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2010-12 CPUC Nonresidential (Non-Core) Audit Evaluability Assessment

Final Report

Local Government Partnership, Institutional Partnership and Third Party Programs

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Executive Summary

This report presents a summary of the results from the 2010-2012 California Public Utilities Commission (CPUC) evaluability assessment of the nonresidential Local Government Programs (LGP), Institutional Partnership (IP)[1] and Third Party programs (3P) that fall outside of the Core statewide Nonresidential Audit programs.

E.1 Evaluation Goals and Objectives

Prior to this study, little information was available on audit services and related activities offered through nonresidential non-core LGP, IP and 3P programs, though these programs comprise a significant portion of the portfolio and often offer audit services as part of program marketing and project identification. Consequently, audits offered through LGP, IP and 3P programs were identified as an area in need of greater accountability and an improved understanding. More specifically, in this Study we seek to learn and document the scale and scope of audit efforts in the LGP, IP and 3P sectors, the quality of related documentation and data available to support evaluation, as well as indicators of their success in terms of the energy impacts associated with these audit activities. Therefore, the objectives of this evaluability assessment of the audit components of these LGP, IP, and 3P programs are to:

- Characterize and classify audit offerings
- Provide a detailed summary of the content and format of the audit-related tracking data recorded by program implementers, with an eye toward comprehensiveness and accessibility. Specific types of tracking data to be reviewed are to include:
  - Site Data – Address, building type, energy using equipment and building shell information
  - Customer Information – Name, contact information, business type and size
  - Audit recommendations – Measure/practice description, implementation costs, and energy savings estimates
  - Outcome – Record of audit recommendations implemented

[1] This category includes the following statewide partnership programs – Department of Corrections and Rehabilitation, University of California and California State University, State of California IOU, and California Community Colleges.

- Provide the foundation for requesting improvements to audit tracking in the LGP, IP and 3P sectors

E.2 Evaluation Methods

Table E-1 below provides a summary of the data collection activities conducted to support this evaluability assessment. The primary data collection activities include an on-line survey of 139 LGP, IP, and 3P program managers (out of a population of 186 in-scope programs, resulting in a 75% response rate) and a series of 5 Case Studies and 20 in-depth audit data assessments with a sample of programs spanning utilities, program types, business type sector and program size.[2]

Table E-1: Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Target Completes	Population / Completes				Timing
				PG&E	SCE	SCG	SDG&E	
On-line Survey (Stage 1)	LGP Program Managers	Statewide LGP Programs	Census	20 / 16	27 / 17	14 / 10	8 / 7	March – April 2012
	IP Program Managers	Statewide IP Programs	Census	18 / 17				
	3P Program Managers	Statewide 3P Programs	Census	Ag – 9/6, Comm – 68 / 50, Ind – 22/16				
Case Study (Stage 2)	Phone Interviews	LGP/IP/3P Programs Responding to On-line Survey	5	51 / 2	38 / 1	18 / 1	17 / 1	August – November 2012
	In-Depth Data Request							
In-Depth Assessment (Stage 2)	In-Depth Data Request		20	51 / 9	38 / 6	18 / 2	17 / 3	

E.3 Findings

This evaluability assessment found that during the 2010-2012 program cycle, a wide variety of audit services[3] were offered to nonresidential customers within PG&E, SCE, SDG&E and SCG service territories through a number of non-core LGP, IP and 3P programs. These audit services assisted customers in identifying energy savings opportunities and promoted energy efficient practices. With respect to the range of target markets addressed and services offered:

[2] Sampling methodology for the Stage 2 Case Studies and In-depth assessments is presented in the Draft Interim Findings Memo in Section 6.1.2 of this report.

[3] These are audits offered outside of the NRA program through the LGP, IP and 3P programs directly.

- The programs included in the evaluation provided technical and evaluation assistance, imparted training and education at college campuses, created comprehensive energy solutions for the retail sector, provided lighting and thermostats or sensors at hotels, and developed energy savings projects with petroleum refineries.
- Some of the programs targeted specific market segments, such as multi-family buildings and college campuses, while others served broad market categories such as commercial and industrial structures.
- Some programs addressed specific measures or population segments, while others were more comprehensive and served whole sectors or communities.

The findings presented below are based on data collected during an initial on-line survey. This survey targeted a census of program managers of LGP/IP/3P programs thought to offer audits[4] to nonresidential customers in California based on an initial review of the Program Implementation Plans. Also included are findings from a more targeted in-depth follow-up assessment of a sample of 25 of these programs. The programs included in the in-depth assessment are those with substantial audit components.[5]

Programs Offering Audits - During the 2010-2012 program cycle, it was found that there were a large volume of LGP/IP/3P programs (~124 programs were confirmed to offer audits during the Stage 1 online survey) that reportedly offered a variety of unique program-specific audits[6] to nonresidential[7] customers across the four California IOUs. It is estimated that across 124 programs approximately 100,000 audits were conducted in the 2010-2012 program cycle. Figure E-1 below shows the distribution of audits reportedly completed by in-scope programs across the three Program Types. Third-Party programs completed the largest percentage of audits, followed by LGP programs. Institutional Partnership programs conducted far fewer audits than LGP or 3P programs due to the fact that the there are fewer IP programs offered statewide[8] and the targeted customer base for most IP programs is significantly smaller than that of LGP and 3P programs and thus, the opportunities for audits are more limited.

[4] The evaluation team found that none of the utilities maintained an inventory of all of the audits offered through LGP/IP/3P programs. PG&E noted that they did not pay for 3P audit results in 2010-2012 and therefore did not collect the data.

[5] A summary of the 25 programs selected for the in-depth assessment is provided in Section 4.0.

[6] An audit was classified as any form of assessment of participant facilities and equipment that would enable energy savings.

[7] A few of the programs included in this analysis were large scale programs, such as East Bay Energy Watch, that also were also found to offer audits to residential customers.

[8] The evaluation team estimated there were 17 IP programs statewide that offered audits to program participants, compared to 63 LGP programs and 86 3P programs. Twenty-seven of these 166 programs were not confirmed to offer audits since they either did not respond to the on-line survey or were not surveyed because they were a new program.

Figure E-1: Distribution of Reported Audits by Program Type[9]

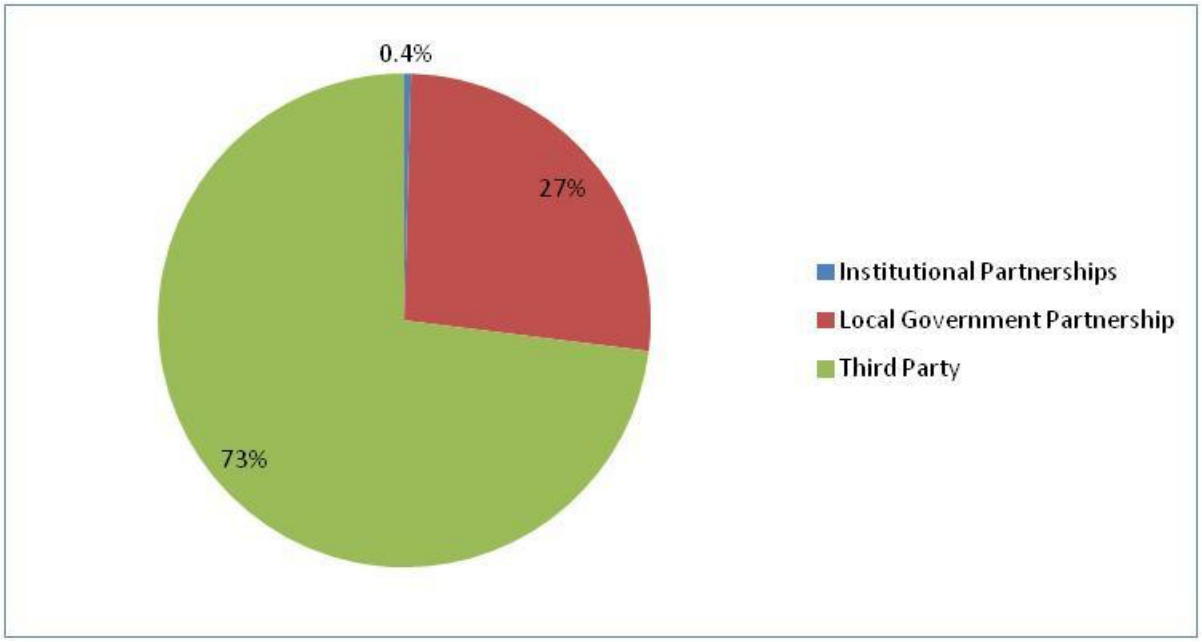


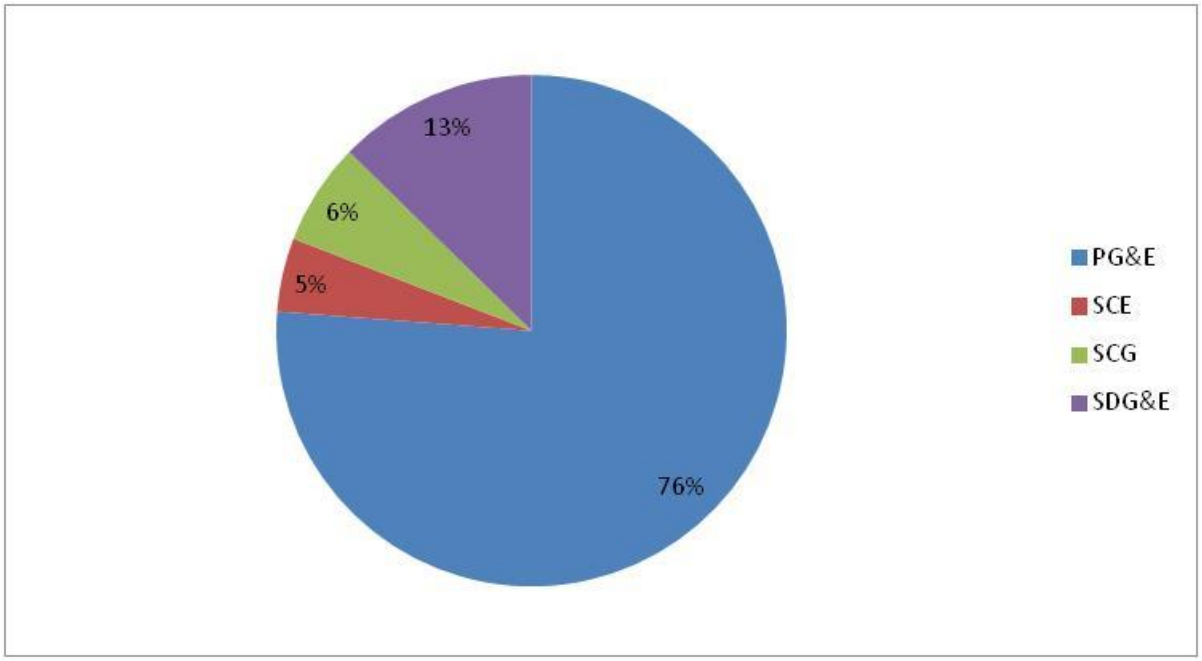
Figure E-2 below shows the distribution of audits across the four California IOUs reportedly[10] conducted by the programs included in this study.[11] LGP/IP/3P programs in PG&E territory reported conducted three times more audits than those conducted by the other three utilities combined. PG&E programs made up 41 percent of the 124 in-scope programs and 52 percent of the 3P programs. On average, 3P conducted significantly more audits than both LGP and IP programs.

[9] This figure shows the distribution of the three program types across the total number of reported audits conducted in 2011 based on data collected during the Stage 1 online survey (number of audits ~30,000).

[10] Based on the data collected during the Stage 2 in-depth assessments.

[11] These programs are referred to as in-scope programs throughout the remainder of this report

Figure E-2: Distribution of 2010-2012 Reported Audits by Utility



***Type and Frequency of Audits Offered* –** Evaluation research found there were a wide variety of audit types offered through LGP/IP/3P programs, ranging from simple on-line audits to complex feasibility studies. Table E-2 below shows the distribution of audit types offered by the sample of 25 LGP/IP/3P programs included in the in-depth assessment. On-site basic, on-site in-depth and direct install audits account for nearly 90 percent of the audits conducted by these 25 programs.

Table E-2: Distribution of Audit Types Offered across Sample of 25 LGP/IP/3P Programs

Audit Type	Sub-Programs[12] Offering Audit Type	Audits Conducted in 2010-2012	% of Audits Conducted[13]
Direct Install	7	17,616	24%
Feasibility Study	3	660	1%
Mail	1	35	0%
On-line	2	7,166	10%
On-Site Basic	9	12,278	17%
On-Site In-Depth	10	35,287	48%
Retro Commissioning	2	14	0%
Steam Assessment	1	1	0%
Varied	1	0	0%
Total	**36**	**73,057**	**100%**

The percentage of participants in the in-scope LGP/IP/3P programs that received an audit was found to quite high, with between half and three-quarters of all program participants receiving some type of audit.

Customer Audit and Recommendation Data Collection and Storage – The collection and storage of customer audit[14] data is of particular interest to this evaluation, as this information is essential to effectively evaluate the audit offerings. Analysis of the data collected for this Evaluability Assessment led to a number of findings that indicated evaluation of these programs could be problematic and limited:

- While the majority of in-scope programs reported tracking customer data electronically, more than half reported these data are not stored in an electronic database format that could be easily transferable to an evaluator (that is they may be stored as a series of separate word files on individual staff members' computers so while they are technically stored "electronically" they are not stored in an integrated or relational electronic database). Gathering data and creating a single uniform electronic database[15] from such a

[12] Some of the 25 programs included in the in-depth assessment were comprised of number of distinct sub-programs which offered different audit types to distinct customer segments.

[13] These distributions are only representative of the sample of programs included in the Stage 2 analysis.

[14] Such as customer contact information, account numbers, baseline equipment installed, hours-of-operation, etc.

[15] PG&E is currently in the process of piloting their new Energy Insight platform with 12 LGP and 3P partners. This platform serves as an energy efficiency collaboration platform to connect sales representatives, partners and program management. Its goal is to better serve customers by streamlining processes, connecting stakeholders, and empowering users by putting relevant information at their fingertips. Currently the platform is set up to

large portfolio of programs that could be used for evaluation purposes would be extremely difficult and time consuming.

- The in-depth review of program tracking data that occurred for a sample of 25 of the in-scope programs also revealed that only 32 percent of programs tracked customer and recommendation data for all of the audits conducted. The remaining 68 percent of programs either tracked none of the audit data or tracked only audit data for the portion of recommendations that eventually turned into projects.[16] This is problematic from an evaluation perspective as a comprehensive audit program evaluation requires data on all audits conducted and recommendations provided.

One significant opportunity identified through this Evaluability Assessment was the large volume of data that are being collected during audits but that are not currently being systematically retained. In-scope programs reported collecting a variety of data, such as customers' baseline equipment efficiency level, including lighting and HVAC inventories, types and sizes of process equipment, current insulation levels, and conditioned square footage. While the percentage of programs tracking these data ranged from 16 percent to 65 percent depending on the specific data element, the loss of any of these data is unfortunate. It is strongly recommended that the CPUC work with the utilities and the program implementers to create a formal process to retain, at a minimum, a basic set of site-level data collected during the audits and provide this data electronically to the utilities. The aggregation of these audit data could assist the utilities in building a comprehensive customer-wide database of the existing inventory of equipment installed at customer facilities. Expanding the role of the audits to capture and track these data would greatly enhance the value of the audits and would provide each of the utilities with a resource that could be mined for future energy efficiency program design and targeting, energy efficiency potential studies, and market/baseline characterization efforts.

E.4 Overall Evaluability Assessment

Based on the Evaluability Assessment conducted, the evaluation team believes conducting a comprehensive evaluation of the audits offered through the nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle would be infeasible for the majority of in-scope programs. Based on a thorough review and analysis of the data collected on the sample of programs included in the in-depth research (Stage 2), an evaluability assessment was assigned to each of the 25 programs. This evaluability assessment classified each program into one of the following categories:

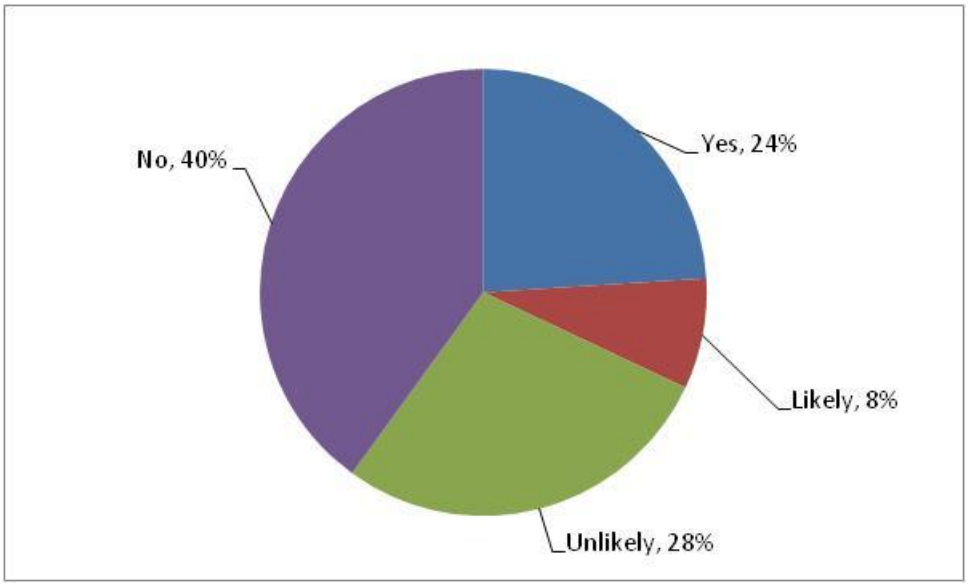
display customer and energy efficiency project data for custom and direct install projects. A formal release is expected in December 2014. This platform should be further research to determine if it is a platform capable of incorporating audit data as well.

[16] A project is defined as the implementation of one or more audit recommendation.

- Yes – An evaluation of the audits conducted for this program is feasible.
  - Verified – Audit recommendation data have been verified in support of this assessment.
  - Not Verified – Audit recommendation data were not provided and thus have not been verified in support of this assessment.
- Likely – The likelihood of being able to conduct an evaluation of the audits conducted for this program is high.
- Unlikely – The likelihood of being able to conduct an evaluation of the audits conducted for this program is low.
- No – An evaluation of the audits conducted for this program is infeasible.
  - Audit recommendations not tracked
  - Audit recommendations tracked only for those implemented
  - Program cancelled

The overall evaluability assessment results are shown in Table E-4 below based on Stage 2 findings. The conclusion is that an evaluation of the audit offerings could likely only be conducted for 32 percent of the programs in the sample (and less than 40 percent of this estimate was verified with audit recommendation data). For the remaining 68 percent of the programs in the sample, the assessment found that it is unlikely that an evaluation of the audit offerings could be conducted. These "unlikely" programs accounted for 83 percent of the audits conducted during the 2010-2012 program cycle.

Table E-4: Evaluability Assessment of Sample of 25 Programs



The primary barriers to conducting an evaluation of these audit offerings are the following:

1 – Lack of a Comprehensive Database of Audit Activities and Accomplishments. The Evaluability Assessment conducted identified a minimum of 124[17] nonresidential non-core LGP/IP/3P programs that offer audits to participating customers across California. The volume of audits conducted through these programs was estimated to be around 100,000[18] during the 2010-2012 program cycle. No comprehensive statewide or utility specific databases were identified to capture and store all of the customer, audit and recommendation data that was gathered and analyzed as part of these audits.

2 – A Lack of Consistency across Programs. The majority of the programs analyzed were unique in their approach and delivery of audits, as well the manner in which they captured and stored data. While this is a strength of the programs offering audits as they are able to reach the very large and diverse customer base served by the California IOUs, it does mean that each program included in a statewide evaluation of the audit components of these programs would require an individualized approach to data collection and analysis. This would be difficult and time consuming undertaking given the large portfolio of LGP/IP/3P programs offered statewide.

3 – Few Comprehensive Program Databases Exist. Few of the programs that capture and record customer baseline, audit and recommendation data store these data in comprehensive electronic databases that could be easily transferred and mined for evaluation purposes. Accessing these data would likely require significant manual effort by both program staff and evaluators in order to compile the data required to complete a comprehensive evaluation. This extensive manual effort is magnified by the large volume of the LGP/IP/3P programs offering audits.

4 – Magnitude of Programs. Through the on-line survey conducted with a census of LGP/IP/3P program implementers, a total of 124 programs were identified as offering audits to program participants. Further in-depth assessment of a sample of these programs identified a number of the programs (3 of the 25 in-depth assessment programs) that were comprised of a number of sub-programs. These sub-programs often implement and track the audits they offer independently which increases the magnitude of the audit program offerings even further. For example, the East Bay Energy Watch Program includes five distinct sub-programs that are managed by separate entities and offer their own unique audits to the different segments of the market.

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[17] This is likely a lower bound on the actual number of LGP/IP/3P programs offering audits since 31 of the 182 programs implementers contacted either did not respond or provided an incomplete response to the Stage 1 on-line survey.

[18] This estimate does include a portion of residential audits (~15 percent) that are completed through in-scope programs that serve both residential and nonresidential customers.

5 – Tracking of Projects Rather than Audits. This Evaluability Assessment found that many programs either do not track any audit data or only track audit data for those recommendations that are implemented and turned into projects. An evaluation of audit programs requires customer and recommendation data for all audits completed, not just those that result in projects, in order to determine the overall effectiveness of the audit offering.

6 – Complex Data Collection. Collecting data from a large number of individually managed and inconsistently tracked programs (and in some cases sub-programs) would likely be complex and time consuming. Even for the limited purposes of conducting this Evaluability Assessment, the gathering of data from the subset of programs that did track and retain the necessary audit and recommendation data for the population of audits conducted was a laborious manual process that required significant back and forth with the program implementers and IOU staff. This was despite efforts to streamline this process. For example, for this Evaluability Assessment, all 25 of the in-depth assessment program implementers were provided nearly identical data requests. The resulting data provided to the evaluation team in response to these requests reflected a wide range of data/information formats, methods to interpret results, and levels of completeness. There were many cases where the data requested were missing with no explanation offered for their absence (and no response provided to follow-up requests).

