setting regarding free ridership as early as possible in the process. A manager spoke to the importance of educating the sales force on how to recognize (and discourage) projects that are already planned to be implemented. Front-end groups, such as the Customer Solutions Group at PG&E, are an important player in this as they assimilate projects to the program process and have an important role in setting customer expectations. Another example of utility efforts to identify and screen for free ridership is the industry standard practice studies being performed by SCE. These studies focus on more commonly installed technologies and are seeking to identify those measures that would be installed on their own outside of any energy efficiency programs. Codifying and distributing guidelines can help in the process of educating front-line staff, while also providing them an authoritative reference point. Another new addition in this regard is the Energy Engineering Group (EEG) at SCE, which is an additional layer of review beyond the typical project processing office. The EEG is focused primarily on reviewing policy and eligibility issues, such as baseline selection, standard practice, and free ridership, not energy savings issues, which are addressed via the traditional Internal Technical Review group. Utility staff indicated that in light of previous cycles' disputed free ridership findings there was a new emphasis on upstream documentation of program influence. The logic is that much of previous cycles' identified free ridership was due to poor documentation of influence rather actual free ridership. Third-parties and account representatives who process projects primarily through calculated have been pushed to better document their interactions with potential customers.

Early Evaluation Findings

Early results of the Custom Impact Low Rigor Assessment and Net-To-Gross Assessment efforts are summarized here to provide additional perspective on IOU-reported program developments in the current cycle.

Low Rigor Assessment

As part of the Custom Impact WO033 evaluation activities, in addition to the standard M&V approach for the full impact sample points, additional 'low rigor' points have been sampled to support program assessment and process evaluation activities conducted within this Overarching Non-Residential Process Evaluation (WO012). This low rigor evaluation activity enables the assessment of a larger proportion of the IOUs' portfolios than if only standard rigor M&V points were included. The low rigor points involved a higher level assessment of the appropriateness and adequacy of the underlying engineering methods and assumptions used to evaluate projects. This activity identifies certain types of strengths and weaknesses in specific IOU programs or measures. The majority of low rigor point assessments are based on desk reviews of ex ante application and project documents. The desk review is a least cost alternative, involving a simple review of the project file and ex-ante savings estimate. It does not involve any customer contact

and includes very limited savings analysis. Note that savings analysis is not intended to be included in the scope of the low rigor assessment.

The gross impact sample is also nested inside the low rigor sample. For the gross impact sample points, more in-depth methods are used, involving varying degrees of customer contact (through phone calls or site visits), more in depth savings analyses, and additional documentation or data collection. Measurements at site visits are limited to spot measurements (where applicable) and data collection from existing customer records to obtain pre- and post-retrofit system operation.

Reporting of site-specific results is done using a common template which was developed specifically for these low rigor assessments. Site level reporting of results for the low rigor sites is limited to a brief discussion of the methods used and results obtained.

LRA Sample Design

There are two components of the LRA sample: the M&V or Gross Realization Rate (GRR) sample, and the low rigor (LR) sample.

In accordance with the requirements of the California EM&V Framework, the GRR sample points were allocated to maximize precision for the six IOU/fuel domains using size stratification. The GRR points are concentrated among the largest programs, somewhat proportional to relative program size in savings claimed. Since the largest 10 to 20 of the roughly 100 programs account for 65% to 85% of the WO033 savings (based on 2010 tracking data), the bulk of the GRR points are concentrated specifically in those largest programs. The LR points are designed to complement the GRR sample and supplement the GRR points for a portion of the programs with fewer or zero GRR points. For the purpose of providing program-level feedback on impact-related practices, a large, statistically robust sample is not necessarily required. A small number of projects randomly selected for review by the evaluation team provide project-level feedback for more programs than would be the case with the GRR sample alone.

The sample was designed by setting a threshold of 5 to 8 projects for program-level feedback and targeting a total of up to 30 programs. Note that the programs with the most activity in terms of participant numbers will naturally have a greater number of reviewed projects, while those with less activity have fewer.

LRA Reviews Completed

Across all program groups, a total of 300 reviews were performed as shown in Table 4-4.

There was wide variation in the number of reviewed projects ***by utility***, reflecting differences in the number of completed projects in the population by IOU. Half of the reviewed projects were

for PG&E (146 of 300, another 30% were for SCE (88 of 300) and approximately 10% each were for SDG&E (39 of 300) and SCG (27 of 300), respectively.

Table 4-4: Summary of LRA-Reviewed Projects by Program Grouping and Utility

IOU	Third Party	Core Calculated	Local Government Partnerships	New Construction	Institutional Partnerships	Total by IOU
PG&E	48	54	8	9	27	146
SCE	10	32	9	12	25	88
SCG		25		2		27
SDG&E	19	10		10		39
Totals	**77**	**121**	**17**	**33**	**52**	**300**

The number of reviewed projects by program area also varied widely as shown above in Table 8:

- For the Calculated program area, a total of 121 LRA reviews were performed. The number of reviewed projects varied widely by utility as shown below. The number of projects reviewed ranged from a low for SDG&E (N=10) to a high for PG&E (N=54).
- The Third Party program group received the next highest number of reviews, a total of 77. Nearly two-thirds of these were for PG&E (N=48), another one-fourth were for SDG&E (N=19) and the remainder was for SCE (N=10).
- The third ranking category was Institutional Partnerships, with 52 reviews completed. These were split roughly 50-50 between PG&E (N=27) and SCE (N=25).
- Additional reviews were completed for the New Construction (N=33) and Local Government Partnerships categories (N=17), with PG&E and SCE accounting for the largest shares.

The breakdown of reviewed projects by utility and customer sector is shown below in Table 4-5. Over half of reviewed projects (170 of 300, or 56%) were for Commercial customers, another third (98 of 300, or 33%) was for Industrial customers, and the remaining 11% (32 of 300) was for Agricultural customers.

