DCEO
Energy Efficiency/Demand Response Plan
Plan Year 1 (6/1/2008-5/31/2009)
Evaluation Report:
Public Sector Electric Efficiency Custom Incentives Program
Ameren Service Territory

January 20, 2010

Submitted To:
The Illinois Department of Commerce and Economic Opportunity

SUMMIT BLUE CONSULTING, LLC
Itron
ODC OPINION DYNAMICS CORPORATION
Michaels engineering

Final Report

Submitted to:

DCEO
Illinois Department of Commerce and Economic Opportunity
620 East Adams Street
Springfield, IL 62701

Submitted by:

Summit Blue Consulting, LLC
1722 14th Street, Ste. 230
Boulder, CO 80302
720.564.1130
Contact: Randy Gunn, 312-938-4242, rgunn@SummitBlue.com
Jeff Erickson, 608-807-0082, jerickson@SummitBlue.com

Prepared by:

Kris Bradley
Itron, Inc.
510-844-2818
kris.bradley@itron.com

Antje Siems
Opinion Dynamics Corporation
617-492-1400
asiems@opiniondynamics.com

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E EXECUTIVE SUMMARY

E.1 Evaluation Objectives

The goal of this report is to present a summary of the findings and results from the evaluation of the Program Year 1 Public Sector Electric Efficiency (PSEE) Custom Incentives program.[1] The primary objectives of this evaluation are to quantify gross and net impacts and to determine key process-related program strengths and weaknesses and identify ways in which the program can be improved.

The Illinois Department of Commerce and Economic Opportunity (DCEO) Public Sector Electric Efficiency Program provides incentives for public sector customers of ComEd and Ameren Illinois Utilities who upgrade their facilities with energy efficient equipment. There were two specific program elements that were available to customers during program year 1: a Custom Incentives program and a Standard Incentives program.

- Custom program incentives are available to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects.
- The Standard Incentives program provides an expedited application approach for public sector customers interested in purchasing efficient technologies. The program targets discrete retrofit and replacement opportunities in lighting, HVAC, motor, and refrigeration systems. A streamlined incentive application and quality control process is intended to facilitate ease of participation.

Some tasks within the Standard and Custom program evaluations involved close coordination between the two efforts, but the evaluations were otherwise conducted through separate approaches. The Standard and Custom Incentive programs have evaluation results reported separately.

E.2 Evaluation Methods

Project-specific M&V was completed for a sample of selected projects in order to assess the gross impacts achieved by the program, and ratio estimation was then applied to estimate program-level gross savings using the project M&V results. Net impact estimates were completed to adjust for free-ridership, evaluated using a self-report survey with program participants. Participant spillover was examined qualitatively through a self-report survey in PY1 and is not factored into the net impacts. Participant spillover will be examined quantitatively in PY2 and PY3.

Table 1 provides a summary of the principal data sources contributing to the evaluation of the PY1 Custom Incentive (Custom) program. For each data element listed the table provides the targeted population, the sample frame, sample size and timing of data collection.

[1] The Program Year 1 (PY1) program year began June 1, 2008 and ended May 31, 2009.

Table 1. Principal Data Sources Contributing to the PY1 Evaluation

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Custom program customers, projects and measures	DCEO Tracking Database	-	All	Ongoing
Application Records Analysis	Custom program customers, projects and measures	File Copies	-	All	As Needed
In-depth Phone Interviews	DCEO Custom Program Staff	Contact from DCEO	Custom Program Manager	1	June 2009
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of Custom Program Participants	10	October 2009
Project Application File Review	Custom Program Projects	Tracking Database	Stratified random sample by project-level kWh (3 strata)	5	October 2009
On-Site Visits and Measurement					

E.3 Key Findings

Tables 2 and 3 below provide a summary of reported ex ante savings from the DCEO tracking system, and evaluation-adjusted gross and net savings impacts for the Statewide PY1 Custom Incentives program. As shown in Table 2, the PY1 evaluation found that verified gross impacts were equal to 78% of the savings in DCEO's tracking system, as indicated by the realization rate (realization rate = ex post gross / tracking system gross).

A realization rate for peak demand impact could not be estimated due to the fact that the program does not track kW savings. The missing tracking system records for ex ante peak demand impact (kW) precluded the development of kW weights and so the estimation of ex post peak demand impacts was set equal to kW estimates derived within the M&V sample alone. Since the M&V sample represents 74% of the ex ante annual energy savings claim, it is expected that the sample also represents the bulk of the summer peak demand savings.

Table 2. Program-Level Evaluation-Adjusted Net kWh Impacts for PY1

Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
16,881,910	13,143,568	0.78	9,434,996	0.72

The chained realization rate (gross RR * NTG Ratio) is 0.56 for kWh (0.78 x. 0.72). This indicates that the evaluation-based (ex post) estimate of savings is equal to 56 percent of the value claimed in the DCEO tracking system.

Table 3. Program-Level Evaluation-Adjusted Net kW Impacts for PY1

Ex Ante Gross kW	Ex Post Gross kW	kW RR	Ex Post Net kW	NTGR (ex post gross)
-	1,071	NA	761	0.71

Ex ante summer peak demand (kW) impacts are not currently tracked by the program.
Ex post gross summer peak demand (kW) impacts are set equal to the ex post gross impacts measured in the M&V sample alone.

Impacts for public sector customers in Ameren delivery service territory are provided in Table 4.

Table 4. Utility-Specific Evaluation-Adjusted Net kWh and kW Impacts for PY1

Utility	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)	Ex Post Net kW
Ameren	9,560,498	7,443,414	0.78	5,343,190	0.72	NA

Ex post gross summer peak demand (kW) impacts were not estimated for the individual utilities.

The relative precision at a 90% confidence level is ± 3% for the kWh Realization Rate.

Key Impact Findings

- Based on the relatively small sample sizes evaluated in PY1, it appears that DCEO should consider additional analysis of the underlying assumptions of savings in projects entering the program. . The project documentation that was reviewed generally presents a reasonably clear description of how a given project saves energy (and the energy efficiency measures included in the program all appear to have a reasonable basis for claiming energy savings), and the baseline condition selected for the impact calculations was generally reasonable. However, some project input assumptions were found to result in higher ex ante impact claims than the ex post impact result. In some cases the underlying assumptions could be more conservative.

- The program should estimate and track summer peak demand savings. Additional effort is needed within the program to enhance the estimation of demand savings and the tracking of those resulting impact estimates.

- Free-ridership levels measured are better than expected for a Custom program at roughly 30%. Participants report that the program is a strong motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Low free-ridership was observed across all project size categories (sampling strata).

- It is recommended that selected DCEO staff review the content of the site M&V reports in Appendix 5.2.3 to better understand the reasons underlying the ex post realization rate results.

Key Process Findings

Program Participation

The program met its savings goals for PY1, while building a good foundation for future program years. This is especially impressive given the limited program resources and the challenging economic climate. Examination of paths to participation will be an evaluation objective for the next evaluation cycle to ensure continuing success.

DCEO should take steps to reduce barriers to participation presented by the public sector budgeting process by creating confidence among public sector customers that the program will be active in future years. This is especially true as demand for the incentives increases and the program becomes more fully subscribed.

Incentives

The program design included a $100,000 incentive cap in PY1 (the cap was raised to $200,000 for PY2). . The program also exercised discretion in making exceptions to the cap, which is appropriate for a new program, especially since incentive funds were not exhausted during PY1. For example, the program allowed entities to apply for incentives greater than $100,000 if the application included multiple projects. However, a high concentration of incentive money in a single customer or project carries risk for the program and program savings, e.g., if the customer is found to be a free-rider.

Implementation

The assigned program staff targeted their efforts at core activities related to processing applications, participant implementation assistance, marketing, and inspections. While the program has achieved significant savings in PY1, future growth of the program and attainment of program goals will require additional resources (staff and dollars) to expand the depth and breadth of program activities undertaken.

Marketing and Outreach

In PY1 DCEO assigned one full time staff person to focus on marketing for all PSEE programs. In addition to this full time staff member, other program staff participated in marketing activities as part of their normal job duties. Overall, the program heavily leveraged activities by SEDAC, ComEd, and Ameren, with DCEO-specific activities somewhat limited by staff and resource availability. The marketing that was conducted was recalled and well received by program participants. The most successful efforts were promotion via market actors and customer events.

1 INTRODUCTION TO PROGRAM

This evaluation report covers the Custom Incentive (Custom) program element of the Public Sector Electric Efficiency incentive program.

1.1 Program Description

The Illinois Department of Commerce and Economic Opportunity (DCEO) Public Sector Electric Efficiency program provides incentives for public sector customers of ComEd and Ameren Illinois Utilities who upgrade their facilities with energy efficient equipment. There were two specific program elements that were available to customers during program year 1: a Custom program and a Standard program.

- Custom program incentives are available to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Equipment installed includes lighting retrofits, HVAC measures such as VFDs, equipment controls, coil replacement and adding pipe insulation, retrocommissioning of buildings, and other miscellaneous measure installations. Some of these measure installations are "True Custom" measures in the sense that simple deemed savings and/or simple-to-apply algorithms do not already exist for this homogenous measure segment of the program population. However, about half of the applications processed in PY1 were lighting retrofits, contributing about one-third of the ex ante energy savings claim.
- The Standard program provides an expedited application approach for public sector customers interested in purchasing efficient technologies. The program targets discrete retrofit and replacement opportunities in lighting, HVAC, motor, and refrigeration systems. A streamlined incentive application and quality control process is intended to facilitate ease of participation.

DCEO uses internal staff to manage, implement, and administer the program. Technical assistance is provided as needed through the Smart Energy Design Assistance Center (SEDAC). The PY1 program application form listing measures, eligibility criteria and incentive levels is provided in Appendix 5.2.1. The measure list and incentives matched those offered by Ameren, except that DCEO offered incentives for LED traffic signals. The Standard and Custom programs were continued in program year 2, with minor increases to incentive levels and changes to rebate options.

The net MWH savings goals for the PY1 Custom incentive program are shown in Table 5:

Table 5. Public Sector Electric Efficiency Custom Program PY1 Planned Savings Goals

Utility	Plan Target Net MWH	Plan Target Net MW
ComEd Service Territory	4,385	0.60
Ameren Service Territory	1,615	0.20
Total	**6,000**	**0.80**

Source: Direct Testimony of Jonathan Feipel, DCEO, Docket No. 07-0541, Exhibit 1.3, November 15, 2007.

1.2 Evaluation Questions

The evaluation sought to answer the following key researchable questions:

Impact Questions

1. What are the gross impacts from this program?
2. What are the net impacts from this program?
3. Did the program meet its energy and demand goals? If not, why not?

Process Questions:

The process evaluation questions focused on five key areas:

1. Effectiveness of program implementation
2. Effectiveness of program design and processes
3. Customer and program partner experience and satisfaction with the program
4. Opportunities for program improvement
5. Program awareness and potential market effects

The full list of researchable questions can be found in the Evaluation Plan.

2 EVALUATION METHODS

Although participants consist of both ComEd and Ameren utility customers', the evaluation was planned and completed in such a way that it supports a single program-wide result and not individual utility results. However, examination of the tracking data identifies the following participation patterns and ex ante impact claim from each utility:

- There were 15 applications processed for ComEd customers involving an ex ante impact claim of 7.3 million kWh.

- There were 10 applications processed for Ameren customers involving an ex ante impact claim of 9.6 million kWh.

The evaluation plan calls for on-site visits and detailed M&V for 5 Custom projects to address the gross impact evaluation objectives, plus telephone surveys with 10 Custom projects to address evaluation process and net objectives. No attempt was made to sample by utility or to develop gross or net impact parameter estimates that support individual utility findings.