E.5 Recommendations

Based on the Evaluability Assessment of the audit activities offered through the portfolio of nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle and the audit and recommendation data reportedly collected and tracked by each of these programs, the evaluation team offers the following recommendations:

The CPUC should strongly consider working with the utilities and program implementers to develop a standardized database to house audit and recommendation data and accomplishments – The CPUC and the utilities need data in a consistent format for the purposes of conducting due diligence and assessing performance versus stated metrics. Establishing such a database and requiring all program implementers to provide data from their program to populate the database will allow for consistent tracking of audit recommendations and measure implementation and can help with the identification of markets that are saturated. Money is being spent on programs that are unable to easily report the quantity of audits being conducted and the recommendations being offered through these audits. Requiring standardized data collection will improve documentation of program activities and performance for the money being spent on the large quantity of audits that are being administered as part of the IP, LGP and 3P programs across California (estimated to be close to 100,000 audits during the 2010-2012 program cycle). This database should include at a minimum:

- Program name
- Business name
- Address
- Account number[19]
- Contact name
- NAICS code
- Phone
- Date of audit
- Audit scope (e.g. lighting, HVAC, envelope, gas, process, pumping)
- Audit recommendations

Adequately developing such an infrastructure will require the dedication of future resources[20] to work with the utilities to design both a standard data collection database, as well as a standardized data delivery format so that this database can be easily and fully populated with a large number of files coming from each of the individual programs offered.

Furthermore, the CPUC should strongly consider expanding the scope of the recommended standardized audit database to include all other site-level data that are being collected at the time of the audit. Many in-scope programs reported that during the audits they conduct, they also collect facility operational data that allows them to identify energy efficiency opportunities and develop site-level recommendations. While tracking of these data are currently not required by program implementers, they represent a significant lost opportunity in the value of these audits. The data collected in the course of program audits have great potential value, in that they could be used to improve Customer Information System (CIS) data, analyze the effectiveness of various program and audit types on a variety of customer segments, and support coordinated marketing efforts across the entire portfolio of utility programs. Facility data currently reported to be collected by some in-scope audit programs include elements such as:

- Baseline equipment inventory and age of equipment (including, but not limited to, HVAC, primary lighting, water heating, and building control systems)
- Building characteristics (year built, conditioned square footage)
- Business type activities occurring within facility
- Facility hours of operation

[19] Account numbers are protected confidential customer information which require adequate security protections to be in place to comply with CPUC regulations and state laws. Their inclusion is important to be able to match this data to other resource program tracking data, as well as utility CIS and billing data.

[20] One significant task that needs to be figured out is how this data collection would be funded.

The value of this site-level database could be increased by identifying a minimum set of facility variables that could be required data collection elements for every audit conducted (where applicable). Adequate security precautions would need to be set up to handle the storage and delivery of all of this potentially sensitive customer data.

Track Program Spending on Audit Activities – Program expenditure reporting by nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle was not sufficiently detailed to document how much money is being spent on audit activities offered by these programs. The evaluation team recommends unbundling the audit activity expenditures and reporting these separately to allow for greater transparency of these costs.

Identify Audit Program Best Practices - Consider investing resources in the following areas to identify best practice audit improvements which could be applied to all programs:

- Find and share examples of record keeping best practices employed by audit programs; that is, examples of efficient, comprehensive and accessible audit program record keeping. Use the record keeping best practices identified to formalize a process for tracking all audit recommendations provided to audit recipients. This process should include a highly structured database to be used for the electronic tracking and storage of participant data which can be used by future evaluations and allow for the estimation of recommended measure uptake and attribution.
- Creating a standardized audit follow-up process that would capture recommendation implementation and store it in a database to determine audit effectiveness.

1

Introduction

This document presents the final results of research completed to characterize the audit services provided by California's 2010-2012 portfolio of energy efficiency programs. This research addresses audit services provided through California's Local Government (LGP), Institutional Partnerships (IP) and Third Party (3P) Programs that serve the nonresidential sector. The objective of this research is to develop a better understanding of the size and scope audit services offered through these sectors of the EE portfolio, as well as the associated record keeping.

1.1 Background

Energy Efficiency audits are a fundamental marketing and program delivery element for the majority of LGP, IP, and 3P energy efficiency programs in California. However, only a small fraction of audit-related documentation is provided to the IOUs or the CPUC. Records documenting audit activity and associated outcomes, if stored at all, are kept within the particular recording infrastructure of the program implementer. The format and structure of audit data tracking are typically at the implementer's discretion and there are no standardized audit data templates or content requirements. Consequently, the audit offerings in these sectors are not well understood. In contrast, the IOUs Statewide Core Nonresidential Audit (NRA) Programs have had regular comprehensive evaluations.[21] The primary rationale for this Audit Evaluability Assessment is to begin to fill this information gap for to LGP, IP and 3P audit activities. The potential importance of this information gap is significant with about 35 cents of every dollar spent on programs in the nonresidential sectors directed to LGP, IP and 3P programs.

Prior to this Study effort, little was known about the overall investment in audits through the Third Party, IP, and LGP sectors. Aside from general descriptive information in the PIP, there is no comprehensive reporting or previous evaluation that describes the volume of audits, types of audits, or rates of follow-through. Audit data can potentially be a rich source of information about markets, customers and opportunities. This effort also seeks to describe the data being tracked by the LGP/IP/3P programs during the 2010-2012 program cycle, as well as the data that could be tracked under different reporting requirements.

[21] Process and Impact Evaluations were completed in 2002, 2003, and 2004/2005. An impact evaluation was completed for a portion of NRA programs in 2006-2008. An Evaluability Assessment was completed in October 2011 for the NRA programs, and there was a "Program Assessments" evaluation conducted for the 2010-2012 program cycle that addresses NRA programs.

Under current reporting requirements, it is unclear the numbers or types of audits that are offered through programs in these sectors. The comprehensiveness of the tracking of audit results and data in these sectors is another unknown. As a consequence, the range of feasible approaches for conducting comparative analysis to measure effectiveness or identify better ways to deliver audits is also unknown. This Evaluability Assessment seeks to provide documentation of current audit program activities and results, in an effort to answer these basic questions.

This document summarizes complete findings of this research effort which was conducted in two stages. The first stage gathered data via an on-line survey of 3P, IP and LGP program managers. This on-line survey gathered various program year 2011 data elements: program information, audit information and delivery mechanisms, data collection and storage, audit recommendations, measures, and target markets. The second stage, designed based upon the results of the first stage of analysis, included a series of five case studies and 20 in-depth analyses for a sample of LGP, IP, and 3P programs.

1.2 Budgets and Projected Energy Savings

Table 1-1 and 1-2 below summarize the program budgets and energy savings (projected and actual) across the in-scope IP, LGP, and 3P programs at each of the IOUs. As these tables show, the 2010-2012 budgets for these 166 programs were close to $800 million dollars and the projected energy savings were approximately 1,700 GWh, 300 MW and 19 million therms. Statewide, the LGP programs exceeded their energy savings projections within their allotted budgets. The IP and 3P programs achieved roughly 80 percent and 70 percent of their MWh projections, respectively, spending approximately those same percentages of their allotted budgets. Both IP and 3P programs significantly exceeded their projected therm savings.[22] The average budget per program is close to $5 million, and ranges widely, from a low of $400,000 for SCG's LGP Programs to a high of nearly $13 million for PG&E's IP Programs. PG&E's programs make up 70 percent of the final statewide energy and demand savings and 96 percent of the statewide therm savings claimed by these programs. SCG did not project any therms savings from their IP or LGP programs; SDG&E did not project any energy or gas savings from their IP and LGP programs.

[22] PG&E LGP programs projected negative therm savings that are likely attributable to either fuel switching impacts or the interactive effects resulting from energy efficiency lighting upgrades.

Table 1-1: Statewide Spending on In-Scope Programs through December 2012[23]

IOU	Program Type	Programs Offering Audits[24]	2010-2012 Revised Budget (In Millions)	$ Spent Through 12/2012 (In Millions)	% Spent Through 12/2012
PG&E	IP	4	$50.9	$48.7	96%
	LGP	17	$116.2	$115.9	100%
	3P	41	$289.2	$265.7	92%
SCE	IP	4	$33.5	$27.2	81%
	LGP	24	$52.5	$29.6	56%
	3P	30	$158.0	$94.9	60%
SCG	IP	4	$4.1	$2.3	56%
	LGP	14	$5.9	$3.6	61%
	3P	7	$17.3	$10.4	60%
SDG&E	IP	5	$5.4	$2.9	54%
	LGP	8	$18.1	$15.5	86%
	3P	8	$11.5	$11.2	98%
Total	IP	17	$93.8	$81.0	86%
	LGP	63	$192.6	$164.6	85%
	3P	86	$475.9	$382.2	80%
	All	166	$762.3	$627.9	82%

[23] Program expenditures through December 2012 were gathered from the Monthly Energy Efficiency Reports posted on the California Energy Efficiency Groupware Application (http://eega.cpuc.ca.gov/).

[24] Programs thought to offer audits were determined based upon responses to the on-line survey. Twenty-seven of the 166 programs were included in this population although they either did not respond to the on-line survey or they were not surveyed because they were a new program.

Table 1-2: Statewide Energy Savings on In-Scope Programs through December 2012[25]

IOU	Pgm Type	Offering Audits	Energy Savings (MWh)			Demand Savings (MW)			Therm Savings (1,000)		
			Projected	Actual	%	Projected	Actual	%	Projected	Actual	%
PG&E	IP	4	93,377	76,034	81%	13	14	107%	3,170	4,367	138%
	LGP	17	146,677	269,028	183%	28	47	169%	(136)	90	(66%)
	3P	41	597,969	609,006	102%	95	92	97%	11,937	23,992	201%
SCE	IP	4	101,114	76,714	76%	15	13	85%	0	0	n/a
	LGP	24	103,190	58,395	57%	23	10	45%	0	0	n/a
	3P	30	670,985	243,771	36%	117	40	35%	0	0	n/a
SCG	IP	4	0	0	n/a	0	0	n/a	0	0	n/a
	LGP	14	0	0	n/a	0	0	n/a	0	0	n/a
	3P	7	0	0	n/a	0	0	n/a	3,035	947	31%
SDG&E	IP	5	0	0	n/a	0	0	n/a	0	0	n/a
	LGP	8	0	0	n/a	0	0	n/a	0	0	n/a
	3P	8	18,527	10,511	57%	4	2	48%	907	279	31%
Total	IP	17	194,491	152,748	79%	28	26	95%	3,170	4,367	138%
	LGP	63	249,866	327,423	131%	50	57	113%	(136)	90	(66%)
	3P	86	1,287,481	863,289	67%	216	135	62%	15,879	25,218	159%
	All	166	1,731,839	1,343,460	78%	294	218	74%	18,913	29,675	157%

[25] Program savings through December 2012 were gathered from the Monthly Energy Efficiency Reports posted on the California Energy Efficiency Groupware Application (http://eega.cpuc.ca.gov/).

1.3 Evaluation Research Objectives

The objectives of this Evaluability Assessment of the audit components of these IP, LGP and 3P programs include:

- Documenting the various audit offerings outside of the Core Statewide NRA program, with particular attention to nuances in design and delivery by IOU and audit delivery mechanism.
- Summarizing information that can be gathered at this time, such as:
  - Customer Information – including customer size and annual usage
  - Audit Data – describing the type of audit conducted
  - Recommendation Information – including costs and savings estimates
  - Site Data - collected by auditors regarding the customer site
- Providing the foundation for requesting improvements to the tracking of these activities going forward.

1.4 Report Outline

This report consists of the following chapters:

Chapter 1 (Introduction) states study background, budgets and projected energy savings of in-scope program and evaluation research objectives.

Chapter 2 (Methodology and Data Collection) describes the methodology employed for the study along with the rational and a description of the Stage 1 and Stage 2 data collection activities.

Chapter 3 (Stage 1 Findings) provides a summary of the LGP/3P/IP program audit offerings during the 2010-2012 program cycle. This summary includes the quantity of audits completed, the types and frequencies of recommendations offered, the percentage of programs that tracking recommendation uptake and the reporting savings from programs that reported offering audits.

Chapter 4 (Stage 2 Findings) provides results from the Case Study assessment and the 25 program in-depth assessment. Also includes the overall Evaluability Assessment of the portfolio of LGP/3P and IP programs based on the Stage 2 analysis performed.

Chapter 5 (Overall Findings and Recommendations) summarizes the findings from the audit, customer and recommendation data tracking assessment. Also provides recommendations for future data tracking improvements and opportunities.

Chapter 6 (Appendices) the report appendices include the Stage 1 and Stage 2 data collection instruments, as well as the Stage 1draft interim findings memo.

2

Methodology and Data Collection

2.1 Methodology

As stated in the introduction of this report, one of the primary objectives of this Evaluability Assessment of the LGP, 3P and IP programs was to summarize the audit data that were collected and stored by these programs. Specifically, this Evaluability Assessment is focused on three primary types of data:

- Customer account and site-level data, such as annual usage and business type
- Audit data, describing the type of audit conducted
- Recommendation data, describing the recommendations provided, as well as the costs and savings associated with the recommendations

In order to assess the evaluability of these programs from this perspective, the evaluation team contacted a census of in-scope programs to collect data on the audits that were conducted through these programs during the 2010-2012 program cycle.

The approach employed for this Evaluability Assessment took into account the large number of unique LGP, IP, and 3P programs that offer audits. Working under the assumption that customer audit and recommendation tracking data are captured and stored for the majority of these programs, it would have been infeasible to evaluate the audit portion of the 187 in-scope programs using the same approach that was employed for the NRA/HEES program assessments due to time and budget constraints.

As a result a two-stage effort was proposed; a first base stage (Stage 1) was conducted with a census of in-scope programs, and a second in-depth stage (Stage 2) was conducted with a carefully selected sample of programs offering audits. This two-stage approach allowed the evaluation team to process, evaluate, and present the data in the most efficient manner; thereby maximizing the learning drawn from this evaluation activity.

The first stage consisted of an on-line survey of nonresidential LGP, IP and 3P program managers. This survey collected basic information about audit activities and associated record keeping practices, but did not examine any of the underlying audit data. The second stage included a more rigorous examination designed to reduce the uncertainty associated with the on-

line survey-based findings. This second stage research included interviews with LGP, IP, and 3P program managers, data requests for database summaries and reports, sample records and audit reports, records of audit recommendations, and referrals from a subset of the in-scope programs. This deeper Stage 2 examination of audit data provided additional insight to allow for further interpretation and verification of the Stage 1 on-line survey findings. The Stage 2 analysis of the detailed audit data, together with results from the Stage 1 on-line survey, combined with secondary data available on EEGA[26] and in the Program Implementation Plans (PIPs), allow for a complete LGP, IP and 3P Audit Evaluability Assessment.

The Stage 1 on-line survey[27] was administered to a census of program managers responsible for one of the LGP, IP, or 3P programs that are offered by the California IOUs that that offered audits to nonresidential customers in California based on an initial review of the PIPs. This survey gathered data on basic audit information, such as:

- Verification that audits were included in the program
- The number of audits that were completed during program year 2011
- The approaches for delivering audits to customers
- The names of the parties that administered the audits
- The specific measures targeted by the audits (if applicable)
- The specific market segments targeted by the audits (if applicable)
- A description of audit 'follow up' procedures

The survey also gathered descriptions of the record keeping associated with audits, including audit participant data, data storage methods (e.g. stored as a hardcopy or organized in a database), and recommendations provided to each participant. The goal of the Stage 1 analysis was to gather a substantial amount of highly informative data on the in-scope LGP, IP and 3P programs and to obtain the data needed to inform the sample of programs selected for the Stage 2 analysis activities.

The objective of Stage 2 was to understand how underlying audit activity and tracking records related to the higher level data obtained from the on-line survey. The Stage 2 research was completed based on data collected using a stratified random sampling approach of the Stage 1 findings. This sampling approach grouped the programs into strata based on Stage 1 survey results regarding similar types of audit offerings and audit tracking and record keeping.

[26] EEGA data included program budgets and expenditures, program energy savings goals, and installed savings estimates. These data allowed for the "normalization" of survey results to the relative size of each program.

[27] The survey instrument is provided in the Appendix of this report.

2.2 Stage 1 Data Collection

The primary data collection activity to support the first stage of this assessment was an on-line survey of all LGP, IP, and 3P programs believed to offer audits to nonresidential customers. The Stage 1 assessment primarily served to verify that audits were being conducted through these programs, and to document the type and quantity of audit data being collected and tracked (non-verified).

The electronic survey developed by Itron was emailed to a census of the in-scope program managers. This on-line survey was a starting point to gather data from the full population of programs assumed to offer audits based on a review of PIPs. The survey sought to determine which LGP, IP, and 3P programs conducted audits, the types of audits being conducted, and the types and scope of data that were gathered and stored during the audits. The Stage 1 survey was relatively short and narrowly focused, which made it a good fit for the on-line format.

The electronic survey was hosted on-line by Star Data Systems and was delivered via email to 186 nonresidential LGP and 3P program contacts on March 6, 2012. Itron sent reminder emails to the 102 program contacts that had not responded as of March 15, 2012 and a second reminder to the 77 program contacts that had not responded as of March 26, 2012. A secondary contact for select programs was also contacted during the follow-up phase if the primary contact was unresponsive. The on-line survey was closed on April 24, 2012 after a total of 139 completed surveys had been submitted (approximately a 75 percent response rate).

The 139 completed on-line surveys represented 102 resource programs and 37 non-resource programs. For the purposes of analysis, LGP programs were further divided by IOU service territory, since the program designs were more similar within an IOU than across IOUs. Third Party programs were subdivided into commercial, industrial and agriculture sectors, but were not divided by IOU. Sector is a substantial driver of program features, and the data would not support stratification by both dimensions.

Table 2-1 shows the distribution of the on-line survey sample and completes by program category. It also provides the survey response rate by both the number of programs surveyed and the allocated program budget. The response rate ranged from 72 percent for LGP programs, which made up 70 percent of the overall revised budget for this sector, to 94 percent for IP programs, which represented 99 percent of the budget.

Table 2-1: Percent of Population Verified by Survey Sample by Strata

Program Category	Survey Sample	Survey Completes	% of Completes	Survey Response Rate	Budget ($1,000) Sample	Budget ($1,000) Completes	Response by Budget
IP	**18**	**17**	**12%**	**94%**	**$87,770**	**$87,018**	**99%**
LGP - PG&E	20	16	**12%**	80%	$125,808	$108,347	86%
LGP - SCE	27	17	**12%**	63%	$92,474	$43,837	47%
LGP - SCG	14	10	**7%**	71%	$5,494	$3,874	71%
LGP - SDG&E	8	7	**5%**	88%	$19,227	$14,009	73%
LGP	**69**	**50**	**36%**	**72%**	**$243,002**	**$170,067**	**70%**
3P-Agriculture	9	6	**4%**	67%	$43,275	$30,239	70%
3P-Commercial	68	50	**36%**	74%	$330,202	$225,625	68%
3P-Industrial	22	16	**12%**	73%	$160,724	$108,333	67%
3P	**99**	**72**	**52%**	**73%**	**$534,200**	**$364,197**	**68%**
Total	**186**	**139**	**100%**	**75%**	**$864,973**	**$621,282**	**72%**

2.3 Stage 2 Data Collection

The second stage of this Evaluability Assessment relied on a two-part data request to gather the core information required to take a more in-depth look at audit evaluability across 25 LGP, IP, and 3P programs. An interview guide and data request were designed to gather comprehensive data for an initial set of five programs. These five programs served as a 'case studies' to provide deeper profiles and to inform refined data request techniques for the remaining Stage 2 sample of 20 programs. The interviews supported detailed characterization of data content, storage systems and warehousing, as well as clarification of facts and terminology. This provided a better frame of reference for the final stages of the study and analysis. The 5 case study interviews were completed in August of 2012. In September of 2012, a sample design for the additional 20 LGP, IP, and 3P programs to be selected for the in-depth data requests was submitted to the CPUC.

2.3.1 Sample Design

The population from which the Stage 2 sample was drawn was comprised of the 124 LGP, IP and 3P programs that responded to the email survey, and that confirmed their program included some type of audit offering to program participants. They are a heterogeneous set of programs comprised of different program types, target market segments, IOU service territories, and emphasis/scale of audit efforts. All of these attributes were considered in the Stage 2 sample selection.

The objective of the Stage 2 sampling approach was to be representative of the field of LGP, IP, and 3P programs that offer audits, while also emphasizing programs with substantial audit components. Many programs reported that they did not keep an electronic database with audit related information, and instead reported that they kept paper records or a series of individual

spreadsheets or reports. These programs were under-emphasized in the sample, particularly if they had small audit efforts, since they weren't able to offer very much in the way of data to review, and their evaluability could generally be assessed without significant additional research.

An audit size[28] variable representing the volume of audits completed by a program (based on the data collected during the on-line survey) in 2011 was created with an order-of-magnitude difference in each category. A substantial portion of the in-scope programs that reported offering audits (37 percent) were categorized as "Very Small", based on their performing fewer than 10 Energy Efficiency (EE) audits in 2011. The small number of audits may reflect an emphasis on their having performed fewer audits for larger projects or may simply represent a small-scale audit program. A similar percentage, 39 percent, was categorized as "Small", having completed between 11 and 100 EE audits in 2011. The remaining programs were categorized offering a "Medium" (between 101 and 1,000 audits) or "Large" (more than 1,000 audits) number of audits in 2011. These two audit size groupings made up 15 percent and 10 percent of the programs reporting audits, respectively.

The IOU and size distribution of surveyed programs that report offering EE audits in 2011 is summarized in Table 2-2 below. The distribution is shown for the population of surveyed programs with an audit offering, as well as the subset that keep an electronic database of audit data. The three columns on the right show the distribution of the Stage 2 sample. The sample emphasized programs offering a "Large" or "Medium" number of audits and was primarily selected from programs that reportedly kept an audit database. Audit programs that were categorized as "Very Small" (conducting 10 or fewer audits in 2011) had a somewhat lower propensity to keep an audit database. For these programs, the limited number of audits completed may mean that a database is not necessary to track the audits completed. However, 50 percent of the "Large" programs and 40 percent of the "Medium" also reported not having an electronic database. Due to the size of these programs' audit efforts, two of the eight "Large" programs selected for the Stage 2 analysis were programs that reported they did not have an electronic database. These programs were selected so that a better of understanding of the audit-related record keeping, and hence, evaluability in the absence of an electronic database, could be determined.