Table 4-5: Summary of LRA-Reviewed Projects by Utility and Customer Sector

Sector	PG&E	SCE	SCG	SDG&E	Total
Agricultural	22	9	1	0	32
Commercial	68	56	9	37	170
Industrial	56	23	17	2	98
Totals	146	88	27	39	**300**

LRA Data Reporting and Analysis

Findings for each sampled LRA site are being summarized in a common data template. The template is organized to report on three key areas of interest, areas needing improvement as documented in the previous PY 2006-2008 evaluation. These areas were: the appropriateness of the selected baseline/assumptions; the appropriateness of the impact calculation methodology; and the degree of compliance with various program rules. Within each of these areas are several sub-dimensions of each area, representing specific issues that were raised in the previous evaluation findings.

In some cases an issue was impossible to assess with desk review or information available in the specific desk review. In these cases the project is excluded from a category of assessment. The number of projects for which an issue could be assessed is shown as the figure "Able to Assess" and is shown for each issue category. Note that where evaluators noted they were "able to assess" this does not mean the assessment is absolute or complete, but that they had enough information to make a desk review based assessment.

With custom projects, critical particulars are often only apparent with a deeper look. Combine this attribute with a large variance in project size, and there is potential for custom impact evaluation outcomes to diverge from what is implied by lower rigor results. Again the intention of lower rigor results is to flag what is apparent with a desk review. In general the lower rigor assessments may miss or partially identify issues that would be fully addressed with an M&V approach. Two examples help to illustrate how the lower rigor review is useful and why it needs to be considered with appropriate caveat. One lower rigor review found a project that used an in-situ baseline, but was a new construction project. In this case, a clear problem with the baseline was caught by the desk review. In another case, a project appeared to have a reasonable baseline on paper and was give a 'good' rating based on the desk review. During a follow up interview with the site contact that was done as part of M&V, it became a clear case of industry standard practice. This latter project is a relatively large one, and will have notable consequences to the final evaluation outcome.

The results for each site are tabulated across issue areas and then summarized by categories of interest (specifically, program groupings and/or groupings by IOU) in order to support the WO12

final reporting of results. These categories were: core calculated, third-party, institutional partnerships, local government partnerships, new construction and core calculated by IOU.

Key LRA Findings

The overall findings of the LRA assessment are described below. First are findings for all reviewed programs, subsequently are findings specific to the Core (Calculated) program area.

All Programs

The following two tables summarize LRA findings across all programs evaluated for each issue identified in the PY 2006-2008 evaluation. Table 4-6 below provides a general snapshot of findings related to compliance with specific types of program rules/rule violations.

Table 4-6: Findings with Respect to Compliance with Program Rules – All Programs

Total Sample size (pop)	300
Able to assess (Y)	281
Customer Installation Meets All Program Rules (N)	254
Customer Installation Does Not Meet All Program Rules (N)	27
Customer Installation Does Not Meet All Program Rules (%)	10%
Reasons for not meeting all program rules:	
1. Equipment remaining life differs from program rules	0%
2. Equipment repair disallowed	42%
3. O&M / operational practice changes disallowed	17%
4. Measure not permanent	4%
5. Measure life less than five years for non-RCx measure	0%
6. Lower than required efficiency	4%
7. Existing equipment not removed as required	17%
8. Ineligible fuel switching	8%
9. Specific measure listed as ineligible	13%
10. Other (describe briefly in Notes)	33%
Reasons for not meeting all program rules (N)	27

Some general observations are:

- Among the 281 projects that were able to be assessed, about 10% or 27 had apparent program rule violations.
- Among the 27 projects that did not meet program rules, many had more than one rule violation. The most common issue was that the project involved a **routine equipment repair** (11 projects); therefore, ineligible for program rebates. Other rule violations corresponding to identified categories were that the project comprised a **routine O&M practice** (4 projects), the **pre-existing equipment had not been removed** (4 projects), the specific measure was **ineligible for rebates** per program rules (11 projects), the project consisted of **ineligible fuel switching** (2 projects) and the **measure was not permanent** (1 project). There were also a number of other projects, 9 in all, for which a variety of reasons were found for not meeting program rules.

The LRA reviews also involved a deeper examination of specific issues identified in the PY2006-2008 Industrial evaluations. The findings of this more detailed inquiry are shown in Table 4-7.

Table 4-7: Summary of LRA Findings for Key Issues of Interest – All Programs

Key Issue Assessed	Able to Assess	Assessment Results (Ns)				Assessment Results (%)		
		Good	Neutral	Poor	Total	Good	Neutral	Poor
Appropriate Measure and Baseline Specification								
Ex-ante Conditions Vary from As-Found Conditions	14							
IOU Application Documentation Complete and Accurate	289	130	96	72	298	44%	32%	24%
IOU Tracking Data Complete and Accurate	290	109	122	65	296	37%	41%	22%
Project utilized pre-installation M&V	254	93	56	86	235	40%	24%	37%
Appropriate Baseline	271	221	0	52	273	81%	0%	19%
Early Replacement Claim: Valid RUL / EUL Approach Used	152	101	0	55	156	65%	0%	35%
Appropriate Calculation Method								
Appropriate Impact Calculation Method	273	136	92	49	277	49%	33%	18%
All Relevant Inputs Considered	265	222	0	48	270	82%	0%	18%
Adequate Values for All Inputs	256	96	119	50	265	36%	45%	19%
Appropriate HVAC Interactive Effects Calculation Method	105	3	0	9	12	25%	0%	75%
Appropriate non-HVAC Interactive Effects Calculation Method	64	40	8	5	53	75%	15%	9%
Project utilized post-installation M&V	290	87	97	112	296	29%	33%	38%
Compliance with Program Rules								
Measures are IOU Program Eligible	287	283	0	3	286	99%	0%	1%
Measures Exceed Code or Industry Standard Practice	257	229	0	22	251	91%	0%	9%
Multiple IOU Fuel Impacts Properly Accounted for (includes Fuel Switching and Cogeneration)	14	8	0	9	17	47%	0%	53%
If Applicable, Fuel Switching Supported with Three Prong Test	8	3	0	5	8	38%	0%	63%
Non-IOU Fuel and Ancillary Impacts of Project Properly Accounted for (Cogen/Waste Heat Recovery/ Refinery Gas, etc.)	63	19	0	60	79	24%	0%	76%
Customer Installation Meets All Program Rules	285	254	0	27	281	90%	0%	10%