- The on-site visits and M&V activities for 5 Custom projects (applications) seeks to update, refine or replace the calculation procedures that were submitted as part of the final application submittal.

- The telephone surveys support a Basic net impact approach (as described in greater detail in the Net Program Savings section, 2.1.2 below). When warranted based on project size, the extra large net impact approach or the Enhanced approach will be applied in PY2 and 3.

- Data were also collected in the survey described above to support the process evaluation.

The sections that follow provide greater detail on the methods deployed.

2.1 Analytical Methods

2.1.1 Gross Program Savings

The objective of this element of the impact evaluation is to verify the PY1 ex ante gross savings estimates in the Custom program tracking system for the program population. The savings reported in DCEO's tracking system was evaluated using the following steps:

1. Develop a site-specific M&V plan for a representative sample of program projects. Each M&V plan details the data collection and analysis approach to be undertaken, following a careful review of relevant documents stored in DCEO's tracking system, including the Final Application submittal and the application-based calculations.
2. Implement a site-specific data collection approach for each sampled project. The focus of the data collection is to verify and/or update the assumptions that feed into engineering algorithms of measure level savings. Data collection also includes verification of measure installation and that the systems are functioning and operating as planned, and if not then in what way(s) there is variance.

3. Perform on-site measurement or obtain customer-stored data to support downstream M&V calculations. Measurement data obtained from the sites are used to calibrate the analyses, as measured parameters typically have the least uncertainty of any of the data elements collected. Measurement includes spot measurements, run-time hour data logging, and post-installation interval metering. Customer-supplied data from energy management systems (EMS) or supervisory control and data acquisition (SCADA) systems are often used when available.
4. Complete ex post engineering-based estimates of gross annual energy (kWh) and summer peak demand (kW) impact for each sampled project. A site specific analysis is performed for each point in the impact sample. The engineering analysis methods and degree of monitoring will vary from project to project, depending on the complexity of the measures installed, the size of the associated savings and the availability and reliability of existing data. Gross impact calculation methodologies are generally based on IPMVP protocols, options A through D. At a minimum the ex post impact evaluation incorporates the following additional information that may not have been feasible to incorporate in Final Application submittal:
    a. Verification that measures are installed and operational, and whether or not the as-built condition will generate the predicted level of savings.
    b. Observed post-installation operating schedule and system loading conditions.
    c. A thorough validation of baseline selection, including appropriateness of a retrofit vs. replace on burnout claim.
    d. Development of stipulated and measured engineering parameters that contribute to the impact calculations.
5. Prepare a detailed, site-specific impact evaluation report for each sampled site.
6. Carry out a quality control review of the ex post impact estimates and the associated draft site reports and implement any necessary revisions.

A verified gross realization rate (which is the ratio of the ex post gross savings-to-reported tracking savings) was then estimated for the sample, by segment and sampling strata, and applied to the population of reported tracking savings, using sampling-based approaches that are described in greater detail in Sections 2 and 3 below. The result is an ex post estimate of gross savings for the Custom program.

Selection of IPMVP Approach

Ex post gross annual energy and demand impacts were assessed using an array of methods that are compliant with and defined by the International Performance Measurement and Verification Protocols (IPMVP). Flexibility was also considered in applying these protocols, with an eye towards deployment of a cost-effective M&V approach (i.e., reduction in uncertainty per evaluation dollar spent). Choices include IPMVP Option A (simple engineering model), Option B (retrofit isolation model), Option C (normalized annual consumption model or a fully specified regression model) and Option D (calibrated building energy simulation models).

Baseline Assessment

Development of baseline is a crucial step in accurately assessing custom measure ex post savings, and it is sometimes the case that the ex post evaluation-defined baseline does not agree with the program-defined baseline. For example, it is common in site-specific custom measure analyses for the program baseline to be defaulted as the *in situ* equipment, no matter what the age of the existing equipment that are subsequently removed. In each case an investigation is needed to determine whether the existing equipment was at the end of its life and whether there is an efficiency increment among new equipment available in the market. If the equipment is at the end of its life and there is variation among new equipment efficiencies, then the savings should be based on the delta between the efficiency of the standard baseline equipment and program induced installation. In such cases the efficiency of the *in situ*

equipment is irrelevant. If it the equipment is at the end of its life (i.e., no evidence of program-induced early replacement) and there is little or no difference in efficiencies among new equipment choices, then the savings will essentially be zero. The point here is to simply illustrate that baseline determination and analysis are an integral and extremely important part of custom impact evaluation.

Review Applications and Prepare Analysis Plans

For each selected application, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. Application review serves to familiarize the assigned engineer with the gross impact approach applied in the program calculations. This will also forms the basis for determining the additional data and monitoring needs that are required to complete each analysis and the likely sources for obtaining those analytic inputs. For most projects on-site sources include interviews that are completed at the time of the on-site, visual inspection of the systems and equipment, EMS data downloads, spot measurements, and short-term monitoring (e.g., less than four weeks). For some projects data sources also include program implementers, interviews with vendors and Energy Efficiency Service Providers (EESPs) that participated in a given project.

Each review results in a formal analysis plan. Each plan explains the general gross impact approach used (including monitoring plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex post gross impact approach.

Schedule and Conduct On-Site Data Collection

On-site surveys are completed for each of the customer applications sampled. The engineer assigned to each project first calls to set up an appointment with the customer.

During the on-site audit, data identified in the analysis plan is collected, including monitoring records (such as instantaneous spot watt measurements for relevant equipment, measured temperatures, data from equipment logs and EMS/SCADA system downloads), equipment nameplate data, system operation sequences and operating schedules, and, of course, a careful description of site conditions that might contribute to baseline selection.

All engineers who conduct audits are trained and experienced in completing inspections for related types of projects. Each carries all equipment required to conduct the planned activities. They check in with the site contact upon arrival at the building, and check out with that same site contact, or a designated alternate, on departure. The on-site audit consists of a combination of interviewing and taking measurements. During the interview, the engineer meets with a building representative who is knowledgeable about the facilities' equipment and operation, and asks a series of questions regarding operating schedules, location of equipment, and equipment operating practices. Following this interview, the engineer makes a series of detailed observations and measurements of the building and equipment. All information is recorded and checked for completeness before leaving the site.

Conduct Site-Specific Impact Calculations and Prepare Draft Site Reports

After all of the field data is collected, including any monitoring data, energy and demand impacts are developed based on the on-site data, monitoring data, application information, and, in some cases, billing or interval data. Each engineering analysis is based on calibrated engineering models that make use of hard copy application review and on-site gathered information surrounding the equipment installed through the program (and the operation of those systems).

Energy savings calculations are accomplished using methods that include short-term monitoring-based assessments, simulation modeling (e.g., DOE-2), bin models, application of ASHRAE methods and algorithms, analysis of pre- and post-installation billing and interval data, and other specialized algorithms and models.

After completion of the engineering analysis, a site-specific draft impact evaluation report is prepared that summarizes the M&V plan, the data collected at the site, and all of the calculations and parameters used to estimate savings.

Quality Control Review and Final Site Reports

The focus of the engineering review is on the quality and clarity of the documentation and consistency and validity of the estimation methods.

Each draft site report underwent extensive senior engineer review and comment, providing feedback to each assigned engineer for revisions or other improvements. Each assigned engineer then revised the draft reports as necessary to produce the final site reports that appear in Appendix 5.2.3 to this report.

2.1.2 Net Program Savings

Net Program Savings

The primary objective of the net savings analysis for the Custom program was to determine the program's net effect on customers' electricity usage. After gross program impacts have been assessed, net program impacts are derived by estimating a Net-to-Gross (NTG) ratio that quantifies the percentage of the gross program impacts that can reliably be attributed to the program. A customer self-report method, based on data gathered during participant phone surveys, was used to estimate the NTG ratio for this evaluation.

For PY1, the net program impacts were quantified solely on the estimated level of free-ridership. This requires estimating what would have happened in the absence of the program. The existence of participant spillover was examined qualitatively in PY1.

Once free-ridership has been estimated the Net-to-Gross (NTG) ratio is calculated as follows:

NTG Ratio = 1 – Free-ridership Rate

Free-Ridership

Free ridership was assessed using customer self-report approach following a framework that was developed for evaluating net savings of California's 2006-2008 nonresidential energy efficiency programs. This method calculates free-ridership using data collected during participant phone surveys concerning the following three items:

- A **Program Components** score that reflects the importance of various program and program-related elements in the customer's decision and timing of the decision in selecting a specific program measures.

- A **Program Influence** score that reflects the degree of influence the program had on the customer's decision to install the specified measures. This score is cut in half if they learned about the program after they decided to implement the measures.

- A **No-Program** score that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score accounts for deferred free ridership by incorporating the likelihood that the customer would have installed program-qualifying measures at a later date if the program had not been available.

Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure. The rationale for using the maximum value is to capture the most important element in the participant's decision making. This approach and scoring algorithm is identical to that used by the Ameren Illinois and ComEd evaluators with the exact same questions.

The calculation of free-ridership for the Custom program is a multi-step process. The survey covers a battery of questions used to assess net-to-gross ratio for a specific project/application.

Responses are used to calculate a Program Components score, a Program Influence score and a No-Program score for each project covered through the survey. These three scores can take values of 0 to 10 where a lower score indicates a higher level of free-ridership. The calculation then averages those three scores to come up with a project-level net-to-gross ratio. If the customer has additional projects at other sites covering the same end-use, the survey asks whether the responses also apply to the other projects. If that is the case, the additional projects are given the same score.

This scoring approach is summarized in Table 6.

Table 6. Net-to-Gross Scoring Algorithm for the PY1 Custom Program

Scoring Element	Calculation
Program Components score. The maximum score (on a scale of 0 to 10 where 0 equals not at all influential and 10 equals very influential) among the self-reported influence level the program had for: A. Availability of the program incentive B. Information from technical assistance received from DCEO or Smart Energy Design Assistance Center staff C. Recommendation from utility staff D. Information from utility or program marketing materials E. Endorsement or recommendation by a utility account rep	Maximum of A, B, C, D, and E
Program Influence score. "If you were given a TOTAL of 100 points that reflect the importance in your decision to implement the <ENDUSE>, and you had to divide those 100 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM?"	Points awarded to the program (divided by 10) Divide by 2 if the customer learned about the program AFTER deciding to implement the measure that was installed
No-Program score: "Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the DCEO program had not been available, what is the likelihood that you would have installed exactly the same equipment?" Adjustments to the "likelihood score" are made for timing: "Without the program, when do you think you would have installed this equipment?" Free-ridership diminishes as the timing of the installation without the program moves further into the future.	Interpolate between No Program Likelihood Score and 10 where "At the same time" or within 6 months equals No Program score, and 48 months later equals 10 (no free-ridership)
Project-level Free-ridership (ranges from 0.00 to 1.00)	1 – Sum of scores (Program Components, Program Influence, No-Program)/30
PY1 Project level Net-to-Gross Ratio (ranges from 0.00 to 1.00)	1 – Project level Free-ridership
Apply score to other end uses within the same project?	If yes, assign score to other end-uses of the same project
Apply score to other projects of the same end-use?	If yes, assign score to same end-use of the additional projects

Spillover

For the PY1 Custom program evaluation, a battery of questions was asked to qualitatively assess spillover Below are paraphrased versions of the spillover questions that were asked:

1. Since your participation in the DCEO program, did you implement any ADDITIONAL energy efficiency measures at this facility that did NOT receive incentives through any utility or government program?
2. What specifically were the measures that you implemented?
3. Why are you not expecting an incentive for these measures?
4. Why did you not install this measure through the DCEO Program?
5. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of these measures.
6. Please describe the EFFICIENCY of these measures.
7. Please describe the QUANTITY installed of these measures.
8. Were these measures specifically recommended by a program related audit, report or program technical specialist?
9. How significant was your experience in the DCEO Program in your decision to implement this Measure, using a scale of 0 to 10, where 0 is not at all significant and 10 is extremely significant?
10. Why do you give the DCEO program this influence rating?
11. If you had not participated in the DCEO program, how likely is it that your organization would still have implemented this measure, using a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure?