[28] The size variable is based on the number of audits completed in 2011. The ranges are defined as: Large: > 1,000, Medium: 101 - 1000, Small: 11-100, Very Small: 1-10.

Table 2-2: IOU and Size Distributions, Population and Sample

IOU & Size[29]	Population				Stage 2 Sample		
	Audit Offering		With Audit DB				
	Total	Percent	Total	Percent	Total	Percent	No DB
PG&E							
Large	8	6%	4	6%	6	23%	2
Med	10	8%	5	8%	3	12%	
Small	22	18%	15	23%	2	8%	
Very Small	11	9%	6	9%	0	0%	
SCE							
Large	2	2%	0	0%	0	0%	
Med	3	2%	2	3%	3	12%	1
Small	17	14%	9	14%	3	12%	
Very Small	16	13%	4	6%	1	4%	
SCG							
Large	1	1%	1	2%	1	4%	
Med	1	1%	1	2%	1	4%	
Small	2	2%	1	2%	0	0%	
Very Small	14	11%	6	0%	1	4%	
SDG&E							
Large	1	1%	1	2%	1	4%	
Med	4	3%	3	5%	2	8%	
Small	7	6%	5	8%	0	0%	
Very Small	5	4%	1	2%	1	4%	
All							
Large	12	10%	6	9%	8	32%	2
Med	18	15%	11	17%	9	36%	1
Small	48	39%	30	47%	5	20%	
Very Small	46	37%	17	27%	3	12%	
Grand Total	**124**	**100%**	**64**	**100%**	**25**	**100%**	**3**

Table 2-3 below shows the distribution of the Stage 2 sample of programs by IOU and Program type. The distribution of the sample is similar to that of the population of programs with an Audit database (DB).

[29] The size variable is based on the number of audits completed in 2011. The ranges are defined as: Large: > 1,000, Medium: 101 - 1000, Small: 11-100, Very Small: 1-10.

Table 2-3: IOU and Program Type Distributions, Population and Sample

IOU and Program Type	Program Population				Stage 2 Sample		
	Audit Offering		Audit DB				
	Number	Percent	Number	Percent	Total	Percent	No DB
PG&E							
Inst Partnerships	4	3%	2	3%	0	0%	
LGP	12	10%	4	6%	3	12%	1
Third Party	35	28%	24	38%	8	32%	1
SCE							
Inst Partnerships	4	3%	2	3%	2	8%	
LGP	15	12%	4	6%	0	0%	
Third Party	19	15%	9	14%	5	20%	1
SCG							
Inst Partnerships	4	3%	0	0%	0	0%	
LGP	9	7%	5	8%	1	4%	
Third Party	5	4%	4	6%	2	8%	
SDG&E							
Inst Partnerships	4	3%	3	5%	1	4%	
LGP	5	4%	2	3%	1	4%	
Third Party	8	6%	5	8%	2	8%	
Grand Total	**124**	**100%**	**64**	**100%**	**25**	**100%**	**3**

2.3.2 Case Studies

As noted above, the second stage of the evaluation included the selection of five in-scope programs as case studies; these underwent a higher level of data collection and audit assessment rigor. For each of the case study programs, a data request packet was sent to the program manager, which included: 1) a spreadsheet that requested information on customer data tracking, audit data storage, recommendation tracking, and referral tracking; and, 2) a cut of recommendation data provided to audit recipients from a recommendation database. If a data cut of recommendation data was unavailable due to the lack of a recommendation database, program managers were requested to substitute an example of an audit report or other program tracking data.

In parallel, program manager interviews were scheduled with the individuals responsible for the five case study programs. These interviews focused on understanding the role audits played in each of the program designs, and the content and capabilities of audit related data tracking. These interviews were intended to expand on the information obtained from the data request by allowing the program staff the opportunity to describe in greater detail the audits provided to

utility customers through their program, the data collection and storage procedures used, how the audit data were used by their program, and exactly what audit data were tracked. These interviews allowed the evaluation team to get a fuller understanding of the audit procedures and data systems in place. It also provided the program managers an opportunity to provide feedback and suggestions on the data request template before it was distributed to the wider sample of program managers.

The evaluation team attempted to stratify the selection of programs for the Case Studies by IOU, program size, resource versus non-resource, and target market. Table 2-4 below presents a list of the five programs selected for the Case Studies. This sample contains two programs from PG&E, and one program each from the other three IOUs. It addresses most customer sectors and is comprised of two large resource programs, and one from each of the other categories.

Table 2-4: Stage 2 Case Study Sample

Program Number	Program Name	Program Type	Size/Non-resource Strata[30]	IOU	Sector
1	Energy Efficiency Services for Oil and Gas Production	3P	Large Resource	PG&E	Industrial
2	East Bay Energy Watch	LGP	Large Resource	PG&E	Muni/Comm
3	Riverside County Partnership	LGP	Non-resource	SCG	Municipal
4	Data Center Energy Efficiency	3P	Small Resource	SCE	Comm.
5	CA Department of Corrections Partnership	IP	Medium Resource	SDG&E	Institutional

Out of the five programs in the case study, only two programs submitted all data elements that were requested by the evaluation team. The Riverside County Partnership did not complete the Stage 2 data request spreadsheet, however they did provide information via a phone interview, and they submitted several sample audit reports. The SDG&E California Department of Corrections Partnership (CDCR) program reported they did not perform any audits in the 2010-2012 program cycle, and thus provided no data. Their data request response indicated that one audit had been performed. However the program manager clarified that it had actually occurred in the previous program cycle and therefore, they declined to participate in a phone interview. Subsequent follow-up conversations with a new CDCR program manager indicated one audit did occur during the 2010-2012 program cycle, however the audited site was a Co-Gen facility and thus SDG&E offered no incentives for energy efficiency measure implementation. As a result no energy efficiency upgrades were implemented. The EE Services for Oil and Gas Production

[30] The "Size/Non-resource" category addresses both the resource versus non-resource designation, as well as budget size. Programs are categorized into one of four groups. Non-resource programs are their own group. The resource programs are divided into three groups (small, medium and large) based on budget size.

program completed the phone interview and spreadsheet data request, however since they do not track audit recommendation data in a traditional database, they were unable to provide any recommendation data to the evaluation team.

After analyzing the data received during the case study, it was apparent that the evaluability assessment would need to capture less conventional forms of record-keeping. Only one of the five programs in the case study sample had a traditional database. The other four programs primarily used Excel and Word files to track their audit data. Questions in the data request were revised so program managers would interpret Excel and Word files as legitimate forms of data keeping. This was done so the evaluability assessment could capture less traditional forms of data storage.

In-Depth Analysis

Based on lessons learned from the Case Studies, the data request packet was revised to capture the following data elements for each of the audit types offered by LGP/IP/3P programs during the 2010 – 2012 program cycle:

- Customer Identification (6 variables)
- Customer/Building Classification (6 variables)
- Site/Building Characteristic (9 variables)
- Date of audit and audit report
- Audit Recommendation variables (including recommended measure, energy savings, cost/payback) (11 variables)
- Baseline Equipment (4 variables)
- Measure implementation status
- Actual cost and payback
- No-cost low-cost recommended measure savings
- Referrals made to other programs and referral outcome
- Date of follow up and follow up activity

The evaluation team sent out their final version of the data request to the 20 non-case study program managers on September 11, 2012. Responses to the data request were submitted between September 28, 2012 and October 8, 2012. Including the five case study programs, data were requested from all 25 programs included in the Stage 2 sample (out of the 124 programs reported to offer audits).[31] The stratification of these programs is shown in Table 2-5.

[31] Based on the Stage 1 on-line survey responses.

Table 2-5: Data Received For Stage 2 In-Depth Assessments

Utility	Program Type	Data Requested	Spreadsheet Returned	Recommendation Data Provided	Sample Audit Reports Provided
PGE	LGP	3	3	1	3
	3P	8	8	4	4
SCE	IP	1	0	0	0
	LGP	1	1	0	0
	3P	5	5	1	2
SDGE	IP	1	1	1	0
	LGP	1	1	1	0
	3P	2	2	0	1
SCG	LGP	1	0	0	1
	3P	2	1	0	0
Total	IP	2	1	1	0
	LGP	6	5	2	4
	3P	17	16	5	7
	Total	25	22	8	11

3

Stage 1 Findings

This section presents a summary of the Draft Interim Findings Memo presented to the CPUC on June 7, 2012. All analysis presented in this section is based on the results of the Stage 1 data collection. The complete Draft Interim Findings Memo is included as an Appendix to this report.

3.1 Audit Offerings

Programs included in the Stage 1 on-line survey effort represent a diverse range of services intended to identify energy savings opportunities and promote energy efficient practices. With respect to the range of target markets addressed and services offered, survey responses revealed that:

- The programs included in the evaluation provided technical and evaluation assistance, imparted training and education at college campuses, created comprehensive energy solutions for the retail sector, provided lighting and thermostats or sensors at hotels, and developed energy savings projects with petroleum refineries.
- Some of the programs targeted specific market segments, such as multi-family buildings and college campuses, while others served broad market categories such as commercial and industrial structures.
- Some programs addressed specific measures or population segments, while others were more comprehensive and served whole sectors or communities.

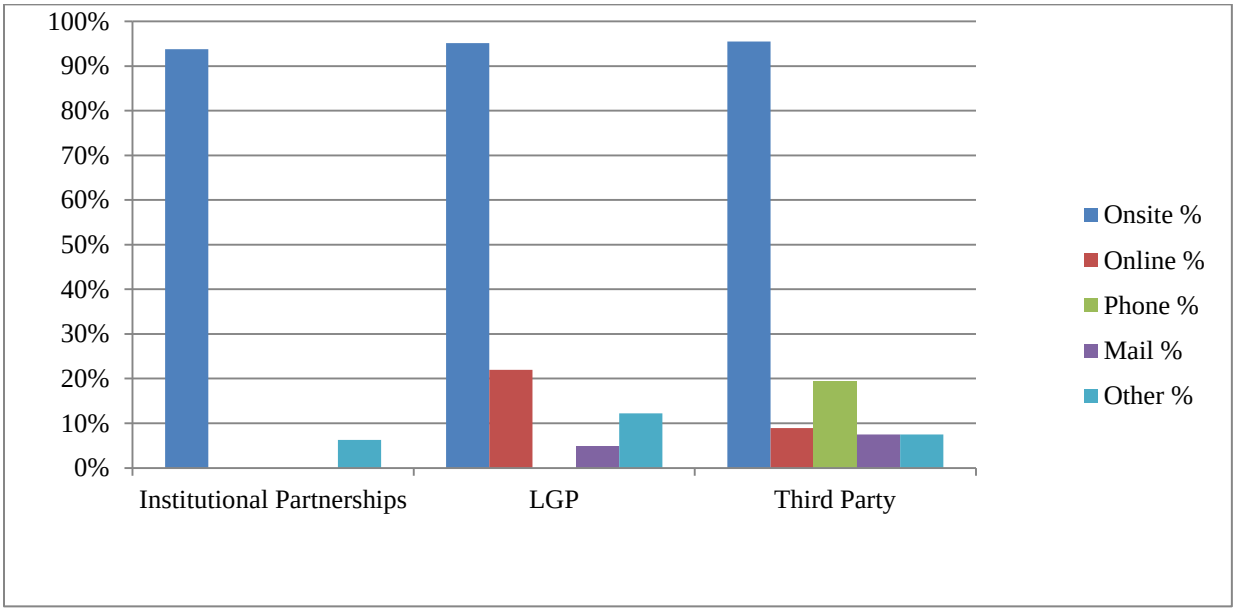
Nearly 90 percent of programs surveyed (124 out of 139) reported offering audits of some kind to program participants. Table 3-1 below shows the distribution of completed surveys across strata and the proportion of those that offered audits to customers. As defined, an audit included any form of assessment of participant facilities and equipment that would lead to energy savings.

Table 3-1: Count of Programs Surveyed and Offering Audits

Program Type	#Programs Surveyed	# Programs Offering Audits	% Offering Audits
Institutional Partnerships	17	16	94%
LGP - PG&E	16	12	75%
LGP - SCE	17	15	88%
LGP - SCG	10	9	90%
LGP - SDG&E	7	5	71%
LGP	50	41	82%
Third Party - Agriculture	6	6	100%
Third Party – Commercial	50	45	90%
Third Party-Industrial	16	16	100%
Third Party	72	67	93%
Total	139	124	89%

Among those programs that have an audit component, on-site assessments were found to be the most prevalent type of audit service offered. Just over 95 percent of programs reported offering on-site audits. Other forms of audits offered included on-line, telephone or mail-based audits of energy savings opportunities. As seen in Figure 3-1, LGP programs primarily used on-line surveys as an alternative, or in addition to, on-site surveys. However, 3P programs used a combination of methods including both on-site visits and phone surveys. IP programs offered primarily on-site audits. The percentages by program type sum to more than 100 percent for LGP and 3P programs because multiple types of audits were offered by some of the evaluated programs.

Figure 3-1: Distribution of Audit Types by Program Type



3.2 Audits Completed

Table 3-2 shows the distribution by program type of the percentage of program participants who completed an audit.[32] Overall, the most common response given was that 100% of participants go on to complete the audit. One-third of the program managers who responded to the on-line survey reported that 100 percent of their customers completed an audit. This completion rate was highest for Third Party programs (43 percent) and lowest for LGP programs (20 percent). Less than one-fifth of programs (17 percent) reported that only a minority of their program participants went on to complete an audit.

Table 3-2: Portion of Program Participants Who Go on to Complete Audit

Program Types	Percentage of Participants Who Complete Audit[33]		
	<50%	50% - 99%	Everyone (100%)
Institutional Partnerships	13%	19%	25%
LGP	24%	17%	20%
Third Party	13%	28%	43%
Total	**17%**	**23%**	**33%**

Nearly all of the 124 programs that reported offering audit services also provided information about the quantity of audits conducted in 2011. The number of audits provided by each program that reported results ranged from zero to 4,700. Table 3-3 shows the total number of audits completed by program type and the average number of audits per program type across the 121 programs that reported their audits completed in 2011. The audits completed by 3P Agriculture and Commercial programs and PG&E LGP programs accounted for 94 percent of the total audits performed in 2011.

[32] This analysis is based on program manager responses to the Stage 1 on-line survey.

[33] Percentages do not add to 100% as they the remaining 27% of on-line survey respondents reported they were unsure of the percentage of their customers who completed audits.

Table 3-3: Completed Audits Reported by Strata[34]

Program Type	# Programs Offering Audits	Total Audits Completed	Average Audits/ Program	% of Audits
Institutional Partnerships	**15**	**124**	**8**	**0.4%**
LGP - PG&E	12	6,370	531	22%
LGP - SCE	14	262	19	1%
LGP - SCG	9	38	4	0.1%
LGP - SDG&E	5	1,024	205	4%
LGP	**40**	**7,694**	**192**	**27%**
Third Party - Agriculture	6	3,877	646	13%
Third Party – Commercial	44	16,904	384	58%
Third Party-Industrial	16	377	24	1%
Third Party	**66**	**21,158**	**321**	**73%**
Total	**121**	**28,976**	**239**	**100%**

3.3 Recommendations Offered

The goal of audit programs is to customize recommendations based on site and customer characteristics. However, programs can focus on a particular set of measures or end uses. It was found during this Stage 1 assessment that Lighting, HVAC and Hot Water measures dominate the recommendation measure categories, despite the fact that audits in this nonresidential, non-core utility sector offer a vast variety of measures. As shown in Table 3-4 below, lighting measures were reported as a major audit offering consistently across most program types and utilities, while HVAC measures dominated the LGP-SCG and Third Party Commercial strata.

[34] Based on data collected during the Stage 1 on-line survey.

Table 3-4: Measure Recommendations Offered to Audit Participants

	IP	LGP					3P				All
Measures	All	PG&E	SCE	SCG	SDG&E	All	Ag	Com	Ind	All	
Completed Surveys	16	12	15	9	5	41	6	45	16	67	124
Appliance	13%	25%	20%	44%	60%	32%	0%	20%	0%	13%	19%
Building Envelope	13%	33%	27%	0%	40%	24%	17%	20%	6%	16%	19%
Hot Water	56%	50%	13%	89%	60%	46%	33%	33%	19%	30%	39%
HVAC	56%	58%	60%	78%	40%	61%	17%	71%	19%	54%	56%
Lighting	56%	83%	67%	11%	60%	59%	67%	73%	31%	63%	60%
Process	31%	33%	20%	11%	20%	22%	67%	22%	94%	43%	35%
Water	0%	17%	20%	0%	40%	17%	50%	7%	6%	10%	11%
Other	13%	25%	7%	0%	20%	12%	0%	9%	19%	10%	11%
Plug load	0%	0%	0%	0%	20%	2%	0%	4%	0%	3%	2%
Refrigeration	0%	17%	0%	0%	0%	5%	0%	7%	0%	4%	4%
Natural Gas	25%	8%	0%	33%	0%	10%	33%	2%	19%	9%	11%
Solar and DG	0%	0%	0%	0%	0%	0%	0%	4%	0%	3%	2%

Along with the measure recommendations, most audit programs also provided information to customers on the estimated energy savings, measure costs and payback timeframe for the recommendation, as well as referrals to other utility programs. Table 3-5 summarizes the on-line survey results regarding the information provided to customers upon completion of their audit. Although 3P programs were more likely to provide audit customers with information on measure savings and cost, they were less likely to refer them to other programs. Additionally, programs also provided participants with information regarding contractors or vendors, carbon footprint impacts, safety considerations, and utility programs and events. Programs referred audit participants either directly to utility programs or to utility representatives or account executives where customer needs did not align with program design. Referrals to utility Demand Response and Distributed Generation (DG) programs were frequently reported.

Table 3-5: Information Provided to Customers Post Audit

Program Type	Programs Offering Audits[35]	Information Provided Post-Audit			
		Energy Savings	Cost	Payback	Program Referrals
Institutional Partnerships	**16**	**88%**	**81%**	**81%**	**56%**
LGP - PG&E	12	92%	92%	92%	83%
LGP - SCE	15	87%	67%	67%	47%
LGP - SCG	9	100%	89%	78%	89%
LGP - SDG&E	5	60%	60%	40%	40%
LGP	**41**	**88%**	**78%**	**73%**	**66%**
Third Party - Agriculture	6	83%	83%	83%	50%
Third Party - Commercial	45	93%	89%	71%	36%
Third Party-Industrial	16	100%	100%	88%	50%
Third Party	**67**	**94%**	**91%**	**76%**	**40%**
Total	**124**	**91%**	**85%**	**76%**	**51%**

3.4 Recommendation Uptake

Program managers were asked if their program design allowed for involved follow up contact with the customer after the audit to see if customers had adopted recommendations (uptake). As shown in Table 3-6 below, more than three-quarters of programs reported following up with customers post-audit and over half (52 percent) reported tracking the uptake rate of the recommendations. Overall, only 8 percent of programs estimated that every one of their audits (100%) resulted in uptake (defined as the installation of at least one of the recommended measures). The majority estimated that somewhere between 50 percent and 100 percent of their audits resulted in the uptake of an audit recommendation. About one third of programs were not able to estimate the percent of their audits that resulted in a recommended measure being installed.

[35] Based on data collected during the Stage 1on-line survey.

Table 3-6: Portion of Audit Recipients who Tracked Measure Uptake and Estimated Recommendation Uptake of at least one Measure

Program Types	# Programs Offering Audits	Followed Up Post Audit		Tracked Recommendation Uptake		Estimated % of Participants who Installed 1 or more Recommended Measures			
		n	%	n	%	<50%	50% - 99%	All (100%)	Don't Know
IP	16	14	88%	6	38%	7%	27%	27%	40%
LGP	41	29	71%	13	32%	8%	19%	5%	68%
Third Party	67	54	81%	45	67%	30%	50%	6%	14%
Total	**124**	**97**	**78%**	**64**	**52%**	**20%**	**37%**	**8%**	**34%**

Although follow ups were conducted the majority of the time, the method used and the time interval between the audit and follow up were highly variable by program and project. Phone calls appear to be the most common method used to follow up. In cases where recommendations could not be provided during the initial audit visit, the follow up provided an opportunity to present the final recommendations to owners. Responses regarding the time interval between the audit and follow up ranged from one hour to several months (based on when the project develops). In many cases though, the convenience to the customer was the guiding principle governing the choice of method and time frame for follow up.

3.5 Distribution of Reported Savings

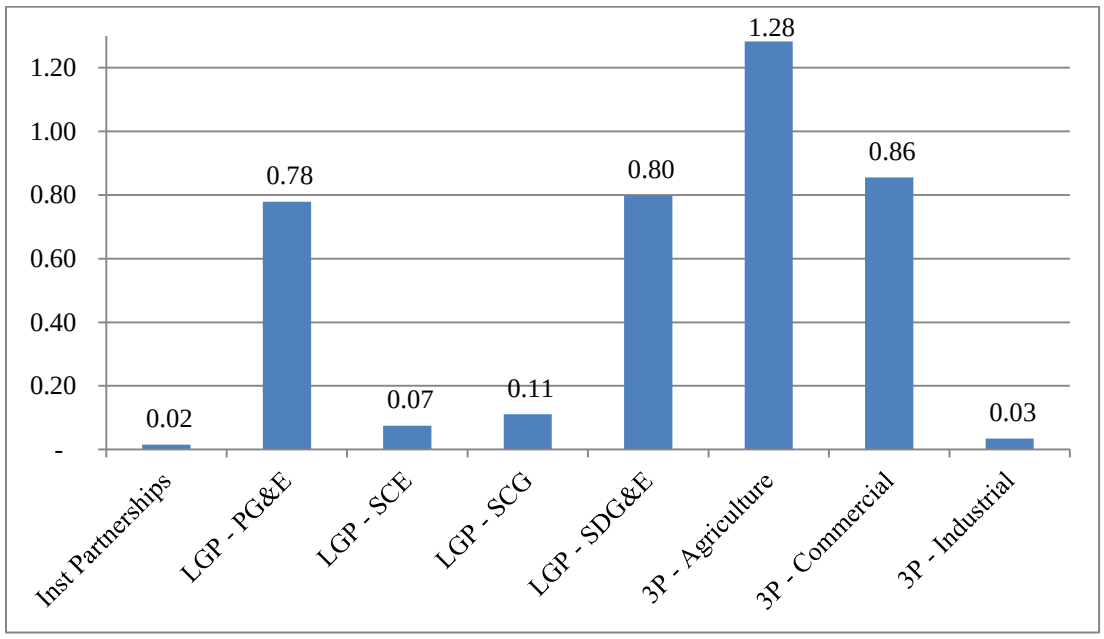
To analyze the percentage of savings by the various categories of in scope audit programs, the evaluation team used a combination of self-reported data collected through on-line surveys and data posted on EEGA. Table 3-7 presents the contribution of each program type to the total installed savings (kWh and therm) for those programs that reported the number of audits they completed in 2011 during the on-line survey. Third Party Industrial audits yielded high kWh and therm savings values per audit reported. Also high were the kWh savings per audit for Institutional Partnerships.