The following observations can be made:

- **Appropriate Measure and Baseline Specification.**
  - *Able to be Assessed.* The reviewed projects were able to be assessed against the majority of issues related to this area. The remaining issues were only relevant to a small subset of projects, and thus have a small number that were 'able to be

assessed' on those issues. Again, 'able to assess' does not mean the assessment meets an M&V rigor level. It means the evaluator had enough information to make a lower rigor assessment. As discussed above, results need to be considered indicative.

- **Specific sub-issues.** Note that the quantities in the Total column differ slightly from the Able to Assess column. This is due to the fact that some of the projects were given a "Not Applicable" (N/A) with respect to this issue.
  - *Appropriate Baseline.* There were 273 projects for which there was a low rigor assessment of the baseline. Among these, 52 projects (or 19%) were found to have apparent problems in the baseline selection.
  - *Project Documentation and Tracking Data Quality/Completeness.* The assessment of project documentation and tracking data differs from most assessment issue categories in that the completeness of a desk review is not expected to differ from an M&V review. Evidence of project documentation is the same in both approaches. Nearly all projects (298 of 300) were 'able to be assessed' with regard to documentation and tracking data. Documentation was found to be either incomplete or inaccurate for 72 projects, or about one-fourth of all assessments. Less than half of projects received Good ratings (130 of 298, 44%), while the remaining one-third (96 of 298, 32% of projects) were rated Neutral with respect to this issue. **Program tracking data quality** was deemed Good for just over one-third of reviewed projects (109 of 296 projects, 37%), while for the remainder it was either Neutral (122 of 296 projects, 41%) or Poor (65 of 296 projects, 22%).
  - *Early Replacement Claim.* Lower rigor assessments were 'able to assess' this issue for 156 projects and found 55 (35%) to have inappropriate claims with respect to RUL and EUL assumptions.

- **Appropriate Calculation Method**
  - *Appropriate Impact Calculation Method.* Over three-fourths of reviewed projects were rated either Good (136 of 277, 49%) or Neutral (92 of 277, 33%) indicating most projects used a calculation method that was not determined incorrect based on the low rigor review. One-fifth, or 49 projects were found to have used a Poor calculation method.
  - *All Relevant Inputs Considered.* Similarly, Among the 270 projects assessed on this issue, 48 (18%) were determined to be missing relevant inputs..
  - *Adequate Values for All Inputs.* About one-third (96 of 265, 36%) of reviewed projects were determined to have sufficient input values. Another 45% (119 of 265) of projects received a Neutral rating on this issue, while the remaining 19% (50 of 265) were given a Poor rating. The large quantity of neutral ratings reflects in part the limitations of desk review.
  - *Appropriate Interactive Effects Calculation Method.* Methods used for HVAC and non-HVAC measures were reviewed separately. HVAC methods were viewed as

problematic, with three-fourths of reviewed projects (9 of 12, 75%) rated 'poor'. The opposite was found for non-HVAC technologies, where three-fourths of reviewed projects (40 of 53, 75%) were found to have used a Good method, another 8 of 53 projects (15%) received a Neutral rating, and only 5 of 53 projects (9%) were considered to have used a Poor method.

- *Project Used Post-Installation M&V.* There is substantial room for improvement with respect to this issue as fewer than one-third of projects (87 of 296 projects, 29%) received a Good rating. The remainder were rated either Neutral (97 of 296 projects, 33%) or Poor (112 of 296 projects, 38%).

- **Compliance with Program Rules**
  - Overall, the lower rigor reviews showed a majority of projects complied with program rules. Issues that continue to pose particular challenges are with respect to projects involving fuel switching or multiple fuel/energy source impacts.
  - *Measures are IOU Program Eligible and Exceed Code/Industry Standard Practice.* Nearly all projects (99%) reviewed include measures not specifically excluded from program eligibility. A majority of projects (91% or 229 of 251) had measures that appeared to exceed code and/or industry standard practice in the particular applications of the project. With respect to industry standard practice, note that in many cases more in-depth research is needed to identify the project context in enough detail to determine standard practice. Projects with a 'poor' rating in the above areas were clear enough that a desk review revealed eligibility and/or standard practice violations.
  - *Fuel Switching or Multiple Fuel/Energy Source Impacts.* This area involves only a small number of reviewed projects but demonstrates a need for improvement. Only about half of the reviewed projects involving multiple fuel impacts had them properly accounted for (8 of 17, 47% rated Good), while the remainder did not (9 of 17, 53% rated Poor). Similarly, of the 8 reviewed projects that triggered the 3 prong-test, only 38% (3 of 8 projects) were found to have addressed this properly (as indicated by ratings of Good), while the remaining 63% (5 of 8) did not address it correctly, receiving Poor ratings. The final issue reviewed was the proper accounting of non-IOU fuel and ancillary impacts, for which reviewed projects also performed poorly. Only 19 of the 79 reviewed projects (24%) were rated Good with respect to this issue, while the remaining 60 of the 79 reviewed projects (76%) received Poor ratings.
  - *Customer Installation Meets Program Rules.* This category goes beyond assessment of the measure eligibility to include any apparent violation related to the particular installation of the project. Of course it is constrained to those violations that can be gleaned from a desk review. Examples include ineligible fuel switching, a routine equipment repair, or an impermanent installation. Ten percent of projects, or 27 of 281 reviews revealed at least one program rule violation.