Responses to these questions were used to assess whether spillover may be occurring and the type of equipment involved, but do not offer enough detail to quantify the spillover. Spillover could be quantified through follow-up questioning and site visits on potential spillover occurrences reported by the participants.

2.2 Data Sources

Table 7 provides a summary of the principal data sources contributing to the evaluation of the PY1 Custom program. For each data element listed table provides the targeted population, the sample frame, sample size and timing of data collection. In addition the evaluation team reviewed program materials developed by DCEO, including program guidelines, and program application forms.

Table 7. Principal Data Sources Contributing to the PY1 Evaluation

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Custom program customers, projects and measures	DCEO Tracking Database	-	All	Ongoing
Application Records Analysis	Custom program customers, projects and measures	File Copies	-	All	As Needed
In-depth Phone Interviews	DCEO Custom Program Staff	Contact from DCEO	Custom Program Manager	1	June 2009
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of Custom Program Participants	10	October 2009
Project Application File Review	Custom Program Projects	Tracking Database	Stratified random sample by project-level kWh (3 strata)	5	October 2009
On-Site Visits and Measurement					

Tracking Data

The tracking data for this evaluation consists of an Excel spreadsheet that DCEO staff maintained. Program samples were drawn from the versions sent by DCEO dated September 8, 2009.

Project Application File Review

To support Final Application file review and the development of critical evaluation data not supported by the tracking system, project documentation was obtained from DCEO files, for each project in the population. Documentation included application forms and supporting documentation from the applicant (ex ante impact calculations, invoices, measure specification sheets, vendor proposals), pre-inspection reports and photos (when required), post inspection reports and photos (when conducted), and important email and memoranda.

Program and Implementer Staff Interviews

One in-depth interview, with the Program Manager Tom Coe, was conducted as part of this evaluation. The interview was completed over the phone in June of 2009. The interview focused on program processes to better understand the goals of the program, how the program was implemented, the perceived effectiveness of the program, and also verified evaluation priorities. The interview guide used for the interview is included in Appendix 5.1.1.

CATI Phone Survey

A CATI telephone survey was conducted with 10 Custom program participants. This survey focused on questions to estimate the net program impacts and to support the process evaluation. All CATI surveys were completed in October 2009.

The CATI survey was directed toward unique customer contact names from the tracking system for PY1 paid Custom projects. The survey assessed all of the parameters necessary to calculate PY1 free-ridership, and supported gross savings analysis by collecting self reported data for end-use hours of operation. Additional data was collected to support a qualitative assessment of spillover as well as the process evaluation. The CATI survey instrument used for this evaluation is included in Appendix 5.1.2.

On-Site Visits and Measurement

On-site surveys were completed for each of the applications sampled for M&V. During each on-site visit, data identified in the analysis plan is collected, including monitoring records (such as instantaneous spot watt measurements for relevant equipment, measured temperatures, data from equipment logs and EMS/SCADA system downloads), equipment nameplate data, system operation sequences and operating schedules, and a careful description of site conditions that might contribute to baseline selection.

2.3 Sampling

The tracking data delivered for this evaluation was provided as an Excel spreadsheet by DCEO on September 8, 2009.

Profile of Population

Tables 8 and 9 below provide a profile of PY1 Custom program participation. Tracking records are project applications, and were first sorted and placed in three strata using ex ante savings kWh to create three strata with roughly equal contributions to total program savings.

Sampling by strata was completed for ex post gross M&V-based evaluation, as well as a telephone survey supporting ex post net impact evaluation and the process evaluation. Due to overlapping customers in both the Prescriptive and Custom programs, those two samples were carefully coordinated to avoid contacting customers more than once.

Table 8 presents each of the 25 tracking records that are included in the Custom program, sorted on the ex ante gross kWh claimed by the program for each application. Also shown is the kWh-based strata used in the sample design, the incentive paid, and a measure description taken from the application files provided. The program does not seek to quantify or track peak demand impacts, which made it problematic to estimate peak savings for the program overall, as will be discussed at greater length in the results in Chapter 3.

Table 9 presents each of three strata developed for sampling, among 25 unique Custom applications. The number of unique applications is presented by strata, along with ex ante gross kWh claimed, and the amount of incentive paid. The three largest applications that make up all the strata 1 and 2 projects account for 73% of the kWh-based ex ante impact claim.

Table 8. PY1 Custom Participation by Project Application Submitted

Application ID	Measure Description	Ex Ante kWh Impact Claimed	% of Total kWh	Sampling Strata	Incentive Paid to Applicant
1	Insulate steam and condensate piping, and retrocommission four buildings	7,557,704	45	1	$529,039
2	Lighting retrofits to public safety buildings	3,453,000	20	2	$241,710
3	Install power management software on PCs and monitors	1,376,200	8	2	$96,334
4	Digital control of air handling units	967,874	6	3	$67,751
5	Replace existing HPS lights with induction high bay lighting	744,074	4	3	$52,085
6	Retrofit T12 lighting with T8, and replace incandescent Exit signs with LED, etc.	504,479	3	3	$28,919
7	Installation of VFDs at sanitary lift station	323,100	2	3	$22,617
8	Replace existing full voltage starters with variable control starters, and add torque control load balancer	222,114	1	3	$14,088
9	Lighting retrofit in 3 buildings	215,265	1	3	$15,069
10	Replace 30 mercury vapor fixtures with 30 metal halide fixtures, install timer and off switches, and replace incandescent lamps with fluorescent lamps	197,277	1	3	$13,809
11	Replace 26 welding machines with 19 new welding machines	195,686	1	3	$13,698
12	Installation of VFDs at sanitary lift station	193,000	1	3	$13,510
13	Replace HID's with metal halide fixtures and reflective ceiling	180,904	1	3	$12,663
14	3 VFDs and 1 controller to existing blower system	165,014	1	3	$10,966
15	Install lighting control panel for 122 T-5 fixtures	158,580	1	3	$9,747
16	Replace T12 lighting with T7, replace incandescent with CFL, and replace incandescent exit with LED exit lamps	108,586	1	3	$7,601
17	Retrofit existing high-pressure sodium fixtures with pulse start metal halide; and implement high-low operation	74,412	0.4	3	$5,209
18	Replace elevator motors	71,305	0.4	3	$4,992
19	Replace T12 HO with T8 and electronic ballasts	65,910	0.4	3	$4,614
20	Install VFD on pool pump	35,145	0.2	3	$1,993
21	Replace cooling coils, and take out "moisture eliminators"	27,200	0.2	3	$1,904
22	Install occupancy sensors	27,200	0.2	3	$5,141

Application ID	Measure Description	Ex Ante kWh Impact Claimed	% of Total kWh	Sampling Strata	Incentive Paid to Applicant
23	Replace outdoor lighting with metal halide pulse start lamps	8,100	<0.1	3	$567
24	Replaced computer monitors with LCD monitors	5,654	<0.1	3	$396
25	Replace existing lamps with energy efficient lamps and ballasts	4,127	<0.1	3	$289

Source: Evaluation analysis of tracking savings.

Table 9. PY1 Custom Participation by Sampling Strata

Sampling Strata	Ex Ante kWh Impact Claimed	Percent of Total kWh Claimed	Applications	Incentive Paid to Applicant
1	7,557,704	45%	1	$529,039
2	4,829,200	29%	2	$338,044
3	4,495,006	27%	22	$307,627
TOTAL	16,881,910	100%	25	$1,174,710

Source: Evaluation analysis of tracking savings.

2.3.1 Gross Impact M&V Sample

The sample for the PY1 Custom program projects was selected from data in the DCEO tracking system. Data review was undertaken before the sample was pulled to check for outliers and missing values. Some projects contain both Custom and Standard measures (combined projects). The Custom and Standard Incentive programs were evaluated through different approaches by necessity, so the evaluation team included all custom measures within the Custom evaluation, and all standard measures within the Standard evaluation. The phone survey was coordinated by assigning combined projects to one evaluation or the other to avoid multiple contacts. As a result, 18 projects required special coordination between the two evaluations.

Program-level Custom savings data were analyzed by project size to inform the sample design for this population of heterogeneous measures. Projects were stratified by tracking record size using the ex ante kWh impact claim. Records were sorted from largest to smallest Custom kWh claim, and placed into one of three strata in an effort to place roughly one-third of the program total kWh claim in each. Thus, the single largest record comprising over one-third of the program savings was assigned to strata 1, the next 2 largest records comprising less than one-third of program savings were assigned to strata 2, and the smallest 22 records were assigned to strata 3.

The Custom evaluation plan called for a target sample of 5 applications in the ex post gross impact M&V sample. This sample was drawn as follows: the one record in strata 1 was selected, the 2 records in strata 2 were selected, and 2 records out of 22 were randomly selected in strata 3.

Profile of the Gross Impact M&V Sample

Table 10 provides a profile of the gross impact M&V sample for the Custom program in comparison with the program population. Shown is the resulting sample that was drawn, consisting of 5 applications, responsible for 12.4 million kWh of ex ante impact claim and representing 74% of the ex ante impact claim for the program population. Also shown are the ex ante-based kWh sample weights for each strata. Ex ante-based kW weights were not developed because peak demand impact estimates are not tracked by the program. The sample points targeted were all completed.

Table 10. Profile of the Gross Impact M&V Sample by Strata

Custom Program Population Summary				Target and Achieved Sample		
Sampling Strata	**Number of Applications (N)**	**Ex Ante kWh Impact Claimed**	**kWh Weights**	**n**	**Ex Ante kWh**	**Sampled % of Population**
1	1	7,557,704	0.45	1	7,557,704	100%
2	2	4,829,200	0.29	2	4,829,200	100%
3	22	4,495,006	0.27	2	35,300	1%
TOTAL	25	16,881,910	-	5	12,422,204	74%

2.3.2 CATI Telephone Survey

A CATI telephone survey was implemented with a stratified random sample of 10 Custom Incentive Program participants. This survey focused on questions to estimate net program impacts and to support the process evaluation. All CATI surveys were completed in October of 2009.

Sampling

The CATI phone survey drew a sample from the Custom program population, with a target to achieve 10 completed telephone interviews with unique program participants. Duplicate contact names were removed from the sample where a single person was involved in more than one project application.

A stratified random sampling approach was employed. Program-level Custom savings data were analyzed by project size to inform the sample design for the population. Projects were stratified by tracking record size using the ex ante kWh impact claim. Records were sorted from largest to smallest Custom kWh claim, and placed into one of three strata such that each contains one-third of the program total kWh claim. The strata that were developed were already identified above under gross impact M&V, Table 9.

The Custom evaluation plan called for a target sample of 10 applications in the ex post net impact and process evaluation sample. This sample was drawn as follows: a census of one application in strata 1 was selected, a census of 2 applications out of 2 were selected in strata 2, and 7 applications out of 22 were randomly selected in strata 3. After initially targeting completes with just the targeted applications, the sample was eventually opened up to the remaining points in strata 3 in an attempt to collect the full number of targeted completes.

The evaluation team concluded that an un-weighted analysis provided the best representation for process results.