Table 3-7: Installed kWh and Therm Savings for Programs Reporting Audits

Program Type	% of Reported kWh Savings	% of Reported Therm Savings
Institutional Partnerships	14%	15%
LGP - PG&E	20%	2%
LGP - SCE	3%	0%
LGP - SCG	0%	0%
LGP - SDG&E	0%	0%
LGP	23%	2%
Third Party - Agriculture	3%	5%
Third Party – Commercial	39%	17%
Third Party-Industrial	21%	61%
Third Party	63%	83%
Total	100%	100%

In an effort to assess the level of program activity relative to program size, self-reported audit counts were compared with revised budget numbers for each stratum. Figure 3-2 represents the number of audits completed per $10,000 of the program's budget. This analysis indicates a high level of program activity within the Third Party – Agriculture stratum given resources, while dollar amounts available to programs within the Third Party Industrial and Institutional partnership realized the lowest audit completion reported across all strata. This is not unexpected as the audits completed within these strata tend to be complex and resource intensive. The evaluation recognizes audit offerings are unique and highly varied in magnitude and scope, and the summary below is in no way representative of the relative efficiency of audit implementation across strata.

Figure 3-2: Completed Audits Reported per $10,000 of Program Budget



3.6 Data Collection

In order to evaluate audit programs, certain key information is required. This includes customer tracking data such as the customer name, business name, facility ID, account number, address, phone numbers, and utility Rate Code. Other information that is critical to evaluation includes detailed information on the audit such as technical information regarding the measures installed, the estimated energy savings and costs associated with the implementation of recommended measures, and information about the facility itself.

As part of the evaluability assessment, the on-line survey probed into the data collection and tracking activities conducted by LGP and Third Party programs. In this Stage 1 effort, survey respondents were asked to provide specifics regarding the information that was collected and stored by them as part of the audit. This information included customer, facility and measure level data, as well as other metrics of interest like information provided to participants through the audit, audit recommendation uptake rates and audit follow-ups. Table 3-8 lists the percentage of respondents offering audits who reported that they collected key customer and facility information.

Table 3-8: Customer and Facility Information Collected During the Audit

Data Element	IP	LGP					3P				All
	All	PG&E	SCE	SCG	SDG&E	All	Ag	Com	Ind	All	
# Programs	16	12	15	9	5	41	6	45	16	67	124
Customer Name	56%	92%	47%	56%	60%	63%	100%	88%	100%	99%	81%
Business Name	31%	83%	33%	33%	40%	49%	100%	86%	100%	97%	73%
Facility ID	25%	50%	33%	33%	20%	37%	33%	44%	81%	55%	45%
Facility Address	50%	92%	67%	56%	60%	71%	100%	86%	100%	97%	82%
Phone number(s)	44%	83%	40%	33%	60%	54%	100%	86%	100%	97%	76%
Utility Rate Code	56%	75%	40%	33%	20%	46%	50%	48%	81%	60%	55%
Utility Account #	31%	92%	47%	56%	20%	59%	100%	80%	94%	91%	73%
Billing Data	44%	83%	47%	56%	40%	59%	100%	60%	63%	69%	62%
Hours of Operation	56%	92%	47%	56%	40%	61%	100%	78%	100%	91%	77%
Age of facility	63%	83%	60%	56%	20%	61%	50%	60%	44%	60%	60%
Conditioned Sqft	50%	75%	60%	56%	0%	56%	33%	52%	19%	46%	50%
Window Sqft	13%	25%	33%	0%	0%	20%	0%	18%	0%	13%	15%
HVAC Specs	56%	42%	53%	56%	20%	46%	33%	58%	25%	52%	51%
Lighting Inventory	63%	92%	60%	22%	40%	59%	33%	66%	19%	57%	58%
Insulation Level	13%	42%	13%	11%	20%	22%	50%	18%	0%	18%	19%
Process Equip	6%	0%	0%	0%	0%	0%	17%	2%	0%	15%	9%

Key to meeting evaluation requirements is that the program must track participating customer and site data, as well as audit recommendation details on a platform that renders analysis feasible. This involves recording and storing key metrics in a format that can be transferrable and easy to read. Ideally, such information would be stored electronically in a clearly prescribed form. Table 3-9 shows the percentage of programs that reported offering audits and that recorded the customer information either electronically or on paper. Many programs recorded customer information using more than one method. The majority of programs record customer information in some type of electronic format (82 percent). It is important to keep in mind that these electronic records are not always databases, as many programs reported maintaining customer and facility information in electronic reports which are not transferred into databases due to either resource constraints or a lack of need for a database. Some program implementers reported that the audit assessments they offered were unique to each customer and thus, they did not need to be consolidated across program participants.

Table 3-9: Method of Recording Customer Information

Program Type	# Programs Offering Audits	Paper	Electronic	Other
Institutional Partnerships	16	63%	88%	0%
LGP - PG&E	12	83%	58%	0%
LGP - SCE	15	47%	60%	7%
LGP - SCG	9	89%	100%	11%
LGP - SDG&E	5	60%	60%	20%
LGP	41	68%	68%	7%
Third Party - Agriculture	6	83%	83%	0%
Third Party - Commercial	45	73%	89%	2%
Third Party-Industrial	16	88%	94%	13%
Third Party	67	78%	90%	4%
Total	124	73%	82%	5%

Table 3-10 summarizes customer and audit information tracked by the in-scope programs that may be available to evaluators to assess the audit components of IP, LGP and 3P programs. While 65 percent of programs reported storing customer data, only 35 percent indicated it was stored electronically. A large percentage of the programs that store customer data raised concerns that could undermine the programs ability to provide these data for evaluation purposes. The issues included:

- confidentiality agreements that exist between the customer and program implementer
- the location of the data (held by the program implementer, utility, sub-contractor)
- incomplete data tracking (i.e., for only the portion of audits that resulted in a project)
- the format of stored data (often in individual files rather than a program-wide database)

Table 3-10: Information Tracked by Audit Programs

Program Type	# Offering Audits	% Store Customer Data in a Database	% Store Cust Data in Electronic Database	% Store Recom Data in Electronic Database	% Track Uptake on EE Pgm Referrals
Institutional Partnerships	**16**	**75%**	**42%**	**25%**	**83%**
LGP - PG&E	12	45%	30%	30%	75%
LGP - SCE	15	38%	24%	33%	47%
LGP - SCG	9	67%	20%	20%	87%
LGP - SDG&E	5	50%	42%	42%	42%
LGP	**41**	**48%**	**28%**	**31%**	**63%**
Third Party - Agriculture	6	83%	50%	67%	83%
Third Party - Commercial	45	82%	45%	68%	71%
Third Party-Industrial	16	87%	33%	67%	100%
Third Party	**67**	**80%**	**42%**	**36%**	**76%**
Total	**124**	**65%**	**35%**	**47%**	**70%**

4

Stage 2 Findings

This section contains the findings from the Stage 2 analysis activities, which included five Case Studies plus an additional 20 in-depth data assessments.

4.1 Individual Case Study Assessments

This section presents detailed assessments of the five programs selected for the Case Studies. The programs selected for the Case Studies are shown in Table 4-1 below.

Table 4-1: Stage 2 Case Study Assessment Programs

Program Number	Program Name	Program Type	Size/Non-resource Strata[36]	IOU	Sector
1	Energy Efficiency Services for Oil and Gas Production	3P	Large Resource	PG&E	Industrial
2	East Bay Energy Watch	LGP	Large Resource	PG&E	Muni/Comm
3	Riverside County Partnership	LGP	Non-resource	SCG	Municipal
4	Data Center Energy Efficiency	3P	Small Resource	SCE	Comm.
5	CA Department of Corrections Partnership	IP	Medium Resource	SDG&E	Institutional

4.1.1 Energy Efficiency Services for Oil Production (PG&E 2222)

The Energy Efficiency Services for Oil Production (EESOP) is a PG&E third-party industrial program that targets the oil and gas production market segment to assist oil and gas producers of all sizes in becoming more energy efficient. Production facilities served include wells, extraction equipment, surface transport, field augmentation, water steam and gas injection, product separation and treatment, and storage and distribution. EESOP is a unique program in that it was designed to audit both buildings and outdoor oil fields and is structured as a whole

[36] The "Size/Non-resource" category addresses both resource versus non-resource designation, as well as budget size. Programs are categorized into one of four groups with non-resource programs being their own group. The resource programs are divided into three groups based on budget size (small, medium or large).

systems approach that examines each participant's entire oil and gas production operation to deliver optimal energy savings.

The EESOP Program, which is administered by Global Energy Partners (Global), provides information on energy efficiency opportunities for oil and gas production through site-specific recommendations resulting from targeted audits of oil and gas production sites. These audits are available to all oil and gas companies in PG&E service territory (in 2012, there were approximately 47,000 active oil wells in PG&E's service territory). Customers are recruited into the program via either customer inquiry or program outreach (via industry trade allies, PG&E account executives, industry associations, and a seed list of customers provided by PG&E that contains customer information and billing history). Global has had long-standing relationships with most of these industrial customers and have staff (approximately 15 individuals) who call on these customers regularly. This regular interaction allows the staff to stay informed of upgrades or expansions customers are considering so that they are able to recommend high efficiency upgrades whenever possible. EESOP program staff try to contact each customer before budgets are set for facility upgrades. This allows them to talk with customers about upgrades and pull in the appropriate engineers who can discuss energy efficiency options for specific technologies. Audits provided under the EESOP program primarily identify energy efficiency opportunities associated with premium efficiency motors, oil well artificial lift conversions, rod beam pump-off controllers, variable speed drives, well water shutoff, and field process optimization.

The EESOP Program contributes approximately one-third of the energy savings and demand reduction achieved by all of the PG&E industrial programs (including the Core programs). It has one of the largest budgets for PG&E energy efficiency programs, at approximately $20 million.

Table 4-2 below shows the budget, expenditures and savings through December 2012 for the EESOP Program, as well as the entire portfolio of non-core Industrial, Commercial or Agricultural Third Party programs within PG&E service territory and statewide programs that reported offering audits. The EESOP Program slightly exceeded its budget during the 2010-2012 program cycle, but also exceeded both its energy and demand savings goals for the three-year cycle.

Table 4-2: Budget, Expenditures, and Energy Savings for ESSOP Program and other In-Scope 3P Programs, As of December 2012

	ESSOP Program	PG&E 3P Programs	Statewide 3P Programs
Budget	$20,440,750	$235,370,314	$382,131,938
Expenditures (% of Budget)	103%	91%	80%
Gross Annual MWh Goals	95,423	500,283	1,014,541
Gross Annual MWh, Installed as % of Goal	117%	105%	71%
Gross Peak MW Goals	11.0	80.9	167.9
Gross Peak MW, Installed as % of Goal	103%	98%	67%

Program Audit Activities

The audit activities of the EESOP Program start with targeted walk-through audits to assess areas of potential energy efficiency upgrades. These are followed by detailed feasibility study reports for projects that customers are interested in pursuing. The long-standing relationships that Global has with customers in the oil and gas market allow them to stay informed of any upgrades or expansions the customer is considering. This program does not pre-screen customers through a telephone or email survey prior to a site visit. Such surveys are not effective at capturing the layout and complexity of an oil field. Instead, this program uses walk-through audits to assess whether or not there are viable potential projects at a given site. With a budget of approximately $20 million for the current program cycle, the program can afford to conduct walk-through audits for its customers without needing to screen customers for eligibility. Data collected during the walk-through audits are typically recorded on paper and are not consistently transferred to an electronic format. However, if a customer is interested in moving forward with one or more of the audit recommendations, then a feasibility study is then conducted and the information from the walk-through audit is recorded electronically as a first step in the data collection for this study. If the customer is not interested in implementing any of the audit recommendations then no feasibility study is conducted and the information collected during the walk-through audit is only kept in paper form.[37]

Targeted audits are typically focused on specific pieces of equipment (motors, pumps, and process optimization). These audits usually involve a program staff engineer recording all necessary site information (existing name plate data, hours of operation, etc.). The site information then allows for the creation of a thorough feasibility study for customers interested in pursuing energy efficiency retrofits. Checklists and field form templates are not generally

[37] Typically these paper notes are kept in within auditors' personal files and which would likely make conducting an evaluation of the audits that do not turn into projects infeasible.

used within this program as industrial equipment tends to vary quite significantly from one site to another.

After completing the targeted audit, program staff meet with the customer to present the audit findings. If a customer expresses interest in the energy savings project identified by the audit, program staff then produce a feasibility study report, detailing the project equipment, costs, implementation process, and estimated energy savings. Writing up this feasibility study may require additional site visits to collect supplementary site details to further inform the feasibility study.

In addition to collecting data directly from the customer, the EESOP Program also receives historical energy usage and billing data from PG&E. These data are used in the feasibility study to inform the energy and cost savings calculations for the recommended energy efficiency measures.

Once a feasibility study is created, it is reviewed by an internal program implementation staff engineer for quality assurance, and then submitted to PG&E for project approval. The projects approved by PG&E are then sent to a third-party engineering firm to confirm the projected energy savings estimated by the program implementation team (Global). Approval from the third-party engineering firm is required before the project is eligible for program incentive dollars.

Customer Data Tracking

Global staff members keep track of each of the customers they call in spreadsheets that they store on their individual computers. These records provide the staff members information about when the customer was last called, when the customer should be contacted next, and any other details that will assist the customer with future energy efficient upgrades.

Audit Data Tracking

No database or other electronic tracking system is used to record the targeted audits that occur as part of this program unless a customer commits to installing a measure recommended in the audit. Hand-written notes are typically taken during the audit and are not formally written up unless a feasibility study is to be completed. The program implementer stores the handwritten audit notes in boxes. If a customer is interested in pursuing a proposed energy efficiency upgrade, the audit notes are used to inform feasibility studies which are tracked and submitted as project documentation to PG&E (electronically via FTP). The way the EESOP Program collects and stores audit data has not changed significantly since the program's inception in 2006.

Audit Recommendation Tracking

The EESOP Program only tracks data associated with completed projects. As a result, data are only retained for recommendations that result in feasibility studies; any additional audit data collected concerning other non-implemented recommendations is not easily retrieved. Some of these data may be stored in archived boxes of paper notes, but are not available in a format that would be useful for evaluation activities.

Audit Follow-Up Activities

The EESOP Program follows up with a customer multiple times after an audit occurs. After the walk-through audit, program staff meet with the customer to present audit findings containing estimates of expected performance of specific energy efficient measures, as well as anticipated project costs. Should the customer commit to installing the recommended energy efficiency measures, then the audit is considered a project. Once an energy efficiency project has been established, a feasibility study is written to document recommended measures identified during the walk-through audit. On an as-needed basis, there are follow-up calls and site visits to support the generation of feasibility study report. According to the data request spreadsheet, the date of follow-up activity and whether or not the recommended measures were eventually implemented is tracked for all feasibility studies.

Approximately six months after the original audit, the program staff follow up with customers who were not originally interested in implementing any of the measures recommended in the audit to see if their interest level has changed for any reason.

Referrals to Other Programs

During Stage 2 of this Evaluability Assessment, the EESOP program staff indicated that information regarding program referrals to other programs is not tracked.

Project Reporting

Global, as the program administrator, submits the feasibility study report to PG&E in a secure manner using an FTP website. The feasibility study report contains all necessary data for project approval and incentive processing. Hard copies of feasibility studies are retained by Global for 7 years. The data PG&E receives from Global are used to track the energy savings resulting from program installed measures.

Analysis of Stage 2 Data Received

As mentioned previously, while the evaluation team requested data on all audits performed, this program only tracks feasibility study data. As a result, this assessment of the Stage 2 data received is only representative of the fraction of the audits completed that result in a feasibility

study. The number of audits conducted that do not result in a feasibility study is unknown because these data are not tracked.

According to the data received, 281 feasibility studies were completed between January 2010 and August 2012. These feasibility studies were completed for approximately 27 unique customers and 63 unique sites. Feasibility study data are stored in one of two ways, either within the individual feasibility study report (Microsoft Word file), or within a program-wide database (Microsoft Excel). Table 4-3 below shows the data reported to be included in the individual feasibility study reports based on the Stage 2 data request spreadsheet. These data include the date of the audit, the date of the audit report, details on the measure recommendation (such as the equipment type, size, and quantity), information on the existing equipment recommended for replacement and the project cost. As mentioned previously, this information is only included in the individual feasibility reports and is not housed inside any type of database. The feasibility study reports were developed to include all information needed for both PG&E and the third party engineering firm to approve a proposed project. No feasibility study reports were provided to the evaluation team and thus, it was not possible to verify these data elements.

Table 4-3: Data Elements Stored in Feasibility Study Reports

Data Type	Data Element
Customer Contact Information	*Unverified*
Audit Information	Date of Site Visit, Date of Audit Report
Measure Recommendation	End-Use, Equipment Type, Size/Volume, Quantity, Incremental Cost
Existing Baseline Information	End-Use, Equipment Type, Size/Volume, Quantity,
Financial Information	Project Cost

Table 4-4 below shows the data elements reported to be stored in a feasibility study database for this program, based on data collected via the Stage 2 data request spreadsheet. This table also shows which of these data elements were verified based on the database cut provided to the evaluation team. A number of fields said to be stored in the database were intentionally not provided to the evaluation team due to confidentiality concerns.

Table 4-4: Data Elements Stored in Program-Wide Excel database

Data Type	Data Element	Evaluation Verified
Site Information	Customer Contact Info (Business Name, Address, Account Number), Rate Schedule, Business Type	Unverified due to confidentiality concerns
	Hours of operation, Size and Type of Process Equipment	Unverified due to confidentiality concerns
Audit Information	Audit status codes (complete, partially completed, refused, incomplete)	No
Measure Recommendation	Measure Description	Yes
	Quantity	Yes
	Annual Energy Savings (kWh, Peak kW)	Yes
	Cost	No
	Rebate Amount	No
Outcome	Referrals to other Programs	No
	Date of Follow-up	No
	Description of Follow-up	No

The recommendation database provided to the evaluation team included a record for each of the 281 feasibility studies created. In total, there were 19 unique measure descriptions, which are shown in Table 4-5 below, and the estimated energy and demand savings were provided for all but nine of these 281 feasibility studies. The table below also shows the number of times each measure description was recommended, and the average estimated energy and demand savings for each of the recommended measures.

Table 4-5: Measure Recommendations included in Database

Measure Recommendation	N	Quantity	Average kWh Savings	Average kW Savings
High Efficiency Motors for Rod Beam Pumping Unit	5	60	101,604	11.8
Process Optimization	6	32	3,337,783	114.4
Process Optimization, Pipeline Optimization	2	2	754,460	78.4
Pump Off Controllers and High Efficiency Motors for Rod Beam Pumping Units	6	76	261,900	26.1
Pump Off Controllers for Rod Beam Pumping Unit	23	300	183,184	17.8
VSD and High Efficiency Motor for Rod Beam Pumping Units	5	67	307,493	35.8
VSD for ESP Pumping Units	50	99	404,271	48.0
VSD for Facility Centrifugal Pump	12	39	613,348	71.8
VSD for Gas Compressor	2	2	120,014	14.0
VSD for Positive Displacement Pump	12	26	204,779	24.4
VSD for Rod Beam Pumping Units	16	159	122,153	14.2
VSD for Steam Generator Equipment	29	34	572,021	66.2
VSD for Steam Generator Feedwater Pump and/or Fan	34	49	600,254	69.9
Variable Speed Drives for ESP Pumping Units	1	1	250,000	28.9
Water Shutoff, Rod Beam Artificial Lift	6	10	154,094	18.0
Well Conversion, Gas Lift to Rod Beam	12	12	242,351	17.6
Well Conversion, to Long Stroke Rotaflex Pumping Unit	20	166	647,798	74.6
Well Conversion, To Progressive Cavity Pumping Unit w/VSD	39	152	385,397	44.9
Total	**281**	**1286**	**467,687**	**47.7**

Stage 1 to Stage 2 Data Comparison

The data collected for this program during the Stage 1 on-line survey was fairly consistent with the data collected in Stage 2 of this evaluability assessment. One item that was revealed in Stage 2 was that the data tracked for this program were only representative of the fraction of audits completed. Only those audits that turned into feasibility studies were electronically recorded. The data from all other audits were only stored in paper form and are thus significantly less accessible.

Evaluability Assessment of Program

Based on the data collected and analyzed for the EESOP Program, it appears as though the EESOP Program data tracking in its current state is insufficient to conduct a comprehensive evaluation of the audits delivered through this program. Any audit evaluation activities conducted would be limited to the audit recommendations that turned into projects (as opposed to all recommendations given) and a significant portion of data on these recommendations would need to be mined out of feasibility reports (Word documents) since the data are not stored in a database that is easily transferable.

4.1.2 East Bay Energy Watch (PG&E 2132)

East Bay Energy Watch (EBEW) is a large resource, Local Government Partnership program which is a collaboration between PG&E, local governments, non-profit and for-profit energy service providers in Northern California. EBEW provides energy efficiency solutions for municipalities, businesses, and residents throughout Alameda and Contra Costa Counties. The Program is a joint venture between PG&E, Quantum Energy Services & Technologies, Inc. (QuEST), Rising Sun Energy Center – California Youth Energy Services (CYES), KEMA, and Community Energy Services Corporation (CESC).

EBEW is a cross-cutting program that targets municipal, small commercial (average maximum electricity demand under 200 kW), and residential markets. QuEST administers the overall program and implements the municipal portion of the program. The small commercial and residential components utilize a "Direct Install" design and are implemented by third-parties (CYES implements the residential sub-program and KEMA and CESC implement two the small commercial sub-programs, Business Energy Services Team (BEST) and SmartLights, respectively). The small commercial and residential direct install program components recruit customers for audits by intensively canvassing a neighborhood, and going door-to-door for a number of days to complete as many audits as possible. The municipal part of the program works directly with cities, business associations, and PG&E account representatives to recruit municipal customers for energy audits and retrofits. The program does not have a goal or a target number of audits to complete for the cycle, but does have energy savings goals.