Core (Calculated) Programs

For the Core (Calculated) program area, which is the subject of this report, additional analysis results are presented. Table 4-8 below provides a general snapshot of findings related to compliance with specific types of program rules/rule violations.

Table 4-8: Findings with Respect to Compliance With Program Rules – Core (Calculated) Programs

Total Sample size (pop)	121
Able to assess (Y)	119
Customer Installation Meets All Program Rules (N)	107
Customer Installation Does Not Meet All Program Rules (N)	12
Customer Installation Does Not Meet All Program Rules (%)	10%
Reasons for not meeting all program rules:	
1. Equipment remaining life differs from program rules	0%
2. Equipment repair disallowed	82%
3. O&M / operational practice changes disallowed	18%
4. Measure not permanent	0%
5. Measure life less than five years for non-RCx measure	0%
6. Lower than required efficiency	0%
7. Existing equipment not removed as required	18%
8. Ineligible fuel switching	9%
9. Specific measure listed as ineligible	17%
10. Other (describe briefly in Notes)	29%
Reasons for not meeting all program rules (N)	12

Some general observations are:

- Ten percent, or 12 of the 119 projects assessed included apparent program rule violations.
- Among those projects with program rule violations, the most prevalent issue was projects that involved a **routine equipment repair** (10 projects, 82%) and was therefore ineligible for program rebates. Other rule violations corresponding to identified categories were that the project comprised a **routine O&M practice** (2 projects, 18%), the **pre-existing equipment had not been removed** (2 projects, 18%), the specific measure was **ineligible for rebates** per program rules (2 projects, 17%), and the project consisted of **ineligible fuel switching** (1 project, 9%). There were a few projects, 3 in all (29%) for which a variety of reasons were found for not meeting program rules.

The LRA reviews for the Core Calculated group also involved a deeper examination of specific issues identified in the PY2006-2008 Industrial evaluations, as shown in Table 4-9 below.

Table 4-9: Summary of LRA Findings for Key Issues of Interest – Calculated Programs

Key Issue Assessed	Able to Assess	Assessment Results (Ns)				Assessment Results (%)		
		Good	Neutral	Poor	Total	Good	Neutral	Poor
Appropriate Measure and Baseline Specification								
Ex-ante Conditions Vary from As-Found Conditions	12							
IOU Application Documentation Complete and Accurate	119	60	44	17	121	50%	36%	14%
IOU Tracking Data Complete and Accurate	119	24	66	30	120	20%	55%	25%
Project utilized pre-installation M&V	113	51	23	31	105	49%	22%	30%
Appropriate Baseline	112	91	0	23	114	80%	0%	20%
Early Replacement Claim: Valid RUL / EUL Approach Used	51	32	0	22	54	59%	0%	41%
Appropriate Calculation Method								
Appropriate Impact Calculation Method	115	60	36	19	115	52%	31%	17%
All Relevant Inputs Considered	113	98	0	18	116	84%	0%	16%
Adequate Values for All Inputs	113	35	63	19	117	30%	54%	16%
Appropriate HVAC Interactive Effects Calculation Method	27	1	0	5	6	17%	0%	83%
Appropriate non-HVAC Interactive Effects Calculation Method	20	10	4	3	17	59%	24%	18%
Project utilized post-installation M&V	118	43	30	47	120	36%	25%	39%
Compliance with Program Rules								
Measures are IOU Program Eligible	120	119	0	0	119	100%	0%	0%
Measures Exceed Code or Industry Standard Practice	103	91	0	8	99	92%	0%	8%
Multiple IOU Fuel Impacts Properly Accounted for (includes Fuel Switching and Cogeneration)	6	4	0	4	8	50%	0%	50%
If Applicable, Fuel Switching Supported with Three Prong Test	3	2	0	1	3	67%	0%	33%
Non-IOU Fuel and Ancillary Impacts of Project Properly Accounted for (Cogen/Waste Heat Recovery/ Refinery Gas, etc.)	34	6	0	37	43	14%	0%	86%
Customer Installation Meets All Program Rules	119	107	0	12	119	90%	0%	10%

The following observations can be made:

- **Appropriate Measure and Baseline Specification.**
  - *Appropriate Baseline.* Findings are similar to All Programs' results.
  - *Project Documentation and Tracking Data Quality/Completeness.* The ratings for the Core Calculated program area are stronger than those across All programs for project documentation, but fall short in terms of tracking data quality. Recall that 25% of All 298 projects assessed were determined to have incomplete or inaccurate project documentation; this rate was 14% among the assessed core calculated projects. Project documentation was found to be complete and accurate ("good") for one-half of Core Calculated projects, (60 of 121) versus 44% of All assessed projects. **Program tracking data quality** is in need of significant improvement and had weaker results for Core programs than all programs. Tracking data was deemed "Good" for only 20% of Core projects and 37% of all projects.
  - *Early Replacement Claim.* The majority of reviewed early replacement projects (32 of 54, 59%) were found to have made a valid claim with respect to the RUL and EUL assumptions, while the remainder (22 of 54, 41%) did not.
- **Appropriate Calculation Method**
  - Results in this category for the Core Calculated Programs are generally very similar to the 'all programs' results.
  - *Appropriate Impact Calculation Method.* Most projects were not determined to have used an inappropriate calculation method. Nineteen projects of 115 reviewed (17%) were found to have used a poor calculation method.
  - *All Relevant Inputs Considered.* Among the 116 projects assessed on this issue, 18 (16%) were determined to be missing relevant inputs Similarly, an overwhelming majority of projects were predominantly found to have used all of the pertinent input parameters, as 84% (98 of 116, projects) were rated Good, while the remainder (18 of 116 projects, 16%) were rated Poor.
  - *Adequate Values for All Inputs.* This issue was more problematic as only about one-third (35 of 117, 30%) of reviewed projects were found to have sufficient input values. Another 54% (63 of 117) of projects received a Neutral rating on this issue, while the remaining 16% (19 of 117) were given a Poor rating.
  - *Appropriate Interactive Effects Calculation Method.* Methods used for HVAC and non-HVAC measures were reviewed separately. HVAC methods were viewed as problematic, with nearly all reviewed projects (5 of 6, 83%) rated Poor while only 1 of 6 reviewed projects, (17%) was rated Good. Findings were improved for non-HVAC technologies, where over half of reviewed projects (10 of 17, 59%) were found to have used a Good method, another 4 of 17 projects (24%) received a Neutral rating, and only 3 of 17 projects (18%) were considered to have used a Poor method.