Survey Disposition

Table 11 provides the net impact and process evaluation sample disposition for the program population. Shown is the resulting number of survey completes, consisting of 10 applications in strata 3, 2 in strata 2 and 1 in strata 1. The resulting survey completes represent 14.4 million kWh of ex ante impact claim which is 85% of the ex ante impact claim of the program population. When the survey was first implemented, no completes were achieved in strata 1 and 2, which combined represents 73% of the ex ante kWh impact claim. A second attempt was then successfully made to obtain net impact and spillover data from strata 1 and 2. For this reason the analysis sample used for process evaluation consists of the 10 strata 3 points alone, while all 13 points contribute to the net impact evaluation. Ex ante-based kW weights were not developed because peak demand impact estimates are not tracked within the program.

Table 11. Profile of the Participant Survey Sample by Strata

Program Population Summary				Achieved Sample		
Sampling Strata	Number of Applications (N)	Ex Ante kWh Impact Claimed	kWh Weights by Segment	n	Ex Ante kWh	Sampled % of Population
1	1	7,557,704	0.45	1	7,557,704	100%
2	2	4,829,200	0.29	2	4,829,200	100%
3	22	4,495,006	0.27	10	2,007,498	45%
TOTAL	25	16,881,910	-	13	14,394,402	85%

Table 12 below shows the final dispositions of the 21 unique participants in the Custom Incentive Program. As this table shows, contact with all contacts was attempted, resulting in 10 completed surveys. An attempt was made to reach each of these customers at least three to four times. In addition, the evaluation team contacted the two largest savers outside of the CATI framework and completed the impact module only with these two customers. Table 12 summarizes the survey dispositions.

Overall, the response rate for this survey was 48% for the entire survey and 57% for the impact portion, computed as the number of completed surveys divided by the number of eligible respondents.[2]

Table 12. Sample Disposition

Sample Disposition	Entire Survey		Impact Module	
	Customers	%	Customers	%
Population of Unique Contacts	21	100%	21	100%
Completed Survey	10	48%	12	57%
Unable to Reach	4	19%	4	19%
Non-Specific Callback/Appointment Scheduled	6	29%	5	24%
Refusal	1	5%	-	-

Source: ODC CATI Center

[2] Eligible respondents include the following dispositions: a) Completed Survey, b) Unable to Reach, c) Non-Specific Callback/Appointment Scheduled, and d) Refusal.

Profile of Survey Respondents

Approximately 70% of survey respondents represent one of two sectors: local government and K-12 schools. This distribution is similar to that of all 21 entities that participated in the Custom Program in PY1. Table 13 presents the comparison of sectors for survey respondents and the population of participants.

Table 13. Business Sector of Survey Respondents

Sector	Population (N=21)	Survey Respondents	
		Entire Survey (n=10)	Impact Module (n=12)
Local Government	62%	60%	58%
K-12 Schools	14%	10%	8%
Federal Government	10%	10%	8%
Community Colleges	10%	20%	17%
Universities	5%	0%	8%

Source: DCEO Tracking Database

Half of survey respondents are classified as small entities with the other half classified as large. This distribution is similar to that of all 21 public sector entities that participated in the program in PY1 (see Table 14).

Table 14. Size of Public Sector Entity

Size of Entity	Population (N=21)	Survey Respondents	
		Entire Survey (n=10)	Impact Module (n=12)
Small	57%	50%	50%
Medium	0%	0%	0%
Large	43%	50%	50%

Source: DCEO Tracking Database.

3 PROGRAM LEVEL RESULTS

This section presents the Custom Incentive program impact and process evaluation results.

3.1 Impact

3.1.1 Verification and Due Diligence

This section provides a summary of the results of Task 3 – Verification and Due Diligence. Under this task, the quality assurance and verification activities currently carried out by program staff are explored. These activities are compared to industry best practices[3] for similar C&I programs to determine:

1. If any key quality assurance and verification activities that should take place are currently not being implemented.
2. If any of the current quality assurance and verification activities are biased (i.e., incorrect sampling that may inadvertently skew results, purposeful sampling that is not defendable, etc.).
3. If any of the current quality assurance and verification activities are overly time-consuming and might be simplified or dropped.

This assessment primarily relied on in-depth interviews with program staff and documentation of current program processes as outlined in the program Guidelines and Application.

The complete draft report on this task is provided in Appendix 5.2.2. The report includes a summary of key quality assurance and verification activities currently conducted by DCEO's Public Sector Energy Efficiency (PSEE) Custom and Standard programs and recommendations for improvement; an overview of data collection activities carried out for this task; and detailed findings on current quality assurance and verification activities by program. The final summary and recommendations section of the report is provided below.

Summary and Recommendations for the PSEE Custom Program

Overall, the DCEO's quality control and verification procedures for the PSEE Custom Program were acceptable for PY1 but need further development to ensure high quality projects and tracking data as program participation expands. It is critical to acknowledge that DCEO programs face staff resource constraints and, within this operating environment, make an dedicated effort to institute sound procedures related to quality control and verification.

In particular, the program is strongest in the area of administrative review. Suggested improvements focus on developing documentation and applying formal pre- and post-inspection protocols, maintaining an up-to-date tracking system through the various stages of project completion, and potentially adding a second check of large and complex projects based on resource availability. These enhancements will help to

[3] See the Best Practices Self Benchmarking Tool developed for the Energy Efficiency Best Practices Project: http://www.eebestpractices.com/benchmarking.asp.

ensure quality and consistency as staff verification resources are added to meet higher program participation levels.

Table 15 summarizes the quality assurance and verification activities currently carried out by the PSEE Custom Program. It also features recommended changes to current procedures, as well as suggestions regarding additional activities that DCEO could implement to enhance quality assurance and verification.

Table 15. Summary of QA Activities in Place and Recommendations

QA Activities in Place	Recommended Changes
Pre-Approval • Customer eligibility and application completeness checks • Measure eligibility review • Pre-inspections using a standardized form	**Pre-Approval** • Document and apply procedures for entry of pre-approval information into the tracking system to minimize time lag in data entry. • In addition to routine checking of measure eligibility and quantities in each application, conduct a second check on large and complex projects. • Document and apply formal criteria for selecting projects for pre-inspection, as well as targets for the number of pre-inspections. • Document procedures in detail for conducting pre-inspections, including what information is collected, where it is recorded, and where inspection forms are stored as part of project tracking.
Final Approval • Customer eligibility and application completeness checks • Measure eligibility review • Post-inspections using a standardized form • Targeted number of post-inspections based on project size.	**Final Approval** • In addition to routine checking of measure eligibility and quantities in each application, conduct a second check on large and complex projects. • Document formal criteria for selecting projects for post-inspection, and targets for the number of post-inspections. • Document procedures in detail for conducting post-inspections, including what information is collected (equipment description and specs, operational data, guidelines for census counts versus sampling), where it is recorded, and where inspection forms are stored as part of project tracking.

3.1.2 Tracking System Review

A review was completed of the Custom Incentives program data in the DCEO tracking system to identify issues that could affect program reporting and improve future evaluation efforts. Project data were reviewed for outliers and missing information, obvious errors and general usefulness for reporting accomplishments and conducting evaluation activities. We also assessed basic functionality of the tracking system for use in recording, tracking, and reporting impact data.

The tracking data for this evaluation consisted of an Excel spreadsheet file that DCEO updated and delivered on a periodic basis. The review is based on versions sent by DCEO dated September 8, 2009. The file is **Custom projects 9-8-09.xlsx** and includes project level details including measures, incentives, milestone dates and savings for each participating project, plus data surrounding the applicants (including project identifiers, customer identifiers and more).

DCEO uses this spreadsheet as the tracking system for the Custom Incentives program. The spreadsheet is used to estimate savings and incentives for each project, and track basic implementation milestones. Participant data and project details from the application package are retained in hard copy files at DCEO offices. This tracking approach has limited functionality for evaluation tasks such as analyzing data and drawing samples.

One aspect of the tracking system that affected the evaluation was the availability of basic contact information in electronic format. This includes applicant contact name, applicant phone number, applicant e-mail and applicant address. This is standard practice in energy efficiency program implementation to have this data available electronically and is an area where improvement is needed. The evaluation team had to photocopy this information from DCEO hard copy files and then enter this information into a database to support evaluation activities such as telephone surveys.

Furthermore, the tracking system did not include electronic information with vendor or contractor contact information. Lastly, the measure description was found lacking in detail on the measures and related equipment in each application. These are also areas for improvement.

Measure description information was populated in the tracking system but there is room for improvement in consistently labeling individual measures. Currently applications involving more than one measure appear as a single record and therefore the measure descriptions tend towards a mixture of rough information concerning the measures installed. DCEO should consider tracking modifications that would isolate individual records for each measure installed and achieve greater levels of consistency in reporting variables that describe measures and end uses affected. With these improvements in place it would be possible to provide measure-based summary statistics and track program accomplishments. Given current measure labeling practices such evaluation efforts were not deemed reasonable to produce.

There were a couple data accuracy issues identified:

- In one earlier extract of the tracking data the Custom and Standard rebate amounts were switched, which could lead to a project being miscategorized.
- One Standard project was erroneously entered as a Custom project.

One particular challenge is that in some cases, multiple customer locations were included in one project, while in others a separate project ID was assigned to each location, and in others multiple buildings in a single site location were included in a single project. An improved tracking approach would be to assign each site address or building to a unique identification number. This could be a unique "Project ID", or potentially a single Project ID could have multiple unique entries for each "Site ID" included in the project. Lacking this identification code limits the ability to construct samples, conduct surveys, and analyze impacts that isolate specific end uses and measures.

For example, one project had measures as diverse as pipe insulation and building commissioning bundled into one project ID, spread across a campus of buildings. Participant phone surveys must focus the respondent's attention to one end-use, measure and decision process at a time because answers to questions on net-to-gross, spillover, and equipment operation are likely to be quite different for different measures.

DCEO does not track summer peak demand impact (kW). This prevents evaluators from confidently and accurately representing the program population using a sample of selected projects. To do so will require consistent estimation summer peak demand, as well as storing those data in the tracking system.

3.1.3 Gross Program Impact Parameter Estimates

Ex post gross program impacts were developed for this evaluation based on detailed M&V for a selected sample of five applications.

Realization Rates for the Program

There are two basic statistical methods for combining individual realization rates from the sample projects into an estimate of verified gross kWh savings for the population when stratified random sampling is used. These two methods are called "separate" and "combined" ratio estimation.[4] In the case of a separate ratio estimator, a separate gross kWh savings realization rate is calculated for each stratum and then combined. In the case of a combined ratio estimator, a single gross kWh savings realization rate is calculated directly without first calculating separate realization rates by stratum.

The separate ratio estimation technique was used to estimate verified gross kWh savings for the Custom program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework. These steps are matched to the stratified random sampling method that was used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of verified gross kWh. The results are summarized in Tables 16 and 17 below. A realization rate for peak demand impact could not be estimated due to the fact that the program does not estimate kW savings.

It should be noted that missing tracking system records for ex ante peak demand impact (kW) precluded the development of kW weights and so the estimation of ex post peak demand impacts was set equal to kW estimates derived within the M&V sample. Since the M&V sample represents 74% of the ex ante annual energy savings, it is further anticipated that the sample also represents the bulk of the summer peak demand savings. Furthermore, strata 1 and 2 savings represent 73% of ex ante annual energy savings, and a census was achieved in those cells. Accepting the sample in strata 3 to represent all the peak demand savings in strata 3 is a conservative evaluation estimate and certainly a lower bound on actual program accomplishments.

[4] A full discussion and comparison of separate vs. combined ratio estimation can be found in Sampling Techniques, Cochran, 1977, pp. 164-169.