EBEW is a relatively large LGP within PG&E's portfolio, accounting for 25 percent of PG&E's total LGP budget for programs that reported offering audits. It should be noted that while spending is on par with the portfolio of PG&E LGP programs, the program outperforms its energy savings goals by a greater margin. Table 4-6 below shows the budget, expenditures and savings through December 2012 for the EBEW program, the portfolio of PG&E LGP programs offering audits,[38] and all statewide LGP programs that offer audits.

Table 4-6: Budget, Expenditures, and Energy Savings for EBEW Program and other In-Scope LGP Programs, As of December 2012

	EBEW Program	PG&E LGP Programs	Statewide LGP Programs
Budget	$23,183,707	$92,336,645	$147,320,648
Expenditures (% of Budget)	98%	99%	86%
Gross Annual MWh Goals	40,893	123,343	195,131
Gross Annual MWh, Installed as % of Goal	209%	180%	138%
Gross Peak MW Goals	6.2	22.5	38.3
Gross Peak MW, Installed as % of Goal	198%	164%	118%

[38] Population of programs offering audits is based on program manager responses to the Stage 1 on-line survey.

Program Audit Activities

All types of energy efficiency audits completed under EBEW share some common characteristics. All audits document baseline conditions; they all provide energy efficiency recommendations; and all recommendations are presented to the customer in the form of an audit report. However, for each target market – residential, small commercial and municipal - the delivery and focus of the energy efficiency audits are different, as described below.

Small Commercial Market, Direct Install Audits

The small commercial direct-install portion of Program is implemented by two third party vendors (KEMA - BEST program and CESC – SmartLights program). One vendor hires contractors to perform the audits, while the other performs the audits themselves. Both third parties utilize vendors for the installation of measures.

The direct install audits offered to small commercial customers (< 200kW), through the BEST and SmartLights sub-programs, focus primarily on lighting and refrigeration measures. The direct install audit process is similar to cold calling, but is typically performed in person. The auditor approaches the business and requests permission to perform an audit to identify no-cost and low-cost energy efficiency opportunities. A business owner can also contact EBEW to request an audit. If the business agrees to an audit, the audit may occur immediately or can be scheduled for a later date. If the business declines the audit, the auditor continues going door-to-door to the neighboring businesses. While on-site, auditors use a checklist during the audit to make sure that common energy efficiency opportunities are not overlooked. Small commercial customers wishing to install one or more of the recommended direct install measures are required to pay a co-payment equal to 10 to 20 percent of the total cost of the energy efficiency upgrade. Table 4-7 below provides a list of measures included in the checklist audit.

Table 4-7: Small Commercial Energy Efficiency Measures Offered by Direct Install Audits

Lighting Measures	Refrigeration Measures	Other Measures
CFLs	Strip Curtains	HVAC
Hardwired Fixtures	Gaskets	Motors
Lighting Controls	Electronic Commutated Motors	Retro-Commissioning
T8s	Anti-Sweat Heat Controls	Boilers and Natural Gas
LED Exit Signs	Fridge/Freezer Fan Controls	Computer Power Management
LED Outdoor Lighting		Steam Traps
Linear FL Delamping		Vending Misers

Residential Market, Direct Install Audits

The residential direct install component of EBEW is implemented by a third party vendor (CYES). This vendor hires local youth to perform energy efficiency audits. Home energy audits provide customers with conservation strategies and energy efficiency education tailored specifically to their homes. Audits focus primarily on measures such as water heaters, faucet aerators, lighting and insulation. Residential direct install audits are offered to all residences, but are primarily targeted to low-moderate and moderate income residents whose incomes exceed the eligibility thresholds for Energy Partners, PG&E's low income energy efficiency program. While the audits are provided free of charge, residential customers wishing to install any of the recommended direct install measures are required to pay a co-payment equal to 10 to 20 percent of the cost of the upgrade. Table 4-8 below provides a list of lighting and other residential energy efficiency measures included in the in-home audits.

Table 4-8: Residential EE Measures Included in Direct Install Audits

Lighting Measures	Other Measures
CFLs	HVAC
Hardwired Fixtures	Pipe Wrap
Lighting Controls	Duct Sealing
Torchiere Exchanges	Floor, Attic And Wall Insulation
T8s	Domestic Hot Water
LED Exit Signs	Appliances
LED Outdoor Lighting	Window Film
	Fenestration

Municipal Market

EBEW provides free audits and benchmarking to municipalities to facilitate retrofit projects. The municipal portion of the EBEW Program is implemented by QuEST, with QuEST using their own engineers to perform the municipal audits. Targeted municipal facilities include buildings such as administration offices, libraries, and firehouses. These facilities are fairly small in number but have large equipment which requires a comprehensive and often complex audit. QuEST performed approximately 44 audits for municipal facilities during the 2010-2012 program cycle, compared to thousands of direct install audits performed for small commercial and residential customers.

Basic On-Site and Retrocommissioning Audits

QuEST performs both basic on-site and retrocommissioning (RCx) audits for municipalities to gather details about the baseline equipment operating at their facilities. During municipal audits, QuEST engineers collect not only the quantity of baseline equipment, such as the number of

lighting fixtures, but also the manufacturer and model number of the baseline equipment. QuEST engineers use an audit form to ensure that equipment is not overlooked. Once these data are collected they are used to calculate potential energy savings resulting from the energy efficiency upgrades. Recommended measures and estimated payback periods are based on these potential energy savings and, therefore, are dependent on the data collected during the audit. Out of the 44 audits that QuEST performed in the 2010-2012 program cycle, 31 were basic on-site audits and 13 were RCx audits.

Benchmarking

In addition to audits, the EBEW Program offers free benchmarking for municipal buildings in Alameda and Contra Costa Counties using the EPA Portfolio Manager. Portfolio Manager is an energy management tool that tracks and assesses energy and water consumption. This tool helps facilities set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance. The Program develops electric and gas usage baselines for government facilities within PG&E service territory by inputting customer electric and gas consumption data into the EPA's Energy Star Benchmarking Tool. This tool allows municipalities to track their energy consumption on-line.

Customer Data Tracking

Commercial Market

The SmartLights sub-program, administered by CESC, tracks customer data for all program participants who complete an audit, as well as those identified as potential audit candidates. The customer data stored include customer contact information, the source of the lead (besides the typical contractor lead, customers are also directed to the program from PG&E, and other programs such as Oakland Shines and the Green Business Program), and the status of the audit. CESC stores all of these data in a BEAM database, which is Access based. While CESC tracks these data for all audits going back approximately 10 years, they only provide QuEST customer data associated with completed projects.

The BEST sub-program, administered by KEMA, tracks customer data only for customers whose audit leads to an energy efficiency upgrade project. KEMA stores these customer records in an access database along with the measure recommendation data. KEMA only provides QuEST, the EBEW Program administrator, customer data associated with completed projects.

PG&E provides billing data to both CESC and KEMA for all customers who complete audits in order to estimate measure recommendation savings. According to the data collected during Stage 2 of this assessment, these data are provided only in hard copy form and stored in project folders.

Residential Market

CYES stores residential program customer data in an on-line portal. These data are stored for each audit separately in individual client reports and cannot be aggregated. Additionally, they are only stored for customers who implement one or more of the audit recommendations.

Municipal Market

For the municipal program, QuEST created their own relational database that houses customer, audit, and project data. The Program Manager reported it was beneficial to house all of these data in one database since it makes finding items, such as the cost savings, incentive amount, or payback period for a project, much easier. This database is also capable of outputting data as flat files which can be sent to PG&E for tracking purposes. Refer to Table 4-9 below for a detailed list of the municipal customer data stored in QuEST's database.

Table 4-9: Municipal Customer Data Tracked in the Database

Tracked Customer Data
Customer/facility identifier
Contact name
Phone number
Service address
Billing address
Utility Account Number
Utility Rate Code/Schedule
Business name

As stated above, PG&E provides QuEST with historical energy usage and account numbers for all municipal customers participating in the program. The utility delivers these data to QuEST twice monthly in a CSV file format.

Audit and Recommendation Data Tracking

One of the disadvantages of having third-party implementers is the potential loss of knowledge about the audits performed through the program. While QuEST has full knowledge of their auditing practices, their knowledge of the third-party implementers' audits is somewhat lost, as described below.

Small Commercial Market

As stated previously, KEMA and CESC (the program implementers), only provide QuEST with data from audits that lead to projects. Data for audits that do not lead to projects, due to either the lack of identification of energy saving opportunities or a customer's refusal to install

recommended measures, are not sent to QuEST. As a result, QuEST does not know the details of how or what the program implementer records for the small commercial audits that do not turn into projects. During the 2010-2012 program cycle there was no standardized format for audit data tracking for the EBEW sub-programs.

Residential Market

Similar to the small commercial audit tracking, QuEST only receives data from CYES for audits that lead to projects. QuEST does not receive any data on audits that do not identify energy saving opportunities or where the recommended measures are not implemented by the customer. Again, QuEST does not know the details of how or what is tracked for these audits that do not result in a project.

Municipal Market

As mentioned above, QuEST has developed their own database to keep track of all clients, project milestones, projected and installed energy savings, and paid incentives. The database is also used to manage project progress and audit results. While details about how the database was programmed are proprietary knowledge, QuEST reported that the database is more advanced than typical spreadsheet software. For example, the software's "dashboard" shows kW, kWh, and therm savings for implemented projects at a glance. The database was implemented in 2010 to track municipal audits and may eventually be used to track commercial and residential audit data.

Before an audit takes place, QuEST uses their database to keep track of their municipal customers and all instances of communication made with these customers. As part of the program, QuEST staff work closely with municipal staff to provide them information and technical assistance on energy efficiency and conservation programs and practices. QuEST staff also reach out to other municipalities that have not contacted the EBEW Program to discuss the energy saving services they offer.

Whenever possible, QuEST reviews previously performed audits for potential energy savings opportunities before performing an audit for a municipality. QuEST consolidates existing audits and planned projects from each city into a single database and financial model, incorporates potential solar and demand response activities, and determines aggregate savings and savings potential. In some cases these data can be used to pre-populate audit forms or can be used in lieu of conducting an additional audit. Table 4-10 below provides a list of data fields collected during municipal audits.

Table 4-10: Data Fields Collected During Municipal Audits

Data Fields Collected
Climate/region codes
Building type code or categorization
Building construction date
Conditioned square footage
Inventory of lighting in use
Inventory of HVAC in use
Hours of operation
Customer energy usage /billing history information
Existing/Baseline - End-Use
Existing/Baseline - Equipment Type
Existing/Baseline - Size/Volume
Existing/Baseline - Quantity

After an audit has been performed, QuEST program staff enter the audit data into the database so they can be stored electronically. The database has been programmed to identify potential data entry errors. For example, if an incorrect zip code is entered into the database, the software will flag the zip code for review. Another beneficial feature of the database is that it is capable of linking files to the project. For example, engineering calculation spreadsheets can be linked to a project's database entry. These archived spreadsheets are then accessible by loading the project's details.

After an audit has been completed, program engineers calculate potential energy savings and present a report to the customer that recommends a number of energy efficiency measures. If the customer decides to implement one or more of the recommended measures, then the audit turns into a project.

It is interesting to note that in some instances it is necessary for QuEST to refer to an older (and less sophisticated) version of their database. This is necessary when they need to look up municipal audit data from a previous program cycle since the new database did not import project data from previous program cycles. Since the new database launched in 2010, project data from previous program cycles are stored in the older version of the database. Municipal projects are considered open until all recommendation measures are installed or declined. It is possible that a project may remain open for multiple years and thus accessing historical audit data is essential so that a new audit does not have to be performed.

Audit Follow-Up Activities

Small Commercial Market

One of the main benefits of direct install audits is the potential for the immediate installation of recommended measures. As such, KEMA and CESC usually present their recommendations to the business owner immediately after the audit has been completed. Depending upon the audit recommendations and the business owner's priorities, measures can be either installed right away or scheduled for a later date. Should a business owner decide to install any of the measures recommended by the audit, the business owner is responsible for a co-pay (between 10 and 20 percent) to offset the cost of the audit.. However, there is no charge to the customer for audits that do not identify any energy saving opportunities or in instances where the customer declines installation of any of the recommended measures. After every completed audit, a survey is delivered to the customer to gather feedback on the customer's experience with the program.

Residential Markets

Residential direct install audits are promoted differently than commercial audits. CYES does not typically solicit residential audits door-to-door and the home occupant usually communicates with CYES prior to the direct install audit. While this communication increases the chances that the resident will choose to install recommended measures offered during the audit, the customer has the right to refuse to install any of the recommended energy efficiency measures. Similar to small commercial direct install audits, there is a co-payment equal to 10 to 20 percent of the cost of the recommended measures if the homeowner chooses to install a recommended measure. Depending on which measures are identified during the audit, the installation of the recommended measures may occur at the time of the audit or may be scheduled for a later date. There is no charge for the audit if the homeowner declines to install any of the recommended measures or if no energy saving opportunities are identified during the audit. After every completed audit, a survey is delivered to the customer to gather feedback on the customer's experience.

Municipal Market

As mentioned above, QuEST offers two types of audits to municipal customers: basic on-site and RCx. While no two audits are the same, QuEST's presentation of audit findings to customers does not vary significantly between audits and thus the data presented for basic on-site and RCx audits are very similar. Table 4-11 below provides a list of the data provided to each customer after an audit has been performed. As this table shows, QuEST presents municipal audit recipients with detailed recommendation data, including the estimated project cost and payback period for each measure which helps customers make an informed decision regarding the implementation of the recommended measure.

Table 4-11: Data Provided on Recommended Energy Efficiency Measures for Municipal Basic On-Site and Retrocommissioning Audits

Data Presented After an Audit
Measure Recommendation - End-Use
Measure Recommendation - Equipment Type
Measure Recommendation - Size/Volume
Measure Recommendation - Quantity
Measure Recommendation - Annual Energy Savings
Measure Recommendation - Natural Gas Therm Savings
Measure Recommendation - Rebate Size (Dollars)
Measure Recommendation - Payback
Measure Recommendation - Cost
Measure Recommendation - Incremental cost

After a municipal audit has been completed and QuEST has completed their analysis, all recommended measures and engineering calculations are sent to PG&E for review and approval.[39] If PG&E approves the recommended measures, EBEW sets up a meeting with the customer to deliver the project agreement. Again at this point there is no charge for the municipal audit and there is no obligation to install the recommended measures.

Every time QuEST contacts a customer, program staff creates an event in the database. For example, program staff would create a phone event in the database for every phone call made to the customer. As such, customer details, including when customers are contacted for follow-up, are tracked in the database.

Referrals to Other Programs

Commercial Market

Both the SmartLights program and the BEST program often refer customers who take an audit to other energy efficiency programs offered by PG&E. SmartLights tracks these referrals in an audit notes field and BEST tracks these referrals in an excel database. Neither program track the outcome of the program referral.

Residential Market

The residential sub-program provides reports to all customers who completed an audit and install one or more recommended measures. In addition to the summary of installed measures, these reports refer customers to other applicable utility programs. The outcomes of these referrals are not tracked.

[39] This process can take 2 to 4 weeks.

Municipal Market

When applicable, customers are referred directly to other programs that may provide financial incentives and technical assistance. These programs include Enovity (boilers), SmartAC, EnergySmart Grocer, Cool Biz, and Global's Comprehensive Food Processing Programs. Referrals to other programs are tracked in QuEST's database, but the outcome of the referral is not tracked by QuEST.

Project Reporting

Commercial Market

QuEST, as the Program administrator, sends the project details they receive from the third-party implementers, KEMA and CESC, to PG&E to fulfill program reporting requirements. All files sent to PG&E are flat files.[40] The details of what is included in these flat files was not provided to the evaluation team.

Residential Market

QuEST, as the Program administrator, sends the project details they receive from CYES, the third-party implementer, to PG&E to fulfill program reporting requirements. All files sent to PG&E are flat files, however the details of what is included in these flat files was not provided to the evaluation team.

Municipal Market

The database that QuEST built for its municipal audits is capable of tracking audit data and producing files that fulfill the necessary PG&E reporting requirements. The database was built from the ground up with the intention of creating "flat files" that can be directly submitted to PG&E. According to the EBEW program manager, the database developed for this program is primarily used for reporting purposes, and can generate a benchmark, savings report, or "event" with one click.

Analysis of Stage 2 Data Received

In addition to the data request spreadsheets that were completed for each of the EBEW sub-programs; a number of datasets were delivered to the evaluation team in response to the Stage 2 data request. An assessment of the data received is provided below.

[40] A "flat file" is a text file which usually contains one record per line. Within such a record, the single fields can be separated by delimiters (e.g. commas or semicolons) or have a fixed length. In a flat file, there are no structural relationships between the records.

Commercial Market

According to the data received for the commercial EBEW sub-programs there is a good deal of customer, audit and recommendation data retained in electronic databases. The sample of databases provided for this evaluability assessment allowed the evaluation team to verify a portion of the tracked data. The primary concern with these data is that the data are only tracked for implemented recommendations and data from all non-implemented recommendations are not tracked or stored electronically.

1. SmartLights Final Invoicing Database – this database contained records for all audit recommendations that had been implemented and invoiced for during the 2010-2012 program cycle. This database contained a detailed measure description, estimated kWh and kW savings, installation date, rebate amount, program year and the project status for each recommendation. This database contained 13,829 records, corresponding to 1,945 completed projects. There were 6,123 unique audit recommendations which could potentially be collapsed, but it would require a great deal of manual effort. This large number of unique audit recommendations would significantly increase the difficulty of evaluating this portion of the EBEW Program. Future evaluation potential of such a program could be improved by creating a standardized measure description field and including an additional details field that holds the details that make the individual recommendations different.
2. SmartLights Audit Database - this database contains records for audits and audit leads going back as far as 2004. All records in this database include customer data, source of lead, and date of program enrollment. For records where an audit has been completed, data also include estimated kWh and kW savings (site-level, not recommendation level), cost of measure installation, rebate, payback period, date the audit was completed, date the audit findings were presented to the customer, date of the customer response, status date, the customer response and the project status. This database contained 3,854 records, of which 3,751 had a status date in 2010-2012. This database did not contain any detailed measure descriptions.
3. BEST Database - this database contains records for all audit recommendations that had been implemented and invoiced for during the 2010-2012 program cycle. This database contained a detailed measure description, quantity installed, estimated kWh and kW savings, rebate amount, measure cost, customer building type and climate zone for each implemented recommendation. This database contained 1,719 records, corresponding to 944 unique vendor ids (assumed to be a site id). This database contained a total of 23 unique audit recommendations. The lack of audit recommendation data for audits that do not turn into projects would limit the scope of an evaluation of this program component.

Residential Market

According to the data received for the residential sub-program, there is a limited amount of customer, audit and recommendation data retained in an on-line portal. The key data elements tracked include: customer name and contact information, date of audit, measure recommendation and savings estimates for the recommended measures that are implemented. No database was delivered for this program since the audit and recommendation data are stored in client reports and are not tracked in aggregate for this program. As a result, the evaluation team was unable to verify the audit data for the residential program. According to CYES, who implements this portion of the program, the on-line portal is only set up to compile and email out client reports and is not capable of aggregating data across customers. The individual client reports include a summary of installed measures and additional measure recommendations that could be installed through other programs.

Municipal Market

A single spreadsheet was delivered to the evaluation team containing data for the basic and RCx audits offered to the municipal market through the EBEW program. This Excel spreadsheet contained the audit type, end-use, equipment type, size and quantity of the recommended measure, and the resulting kW, kWh and therm savings. While the evaluation team requested data on all audits performed, the municipal market sub-program only tracks audits that turn into projects and therefore the Stage 2 data assessment was only representative of the fraction audits that resulted in a project. The number of audits conducted that did not result in a project is unknown because these data are not tracked.

Table 4-12 below shows the data elements reported to be tracked for EBEW municipal audits based on data collected via the Stage 2 data request spreadsheet. This table indicates which data elements were verified based on the data provided to the evaluation team. As this table shows, a number of fields that were reportedly stored in the database were intentionally not provided to the evaluation team to avoid confidentiality issues.

Table 4-12: Data Elements Stored in Program-Wide Excel database

Data Type	Data Element	Evaluation Verified
Site information	Customer contact info (business name, address, account number), rate schedule	Not requested due to confidentiality concerns
	Hours of operation, inventory of lighting and HVAC equipment	Not requested due to confidentiality concerns
Audit information	Date of data collection and report	No
Measure recommendation	Recommendation end-use	Yes
	Size and quantity	Yes
	Annual energy savings (kWh, Peak kW)	Yes
	Cost	No
	Rebate amount	No

The municipal recommendation database cut provided for this evaluation included data for 35 audits (both basic and RCx). In total, there were 15 unique equipment type descriptions for basic audits and 16 unique equipment type descriptions for RCx audits, which are shown in Table 4-13. Estimated energy and demand savings were not provided for all equipment recommendations and the equipment type descriptions are lacking the detail needed for evaluation purposes. It is likely that more descriptive recommendation data are available; however they were not provided to the evaluation team and thus have not been verified as part of this evaluability assessment.

Table 4-13: Data Elements Stored in Program-Wide Excel database

Audit Type	Equipment Type	Average kWh Savings	Average kW Savings
Basic	Add VSD	5,332	
	Boiler	1,801	
	Cooling tower retrofit	30,229	2.0
	Furnace	1,394	2.0
	Install VFD	49,746	3.0
	Install VFDs on pumps	77,796	4.0
	Isolation dampers/VFD on fans	378,938	
	Occupancy sensors	4,720	1.0
	Photocell	814	
	Replace halogen with CFLs	2,584	
	Replace halogen with LED	10,249	
	Replace metal halide with induction	1,336,085	115.5
	Vending miser	1,612	
	Water heater	-	
	Window film	716	
RCx	Boiler lockout	-	
	Change VAV min stop	28,508	2.0
	Chilled water reset	3,317	
	Controls Scheduling	39,402	
	Controls-air flow reduction	215,918	
	Controls-reset	8,629	8.0
	Controls-scheduling	11,306	
	Economizer	15	
	Economizer repair	6,362	
	HVAC	6,696	
	HVAC tune-up	7,438	5.0
	Repair controls on AHUs	81,667	
	Repair economizer	6,204	
	Scheduling	16,115	
	VAV min setting	798	
	Enable economizers	4,901	

Stage 1 to Stage 2 Data Comparison

The data collected for this program during the Stage 1 on-line survey were, for the most part, consistent with the data collected in Stage 2. One thing that was not apparent from the Stage 1 survey data was that the EBEW was comprised of four sub-programs. Each sub-program offered their own unique audits and tracked data separately and in incompatible formats, which complicates the evaluation of this program. It was also apparent, from the Stage 2 data received, that the majority of audit data are only tracked for the fraction of audits that eventually turn into projects.