- *Project Used Post-Installation M&V.* The evaluation revealed that Post-Installation M&V practices need improvement. Only about one-third of projects (43 of 120 projects, 36%) received a Good rating. The remainder were rated either Neutral (30 of 120 projects, 25%) or Poor (47 of 120 projects, 39%).

- **Compliance with Program Rules**
  - Results for the Core Calculated programs are very similar to the 'all programs' results.
  - *Measures are IOU Program Eligible and Exceed Code/Industry Standard Practice.* All reviewed Core Calculated projects (119 of 119) received a rating of Good, indicating there was no evidence the measures were not eligible for the program. A majority of projects had measures that appeared to exceed code and/or industry standard practice (91 of 99 or 92%) had measures that appeared to exceed code and/or industry standard practice in the particular applications of the project.
  - *Fuel Switching or Multiple Fuel/Energy Source Impacts.* This area involves only a small number of reviewed projects but demonstrates a need for improvement. Similar to the 'all programs' results, only about half of the reviewed projects involving multiple fuel impacts had them properly accounted for (4 of 8, 50% rated Good). Core programs did a little better than 'all programs' in use of the 3 prong test, though the samples are small. Two of 3 projects addressed this correctly versus 3 of 8 among 'all programs'. The final issue reviewed was the proper accounting of non-IOU fuel and ancillary impacts. Reviewed projects performed poorly in this area. Only 6 of the 43 reviewed projects (14%) were rated Good with respect to this issue, while the remaining 37 of the 43 reviewed projects (86%) received Poor ratings.
  - *Customer Installation Meets Program Rules.* In a nearly exact mimic of the 'all programs' results, 10% (12 of 119) project reviews revealed at least one program rule violation. This category includes any apparent violation related to the particular installation of the project. Of course it is constrained to those violations that can be gleaned from a desk review. Examples include ineligible fuel switching, a routine equipment repair, or an impermanent installation.

Comparisons Across Individual Programs

Additional analysis was done for the Calculated, Third Party, and Institutional Partnerships areas to examine how well individual programs performed versus the category as a whole. To simplify the presentation of results, the tables below provide a comparison of program or category performance using the percentage of projects that received a rating of Good on each issue. In addition, there is no reporting for issues that involved very small numbers of reviews, such as those pertaining to Interactive Effects, Multiple fuel impacts and use of the 3-prong test.

Calculated program area. This analysis involved comparison of program performance for 4 IOU Calculated programs with those for the Calculated program area as a whole, as shown in Table 4-10 below.

Some observations are:

- **Appropriate Measure and Baseline Specification**
  - There is wide variation across programs with respect to the **completeness and accuracy of the documentation** accompanying the application. SCE's Calculated Industrial program performance was much stronger than the others in this area.
  - All programs performed poorly in the area of **completed and accurate tracking data.** SDG&E's BID program had only about one-third of its projects with Good ratings, yet it had the best performance among the programs examined.
  - Use of **pre-application M&V** is not very common. It was found in about half the projects for PG&E and SCE programs, but only about one-third of projects for SDG&E and SCG.
  - With the exception of PG&E, between 25 and 30% of projects reviewed were determined to have used an incorrect baseline. None of PG&E's projects were determined to have used an incorrect baseline.
  - With regard to early replacement projects, involving **correct use of RUL/EUL**, program performance was less strong. Across all programs and projects reviewed, only 59% received ratings of Good. Again, PG&E appears stronger, but sample sizes are too small to draw any solid conclusions.

Table 4-10: Summary of LRA Findings for Key Issues of Interest – IOU Calculated Programs

	Programs Or Categories Reviewed				
	Statewide	**PGE21021**	**SDGE3117**	**SCG3611**	**SCE-SW-003B**
	Core – Calculated	Calculated Industrial	Non-Residential (BID)	Calculated Industrial	Calculated Industrial
	N = 121	N = 22	N = 19	N = 17	N = 15
Key Issue Assessed	% Good	% Good	% Good	% Good	% Good
Appropriate Measure and Baseline Specification					
Ex-ante Conditions Vary from As-Found Conditions	not available	not available	not available	not available	not available
IOU Application Documentation Complete and Accurate	50%	41%	26%	47%	67%
IOU Tracking Data Complete and Accurate	20%	0%	37%	0%	13%
Project utilized pre-installation M&V	49%	53%	35%	31%	57%
Appropriate Baseline	80%	100%	76%	71%	71%
Early Replacement Claim: Valid RUL / EUL Approach Used	N = 54	N = 4	N = 13	N = 6	N = 4
	59%	75%	62%	67%	50%
Appropriate Calculation Method					
Appropriate Impact Calculation Method	52%	67%	29%	24%	53%
All Relevant Inputs Considered	84%	85%	75%	88%	80%
Adequate Values for All Inputs	30%	33%	57%	24%	33%
Project utilized post-installation M&V	36%	48%	26%	18%	40%
Compliance with Program Rules					
Measures are IOU Program Eligible	100%	100%	100%	100%	100%
Measures Exceed Code or Industry Standard Practice	92%	100%	93%	80%	100%
Non-IOU Fuel and Ancillary Impacts of Project Properly Accounted for (Cogen/Waste Heat Recovery/ Refinery Gas, etc.)	14%	40%	0%	17%	0%
Customer Installation Meets All Program Rules	90%	95%	94%	88%	87%