Table 16. Gross Impact Realization Rate Results for the Selected M&V Sample

Sampled Application ID	Sample-Based Ex Ante kWh Impact Claimed	Sample-Based Ex Ante kW Impact Claimed	Sampling Strata	Ex Ante-Based kWh Gross Impact Weights by Strata	Sample-Based Ex Post Gross kWh Impact	Sample-Based Ex Post Gross kW Impact	Application-Specific Ex Post Gross kWh Realization Rate	Sample-Based Ex Post Gross kWh Realization Rate
1	7,557,704	-	1	1.00	3,195,619	695.20	0.42	0.42
2	3,453,000	-	2	0.72	2,889,444	363.30	0.84	0.76
3	1,376,200	-	2	0.28	799,368	0.00	0.58	
21	27,200	-	3	0.77	37,015	12.93	1.36	1.39
23	8,100	-	3	0.23	12,139	0.00	1.50	
TOTAL	12,422,204	0.00	-	NA	6,933,585	1,071.43	NA	0.78

Table 17. Gross kWh Realization Rates and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision	Low	Mean	High
	± %			
1	-	0.42	0.42	0.42
2	-	0.76	0.76	0.76
3	5%	1.32	1.39	1.47
Total kWh RR	3%	0.76	0.78	0.80

3.1.4 Gross Program Impact Results

Based on the gross impact parameter estimates described in the previous section gross program impacts were derived for the PY1 Custom program. The results are provided in Tables 18.

Table 18. Gross Parameter and Savings Estimates

Sampling Strata	kWh, Ex Ante	kWh, Ex Post	kWh RR	kW, Ex Ante	kW, Ex Post	kW RR
1	7,557,704	3,195,619	0.42	-	695	NA
2	4,829,200	3,688,812	0.76	-	363	NA
3	4,495,006	6,259,137	1.39	-	13	NA
Total	16,881,910	13,143,568	0.78	-	1,071	NA

Ex ante summer peak demand (kW) impact estimates are not currently estimated or tracked by the program.
Ex post gross summer peak demand (kW) impacts are set equal to the ex post gross impacts measured in the M&V sample alone. It should be noted that the M&V sample represents 73% of the ex ante kWh claim and likely represents a substantial fraction of the demand savings as well.
Without the ex ante kW impacts populated it is not feasible to use ratio estimation to aggregate M&V sample results to the program population.

Appendix 5.2.3 to this report contains site-specific M&V reports for each Custom gross impact sample points. These site-specific draft impact evaluation reports summarize the ex ante savings in the Final Application submitted, the ex post M&V plan, the data collected at the site, and all of the calculations and parameters used to estimate savings. While it probably is not reasonable to draw generalized conclusions from details in those reports, given the PY1 sample size of just five projects, there may be valuable lessons to be learned in those reports as they relate to submitted impact calculations, the approach applied and parameters used. With larger sample sizes in PY2 and PY3 it should be feasible to summarize the cumulative lessons learned.

Nonetheless, the large difference in reported stratum-based realization rates requires some level of explanation.

- Stratum 1 is characterized by a single project, including both the installation of steam piping insulation in multiple campus buildings and retrocommissioning in four campus buildings. The pipe insulation measure savings in the application includes unrealistic assumptions concerning both the contribution of the pipe heat loss to cooling savings, as well as the heat loss difference attributable to the pre- and post-installation conditions. Regarding the retrocommissioning work, the application savings estimates appear to be based on past experience, and an associated savings set equal to 20 percent of usage, which was found to also be an aggressive estimate. The net result of the evaluation of both measures classes resulted in a kWh-based realization rate of just 42 percent.
- The strata 2 realization rate of 0.76 is based on two projects, one involving lighting retrofits in firehouses and police stations, and the other involving personal computer sleepware. The ex post impact adjustments estimated in the lighting retrofit application consisted of one major adjustment – the finding that some of the lights operate less than continuously year-round. In the case of the sleepware measure, it was found that the application assumed software control associated with 10,000 computers, but less than 6,000 computers are currently controlled.

- Regarding strata 3 and the associated realization rate of 1.39, it is not possible to say if the 2 applications out of 22 evaluated represent a meaningful finding for that particular sampling domain. However, based on the sample design this finding must be adhered to. For one of the applications in the gross impact sample the outdoor lighting equipment was found to operate longer than anticipated under the application. For the other application it was found that the assumed pressure drop for newly installed evaporator coils was greater in the application-based calculations than what was observed in the ex post assessment.

The engineering parameters and/or savings assumptions within each of the three largest applications resulted in higher ex ante claims than the ex post results . In one case the ex post evaluation estimates for one measure within a project (composed of several measures) was less than 10% of the ex ante application-based claim. In one lighting retrofit project the ex ante claim assumed that all lights operate continuously, but it was determined during the ex post on-site effort that some lights are switched off. Lastly, in a computer software-based energy savings project, just over half of the number of computers that were projected to be controlled were found to actually be controlled.

3.1.5 Net Program Impact Parameter Estimates

Once gross program impacts have been estimated, net program impacts are calculated by multiplying the gross impact estimate by the Program Net-to-Gross (NTG) ratio. As mentioned above, the NTG ratio for the PY1 Custom program was estimated using a customer self-report approach. This approach relied on responses provided by program participants during the CATI phone survey to determine the fraction of measure installations that would have occurred by participants in the absence of the program (free-ridership).

A quantification of spillover was not included in the calculation of NTG ratio for PY1.

The relative precision at a 90% confidence level is provided in Table 19.

Table 19. NTG Ratio and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low	Mean	High
1	-	0.68	0.68	0.68
2	-	0.77	0.77	0.77
3	14%	0.61	0.71	0.81
Population	7%	0.67	0.72	0.77

The measured NTG ratio in the program sample was high overall, with substantial free-ridership (above about 40%) observed in 4 out of 13 completed estimates. However, the remaining nine estimates had very high NTGR estimates, averaging 88%. All but three out of thirteen Program scores were 8 or above, indicating high levels of program attribution in the participant reports. No-Program scores were somewhat lower, although six out of thirteen were greater than 9. Program Influence scores were generally well correlated with the No-Program scores in strata 1 and 3. However, Program Influence scores in strata 2 (both 5's) were lower than the No-Program scores (both 10's).

The resulting overall mean NTGR for the program population is 0.72.

Spillover

A quantification of spillover was not included in the calculation of NTG ratio for PY1. The phone survey was designed to identify evidence of spillover, and if so, did it appear significant enough to attempt to quantify it in future evaluations. The evidence of spillover for the Custom Incentive program is summarized in Table 20 below.

Table 20. Evidence for Spillover in PY1

Spillover Question	Evidence of Spillover
Since your participation in the DCEO program, did you implement any additional energy efficiency measures at this facility that did NOT receive incentives through any utility or government program?	Of the 13 survey respondents that responded to this question, 4 said "Yes" (31%). These 4 respondents implemented a total of 7 energy efficiency measures. One respondent was unable to elaborate surrounding the measure installed.
What type of energy efficiency measure was installed without an incentive?	(1) Lighting Controls (4) Linear fluorescent (3 T-8's, 1 T-5) (1) LED lamps (1) Practicing curtailment
On a scale of 0 to 10, where 0 means "not at all significant" and 10 means "extremely significant," how significant was your experience in the DCEO program in your decision to implement this energy efficiency measure?	For the 7 implemented measures: (2) Gave a rating of 0 (1) Gave a rating of 9 (4) Gave a rating of 10
If you had not participated in the DCEO program, how likely is it that your organization would still have implemented this measure? Use a 0 to 10, scale where 0 means you definitely would NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure?	For the 7 implemented measures: (2) Gave a rating of 0 (1) Gave a rating of 6 (4) Gave a rating of 10
Why did you purchase this energy efficiency measure without the financial assistance available through the DCEO program?	For the 7 implemented measures: -Job was too small to go through the trouble of the applying to program (1 respondent, 2 measures) -Installed prior to the program (2 respondents, 4 measures) -Don't know (1 respondent, 1 measure)

The results of the phone survey suggest that spillover effects for PY1 would have been difficult to quantify due to the contradictory nature of the survey responses. Spillover impacts will be quantified for the PY2 evaluation. A more robust data collection effort should be considered in PY2 and 3 to ensure a rigorous result.

3.1.6 Net Program Impact Results

Net program impacts were derived by multiplying gross program savings by the estimated NTG ratio. Tables 21 and 22 provide the program-level evaluation-adjusted net impact results for the PY1 Custom program. The chained realization rate (gross RR * NTG Ratio) is 0.56 for kWh.

Table 21. Program-Level Evaluation-Adjusted Gross and Net kWh Impacts for PY1

Sampling Strata	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
1	7,557,704	3,195,619	0.42	2,176,064	0.68
2	4,829,200	3,688,812	0.76	2,828,089	0.77
3	4,495,006	6,259,137	1.39	4,430,842	0.71
Total	16,881,910	13,143,568	0.78	9,434,996	0.72

Table 22. Program-Level Evaluation-Adjusted Gross and Net kW Impacts for PY1

Sampling Strata	Ex Ante Gross kW	Ex Post Gross kW	kW RR	Ex Post Net kW	NTGR (ex post gross)
1	-	695	NA	473	0.68
2	-	363	NA	279	0.77
3	-	13	NA	9	0.71
Total	-	1,071	NA	761	0.71

Ex ante summer peak demand (kW) impacts are not currently tracked by the program.
Ex post gross summer peak demand (kW) impacts are set equal to the ex post gross impacts measured in the M&V sample alone. It should be noted that the M&V sample represents 73% of the ex ante kWh claim and likely represents a substantial fraction of the demand savings as well.
Without the ex ante kW impacts populated it is not feasible to use ratio estimation to aggregate M&V sample results to the program population.
NTGR is transferred from the net kWh result by stratum.
Net-to-gross results derived using kWh weights were transferred to derive ex post net kW impacts by strata.

Table 23 presents Ameren evaluation-adjusted net impact results for the PY1 Custom program.

Table 23. Utility-Specific Evaluation-Adjusted Net kWh and kW Impacts for PY1

Utility	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)	Ex Post Net kW
Ameren	9,560,498	7,443,414	0.78	5,343,190	0.72	NA

Ex post gross summer peak demand (kW) impacts were not estimated for the individual utilities.

3.2 Process

The process component of the PSEE Custom Incentive program evaluation focused on program implementation, program design and processes, marketing and outreach, and participant satisfaction. Data

sources for the process component include a review of program materials, one in-depth interview with the program manager, and a telephone survey with 10 program participants. Of the 10 respondents to the participant telephone survey, six are in ComEd's service territory and four are in Ameren's service territory.

3.2.1 Program Theory and Logic Model

This section contains the program theory, logic model, and performance indicators of DCEO's PSEE Custom incentive program. We created this model using discussions with program management and implementers as well as program documentation. The purpose of program theory and logic models is to serve as:

- A communication tool by
  - allowing the implementer to show reasoning to other stakeholders
  - bringing common understanding between implementer and evaluator
- An evaluation tool to
  - Focus evaluation resources
  - Clearly show what evaluation will do and expected answers from evaluation
  - Provide a way to plan for future work effort

The logic model (LM) is a graphic presentation of the intervention – what occurs and clear steps as to what change the activities undertaken by the intervention are expected to bring about in the targeted population. Logic models can be impact or implementation oriented. An impact model is sparse in terms of how the programs works, but clearly shows the outputs of the program and what they are aimed at affecting. Outcomes are changes that could occur regardless of the program and are generally written as such. The implementation model is how the program works and typically resembles a process flow chart. The model included here is an impact model.

We use numbered links with arrows between each box in the logic model. These numbers allow us to:

- clearly discuss different areas of the model,
- describe why moving from one box to the other brings about the description in the later box, and
- if hypothesis testing occurs within the evaluation, the model helps to indicate specific numbered links for hypotheses testing and the evaluation plan would explicate what we will and will not be tested within the evaluation. The main hypothesis testing for the DCEO programs is around energy impacts due to the program.

The program theory (PT) is a description of why the intervention is expected to bring about change. It may reference theories of behavioral change (e.g., theory of planned behavior, normative theory) or be based on interviews with the program managers as they describe their program.