Evaluability Assessment of Program

Based on the data collected and analyzed for the EBEW Program, it appears the data tracked for the 2010-2012 program cycle would be insufficient to conduct an evaluation of all audits delivered through the EBEW Program. The EBEW Program is comprised of four sub-programs, each of which provides distinct audits with independent data tracking. Evaluating this program would require individual evaluation activities to be completed for each of the EBEW sub-programs. For two of the sub-programs, the audit evaluation activities conducted would be limited to the audits that eventually turned into projects (due to data availability). Additionally, for one of the sub-programs, the large number of unique audit recommendations increases the complexity of conducting an evaluation and possibly limits the applicability of the evaluation findings. The lack of aggregate audit data tracking within the residential sub-program would require that recommendations be mined out of individual client reports. This would be a time consuming endeavor.

4.1.3 Riverside County Partnership (SCG 3632)

Introduction

The Riverside County Partnership Program is a LGP program that aims to reduce electricity and natural gas consumption at municipalities located within Riverside County. This partnership was launched during the 2006-2008 program cycle between SCE and the County of Riverside, and SCG, the newest partner, joined in 2010. This program is a non-resource program whose goal is to build an infrastructure that delivers cost-effective energy efficiency projects. This program provides a comprehensive outreach and education element, with the goal of raising partner and customer awareness about the benefits of energy efficiency. This program helps the County in two ways: 1) by providing audits, and 2) by providing technical assistance. The audits identify energy saving opportunities (both electricity and gas) for the County's municipalities and the energy efficiency measures identified in the audits "act as a roadmap" for customers. Projects adopt a comprehensive approach by including retrofits and demand side management alternatives, including demand-response and distributed generation.

Program eligibility is restricted to Riverside County municipal facilities. Audits available through the program include basic on-site audits, retrocommissioning audits, and steam assessments (gas side only). The type of audit delivered depends on the type and the needs of the facility. Program audits are implemented by the County of Riverside via contractors and

engineering consultants. The County has contracts with two external contractors, Enovity[41] and Energy Band Group, and two internal contractors, Airometrix Mfg., Inc. and Spirax Sarco.

Since this program is a non-resource program, all incentives are paid by core programs, but the program has a technical assistance budget for funding the audits. All energy savings resulting from projects identified through an audit are counted towards core program savings. The utilities work with the County of Riverside internal program staff to allocate appropriate partnership incentives for qualified projects. They also collaborate with all applicable demand side management programs to ensure that agencies can include incentive information in the life cycle cost analysis to support any financing requests, where applicable.

The Riverside County Partnership program is an average size LGP program for SCG, making up 13 percent of SCG's total LGP budget for the nine programs who report offering audits. Table 4-14 below shows that this program, along with the rest of the SCG LGP programs, claimed no electric or gas savings during the 2010-2012 program cycle.

Table 4-14: Budget, Expenditures, and Energy Savings for the Riverside County Partnership and other In-Scope LGP Programs, As of December 2012

	RCP Program	SCG LGP Programs	Statewide LGP Programs
Budget	$441,178	$3,431,406	$147,320,648
Expenditures (% of Budget)	53%	51%	86%
Gross Annual MWh Goals	0	0	195,131
Gross Annual MWh, Installed as % of Goal	n/a	n/a	138%
Gross Therms Goals	0	0	-13
Gross Therms, Installed as % of Goal	n/a	n/a	-2451%

Program Audit Activities

Audits available through the program include basic on-site audits, retrocommissioning audits (RCx), and steam assessments (gas side only). The type of audit delivered depends on the type of facility and the needs of the facility. The basic audit uses an internal audit tool to collect site information such as: facility hours of operation and load factors of baseline equipment. It is a relatively simple tool that is used by account executives, as well as interns. The basic audit tool is either handed to the customer when the auditor visits the site or is emailed to the customer. The RCx audit uses third party contractors hired by the Partnership. One of these contractors, Energy Band Group, utilizes their own engineering staff to perform audits using an internal tool.

[41] While third-party contractors are usually selected on a bid process, Enovity was selected as a contractor to perform RCx audits for this program because Enovity was already in contract with SCE to perform core program audits.

Steam assessments are the third form of audit available through the program. These assessments are completed by third party steam assessment vendors contracted through SCG. While the program utilizes these third party vendors for the audits, customers typically provide their own installation vendors for any audit recommendations that result in projects.

Customer Data Tracking

The Riverside County Partnership has an agreement with all participating vendors to ensure the confidentiality of customer data. Customers must sign letters of consent to release data prior to it being transferred or the County fills out a letter of authorization to move data from a vendor to the County (via a secured file transfer site).

Customer-level energy consumption data are provided by the utility in the form of a CSV or Excel file. The program uses these data to characterize the total load of a facility, as well as to break out consumption of each piece of equipment and create a load profile. Consumption data are referenced in most audits, but these data are not specifically documented or placed onto the shared drive.

Customer data from program applications are stored in a database that is similar to a CRM system. These are used along with measure and consumption data from the audits to calculate incentives and process the different phases of the application.

Audit Data Tracking

Tracking of data collected during an audit has been relatively inconsistent to date, with some improvements and standardization taking place near the end of the 2010-2012 program cycle. Audit data are stored in a number of different file types and in a variety of locations. Data from basic audits are typically saved on the Program Manager's computer.[42] Data from audits that are conducted by a third party vendor are typically emailed to the program administrator and stored internally on a shared drive. Data from RCx audits are stored as Excel spreadsheets on the shared drive. Data from steam assessments are typically sent by the third party contractors as PDF files, which makes accessing and analyzing those data more difficult than data delivered within spreadsheets or databases.

According to the Program Manager interviewed for this evaluability assessment, the program has not made significant changes to the way audit data are stored since program inception. Collected audit data are kept for a minimum of three years. The historic data serve as a source of contact information for program outreach to county facilities that have not expressed interest in pursuing energy efficiency projects in the past but that may express interest in the future. Current efforts

[42] In some cases this data is stored on a shared drive, but not consistently.

to standardize and organize these data on the shared drive are targeted at making it easier for the Program Manager to identify and follow up on outreach opportunities.

Data from audits that have not led to active projects are not consistently tracked. These audits are stored on the Program Managers computer and not on a shared drive. Data from the audits are not aggregated across customers for analytical purposes. The program does not use the data to look for general trends in program participation. Audit data are primarily used to calculate potential energy savings resulting from the implementation of recommended measures. Calculations based on the audit data help validate the program approach and provide reassurance that the correct measures are being identified and recommended to customers.

Audit Recommendation Tracking

In the case of a basic audit, the audit form organizes recommended Energy Conservation Measures (ECMs) into short term and long term measures and also specifically identifies ECMs associated with operations and maintenance. Customer name, account number, and report date are included in the report, which is presented to the customer by Sempra. Annual gas usage and gas equipment are listed in the context of presenting load balance results. Data on existing operating conditions are presented in the context of recommended ECMs.

Recommendations from RCx audits are similarly structured and tracked. The audit report provides a project description and recommendations organized by specific retrocommissioning and retrofit opportunities. Customer name, address, and report date are included in the report, which is presented by Enovity. The report also includes a verification plan and project schedule.

Steam Assessments are presented by Airometrix Manufacturing Inc. and by Spirax Sarco, which are contracted by SCG to perform the steam system audits and steam trap surveys. The report includes baseline data on boiler operation, steam generation, steam distribution, and steam recovery, as well as characterization data on facility square footage and hours of operation. A table is included in each steam assessment that contains the recommended ECM along with their estimated therm savings, water savings, and CO_2 emissions reductions. For each ECM an estimate of annual cost savings, an implementation budget, a simple payback period, and whether the measure would be eligible for an SCG incentive is also provided.

Audit Follow-Up Activities

Findings from an audit are presented to the customer in the form of a summary of the data collected during the audit, a series of recommended energy efficiency measures, and estimates of the potential savings associated with implementing the recommended measures. Once audit findings have been approved by the Program Manager, they are typically given to the customer within the same week, either in person, by email or phone. A meeting with the customer is

usually set up for approximately one month after the delivery of the audit findings, to go over them in person.

The energy efficiency measures identified in the audit act as a "roadmap" for the customer. The customer is shown no cost and low cost recommendations as well as longer term recommendations that may be achievable at higher cost. Follow up with the customer is conducted on an as needed basis, rather than according to a specific schedule. Follow up activity is not specifically tracked in a database or spreadsheet, but is mentioned by the Program Manager in regular update meetings with the utility.

Referrals to Other Programs

Because this program is a non-resource program, the audits typically lead to a referral to a utility rebate programs and, in some cases, solar thermal and distributed generation programs. However, according to the program manager, the program does not track the uptake of referrals to other utility programs.

Project Reporting

During the 2010-2012 program cycle, there were no project reporting requirements in terms of data. Most of the reporting is fairly informal. The program manager has monthly update calls with SCG and they go through the audits that have been conducted at that time. Most of the data from the current program cycle are kept either locally, on a partnership staff member's computer, or on a shared drive. The data are not aggregated but there is talk of doing this in the future.

Analysis of Stage 2 Data Received

The Riverside County Partnership Program did not complete the data request spreadsheet as their data are not stored in a database and thus they felt the template was not appropriate for their program.

The data received as part of the Stage 2 evaluability assessment included the following files:

1. **Basic Audit Report**. This report provides a description of the recommended energy conservation measures (ECMs) that were identified at the facility during the walk-through audit and an overview of the energy consuming systems at their facility. The ECMs are broken down into short and long term ECMs. Estimated incentives and CO_2 reductions are provided. The report also directs the customer to contact their Account-Executive before implementing savings measures.
2. **RCx Assessment Scoping Brief**. This report provides a project description of the proposed energy efficiency opportunities that were identified during the RCx assessment. The project description provides details on the proposed optimized control and low cost

energy retrofit measures, including the projected electricity and therm savings, the estimated costs and payback periods. It also outlines the incentives available from the utility to offset the cost of the work and the project schedule and verification plan.

3. **Steam Assessment Best Practices Audit Report**. This report is a detailed summary of audit findings and energy savings estimates (59 pages long) and a complete listing of the measure recommendations resulting from the steam assessment audit. Recommendations can be either Energy Conservation Measures or Operational and Maintenance Measures. For each recommended measure, the report includes the annual therm, water, cost and CO_2 savings, an estimate of the cost of implementation, the estimated payback period and whether or not the measure was eligible for an SCG incentive. All of these recommendations are prioritized in an action plan provided in the report. The audit report also contains results from a Steam Trap Survey conducted while the engineers were on-site.

Stage 1 to Stage 2 Data Comparison

The data collected for this program during the Stage 1 on-line survey was generally consistent with the data collected in Stage 2. It was not apparent from the Stage 1 survey data that the program was comprised of three distinct audit types that function independently from one another and store their customer and audit data differently. It was also not apparent from the data collected in Stage 1 that audit data for non-implemented recommendations are not tracked in a consistent manner.[43]

Evaluability Assessment of Program

Based on the data collected for this program, it appears as though the current program data tracking is insufficient to conduct a comprehensive evaluation of the audits delivered through this program. The majority of the audit data retained are kept in an ad-hoc manner on program staff members' computers. It is possible that some recommendation data could be mined out of the various audit reports that are saved locally or, in some cases, saved to a shared drive.

4.1.4 Data Center Energy Efficiency (SCE-TP-010)

Introduction

The Data Center Energy Efficiency Program (DCEEP) is Third-Party program offered through SCE that offers free complete audit and project identification, in addition to cash incentives for completing energy-saving retrofits of existing equipment or systems in data centers and other IT-related facilities. The program is administered by Willdan Energy Solutions. They offer both

[43] The program manager interviewed indicated that she often stores files location on her desktop but that these files are not in a format that is intended ever to be shared.

email and investment grade in-depth on-site audits which result in audit reports. These reports identify energy efficiency opportunities, along with the implementation costs and available incentives. The program recruits customers by reaching out to program vendors. Vendors inform customers of available incentives and help them fill out incentive application forms. This program has an in-house marketing team that creates marketing materials. The program manager also performs outreach while attending the quarterly meetings of various trade ally groups.

Program participation consists of two major phases: the Project Application (PA) phase and the Installation Report (IR) phase. In the first phase, an audit is conducted by Willdan Energy Solutions who then helps the customer with the application process. The application is then sent to SCE for review. Applications that pass SCE's review are then forwarded to Intergy Corporation for inspection and review of the energy savings calculations. The second milestone occurs once the customer fully commissions the new equipment. Intergy returns to inspect the installed equipment and review the final energy savings calculations. The program does not use outside contractors to perform program audits, however due to a large number of audits coming down the pipeline, the program manager reported plans to train contractors with data center audit experience to assist with the audits.

As part of the incentive program process, energy savings and incentives are estimated at the beginning of the application (PA phase) and verified after the retrofit has been completed (IR phase). A variety of factors can affect the energy savings and incentive including differences in installed equipment or a change in operating hours.

As of May 2011, when the current program manager started at SCE, the program was not achieving its energy savings goals. However the program has since gotten back on track. Higher than expected energy savings have been achieved by the program managers involvement on some large projects. Because program goals are based on energy savings rather than number of projects, there is no minimum number of audits that need to be completed.

Table 4-15 below presents the budget and expenditures for the DCEEP and other in-scope programs. As shown in the table below, the budget for the DCEEP is small relative to the other third party programs in SCE territory (less than four percent of total SCE 3P program budget). Energy and demand savings goals were relatively small too (less than two percent). This table also shows that through December 2012 the program energy and demand savings have exceed budget expenditures.

Table 4-15: Budget, Expenditures, and Energy Savings for the DCEEP and other In-Scope 3P Programs, As of December 2012

	DCEEP	SCE 3P Programs	Statewide 3P Programs
Budget	$4,751,219	$121,751,608	$382,131,938
Expenditures (% of Budget)	78%	60%	80%
Gross Annual MWh Goals	8,774	495,731	1,014,541
Gross Annual MWh, Installed as % of Goal	94%	36%	71%
Gross Peak MW Goals	0.6	82.9	167.9
Gross Peak MW, Installed as % of Goal	162%	39%	67%

Program Audit Activities

In order to participate in the program, a customer prepares and submits a Project Application (PA), which includes customer information, site information, data regarding specific measures to be installed and estimated energy savings. SCE reviews the application and forwards the application to Intergy Corporation for inspection and review of the PA energy savings calculations. Intergy then reviews the PA form and performs an audit to verify baseline equipment.

DCEEP offers email surveys and in-depth on-site audits; however, the program does not deliver both types of audit for a given project. A customer will receive either an email survey or an in-depth on-site audit based on the program's determination of which audit best fits the customer's needs. During the audit, program staff inquire into the customer's budget so as to target recommended measures within a feasible range. Once the customer fully commissions the new equipment, Intergy returns to inspect the installed equipment, review the paperwork, and finalize the energy savings calculations.

As part of the program process, energy savings and incentives are estimated at the beginning of the application (PA phase) and verified after the retrofit has been completed (IR phase). A variety of factors can affect the energy savings and incentive, including differences in installed equipment or a change in operating hours. The Program Manager follows up once a month to determine if any changes are anticipated to the energy savings and incentive and makes adjustments to the program tracking data accordingly.

Customer Data Tracking

As part of developing a project file and its associated measure recommendations, SCE provides a year's worth of customer billing data to program staff, summarized by month. The billing data are provided to program staff in a PDF file or an Excel spreadsheet.

Audit Data Tracking

Program staff take handwritten notes while performing an audit. These notes are typed up and formalized as audit findings after the site visit is complete. Calculations are performed using Excel spreadsheet templates and eQuest. Additionally, mechanical drawings or configurations of equipment are stored on a server with the calculations.

While the program has no specific file type requirements for recording and filing audit data, the Customer Relationship Management (CRM) system only accepts electronic files. Thus it is convenient to store audit data electronically in Excel files. EQuest files are also generated and saved as part of the modeling component of the program for savings estimation.

The forms and Excel spreadsheet calculations that are used for data collection and storage have been approved by SCE and EEGA. Each spreadsheet is based off of a template organized by solution codes, and while the spreadsheets do not have any built-in quality check mechanisms per se, the Program has an in-house process that involves a more senior engineer performing quality checks on an engineer's work.

Audit data are stored on a central server, which can be accessed by all program staff members. The change to the file storage system was implemented in January 2010 to make locating audit files easier. The current system of storing audit information in Excel spreadsheets on a shared server is satisfactory to Program staff. There are no existing plans to change the structure of the audit forms or data storage systems looking forward.

Audits that do not result in projects[44] are tracked by the program, but this tracking is on an ad hoc basis. If a customer refuses an audit or if there is no follow up for three months, then the customer is no longer actively tracked.

The Program Manager communicates with SCE on a monthly basis to provide an update on how many customers were contacted, how many audits were performed, and the specific calculations associated with those audits. These data remain on the server without any scheduled deletion.

Audit Recommendation Tracking

Data collected during the audits are a mixture of observations of existing conditions and notes on how program savings may be achieved for the customer. These data help illustrate the customer's current energy usage and how much energy the customer can save. Savings calculations performed by Intergy are reviewed by a third party, and after the PA review or IR review document is finalized, the document is uploaded to SCE's CRM system.

[44] A project is defined as the implementation of one or more audit recommendation.

The formation of recommended measures is dictated, in part, by the length of the relationship between the customer and the program. Audit data for customers that have been associated with the program for a longer time generally contain many energy efficiency measures and are used as project roadmaps for 3-5 years. In cases where the relationship between the customer and the program is likely to be short term, audit data are treated as short-term snapshot, and recommended measures are developed around this view.

While the Customer Relationship Management (CRM) solution used by the Program provides some necessary file sharing capability, it was not designed with file sharing in mind. The CRM tools are usually used for sales teams, but SCE has altered the tool to be used for sharing project files. One of the consequences of using a CRM tool as a file sharing solution is upload speed of documents is slow.

Audit Follow-Up Activities

Once an audit has been completed, the Program delivers a report containing recommendations to the customer in 3 to 6 weeks, depending on the availability of engineers. Typically recommended energy efficiency measures include: uninterruptable power supply replacements, variable frequency drives, storage consolidation, and air flow tiles. The audit findings report includes return on investment (ROI) calculations by measure, as well as combined measures, in an attempt to achieve a ROI that is low enough to meet the customer's threshold. The customer and Program staff jointly review audit findings and determine which projects to address in the short-term and which projects may be addressed in the longer term depending on available budget. Program staff also assist customers with applying for SCE rebates.

Once the report has been delivered, the program follows up with the customer on a regular basis to determine the status of the project. Depending on the needs of the customer, these meetings may be weekly, biweekly, or monthly.

Referrals to Other Programs

No mention of referrals to other programs was made, nor did they report tracking any such data.

Project Reporting

The Program Manager talks to SCE on a monthly basis to update them about how many customers were contacted and how many audits were performed.

Calculations performed by Intergy are reviewed by a third party. After a PA review or IR review document is finalized, the document is uploaded to SCE's CRM system. The CRM system only accepts electronic files, but there is not a file type requirement. Excel and eQuest are the primary file types used to capture the audit data and calculate recommended measure savings.

Analysis of Stage 2 Data Received

DCEEP completed the data request spreadsheet for both the in-depth and email surveys they offer through the program. They did not provide a cut of the recommendation database as recommendation data are stored in separate Excel or eQuest files that cannot be queried as a single database. Individual audit reports were provided for a significant portion of the audits completed during the 2010-2012 program cycle. These audit reports contained the following data elements:

- **Executive Summary** which included description of site, audit conducted, measure recommendations, and energy and savings overview (including estimated energy, demand and electric cost savings, as well as total estimated project cost and incentive funds available).
- **Detailed Explanation of Energy Efficiency Measures Recommendations**
- **Baseline Site Information** including square footage of site, approximate Hours-of-Operation, Climate Zone and historical billing data.
- **Benchmarking**
- **Incentives and Financing Options**
- **Project Process and Timeline**

Stage 1 to Stage 2 Data Comparison

The data collected for this program were, for the most part, consistent between Stage 1 and Stage 2. It was not apparent from the Stage 1 on-line survey response that audit data were not stored in an aggregated database. Additionally, although some audit data were reported to be stored in individual electronic (Excel) files, these files were not provided to the evaluation team and thus were not verified. Individual audit reports containing audit recommendations were only provided for audits that resulted in a project during the 2010-2012 program cycle.

Evaluability Assessment of Program

Based on the data collected for this program as part of this evaluability assessment, it appears as though the current program data tracking is insufficient to conduct a comprehensive evaluation of the audits delivered through this program. No program-wide tracking database exists. Audit data are stored in a series of individual Excel and eQuest files and only summarized in an audit report. The evaluation team was provided sample audit reports, but not the Excel and eQuest files, and therefore, only audit report data were reviewed. Additionally, data on audits that did not turn into projects[45] were not retained. It is possible that recommendation data for audits that

[45] A project is defined as the implementation of one or more audit recommendation.

did lead to projects could be mined out of the various audit reports (or Excel files if they contain the necessary data), however that process would require a great deal of manual effort for each audit conducted.

4.1.5 SDG&E California Department of Correction Partnership (SDG&E 3123)

The 5th program selected for the Case Study assessment was SDG&E's California Department of Corrections Partnership Program. This program is part of a statewide Institutional Partnership (IP) program which is a joint effort between the California Department of Corrections and Rehabilitation (CDCR) and the four California IOUs. It was created to identify energy efficiency projects that will lead to a sustained energy consumption reduction at prisons and other CDCR-owned facilities. This program also assists the CDCR in identifying incentives and other funding available for the implementation of energy efficiency projects.

The SDG&E CDCR program works with nine ESCO contractors statewide who perform investment grade audits at CDCR faculties. The data collected during these audits are used to estimate the energy savings, costs, and payback periods for each of the energy efficiency opportunities identified during the audits.