- **Appropriate Calculation Method**
  - Use of an **appropriate impact calculation method** was a problem area, particularly for the SDG&E and SCG programs, which had much lower ratings in this area. PG&E's Calculated Industrial program had the best performance.
  - In general, all programs performed similarly in their use of **all relevant inputs** in the impact calculation.

- In terms of having **adequate values for all inputs**, program performance was generally poor. SDG&E's Bid program performed strongest in this area, with just 57% of its reviewed projects meeting this requirement.
- Use of **pre-installation M&V** varied widely across programs, and was least used by the SDG&E and SCG programs.

- **Compliance with Program Rules**
  - All Calculated programs performed strongly with respect to having projects with measures that were **IOU program eligible.** All projects reviewed for all programs were found to meet program eligibility rules.
  - Related, a majority of projects for each of the reviewed Calculated programs involved measures that appeared to **exceed code or industry standard practice.**
  - Performance is poor across the board with regard to proper treatment of **non-IOU fuel or Ancillary impacts** in analysis.
  - By program, 5% to 10% of project reviews revealed program rule violations.

Third party program area. This analysis involved comparison of program performance for 2 third party programs with those for the Third Party (3P) program area as a whole, as shown in Table 4-11 below. The 3P programs shown were the only ones with a large enough sample to support reporting of findings.

Table 4-11: Summary of LRA Findings for Key Issues of Interest – Third Party Programs

Key Issue Assessed	Programs Or Categories Reviewed		
	Statewide	PGE2222	PGE2225
	Third Party	Global EEOP	Nexant-REEP
	N = 76	N = 10	N = 10
	% Good	% Good	% Good
Appropriate Measure and Baseline Specification			
Ex-ante Conditions Vary from As-Found Conditions	not available	not available	not available
IOU Application Documentation Complete and Accurate	47%	50%	80%
IOU Tracking Data Complete and Accurate	28%	0%	20%
Project utilized pre-installation M&V	43%	20%	50%
Appropriate Baseline	83%	100%	90%
Early Replacement Claim: Valid RUL / EUL Approach Used	N = 41 41%	N = 2 50%	N = 5 20%
Appropriate Calculation Method			
Appropriate Impact Calculation Method	54%	60%	88%
All Relevant Inputs Considered	79%	100%	88%
Adequate Values for All Inputs	46%	10%	38%
Project utilized post-installation M&V	42%	30%	50%
Compliance with Program Rules			
Measures are IOU Program Eligible	97%	100%	100%
Measures Exceed Code or Industry Standard Practice	90%	100%	100%
Non-IOU Fuel and Ancillary Impacts of Project Properly Accounted for (Cogen/Waste Heat Recovery/ Refinery Gas, etc.)	13%	0%	0%
Customer Installation Meets All Program Rules	89%	100%	90%

The following observations can be made:

- **Appropriate Measure and Baseline Specification**
  - The **completeness and accuracy of documentation** accompanying the applications is not very strong. Only about half of reviewed projects were scored Good on this issue. The Nexant program had the best performance in this area.
  - Lack of **completeness and accuracy in IOU tracking data** is a large problem, particularly for the two 3P programs being reviewed.
  - Use of **pre-installation M&V** is infrequent. The two 3P programs reported on here used it on only 20% and 50% of reviewed projects, respectively.

- Much better performance was seen on the specification of an **appropriate baseline**, where the two reviewed programs were particularly strong, receiving Good ratings for 90% to 100% of reviewed projects.
- With respect to projects involving **early replacement claims, and use of EUL/RUL**, there is substantial room for improvement both for the 3P group in general and the 2 programs being reported on. (However, note the very small sample sizes at the program level.)

- **Appropriate Calculation Method**
  - Use of correct **impact calculation method** is problematic. In general, the 3P programs are using a correct method in just over half of the projects. The 2 programs being reported on performed better than the 3P group as a whole in this area. The Nexant REEP program was particularly strong.
  - Performance is somewhat better with respect to **consideration of all relevant inputs** in the impact calculation. Over three-fourths of reviewed 3P projects received Good ratings in this area, while those both the Global EEOP and Nexant REEP programs were even higher.
  - However, an area of weakness is with respect to **whether there are adequate values for all inputs**. Third party programs in general scored poorly in this area, and the Global and Nexant program performance was even lower (only 10% and 38% of reviewed projects, respectively, received Good ratings).
  - Proper use of **post-installation M&V** is another area where improvement is needed. Less than half of reviewed 3P projects received Good ratings in this area, while only 30% of Global EEOP projects and 50% of Nexant REEP projects were rated Good.
- **Compliance with Program Rules**
  - In general, the 3P group as a whole, and the Global EEOP and Nexant REEP programs scored highly in this area. Virtually all reviewed projects were found to be **program-eligible**. Similarly strong performance was also seen in the issue of incenting **measures that exceed code or industry standard practice**, with 90% or more of reviewed projects for both programs, and the group as a whole receiving Good ratings. Likewise, both programs, and the group as a whole performed similarly strongly with respect to incenting **installations that meet all program rules.** The one area of weakness is with regard to proper treatment of **non-IOU fuel or Ancillary impacts** in analysis. The 3P group and both programs performed poorly on this issue.