Creation of the logic model

There are several different "looks" to logic models. For this evaluation, we are using a multi-level model that has a generic statement about resources in the header, activities in the first row, outputs of those activities in the second row, and outcomes in the third (proximal) and fourth (distal) rows. External factors are shown on the bottom of the diagram.

When we created the boxes in the logic model, we used the following "road-map".

Activities – these are discrete activities that roll up to a single "box" that is shown in the model. It separates out activities that may be performed by different groups. Each activity typically has an output. We used program documentation (implementation plans) and/or discussion with program managers to determine activities.

Outputs – These are items that can be counted or seen. It may be the marketing collateral of a marketing campaign, the audits performed by a program, or the number of completed applications. All outputs do not need to lead to an outcome. We used the same sources as for activities to determine outputs.

Proximal Outcomes – these are changes that occur in the targeted population that the program directly "touches". Multiple proximal outcomes may lead to one or more distal outcomes.

Distal Outcomes – these are changes that are implicitly occurring when the proximal outcome occurs. For example, an energy efficiency program may use marketing to bring about changes in Awareness, Knowledge, or Attitudes as a proximal outcome which leads to the distal outcomes of intent to take actions, which leads to actual installation of EE equipment, which leads to energy impacts.

External Factors – these are known areas that can affect the outcomes shown, but are outside of the programs influence. Typically, these are big areas such as the economy, environmental regulations, codes/standards for energy efficiency, weather, etc. Sometimes these can arise from our discussions with the program managers, but often they were thought about and included based on our knowledge.

Expanding the Impact Logic Model

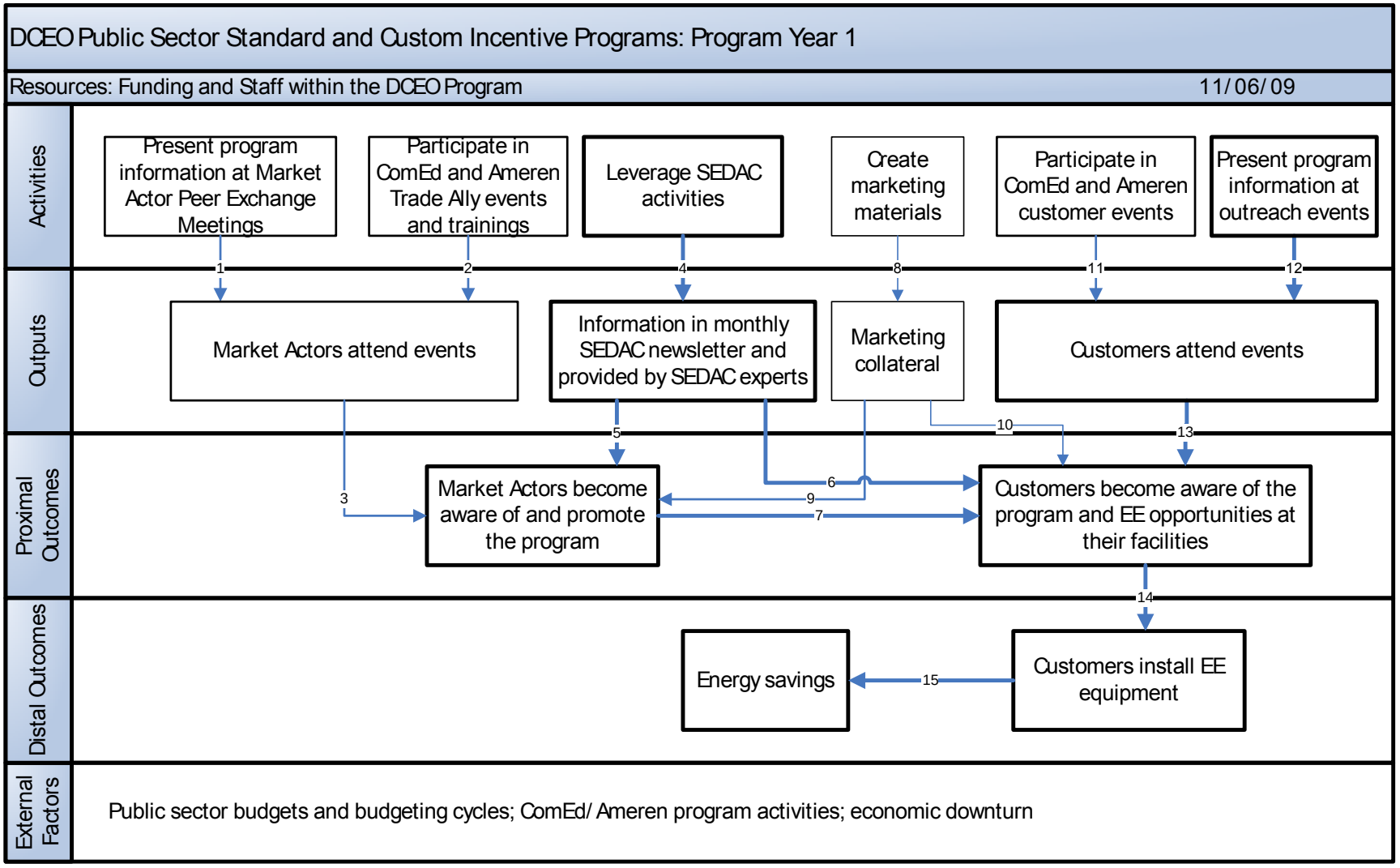
Once the impact logic model was drafted, a table was created that describes the links, the potential performance indicators that could be used to test the link, the potential success criteria that would indicate the link was successful, and potential data sources of the link.

When thinking about how to write each of the performance indicators, we asked ourselves "What might we look at to judge whether the link description actions are occurring" and wrote the answer as the performance indicator.

Success criteria were created by us and are thought to be reasonable. Inclusion of success criteria in the model does not necessarily mean that the evaluation has current plans for examining the program's progress on those criteria. These criteria merely indicate how the particular program theory component **could** be evaluated.

The logic model provides an indication of the relative importance of the various success criteria through shading and thicknesses of links. Some are clearly more relevant than others, given the current market the program operates in. For example, given that the current program faces more demand than it can meet, the success criteria related to marketing the program are not as pertinent as other criteria.

Figure 1. Preliminary Logic Model



Notes: Thicker lines indicate a greater emphasis of activity in program implementation.

Table 24. Performance Indicators Table

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
1	DCEO hosts bi-annual "Peer Exchange" meetings for Market Actors. These events provide a venue for program staff to inform Market Actors about the PSEE program.	1. Number of Peer Exchange meetings where program are discussed	1. 2 Peer Exchange meetings per year.	1. Program documentation
2	DCEO participates in ComEd and Ameren's trade ally events and trainings. These events provide a venue for program staff to inform Market Actors about the PSEE program.	1. Percent of ComEd/Ameren events and trainings attended	1. DCEO staff attends 75% of ComEd and Ameren events and trainings	1. Program documentation
3	Market Actors are not aware of the program or the EE opportunities it offers. The information provided in the events increases Market Actor awareness and knowledge of the program and allows them to promote them more effectively to their customers.	1. Percent of Market Actors who attended Peer Exchange meetings who found information about the program useful 2. Percent of Market Actors who think information helps them to promote the program 3. Percent of Market Actors who attended ComEd/Ameren event who found information about the program useful 4. Percent of Market Actors who think information helps them to promote the program	1/3. 75% of Market Actors who attended an event found it informative 2/4. 75% of Market Actors who attended an event say it helped them promote the program	1. Survey of Market Actors who attended an event - not conducted for PY1
4	Through the Smart Energy Design Assistance Center (SEDAC), the PSEE program have access to an established network of market actors. DCEO leverages this network to inform market actors of program offerings. By using this existing network, DCEO has a captive audience that can be informed of program offerings.	1. Number of SEDAC newsletters with a focus on EE technologies and/or program offerings 2. Percent of SEDAC staff knowledgeable about the program	1. 6 newsletters with PSEE program content 2. 100% of SEDAC staff is knowledgeable about the program	1. Review of SEDAC newsletters 2. Interview with SEDAC staff - not conducted for PY1
5	Market Actors are not aware of the program or the EE opportunities it offers. The information provided through SEDAC increases Market Actor awareness and knowledge of the program and allows them to promote them more effectively to their customers.	1. Percent of Market Actors who are part of the SEDAC network who heard about the program through SEDAC 2. Percent of Market Actors who heard about program through SEDAC who think information helps them to promote the program	1. 75% of Market Actors who are part of the SEDAC network recall hearing about the program through SEDAC 2. 75% of Market Actors who heard about program through SEDAC say information helped them promote the program	1. Survey of Market Actors - not conducted for PY1
6	Customers are not aware of the program or the EE opportunities it offers. The information provided through SEDAC increases customer awareness and knowledge of the program and of energy efficiency opportunities at their facilities.	1. Percent of customers who have used SEDAC services who were informed of the program	1. 75% of customers who used SEDAC services recall hearing about the program through SEDAC	1. Participant & Non-participant surveys (NP survey was not conducted for PY1)
7	Customers are not aware of the program or the EE	1. Percent of Market Actors who	1. 50% of Market Actors who are aware of	1. Survey of Market Actors - not conducted

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
	opportunities it offers. They learn about the program and the available incentives from their Market Actor.	promote the program to their customers 2. Percent of customers who were informed of the program by a Market Actor	the program promote them to their customers 2. 25% of customers report having heard about the program from a Market Actor	for PY1 2. Participant & Non-participant surveys (NP survey was not conducted for PY1)
8	DCEO creates and distributes marketing materials (including a website and program brochures) that provide information on EE technologies and program offerings.	1. Marketing materials are effective 2. Number of website hits	1. Marketing materials provide information and contain messages that will induce customers to participate 2. 25% increase in website hits year to year	1. Review of marketing materials 2. Program documentation
9	Market Actors are not aware of the program or the EE opportunities it offers. They view the program marketing materials and learn about the program and the available incentives.	1. Percent of Market Actors who have seen marketing material 2. Percent of Market Actors who found marketing material useful	1. 10% of market actors report having seen marketing materials 2. 75% of market actors who have seen marketing materials found it useful	1/2. Market actor interviews - not conducted for PY1
10	Customers are not aware of the program or the EE opportunities it offers. They view the program marketing materials and learn about the program and the available incentives.	1. Percent of customers who have seen marketing material 2. Percent of customers who found marketing material useful	1. 10% of customers report having seen marketing materials 2. 75% of customers who have seen marketing materials found it useful	1/2. Participant & Non-participant surveys (NP survey was not conducted for PY1)
11	DCEO participates in ComEd and Ameren's customer events. These events provide a venue for program staff to inform customers about the PSEE program.	1. Percent of ComEd/Ameren events attended	1. DCEO staff attends 75% of ComEd and Ameren events	1. Program documentation
12	DCEO participates in outreach events including presentations at public sector associations. These events provide a venue for customers to find out about program opportunities.	1. Number of events attended	1. 8-12 events attended by a representative of DCEO	1. Program documentation
13	Customers are not aware of the program or the EE opportunities it offers. They attend the outreach events and learn about the program and the available incentives.	1. Percent of customers who attended a ComEd/Ameren event who found information about the program useful 2. Percent of customers who attended an outreach event who found information about the program useful	1/2. 75% of customers who have attended an event found the information useful	1/2. Survey of customers who attended an event - not conducted for PY1
14	Public sector customers have not adopted energy efficient equipment because of awareness, information, and cost barriers. The program makes customers aware of EE opportunities and lowers the information cost as well as the up-front cost through the incentive. Customers participate in the program and install EE equipment.	1. Products offered through the program are desired by public sector customers 2. Incentive offered will induce customers to install promoted products 3. Number of projects	1. 75% of public sector customers desire products offered 2. 75% of customers believe incentives are "good deal" 3. 20% increase in participants year to year	1/2. Participant & Non-participant surveys (NP survey was not conducted for PY1) 3. Program documentation
15	When EE equipment incented through the program is installed, energy savings are realized because the equipment that has been installed is more energy efficient than the equipment that it is replacing.	1. Type of equipment that was replaced 2. Program savings realized	1. 95% of the replaced equipment was less efficient than the installed equipment 2. Program meets is savings goals	1/2. Impact analysis

3.2.2 Participant Profile

In PY1 21 customers conducted 25 projects that accounted for 16.9 GWh of ex-ante gross savings.[5] Municipal governments accounted for almost two-thirds of participants (62%) and projects (64%). Notably, universities account for over half (51%) of energy savings but only 8% of projects. This is due to one project with ex-ante gross savings over 7.5 GWh.