The CDCR program manager filled out the evaluations data request spreadsheet, but granted no interview as no projects[46] were completed during the 2010-2012 program cycle within the SDG&E program. A follow-up phone conversation with a CDCR staff member clarified that a single audit was conducted within the 2010-2012 program cycle. A number of energy efficiency recommendations were provided to the customer. However, due to the fact that this facility was primarily powered by a Cogeneration facility located on-site, SDG&E declined to offer incentives to this facility for the implementation of the energy efficiency upgrades. As a result, no energy efficiency projects were undertaken.

The CDCR program made up approximately 14 percent of the SDG&E budget for all IP programs reporting to offer audits,[47] but less than 1 percent of the statewide budget for IP programs. As shown in Table 4-16 below, this program, along with the other SDG&E IP programs, had no energy savings or demand reduction goals and reported no energy savings for the current program cycle.

[46] A project is defined as the implementation of one or more audit recommendation.

[47] Based on the Stage 1 on-line survey responses.

Table 4-16: Budget, Expenditures, and Energy Savings for CDCR Program and other In-Scope IP Programs, As of December 2012

	CDCR Program	SDG&E IP Programs	Statewide IP Programs
Budget	$665,975	$4,632,909	$93,030,536
Expenditures (% of Budget)	30%	58%	87%
Gross Annual MWh Goals	0	0	194,491
Gross Annual MWh, Installed as % of Goal	N/A	N/A	79%
Gross Peak MW Goals	0	0	28
Gross Peak MW, Installed as % of Goal	N/A	N/A	95%

Since no program manager interview was conducted for this program, little is known about the audit activities beyond what was provided in response to the Stage 1 on-line survey. The recommendation data provided for the single audit appeared to be complete. It is possible that if additional audits were conducted by this program in the future that an evaluation of the audit activities could be completed.

4.2 In-Depth Analysis

This section presents detailed findings from the 25[48] programs that were included in the Stage 2 Evaluability Assessment analysis.

4.2.1 Data Requested

As previously described, the programs included in the Stage 2 in-depth assessment were sent a data request packet that included: 1) a spreadsheet requesting information on customer data tracking, audit data storage, recommendation tracking, and referral tracking; and 2) a request for a cut of the recommendation data provided to audit recipients from the program's recommendation database. Since not all programs use a conventional database like SQL, the data request allowed programs to substitute sample audit reports that contain recommendations in the absence of a database.

The data request packet sent to each of the 25 in-depth assessment program managers consisted of an Excel workbook containing instructions on the data request, a data dictionary, and a separate data request tab for each audit type reported to be offered based on the program managers' on-line survey responses (Stage 1). The data request workbooks contained anywhere from one to five tabs, representing the unique audit offerings of each of the programs.

[48] The five case study programs described above, along with 20 additional in-depth analysis programs.

4.2.2 Data Received

Table 4-17 below shows the distribution of the 25 programs included in the Stage 2 in-depth assessment across the four utilities and three program types. Out of the 25 programs, for which data were requested,[49] 22 completed and returned the data request spreadsheet, and eight provided a database extract containing a sample of the audit recommendation data that are stored by the program. Although sample audit reports were not requested, 11 programs provided them to the evaluation. Eight of these 11 were provided in lieu of the recommendation data requested and three were provided in addition to the recommendation data requested. Two programs (UCCSU and SaveGas) did not provide any data in response to the request, citing their programs did not conduct any audits during the 2010-2012 program cycle. One program, the Riverside County Partnership Program, discussed in the case study section above, only provided sample audit reports as their data are not stored in a database and thus, they felt the spreadsheet template was not appropriate for their program.

Table 4-17: Stage 2 In-Depth Analysis Data Collection

Utility	Program Type	Data Requested	Spreadsheet Returned	Recommendation Data Provided	Sample Audit Reports Provided
PGE	LGP	3	3	1	3
	3P	8	8	4	4
SCE	IP	1	0	0	0
	LGP	1	1	0	0
	3P	5	5	1	2
SDGE	IP	1	1	1	0
	LGP	1	1	1	0
	3P	2	2	0	1
SCG	LGP	1	0	0	1
	3P	2	1	0	0
Total	IP	2	1	1	0
	LGP	6	5	2	4
	3P	17	16	5	7
	Total	25	22	8	11

[49] The data requested was described in the section above.

Data Request Spreadsheet

Out of the 59 individual data request spreadsheets[50] delivered to the 25 program managers included in the Stage 2 in-depth assessment, 47 percent were either not returned or returned blank. Reasons for not completing the spreadsheets included:

- Program was cancelled
- No audits were performed during 2010-2012 program cycle (for the whole program or for a particular audit type)
- Email survey response was incorrect (audit type not actually offered by program)
- Program lacked a central database, data were tracked in ad hoc form, and thus it was not feasible to complete the spreadsheet

A number of program managers did not complete the spreadsheets, nor did they provide a reason for not doing so. In these cases, the evaluation team attempted to follow up with the program manager to gather additional information on the missing data, but in some cases the follow up attempt was unsuccessful.

The data request worksheets that were returned to the evaluation team were generally well populated.

Recommendation Database

Recommendation databases were received from eight of the 25 programs (32 percent) included in the in-depth assessment. Reasons given for not providing recommendation data included:

- Program did not conduct any audits during the time period (2 programs),
- Program did not keep records in a central database (6 programs), and
- Program needed additional information and/or approval from utility[51] and/or participants to share data with evaluators (8 programs).

Again, for a number of programs, neither a recommendation database nor a reason for its absence was provided to the evaluation team. These programs did not respond to follow-up requests from the evaluation team.

[50] Separate spreadsheets were sent for each audit type (mail, phone, on-line, etc.) reportedly offered by a program based on the data collected during the Stage 1 on-line survey.

[51] This was an interesting response as the data request for the Stage 2 in-depth assessment was sent to the program implementers directly from the utilities.

In the process of attempting to collect audit recommendation data, it became apparent to the evaluation team that while some program managers reported in both Stage 1 and Stage 2 that their program stored audit recommendation data in a database, there was some confusion regarding what was meant by a database. A number of programs that indicated their data were stored in a database turned out not to have a central database that could be queried in response to evaluation requests, and instead kept records in individual files on shared or hard drives. Due to the lack of recommendation databases provided from many of the programs in response to the Stage 2 data request, it was difficult to assess the magnitude of the confusion regarding a centralized audit tracking database.

The recommendation data request sought the following data elements:

- Measure Recommendation – End Use
- Measure Recommendation – Equipment Type
- Measure Recommendation – Size/Volume
- Measure Recommendation – Quantity
- Measure Recommendation – Energy Savings (kW, kWh, therms per year)
- Measure Recommendation – Description
- Recommendations for Practices/No-Cost/Low-Cost Measures

The recommendation data received allowed the evaluation team to verify that eight of 25 programs (32 percent) selected for Stage 2 kept audit recommendation data in a central flat file database. This percentage may be higher but could not be verified by the evaluation team based on the data received. All eight programs that provided a sample of the data stored in their recommendation databases provided high quality data that included most of the elements included in the Stage 2 data request. The most common missing recommendation data elements were the end use categorization (which was only provided by two of eight programs), the size or volume of the recommended measure (provided by four of eight programs), and the quantity of measures to be installed (provided by six of eight programs). The missing end use categorization would likely not cause any evaluation issues as the measure descriptions can typically be used to determine the end use involved. However, missing information on the size, volume and/or quantity associated with the audit recommendation can make confirmation of audit recommendation implementation difficult.

Sample Audit Reports

Sample audit reports were provided for eleven of the 25 programs. Eight of these programs provided sample audit reports in place of an electronic database of records. The sample audit reports varied from simple short forms (listing recommended or installed measures) to very

detailed reports of recommended measures that included pictures, estimates of savings, costs, and payback periods. Sample audit reports were typically send as PDF or word files as part of the Stage 2 data request.

4.2.3 Stage 2 Data Analysis

Spreadsheet Data Assessment

Data collected during Stage 2 of the evaluability assessment indicated that the across the 25 programs analyzed, there were more than 36 sub-programs that offered audits to program participants. As shown in Table 4-18 below, across these 36 sub-programs more than 70,000[52] audits were conducted. The majority of the audits delivered were On-site In-depth audits (48 percent)[53] followed by Direct Install audits (24 percent) and On-site Basic audits (17 percent). Third-party programs made up 50 percent of the sub-programs offering audits but accounted for 71 percent of the total audits completed. In comparison, LGP programs made up 44 percent of the Stage 2 sub-programs and conducted 29 percent of the reported audits. This indicates that across the Stage 2 programs analyzed, 3P programs on average conducted significantly more audits than LGP programs (2,883 audits per program compared to 1,322 audits per program). Similarly, 53 percent were PGE&E programs and these programs accounted for 83 percent of the total audits completed. At the opposite end of the spectrum, 22 percent of the programs in Stage 2 were SCE programs and these programs accounted for just two percent of the total audits offered. While this is an interesting finding, it is important to keep in mind that while the Stage 2 program sample selection tried to take into account both the utility and the program size, it is hard to determine how much of this difference in audits completed is a function of the utility versus the programs selected for the Stage 2 in-depth assessment.

[52] A portion of these audits were conducted at residential locations since four of the in-scope programs offered audits to both residential and nonresidential customers. We are unable to separate out the residential audits from the nonresidential audits entirely, however we estimate less than 10,000 are residential audits.

[53] It is important to keep in mind these distributions are only representative of the sample of programs included in the Stage 2 analysis.

Table 4-18: Distribution of Audits Conducted by Stage 2 Programs

Segmentation		Sub-Programs Offering Audit Type	Audits	Percent of Audits[54]
Audit Type	Direct Install	7	17,616	24%
	Feasibility Study	3	660	1%
	Mail	1	35	0%
	On-line	2	7,166	10%
	On-Site Basic	9	12,278	17%
	On-Site In-Depth	10	35,287	48%
	Retro Commissioning	2	14	0%
	Steam Assessment	1	1	0%
	Varied	1	0	0%
Program Type	IP	2	1	0%
	LGP	16	21,159	29%
	3P	18	51,897	71%
Utility	PG&E	19	60,446	83%
	SCE	8	1,288	2%
	SCG	5	3,499	5%
	SDG&E	4	7,824	11%
Total		**36**	**73,057**	**100%**

Analysis of the Stage 2 data found there were a significant number of programs (approximately 20 percent) that tracked customer and recommendation data only for audits that eventually turned into projects.[55] Additionally, a number of programs reported that these data are not tracked in a single electronic integrated database. Several programs reported they "tracked" audit data informally (for example on paper notes that were never transferred to any type of electronic database) and only began formally tracking data for energy efficiency recommendations that a customer indicated they were interested in seriously pursuing. This is problematic from an evaluation perspective as a comprehensive evaluation cannot be conducted of an audit program that does not store at a minimum either customer contact information or a utility account number for all audits conducted. Table 4-19 below shows, for the programs and sub-programs that returned the Stage 2 data request spreadsheet, the proportion of data elements that are tracked for audits that result in a project, as well as the percent of programs that do not result in a project. The table also provides the percentage of audit data that were reported to be stored in a single integrated electronic database.

[54] It is important to keep in mind these distributions are only representative of the sample of programs included in the Stage 2 analysis.

[55] A project is defined as the implementation of one or more audit recommendation.

Table 4-19: Stage 2 Reported Data Element Tracking[56]

Data Element	Tracked for a Portion of Audits	Stored in an Integrated Electronic DB	Tracked for Audits that do not become Projects
n	**31**		
Contact name	100%	77%	65%
Phone number	94%	71%	65%
Service address	97%	77%	61%
Utility account number	84%	71%	48%
Utility rate rode/schedule	61%	45%	39%
NAIC/SIC codes	23%	19%	19%
Building construction date	55%	48%	39%
Conditioned square footage	55%	39%	35%
Window space	10%	10%	3%
Inventory of lighting at the site at the time of the audit	65%	48%	45%
Inventory of HVAC at the site at the time of the audit	39%	26%	19%
Current insulation levels	16%	10%	0%
Types and sizes of process equipment	29%	16%	10%
Hours of operation	74%	48%	42%
Customer energy usage /billing history information	42%	16%	13%
Measure recommendation - equipment type	77%	42%	48%
Measure recommendation - size/volume	74%	45%	45%
Measure recommendation - quantity	77%	52%	55%
Measure recommendation - peak demand reduction	61%	42%	45%
Measure recommendation - annual energy savings	87%	52%	52%
Measure recommendation - natural gas therm savings	58%	32%	42%
Measure recommendation - rebate size (dollars)	71%	45%	48%
Measure recommendation - payback	58%	29%	39%
Measure recommendation - cost	61%	42%	45%
Existing/Baseline - equipment type	74%	48%	39%
Existing/Baseline - Size/Volume	68%	42%	42%
Measure Recommendation implementation status	65%	58%	39%
Referrals made to other programs	35%	10%	10%
Measure Implementation Status	35%	23%	19%

[56] Based on the 31 programs and sub-programs that returned the Stage 2 data request spreadsheet. These represent the percentage of programs reporting tracking this information and are not weighted by the percentage of audits each of the programs performed.

Approximately 90 percent of in-scope programs tracked customer identification data (such as customer name, phone number and service address) for all audits that resulted in projects. This same information was only stored for two-thirds of audits that did not turn into projects. Measure recommendation data (such as the quantity and volume/size of the recommended measures as well as the energy savings associated with its implementation) were tracked less frequently, at around 60 to 70 percent.

One large opportunity, identified through this evaluability assessment, was the large volume of data collected during the audits but not systematically retained (including lighting and HVAC inventories, types and sizes of process equipment, current insulation levels, and conditioned square footage). While the percentage of programs tracking these data ranged from 16 percent to 65 percent depending on the specific data element, the loss of any of these data is unfortunate. It is strongly recommended that the CPUC work with the utilities and the program implementers to create a formal process to retain, at a minimum, a basic set of site-level data collected during the audits and provide this data electronically to the utilities. The aggregation of these audit data could assist the utilities in building a comprehensive customer-wide database of the existing inventory of equipment installed at customer facilities. Expanding the role of the audits to capture and track these data would greatly enhance the value of the audits and would provide each of the utilities with a resource that could be mined for future energy efficiency program design, targeting, and market characterization efforts.

Table 4-20 below shows the reported[57] level of recommendation tracking provided by the Stage 2 LGP/IP/3P programs across the audit types offered and overall. Across all of the audit types, only 17 percent reported tracking all audit recommendations provided to participants in an electronic database. For the majority of audits conducted (65 percent), only a portion of the recommendations are tracked in an electronic database. The most common reason for this is that only the recommendations that are implemented are tracked. For the remaining 17 percent of audits performed during the 2010-2012 program cycle, none of the recommendations were tracked in an electronic database.[58]

[57] This is the program manager reported level of recommendation tracking. Whenever possible this reported level was verified based on the cut of recommendation data provided, however for most in-scope programs data were not provided to verify that audit recommendations were actually tracked.

[58] Some of these recommendations may be made available to an evaluator; however they are not stored in an electronic database on centralized server. This may significantly increase the complexity of conducting an evaluation.

Table 4-20: Audit Recommendation Data Tracking

Segmentation		Audits Completed	Audit Recommendation Tracked in an Electronic Tracking Database		
			All	Some	None
Audit Type	Direct Install	17,616	13%	87%	0%
	Feasibility Study	660	24%	76%	0%
	Mail	35	0%	0%	100%
	On-line	7,166	0%	0%	100%
	On-Site Basic	12,278	25%	35%	40%
	On-Site In-Depth	35,287	20%	78%	1%
	RCx	14	0%	93%	7%
	Steam Assess	1	0%	0%	100%
	Varied	0	n/a	n/a	n/a
Total		**73,057**	**17%**	**65%**	**17%**

The process used by audit programs to track recommendation implementation varies significantly by audit program. Some programs that track measure uptake receive data from the utility on audit participants who have received incentives for installed measures. Other programs work closely with audit participants through the whole process from audit, to savings estimation and finally through measure installation and incentive processing. Eleven of the 36 sub-programs included in the table above did not provide any data on the percentage of audits that turned into projects[59] (implemented audit recommendations). Table 4-21 below shows that across the 36 programs and sub-programs that provided data on audit recommendations, more than 43,000 audit participants (67 percent of audits performed) reported they had installed one or more of the audit measure recommendations.

Feasibility studies had the highest rate of follow through. This is likely a result of most programs only completing a comprehensive feasibility study, which requires a great deal of effort, if the participant has expressed a genuine desire to implement the recommended measure. Direct Install audits also had high follow through rates which is likely due to the nature of those programs which typically install the recommended measure at the time the audit is completed and require little to no cost on the part of the participant. On-site Basic audits had significantly lower measure uptake than On-site In-depth audits. This suggests that the audits which put in the extra effort for in-depth analysis, pays off in a higher follow through percentage.

[59] This could be because they did not track recommended measure uptake or because they did not provide the data to the evaluation team.

Table 4-21: Audit Recommendation Follow Through

Segmentation		Audits[60]	Projects[61]	% Follow Through
Audit Type	Direct Install	17,616	13,908	79%
	Feasibility Study	660	646	98%
	Mail	0	0	n/a
	On-line	0	0	n/a
	On-Site Basic	12,246	5,596	46%
	On-Site In-Depth	35,045	23,455	67%
	Retro Commissioning	0	0	n/a
	Steam Assessment	0	0	n/a
	Varied	0	0	n/a
Program Type	IP	0	0	n/a
	LGP	21,112	15,842	75%
	3P	44,455	27,763	62%
Utility	PG&E	60,402	39,598	66%
	SCE	1,212	977	81%
	SCG	0	0	n/a
	SDG&E	3,953	3,030	77%
Total		**65,567**	**43,605**	**67%**

The Stage 2 data request spreadsheets provides an in-depth look into the nature of the data that audit programs capture and how they are stored. Apart from several programs that appeared to misunderstand what was being asked for, the data request worksheets were an important tool to understanding which programs could undergo evaluation and which programs lack sufficient data to be evaluated. Analysis of the data submitted to the evaluation team via the data request spreadsheets indicated the following:

- There is a large volume of audits that are being conducted by LGP/IP/3P programs offered to nonresidential customers in California. The estimated number of audits that occurred during the 2010-2012 program cycle across the 25 programs included in the Stage 2 in-depth analysis was more than 73,000. Based on the Stage 1 data, these 25 programs made up approximately 75 percent of the audits conducted by the in-scope LGP/IP/3P programs during 2011. Extrapolating the Stage 2 results to the entire population of LGP/IP/3P programs believed to offer audits would suggest there is likely

[60] This is the number of audits that also provided measure uptake information.

[61] A project is defined as the implementation of one or more audit recommended measure.

close to 100,000[62] audits occurring annually through nonresidential LGP/IP/3P programs in California.

- Many programs offer a variety of audits to program participants either through the LGP/IP/3P program directly or through sub-programs that fall within the LGP/IP/3P program. In most cases, each of the audit types track data independently. This increases the complexity of conducting an evaluation due to the magnitude of distinct tracking databases which would need to be processed.
- Audit recommendation data tracking varies significantly by program.
  - Some programs track all recommendations given to program audit recipients.
  - Some programs track only the recommendations given to participants who implement one or more of the measures recommended by the audit.
  - Some programs track only the recommended measures that are implemented.
  - Some programs track recommendation data in an ad hoc manner.
- The method of data tracking also varies significantly by program.
  - Some track data in electronic centralized databases.
  - Some track data in individual audit reports or non-database formats (such as Word files, PDFs or on paper).
  - Some store all audit data on a centralized server (regardless of the format).
  - Some store data on individual staff member's computers (or if on paper in separate files).
- Gathering data from a large volume of distinctly managed programs would be a very time consuming endeavor. For this in-depth analysis stage of the evaluation, 17 of the 25 programs contacted did not submit a cut of their recommendation measure data as requested.
  - Eight programs reported needing approval from the utility or additional information on the use of the data (although the utility provided the data request to program implementers and the data request clearly explained the purpose of the data request).
  - Five reported having no central database and thus the data could not be easily transferred.
  - Three programs claimed to not conduct any audits during the 2010-2012 program cycle and so had no data to provide.

[62] The volume of audits could be substantially higher since many programs indicate they only track audits that result in projects or are seriously considered by program participants. It is estimated that approximately 15 percent of these audits are conducted with residential customers. A number of the large scale LGP and 3P programs, such as East Bay Energy Watch, were found to offer audits to residential customers.

  - One program gave no reason for not providing the requested data and did not respond to follow up attempts.
- The data collected during Stage 2 of this evaluability assessment were somewhat compromised. There appeared to be some confusion over several data elements in the data request worksheet. Thirteen programs appeared to not fully understand the field "How many distinct (unique) values does this data item have across all of your audit records?" Several programs listed for this field the exact number of records that they listed under the question "For how many audits is this data item stored?" Other programs listed very low numbers for fields that should have many more unique entries (such as contact name or phone number).

Audit Recommendation Data Assessment

Eight programs provided a cut of their recommendation database. The audit recommendation data received from this data request was generally well populated. Some of the databases included additional data elements that provide a more detailed description of the recommendations provided. Table 4-22 shows which data elements were included in the eight databases provided. Energy and demand savings estimates, as well as detailed measure descriptions, were provided by all eight programs. The size or volume and quantity of recommended measures were missing for several programs.

Table 4-22: Data Elements Included in Recommendation Databases

Program Name	N Audits	N Records	kWh /kW Savings	Cost Savings / Payback	Measure Cost	Measure Description	Size/Volume	Quantity	Incentive
CA Department of Corrections Program	1	1	x	x	x	x			x
East Bay Energy Watch	13,901	4,797	x	x	x	x			x
Energy Efficiency Services for Oil and Gas Production	281	281	x			x		x	
City of Chula Vista Partnership	2,503	2,505				x	x	x	x
Dairy Industry Resource Advantage	55	371	x			x	x	x	
Air Care Plus	22,083	106,520	x			x		x	x
Small Commercial Comprehensive Retrofit	3,830	1,560	x		x	x	x	x	x
Retail Energy Action	218	136	x			x	x	x	

Concerns with recommendation data included:

- Three of the eight programs only tracked recommendation data for the measures that were implemented.
- Two programs did not provide a unique site identifier to determine how many sites the recommendation data represents. One of these programs indicated they only provided a sample of their database, and thus the evaluation team was unable to assess the population of recommendation tracked.
- Two programs provided recommendation databases that contained data for more customers than the program reported auditing.
- Four programs provided recommendation databases that were missing the size or volume of recommended measures. Two of these programs were also missing the quantity of measures recommended.