Institutional partnerships program area. This analysis involved comparison of program performance for 4 Institutional Partnerships programs with those for the Institutional Partnerships (IP) program area as a whole, as shown in Table 4-12 below. The IP programs shown were the only ones with a large enough sample to support reporting of findings.

Table 4-12: Summary of LRA Findings for Key Issues of Interest – Institutional Partnership Programs

Key Issue Assessed	Programs Or Categories Reviewed			
	Statewide	**PGE21262**	**SCE-L-005G**	**SCE-L-005A**
	Institutional Partnership	UC-CSU Partnerships	UC-CSU Partnerships	CA Comm Colleges
	N = 51	N = 11	N = 9	N = 10
	% Good	% Good	% Good	% Good
Appropriate Measure and Baseline Specification				
Ex-ante Conditions Vary from As-Found Conditions	not available	not available	not available	not available
IOU Application Documentation Complete and Accurate	25%	18%	33%	50%
IOU Tracking Data Complete and Accurate	66%	100%	56%	60%
Project utilized pre-installation M&V	18%	25%	0%	25%
Appropriate Baseline	80%	89%	100%	60%
Early Replacement Claim: Valid RUL / EUL Approach Used	N = 35	N = 6	N = 6	N = 8
	86%	100%	83%	88%
Appropriate Calculation Method				
Appropriate Impact Calculation Method	33%	25%	29%	33%
All Relevant Inputs Considered	80%	75%	83%	78%
Adequate Values for All Inputs	26%	29%	40%	30%
Project utilized post-installation M&V	14%	27%	0%	30%
Compliance with Program Rules				
Measures are IOU Program Eligible	98%	100%	100%	100%
Measures Exceed Code or Industry Standard Practice	89%	90%	86%	89%
Non-IOU Fuel and Ancillary Impacts of Project Properly Accounted for (Cogen/Waste Heat Recovery/ Refinery Gas, etc.)	75%	100%	---	100%
Customer Installation Meets All Program Rules	90%	90%	100%	90%

Some observations are:

- **Appropriate Measure and Baseline Specification**
  - The **completeness and accuracy of the documentation** accompanying the application is a large problem. There is wide variation across programs with respect to this area, however, none of the programs performed very strongly. SCE's

California Community Colleges partnership performance was the strongest in the group.

- All programs performed strongly in the area of **complete and accurate tracking data.** PG&E's UC-CSU partnership performance was the strongest in this area, receiving 100% Good ratings.
- Use of **pre-application M&V** is not common. One of the SCE partnerships apparently does not use it at all, while the remaining SCE and PG&E Partnerships use it infrequently.
- Overall, 20% of institutional partnership projects reviewed were found to have specified an inappropriate baseline. SCE's California Community Colleges partnership performance was the weakest of the group, with 40% of reviews revealing an inappropriate baseline.
- With regard to early replacement projects, involving **correct use of RUL/EUL**, program performance 86% received ratings of Good, and performance is similar at the individual program levels.

- **Appropriate Calculation Method**
  - Use of an **appropriate impact calculation method** is an area of weakness. Across all reviewed projects, only 33% were rated Good. Performance at the individual partnership level was similarly poor, indicating this area needs improvement.
  - Partnerships scored strongly with respect to **considering all relevant inputs** in impact calculations (generally, with Good ratings of 75% and higher). However, considerable improvement is needed with respect to having **adequate values for all inputs**, where the percentage of projects rated Good ranged from only 29% to 40% across all partnerships reviewed.
  - Use of **post-installation M&V** is not very widespread, as indicated by the percentage of Good ratings in this area. SCE's California Community Colleges partnership had the highest percentage of Good ratings (30%).
- **Compliance with Program Rules**
  - At the individual partnership level, all reviewed projects were found to be **program-eligible**. Reviews revealed 14% of projects failed to exceed code or industry standard practice, and 10% of installations violated at least one program rule.. Partnerships stand out from other program groups with strong performance with respect to the proper treatment of **non-IOU fuel or Ancillary impacts** in analysis. While only 24% of all programs received a 'good' rating in this area, IP performed much better with 75% receiving a 'good' rating.

Additional LRA findings. LRA findings were also analyzed separately by IOU, Customer Sector Program Grouping, and by Individual Program, in cases where 8 or more projects were reviewed. Appendix A provides detailed tables containing findings for each of these various subgroups of interest.

Net-to-Gross Assessment

Early results of the Custom impact net-to-gross efforts are also summarized here to provide additional perspective on program developments in the current cycle. Early findings indicate that free ridership in completed custom projects may not be substantially changed from previous cycles**.** To date, a total of 441 NTG surveys have been completed. As shown below in Table 4-13, although the largest number of surveys has been completed for PG&E, a significant number have also been completed for the other 3 utilities.

Since the evaluation process is only partially completed at this point, it is not possible to calculate a program NTG ratio (NTGR). An alternative is to examine the distribution of project level NTGRs across specified intervals, as has been done in Table 4-13 below. The Table shows a greater frequency of projects in the low ranges than the higher ranges – with 157 projects under 0.4 and 124 projects over 0.6. Note the table represents frequencies of project scores, so each project – large and small - carry the same weight in this table. Program NTG results are of course weighted by savings, and so can be quite different from the levels indicated by these frequencies.