Table 25 summarizes the distribution of PY1 participants, projects, and energy savings by sector.

Table 25. Distribution of Participants, Projects, and Savings by Sector

	Participants		Projects			Ex Ante Savings		kWh/ Project
	#	%	#	%	Projects/ Participant	kWh	%	
Municipal Government	13	62%	16	64%	1.2	6,931,903	41%	433,244
K-12 Schools	3	14%	3	12%	1.0	260,192	2%	86,731
Federal Government	2	10%	2	8%	1.0	941,351	6%	470,676
Community Colleges	2	10%	2	8%	1.0	222,886	1%	111,443
Universities	1	5%	2	8%	2.0	8,525,578	51%	4,262,789
TOTAL	**21**		**25**		**1.2**	**16,881,910**		**675,276**

Source: DCEO Tracking Database.

In PY1, 91% of all projects included one or more lighting measures, while 5% of projects included a chiller or HVAC measure and 11% included a VSD or motor.[6]

3.2.3 Program Design and Processes

DCEO's PSEE Custom Incentive program offers incentives designed to encourage implementation of energy-efficiency measures including compressed air, motors, non-HVAC variable-speed drives, and other non-standard equipment. Many aspects of the program, including the type of measures and incentive levels, were based on the ComEd Custom Incentive Program. Choosing a similar program design was intended to reduce potential confusion among market actors involved in implementing program projects and also made program roll-out easier for DCEO staff.

Overall, participants appear to be satisfied with the program and the processes in which they are involved. Participants provide high ratings for a variety of program components (see also Section 3.2.7), and only one interviewed participant reported that they experienced problems during the participation process.

[5] Gross savings reported in this section are based on the program tracking database. See the discussion of verified net savings in the Impact Section above.

[6] Some projects included multiple end uses; as a result, the percentages sum to more than 100%.

Application Process

The application process includes both a pre-approval and final approval application. Program guidelines stipulate that projects must be completed within 90 days of pre-approval. However, this deadline is not enforced as custom projects in the public sector almost always take longer than 90 days. According to the program manager, this deadline sometimes causes initial concern among participants. While a time limit on project completion is important for fund allocation purposes, the program may wish to consider increasing this limit to a more reasonable time frame for custom projects.

In PY1, program participants had to submit the final approval application within 60 days of project completion, which, according to the program manager, did not pose any problems. In fact, program staff were considering reducing this deadline to 45 days for PY2.

Seventy percent of applicants report that they filled out the pre-approval application themselves. All of the customers who completed the application themselves feel that the pre-approval application clearly explains the program requirements and participation process and 86% rate the application process as easy.[7]

Similarly, 80% of participating customers report filling out the final application themselves, and all of these customers rate the final application process as easy.

The application process allows multiple projects to be incorporated into a single grant resulting in some participants including multiple sites or locations in a single application. This results in inconsistencies within the program tracking database and presents difficulties for program evaluation and tracking. (See also Section 3.1.2.) Going forward, the program may wish to consider clarifying the definition of a project in application materials and requesting that applicants fill out a separate application for each unique site.

The payment process for incentives of $10,000 or more must meet several accounting and legal requirements before payment can be made to the customer. These requirements can cause the process to take several months from the time a completed final application is received to the time that the incentive is paid to the customer. Because pre-approval applications are not required for all custom incentive projects, large incentive requests that are submitted without a pre-approval application might not be paid out for several months. The program should consider requiring pre-approval applications for all projects with an incentive of $10,000. This would allow program staff to begin some of the processing while the project is still being completed, cutting down on the delay in incentive payment. However, to avoid unnecessary effort, program staff should ensure that projects will be completed before beginning early processing of grant application paperwork.

Incentives

During PY1, the maximum incentive rate for custom projects was $0.07/kWh. According to the program manager, this rate was set to be consistent with incentive rates offered by ComEd and Ameren, even though the PSEE program could offer substantially higher incentives and still be cost-effective due to their lower administrative cost. The program manager sees initial cost as a main barrier to the adoption of energy efficient equipment in the public sector and reports that the current incentive is not sufficient for

[7] A score of 7 or higher on a scale from 0 to 10 point scale, where 0 is "very difficult" and 10 is "very easy."

some potential participants to overcome this barrier. For PY2, the incentive rate was adjusted to $0.08/kWh.

While consistency between the utility programs and the DCEO programs is desirable to minimize confusion among market actors, the program should reconsider the necessity to maintain the same incentive rate as the utility programs. Public sector entities are fundamentally different from private sector entities and face unique funding constraints and other barriers to participation. As such, offering higher incentive rates in a public sector program could be justified, as long as the program maintains its required levels of cost-effectiveness. Additional research with non-participants should be conducted to confirm the extent to which current incentive levels are a barrier to participation in the program.

The PSEE Energy Efficiency Guidelines stipulate a maximum grant award of $100,000 for PY1.[8] The Program allowed incentives greater than $100,000 if the entity had multiple project While this did not create a problem during PY1 (the program did not exhaust its incentive funds), the program should consider applying the incentive cap to the entity rather than the building/site. As the program gains traction with more public sector customers, a cap applied at the entity level would prevent a single entity from taking up a large share of the available incentive at the expense of other potential participants. In addition, concentrating too much incentive money in a single project or a single customer carries risk for program savings, if the customer is found to be a free-rider. The program could still exercise discretion in providing exceptions to the cap, depending on the overall levels of participation and unique circumstances of the participant. However, such exceptions should be monitored closely in future program years, especially if incentive funds could become exhausted and other applicants might have to be turned away.

Customer Service

The PSEE Custom Incentive program manager fields any program-related questions from participants. Seventy percent of participants report calling DCEO program staff during the participation process. Seventy-one percent of the participants who called DCEO were satisfied with the answers they received to their questions.

3.2.4 Program Implementation

The PSEE Incentive programs do not have an implementation contractor. Instead, the program manager is responsible for most aspects of implementation, with additional support from other DCEO staff for activities such as project inspections and outreach. Given the limited funding and staffing, implementation of the PSEE Custom Incentive program relies heavily on existing delivery channels such as the Smart Energy Design Assistance Center (SEDAC) and outreach activities by the ComEd and Ameren C&I programs. This approach is both cost-effective (given the limited program resources) and practical (given the overlap in market actors between the PSEE and the utility programs). However, relying on ComEd's and Ameren's outreach activities also means limited control over the content, timing, and frequency of messages being sent. This became a problem for the program in PY1 when the ComEd program became oversubscribed. ComEd ended much of its program promotion and market actors mistakenly thought that incentive money had also run out for public sector projects, negatively affecting the PSEE program.

[8] For PY2, this cap was raised to $200,000.

Going forward, the program should continue to leverage existing delivery channels currently used to promote the program. However, the program should also consider ways to differentiate itself from the utility programs and to more independently reach out to key parties such as trade allies and utility account managers.

SEDAC Network

SEDAC provides technical services to private and public facilities in Illinois in order to help them increase their economic viability through the efficient use of energy resources. In support of this mission, SEDAC maintains a network of energy service providers and sends out a monthly newsletter to more than 3,000 market actors and potential customers. In addition, SEDAC experts often recommend participation in the PSEE programs for public facilities.

The PSEE Custom program is making good use of SEDAC's existing network of experts and communication channels. For example, the program holds outreach events at SEDAC and includes program information in the monthly newsletters. SEDAC experts also include the PSEE programs in their recommendations as part of the technical services they provide to customers. The ability to leverage SEDAC to promote PSEE programs is facilitated by the fact that the manager of the Standard Incentive Program also manages the Smart Energy Design Assistance Program, with which SEDAC is affiliated.

The importance of SEDAC, its outreach activities, and its network of experts to participation in the Custom Incentive Program could not be fully explored in our evaluation efforts for PY1. However, interviews with program participants showed that 30% of participants had heard about the program through the SEDAC newsletter. Participants generally do not know whether their contractor was affiliated with SEDAC (71%), and they place varying degrees of importance on contractor affiliation with an electric utility program: while 40% provide the highest importance rating of 10 (on a scale from 0 to 10), 30% provide the lowest rating of 0.

The program should continue its use of SEDAC in promoting the PSEE Standard Incentive Program. Future evaluation efforts should more fully explore additional opportunities of leveraging SEDAC to increase program participation.

ComEd and Ameren Trade Ally Networks

The C&I incentive programs implemented by ComEd and Ameren rely heavily on trade allies to promote the programs to their customers. The PSEE programs leveraged this relationship in PY1 by participating in outreach and training events for ComEd and Ameren trade allies. According to the PSEE Standard program manager, coordination of outreach activities with the utilities waned over the course of PY1. In addition, the oversubscription of the ComEd program indirectly hurt the PSEE program as ComEd curtailed its promotion, and market actors mistakenly thought that incentive money had also run out for public sector projects.

In PY1, contractors played an important role in promoting the PSEE Custom Incentive program: 80% of participants report having discussed the Custom Program with a contractor or trade ally, although only one interviewed participant named a contractor or trade ally as the first source of information about the program.

Going forward, the program should try to further capitalize on the trade ally networks created by ComEd and Ameren. PSEE staff should try to become more closely involved in the promotional messages sent to ComEd and Ameren trade allies. This is particularly important to avoid confusion among market actors, if the utility programs become oversubscribed again in PY2.

In addition to closer coordination, the program should also try to differentiate itself from the utility programs and more independently reach out to trade allies. This could be done through independent communication with contractors registered with Ameren and ComEd and would allow the program to provide its own messaging at times when the utility programs might no longer need to advertise their programs.

Account Managers

DCEO recognizes that utility account managers are a valuable resource in successful custom programs as they have established relationships with targeted customers. In the case of the PSEE programs, both Ameren and ComEd's account managers could be more fully utilized to market program opportunities to customers in the public sector. Early on in PY1, DCEO conducted a webinar for account managers and presented on the public sector as part of the utilities' roll out of program efforts to account managers. DCEO fields calls from account managers.

Despite the absence of any formal marketing through utility Account Managers, program participants report involvement of Account Managers during PY1:

- 60% of program participants report having a utility account manager;
- Of participants with a utility account manager, 67% report receiving assistance with implementing the project from their Account Manager;
- Of participants with an Account Manager, 50% have discussed the program with an Account Manager; and
- One interviewed participant (10% of all participants) first heard about the program from an Account Manager.

As with trade allies, the program should make an effort to more closely coordinate Account Manager activities with the utilities and try to ensure that correct information about the status of the PSEE programs is provided to customers, even if the utility programs become oversubscribed.