Sample Audit Report Analysis

As mentioned previously, sample audit reports were not requested specifically as part of the Stage 2 data request, but were provided by 11 of the 25 programs. Eight of these programs provided these sample reports in lieu of the requested recommendation data cut and three programs provided them in addition to the recommendation data cut. The sample audit reports delivered to the evaluation team provided valuable insight into types of data audit participants receive post-audit. Basic audit programs tended to provide short and simple audit reports compared to on-site in-depth audit programs that often provide lengthy and detailed audit reports. Many of these audit reports contained estimates of payback for all recommended measures, as well as estimated measure costs and pictures of the equipment to be replaced. The detailed audit reports for the on-site in-depth audits are likely partially responsible for the higher follow through rate for on-site in-depth audits than for on-site basic audits. The detailed information on costs and payback likely give decision makers the information they needed to move forward with the project.

Table 4-23 shows the data elements included in the sample audit reports provided by eleven of the 25 programs. Energy and demand savings are presented in all of the audit reports as well as measure costs or total costs. Cost savings or payback is reported in all but two programs. The sample audit reports provide valuable decision making information to building owners and managers and will also be valuable in any program evaluation as an insight into the nature of the audits.

Table 4-23: Data Elements Included Sample Audit Reports

Program Name	Energy / Demand Savings	Cost Savings / Payback	Project or Measure Cost	Baseline Equipment	Building Characteristics	Hours of Operation	Measure Descriptions	Size/Volume	Quantity	Program Incentive	Photos of Existing Equipment
AMBAG	x	x	x			x	x	x	x	x	
San Francisco Energy Watch	x	x	x			x	x	x	x	x	
East Bay Energy Watch	x	x	x	x	x	x	x	x	x	x	
Riverside	x	x	x	x	x	x	x	x	x	x	x
Dairy Industry	x	x	x	x	x	x	x	x	x	x	x
Energy Smart Grocer	x	x	x	x	x	x	x	x	x	x	x
Energy Fitness	x	x	x		x	x	x	x	x	x	
Small Commercial Comprehensive	x	x	x	x	x	x	x	x	x	x	
EE for Entertainment Centers	x		x				x	x	x		
Mobile Energy Clinic	x		x								
Data Center EE	x	x	x	x	x		x	x	x	x	
Total Included (out of 11)	11	9	11	6	7	8	10	10	10	9	3

4.2.4 Overall Evaluability Assessment of Stage 2 Programs

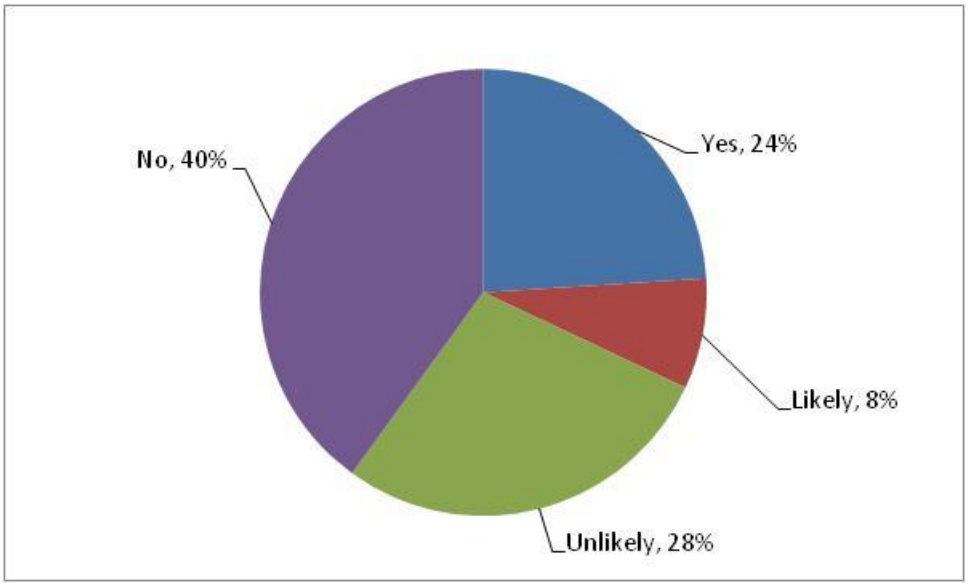
Based on the Evaluability Assessment conducted, the evaluation team believes conducting a comprehensive evaluation of the audit offered through the nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle would be infeasible for the majority of in-scope programs. Conducting audit evaluation activities for the small portion of programs where an evaluation may be feasible would produce results that would not be representative of the magnitude of audits being performed through these LGP/IP/3P programs in California.

Based on a thorough review and analysis of the data collected on the sample of programs included in the in-depth research (Stage 2), an evaluability assessment rating was assigned to each of the 25 programs. This evaluability assessment rating classified each program into one of the following categories:

- Yes – An evaluation of the audits conducted for this program is feasible.
  - Verified – Audit recommendation data have been verified in support of this assessment.
  - Not Verified – Audit recommendation data were not provided and thus have not been verified in support of this assessment.
- Likely – The likelihood of being able to conduct an evaluation of the audits conducted for this program is high.
- Unlikely – The likelihood of being able to conduct an evaluation of the audits conducted for this program is low.
- No – An evaluation of the audits conducted for this program is infeasible.
  - Audit recommendations not tracked
  - Audit recommendations tracked only for those implemented
  - Program cancelled

The overall evaluability assessment ratings are shown in Table E-4 below based on Stage 2 findings. The conclusion from these ratings is that an evaluation of the audit offerings could likely only be conducted for 32 percent of the programs in the sample (and less than 40 percent of this estimate was verified with audit recommendation data). For the remaining 68 percent of the programs in the sample, the assessment found that it is unlikely that an evaluation of the audit offerings could be conducted. These "unlikely" programs accounted for 83 percent of the audits conducted during the 2010-2012 program cycle.

Table 4-24: Overall Evaluability Assessment of Sample of 25 Programs



Detailed evaluability ratings are provided in Table 4-25 below for the Stage 2 sample. Both the detailed evaluability rating and the assessment data verification are provided for the 25 programs included in the Stage 2 in-depth assessment and the 73,000 audits conducted through these programs during the 2010-2012 program cycle. Only four percent of the programs provided sufficient data for the evaluation team to confidently claim the audit programs could be evaluated. Perhaps an additional 20 percent of the programs could also be evaluated; however no data were provided to the evaluation team to verify this assessment. However, fully 40 percent of the programs (which comprised 69 percent of the audits) did not track or retain the data needed for evaluation and thus could not be evaluated.

Table 4-25: Overall Evaluability Rating of Stage 2 Sample of Programs

Overall Evaluability Rating	Assessment Data Verification	Programs	% of Programs	Audits	% of Audits	Evaluability Issue
Yes	Verified	1	4%	2,503	3%	None
	Not Verified	5	20%	10,026	14%	None
Likely	Partially Verified	2	8%	56	0%	Unable to verify based on data provided
Unlikely	Not Verified	7	28%	10,056	14%	No Electronic Database
No	N/A	3	12%	3,427	5%	Recommendations not tracked
	N/A	1	4%	200	0%	Program Cancelled
	Partially Verified	6	24%	46,789	64%	Program Tracks Implemented Measures Only
Total		25	100%	73,057	100%	

5

Findings and Recommendations

This Evaluability Assessment reviewed the 2010-2012 audit offerings provided through the nonresidential Local Government Programs (LGP), Institutional Partnership (IP)[63] and Third Party programs (3P) that fall outside of the Core statewide NRA programs. As part of this assessment, the quality and accessibility of the associated tracking data were assessed for a sample of the in-scope programs to determine the feasibility of conducting a comprehensive evaluation of the audit offerings.

The research conducted for this study found a large percentage (nearly 90 percent) of the in-scope nonresidential non-core LGP/IP/3P programs offered audits of some kind to program participants, which amounted to an estimated 100,000[64] audits being conducted statewide during the 2010-2012 program cycle. While this evaluation found significant audit activity, the availability, quality and consistency of the audit data collected by these programs is in such a poor state that conducting a statewide evaluation of the audit activities would be difficult and provide results that are not representative of the vast array of audits that occur across the portfolio of programs. The majority of programs lack comprehensive customer audit and recommendation data tracking which are necessary for a robust audit evaluation.

Current data collection activities across these programs would allow for an evaluation of the audit offerings for potentially only 36 percent of the Stage 2 programs (representing 17 percent of the Stage 2 audits conducted). Table 5-1 shows the distribution of the assessed evaluability of the Stage 2 programs. The criterion for evaluability includes:

- Program has audit activity
- Program tracks customer information and recommendations for all audit participants, not only participants who implement one or more of the audit recommendations
- Electronic database of customer information and recommendations is available and stored in a format that can be easily transferable

[63] This category includes the following statewide partnership programs – Department of Corrections and Rehabilitation, University of California and California State University, State of California IOU, and California Community Colleges.

[64] This estimate includes some residential audits that are conducted through the in-scope programs.

Table 5-1: Overall Evaluability Assessment of Stage 2 Programs

Overall Evaluability Rating	Assessment Data Verification	Programs	% of Programs	Audits	% of Audits	Evaluability Issue
Yes	Verified	1	4%	2,503	3%	None
	Not Verified	5	20%	10,026	14%	None
Likely	Partially Verified	2	8%	56	0%	Unable to verify based on data provided
Unlikely	Not Verified	7	28%	10,056	14%	No Electronic Database
No	N/A	3	12%	3,427	5%	Recommendations not tracked
	N/A	1	4%	200	0%	Program Cancelled
	Partially Verified	6	24%	46,789	64%	Program Tracks Implemented Measures Only
Total		25	100%	73,057	100%	

Findings from these in-depth assessments can be used to shed light on the reliability of the data indicated in the on-line survey, as well as to create a set of recommended tracking practices that can improve data availability, comparability and evaluability of audit offering in the LGP, 3P and IP sectors.

5.1 Tracking System Assessment

5.1.1 Audit Tracking System Assessment Findings

The collection and storage of customer audit[65] data were of particular interest to this evaluation as these data are essential to effectively evaluate the portfolio of audit offerings. Responses to the on-line survey suggest that the majority of the programs offering audits (82 percent) record customer data electronically, however, only 40 percent store these data in an electronic database. Stage 2 analysis indicates that almost every program claims to keep some form of electronic database but there appears to be confusion about the difference between individual files kept in folders electronically and actual electronic databases of tracking data. Eight programs did provide recommendation databases that were of high quality and could support program evaluation, however for at least three of these eight programs, the electronic databases only retained audit data on recommendations that were implemented. The loss of audit data on recommendations that are not implemented limits the scope of the evaluation activities that can be conducted.

[65] Such as customer contact information, account numbers, baseline equipment installed, hours-of-operation, etc.

The data elements reported to be tracked based on the on-line survey were generally similar to the data elements reported to be tracked based on the in-depth Stage 2 data assessment. However, in Stage 2 it became apparent that much of the data retained were only for the subset of recommendations implemented by program participants.

5.1.2 Tracking System Recommendations

- It is recommended that each IOU create a comprehensive tracking database format that would be used by all LGP/IP/3P programs and would include a uniform set of basic data required for all audits performed. Ideally, this basic content would be consistent statewide.
- Customer Data should include, at a minimum, account numbers, contact names, and phone numbers.
- A comprehensive set of measure recommendation descriptions that are consistent and precise should be created and used across programs statewide
- Energy savings estimates should be included, whenever available, for measure recommendations provided through the LGP/IP/3P audits.
- Audit follow up should take place and be captured electronically to assess audit effectiveness, project uptake, and measure uptake.
- Requiring a tracking database for all programs receiving program dollars would significantly increase the availability of audit data, which would in turn allow for a more robust evaluation. Predetermining a consistent format and variable requirements would improve the comparability of audits offerings provided by the in-scope programs across the state.

5.2 Customer and Recommendation Data

5.2.1 Customer and Recommendation Data Findings

Approximately 60 percent of the programs provided audits that gave participants a combination of no-cost, low-cost and customized site-level recommendations. An additional 10 percent focused entirely on custom recommendations and the remaining programs provided only no or low-cost recommendations. The recommendations given spanned a wide variety of measures, with Lighting, HVAC and Hot Water measures being the predominant recommendations offered (given to 60 percent, 56 percent and 39 percent of audit recipients respectively).

Similar to customer audit data, the collection and storage of measure recommendation[66] data is necessary to effectively evaluate audit offerings. Data collected during the on-line survey indicated that only 40 percent of programs store recommendation data in an electronic database.

5.2.2 Stage 2 Findings

The data collected during Stage 2 found that most programs were tracking customer information and somewhat less capture building information. Several (8 of 31 audit types) programs tracked information informally (paper notes) and only started tracking seriously if customer was interested in pursuing an energy efficiency recommendation.

Most programs (73 percent) indicated they stored customer information records in a single file or database, while the remaining programs indicated that site records were stored independently in their own files or on paper. The individual data elements that programs indicated they captured in the Stage 2 data request mostly aligned with what the programs indicated in Stage 1. There were occasions where certain data elements were indicated as being captured based on Stage 1 data and not captured based on Stage 2 data, however there were only a small number of such cases.

Most programs reported tracking audit recommendations; however, three programs only keep records for sites that implement a recommended measure. Estimated energy savings from recommended measures is more likely to be tracked than the equipment type or end use, according to the Stage 2 data request worksheets. Only about 50 percent of programs capture estimated measure costs, payback, or estimated incentives. About 30 percent of programs capture estimated savings for no cost or low cost measures or referrals made to other programs.

We received recommendation databases for eight of the 25 programs, so the verification of recommendation data was limited.

5.2.3 Customer and Recommendation Data Recommendations

- Customer Data should include, at a minimum, account numbers, contact names, and phone numbers.
- A comprehensive set of measure recommendation descriptions that are consistent and precise should be created and used across programs statewide
- Energy savings estimates should be included, whenever available, for measure recommendations provided through the LGP/IP/3P audits.

[66] Including elements such as detailed measure end-use description, estimated energy savings, and implementation costs.

5.3 Recommendation Follow-Up, Uptake and Referrals to other Programs

5.3.1 Recommendation Follow-Up, Uptake and Program Referral Findings

Stage 1 findings indicted that 51 percent of programs offering audits provided referrals to other utility programs as part of their recommendations, and 27 percent of those tracked the uptake on those referrals. Seventy-eight percent of programs reported following up with customers after the audits to see if they have followed through on any of the recommendations and 57 percent of those reported tracking this uptake metric. Stage 2 analysis indicates that 35 percent of programs in Stage 2 report capturing referrals to other programs and no program indicates that they track follow up to referrals. Sixty-five percent of programs reported tracking the implementation status of recommended measures.

5.3.2 Recommendation Follow-Up, Uptake and Program Referral Recommendations

- Audit follow up should take place and be captured electronically to assess audit effectiveness, project uptake, and measure uptake.
- Referrals to other programs should be tracked electronically and follow up should be captured to assess audit effectiveness.

5.4 Overall Findings and Recommendations

5.4.1 Findings

Based on the Evaluability Assessment conducted, the evaluation team believes conducting a comprehensive evaluation of the audit offered through the nonresidential non-core LGP/IP/3P programs would be difficult. The primary reasons for this conclusion are as follows:

1 – Lack of a Comprehensive Database of Audit Activities and Accomplishments. The Evaluability Assessment conducted identified a minimum of 124[67] nonresidential non-core LGP/IP/3P programs that offer audits to participating customers across California. The volume of audits conducted through these programs was estimated to be around 100,000[68] during the 2010-2012 program cycle. No comprehensive statewide or utility specific databases were

[67] This is likely a lower bound on the actual number of LGP/IP/3P programs offering audits since 31 of the 182 programs implementers contacted either did not respond or provided an incomplete response to the Stage 1 on-line survey.

[68] This estimate does include a portion of residential audits (~15 percent) that are completed through in-scope programs that serve both residential and nonresidential customers.

identified to capture and store all of the customer, audit and recommendation data that are gathered and analyzed as part of these audits.

2 – A Lack of Consistency across Programs. The majority of the programs analyzed were unique in their approach and delivery of audits, as well the manner in which they captured and stored data. As a result, each program included in a statewide evaluation of the audit components of these programs would require an individualized approach to data collection and analysis, which would be difficult and time consuming given the large portfolio of LGP/IP/3P programs offered statewide.

3 – Few Comprehensive Program Databases Exist. Few of the programs that capture and record customer baseline, audit and recommendation data store these data in comprehensive electronic database that could be easily transferred and/or mined for evaluation purposes. Accessing this data would likely require significant manual effort by both program staff and evaluators in order to compile the data required to complete a comprehensive evaluation. This extensive manual effort is magnified by the large volume of the LGP/IP/3P programs offering audits.

4 – Magnitude of Programs. Through the on-line survey conducted with a census of LGP/IP/3P program implementers, a total of 124 programs were identified as offering audits to program participants. Further in-depth assessment of a sample of these programs identified a number of the programs (3 of the 25 in-depth assessment programs) that were comprised of a number of sub-programs. These sub-programs often implement and track the audits they offer independently which increases the magnitude of the audit program offerings even further. For example, the East Bay Energy Watch Program includes five distinct sub-programs that are managed by separate entities and offer their own unique audits to the different segments of the market.

5 – Tracking of Projects Rather than Audits. This Evaluability Assessment found that many programs either do not track any audit data or only track audit data for those recommendations that are implemented and turned into projects. An evaluation of audit programs requires customer and recommendation data for <u>all</u> audits completed, not just those that result in projects, in order to determine the overall effectiveness of the audit offering.

6 – Complex Data Collection. Collecting data from a large number of individually managed and inconsistently tracked programs (and in some cases sub-programs) would likely be complex and time consuming. Even for the limited purposes of conducting this Evaluability Assessment, the gathering of data from the subset of programs that did track and retain the necessary audit and recommendation data for the population of audits conducted was a laborious manual process that required significant back and forth with the program implementers and IOU staff. This was despite efforts to streamline this process. For example, for this Evaluability Assessment, all 25

of the in-depth assessment program implementers were provided nearly identical data requests. The resulting data provided to the evaluation team in response to these requests reflected a wide range of data/information formats, methods to interpret results, and levels of completeness. There were many cases where the data requested was missing with no explanation offered for its absence (and no response provided to follow-up requests).

5.4.2 Recommendations

Based on the Evaluability Assessment of the audit activities offered through the portfolio of nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle and the audit and recommendation data reportedly collected and tracked by each of these programs, the evaluation team offers the following recommendations:

The CPUC should strongly consider developing and requiring implementation of a standardized database to house audit and recommendation data and accomplishments – The CPUC and the utilities need data in a consistent format for the purposes of conducting due diligence and assessing performance versus stated metrics. Establishing such a database will allow for consistent tracking of audit recommendations and measure implementation and can help with the identification of markets that are saturated. Money is being spent on programs that are unable to easily report the quantity of audits being conducted and the recommendations being offered through these audits. Requiring standardized data collection and centralized reporting will improve the documentation of both program activities and program performance which are important due to the large sume of money being spent on the wide variety of audits being administered as part of IP, LGP and 3P programs across California (estimated to be close to 100,000 audits during the 2010-2012 program cycle). This database should include at a minimum:

- Program name
- Business name[69]
- Address
- Account number
- Contact name
- NAICS Code
- Phone
- Date of audit

[69] Customer name, address and account number are confidential customer information which require adequate security protections to be in place to comply with CPUC regulations and state laws. Their inclusion is important to be able to match this data to other resource program tracking data, as well as utility CIS and billing data.

- Audit scope (e.g. lighting, HVAC, envelope, gas, process, pumping)
- Audit recommendations

Adequately developing such an infrastructure will require the dedication of future resources to work with the utilities to design both a standard data collection database, as well as a standardized data delivery format so that this database can be easily and fully populated with a large number of files coming from each of the individual programs offered.

Furthermore, the CPUC should strongly consider expanding the scope of the recommended standardized audit database to include all other site-level data that are being collected at the time of the audit. Many in-scope programs reported that during the audits they conduct, they also collect facility operational data that allows them to identify energy efficiency opportunities and develop site-level recommendations. While tracking of these data are currently not required by program implementers, they represent a significant lost opportunity in the value of these audits. The data collected in the course of program audits have great potential value, in that they could be used to improve Customer Information System (CIS) data, analyze the effectiveness of various program and audit types on a variety of customer segments, and support coordinated marketing efforts across the entire portfolio of utility programs. Facility data currently reported to be collected by some in-scope audit programs include elements such as:

- Baseline equipment inventory and age of equipment (including, but not limited to, HVAC, primary lighting, water heating, and building control systems)
- Building characteristics (year built, conditioned square footage)
- Business type activities occurring within facility
- Facility hours of operation

The value of this site-level database could be increased by identifying a minimum set of facility variables that could be required data collection elements for every audit conducted (where applicable).

Track Program Spending on Audit Activities – Program expenditure reporting by nonresidential non-core LGP/IP/3P programs during the 2010-2012 program cycle was not sufficiently detailed to document how much money is being spent on audit activities offered by these programs. The evaluation team recommends unbundling the audit activity expenditures and reporting these separately to allow for greater transparency of these costs.

Identify Audit Program Best Practices - Consider investing resources in the following areas to identify best practice audit improvements which could be applied to all programs:

- Find and share examples of record keeping best practices employed by audit programs; that is, examples of efficient, comprehensive and accessible audit program record keeping. Use the record keeping best practices identified to formalize a process for tracking all audit recommendations provided to audit recipients. This process should include a highly structured database to be used for the electronic tracking and storage of participant data which can be used by future evaluations and allow for the estimation of recommended measure uptake and attribution.
- Creating a standardized audit follow-up process that would capture recommendation implementation and store it in a database to determine audit effectiveness.

6

Appendix

6.1 Stage 1 Research

6.1.1 On-line Survey Instrument

Stage 1 Online Survey Instrument

6.1.2 Draft Interim Findings Memo

Stage 1 Findings Memo

6.2 Stage 2 Research

6.2.1 Data Request Memos

SDG&E

Microsoft Word 97 - 2003 Document

PG&E

Microsoft Word 97 - 2003 Document

SCE

Microsoft Word 97 - 2003 Document

SCG

Microsoft Word 97 - 2003 Document

6.2.2 Sample Data Request Letter and Spreadsheets

IOUXXXX_DataRequest

IOUXXXX_DataRequest_Spreadsheet