Table 4-13: Project level NTGRs by Utility for All Custom Programs

	NTGR Value Ranges						
IOU	**0.00 to 0.25**	**0.26 to 0.40**	**0.41 to 0.50**	**0.51 to 0.60**	**0.61 to 0.75**	**0.76 to 1.00**	**Total**
PGE	39	61	46	47	53	22	268
SCE	18	20	24	19	26	11	118
SCG	0	6	6	4	5	2	23
SDGE	6	7	10	4	4	1	32
Total	**63**	**94**	**86**	**74**	**88**	**36**	**441**

These data show the following results by utility:

- **PG&E**: 54% of evaluated projects (146 of 268) have NTGR values below 0.51.
- **SCE:** 52% of evaluated projects (62 of 118) have NTGR values below 0.51.
- **SCG:** 52% of evaluated projects (12 of 23) have NTGR values below 0.51.
- **SDG&E:** 71% of evaluated projects (23 of 32) have NTGR values below 0.51.

We note that the number of completed surveys for both SCG and SDG&E is relatively small, and these results could change significantly upon eventual completion of a much greater number.

In addition, project-level NTGRs were analyzed by program group, as shown in Table 4-14 below.

Table 4-14: Project level NTGRs by Utility by Program Group

Program Category	NTGR Value Ranges						Total
	0.00 to 0.25	0.26 to 0.40	0.41 to 0.50	0.51 to 0.60	0.61 to 0.75	0.76 to 1.00	
Third Party	9	21	18	16	29	9	102
Core-Calculated	30	61	46	40	32	24	233
Local Govt Partnerships	15	7	8	11	7	2	50
New Construction	1	1	0	0	1	0	3
Inst. Partnerships	8	4	14	7	19	1	53
Total	**63**	**94**	**86**	**74**	**88**	**36**	**441**

These data show the following results by program group:

- **Third Party:** 47% of evaluated projects (48 of 102) have NTGR values below 0.51.
- **Core Calculated:** 59% of evaluated projects (137 of 233) have NTGR values below 0.51.
- **Local Government Partnerships:** 60% of evaluated projects (30 of 50) have NTGR values below 0.51. The data appear to indicate that the LGP program group will have a lower average NTGR that other groups, though again, application of weights by project size may change results substantially.
- **New Construction:** The number of completed interviews is too small to draw a meaningful conclusion at this point.
- **Institutional Partnerships:** 49% of evaluated projects (26 of 53) have NTGR values below 0.51.

Finally, we observe that program design changes recommended in past evaluations to improve program influence and reduce free ridership have not been adopted. These include:

- Adopting a minimum payback threshold, for example, excluding projects for which the payback time is less than one year.
- Increase incentives for measures with longer paybacks, particularly for emerging technologies.
- Provide a bonus for first-time participants.
- Set a minimum percentage for incentive payments, to insure that the program is providing a meaningful incentive amount to each project, thereby making the program more attractive to those that were not planning to install the measure absent the rebate.

Relationships to Known Best Practices

This section describes how the current IOU practices relate to previously described best practices. Known best practices are derived from the *Non-Residential Large Comprehensive Incentive Programs Best Practices Report* released in 2004. The known best practices include the following:

Conduct both process and impact evaluations routinely.

California's Core Calculated energy efficiency programs are evaluated on a regular basis. Impact and process evaluations are typically conducted every three to four years.

Stagger the timing of process and ex post impact tasks so that process evaluations can be conducted and results communicated on a relatively real-time basis.

This practice has been followed at times by the IOUs, though not on a regular basis. The recently completed process evaluation of Sempra's non-residential programs is an example.

Involve impact evaluators in projects that may require pre-installation measurement.

California's evaluation framework requires evaluator involvement in pre-installation measurement activities for projects meeting certain criteria.

Include estimation of free-ridership and spillover.

California IOU impact evaluations include an assessment of free ridership and participant spillover. However, current CPUC policy precludes the inclusion of non-participant spillover in the program net-to-gross ratio.

Develop realization rates by end use or measure type and utilize these to improve savings estimates over time.

Starting with evaluations completed for PY 2006-2008, California has used an approach to sampling and impact reporting that is based on high-impact measures. Results are developed at the measure level for those measures that account for the most significant shares of program savings.

Program Evaluation and Adaptability – Best Practices (Existing)
Existing ■ Conduct both process and impact evaluations routinely. ■ Stagger the timing of process and ex post impact tasks so that process evaluations can be conducted and results communicated on a relatively real-time basis. ■ Involve impact evaluators in projects that may require pre-installation measurement. ■ Include estimation of free-ridership and spillover. ■ Develop realization rates by end use or measure type and utilize these to improve savings estimates over time.

- **Conduct both process and impact evaluations routinely**. This best practice ensures that managers of calculated customer programs are provided timely feedback to enable them to make improvements on a regular basis. These programs tend to be the largest programs in an administrator's portfolio and hence require close monitoring.
- **Stagger the timing of process and ex post impact tasks so that process evaluations can be conducted and results communicated on a relatively real-time basis**. Evaluations typically occur after the end of a multi-year program cycle. Because of the long lag after program participation in the calculated program, it is important to free process evaluation tasks to be conducted during or just after the immediate program year, if possible. This will enable problems to be identified and remedied in a timely manner.
- **Involve impact evaluators in projects that may require pre-installation measurement**. Given that final ex post savings measurements considerably lag project installations, it is useful to involve impact evaluators up-front during project review so that any necessary pre-installation measurements can be agreed upon and carried out.
- **Include estimation of free-ridership and spillover**. Although measuring free-ridership and spillover can be difficult and contentious, there is critically important knowledge gained about program effectiveness through these analyses. A key challenge is to develop a measurement framework that is able to capture the complex decision making inherent in the nature of the projects developed through calculated programs.
- **Develop realization rates by end use or measure type and utilize these to improve savings estimates over time**. Because savings from custom measures are intrinsically difficult to estimate, it is important to use ex post measurement of savings to develop realization rates by end use, measure type, or other key segments, so that program implementers can make appropriate adjustments to their savings calculations.