3.2.5 Program Marketing & Outreach

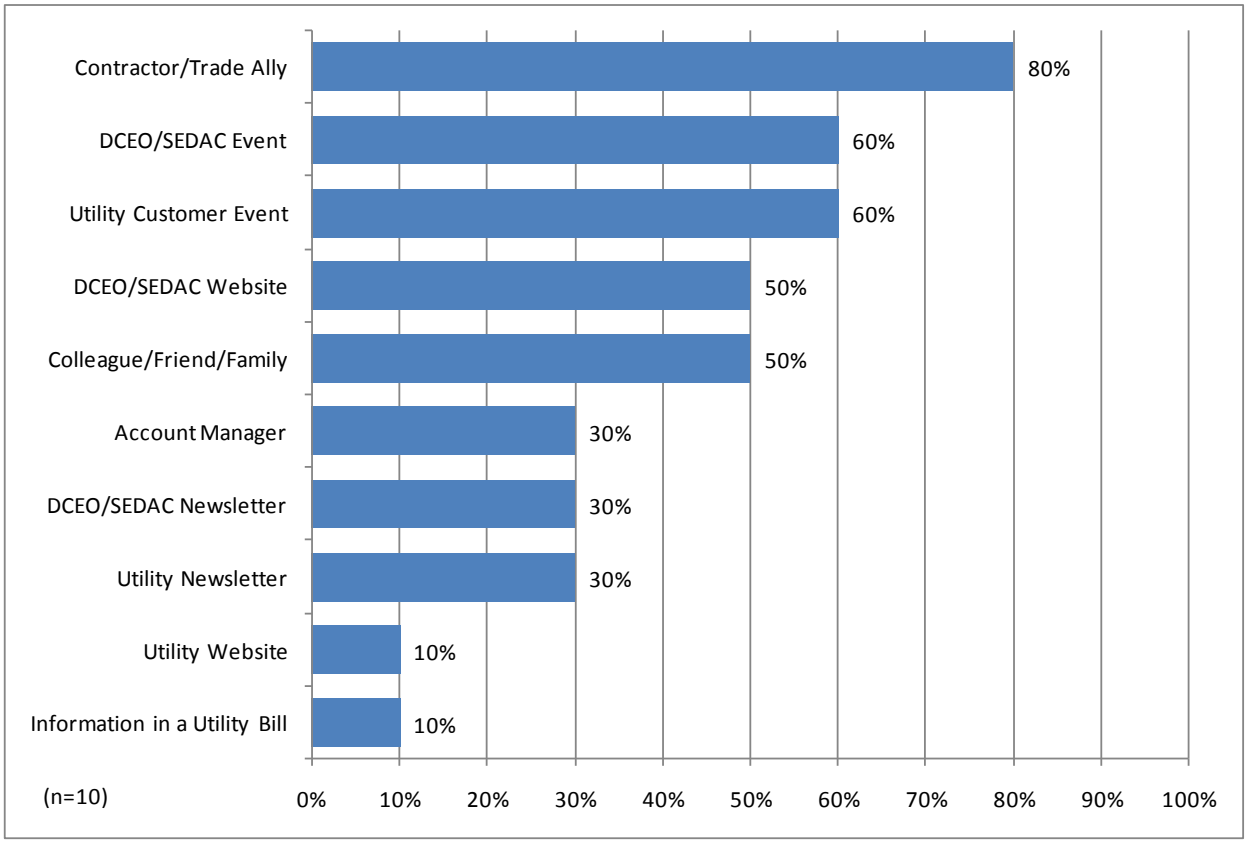
The level of marketing activity conducted in PY1 was limited by staffing availability. In PY1, DCEO assigned one full time staff person to focus on marketing. In addition to this full time staff member, other program staff participated in marketing activities as part of their normal job duties. As discussed in Section 3.2.4, the program did leverage the SEDAC network both by making use of the SEDAC newsletter to inform market actors and potential participants of program opportunities and by including program opportunities in SEDAC's recommendations. In addition, DCEO held two "peer exchange" meetings where program opportunities were presented to market actors, and DCEO staff attended many of ComEd and Ameren's market actor and customer events. It is important to note that public sector customers would also have been exposed to any utility-sponsored marketing of ComEd's Smart Ideas for Your Business and Ameren's Act On Energy programs. In addition, any public sector customer who inquired about participation in the utility programs should have been referred to DCEO's Public Sector Efficiency programs.

Participants recall hearing about the program through a number of different channels. The top three sources of program information are a contractor or trade ally (80%), a DCEO/SEDAC event (60%), and a

Utility Customer event (60%). In addition, utility customer events were most often named as the *first* source of information about the program (30%).

Figure 2 summarizes participant responses about program information sources (questions were prompted).

Figure 2. Sources of Information about the Public Sector Electric Efficiency Program

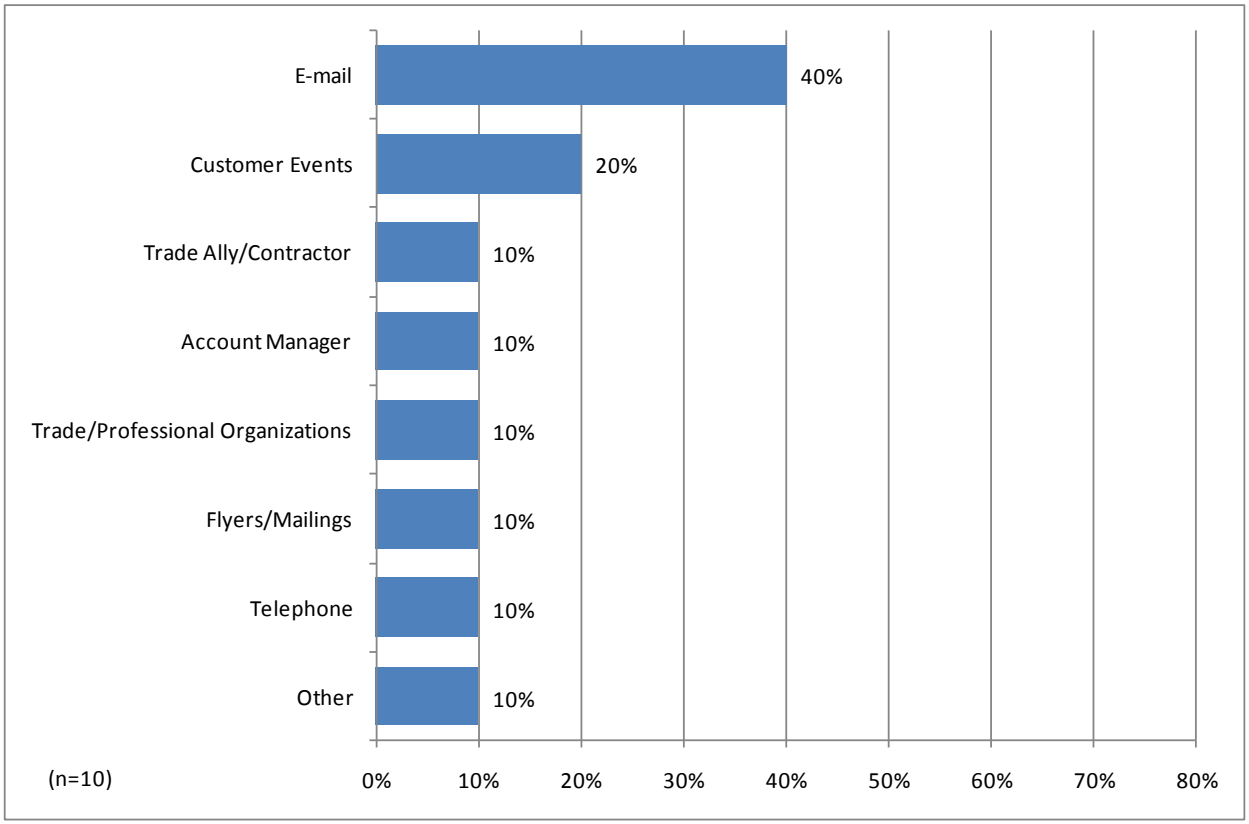


Source: CATI Participant Survey.

In addition to recalling program marketing materials, 90% of participants found the materials to be useful.

When asked about their preferred way of being informed about opportunities such as the PSEE incentive programs, participants most often name e-mail (40%), followed by customer events (20%). (See also Figure 3.) DCEO currently uses e-mail when distributing its monthly SEDAC newsletters as well as conducts two "peer exchange" events per year and attends many of ComEd and Ameren's customer outreach events. The program may wish to consider expanding its use of e-mail for recruiting new participants into the program. If e-mail addresses are not already available, collection could be delegated to a lower level staff member or an intern. Alternately this effort could be limited by focusing on only one or two sectors that have been hard to reach through other channels.

Figure 3. Preferred Methods of Contact (Multiple Response)



Source: CATI Participant Survey.

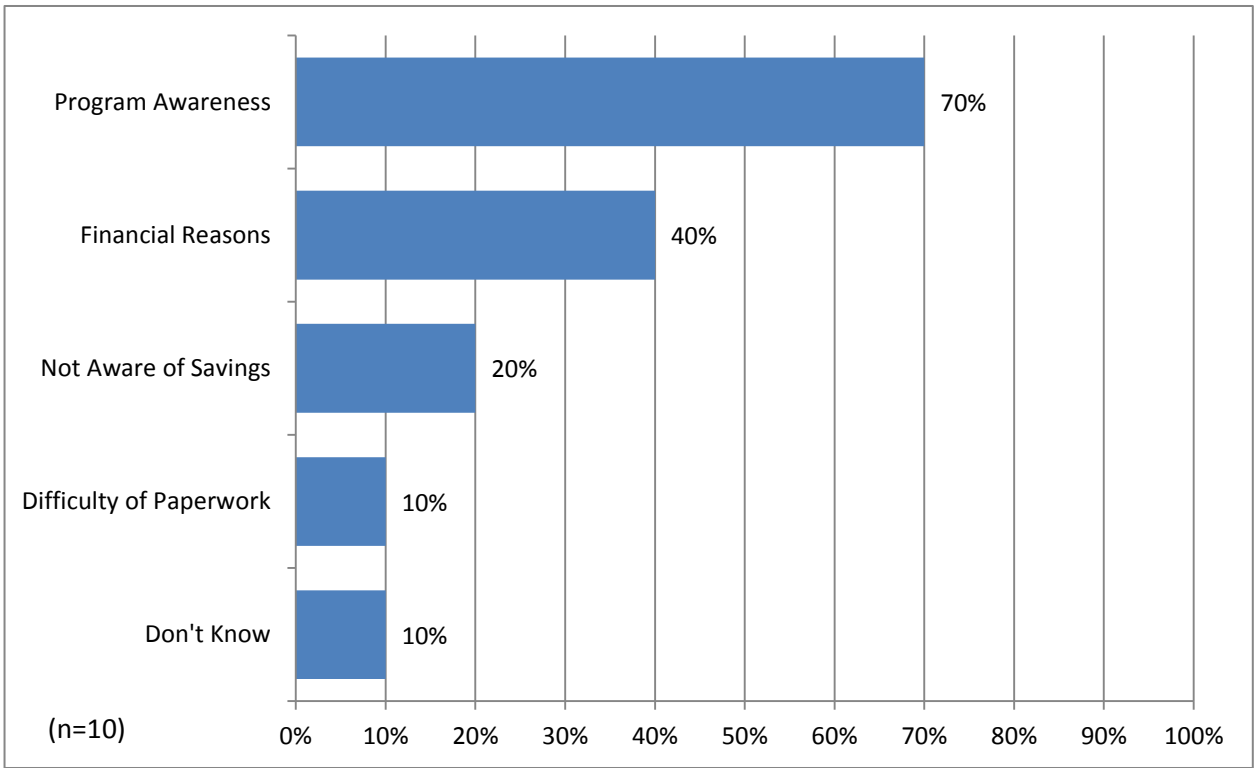
As noted above, public sector customers are also exposed to utility-sponsored marketing of ComEd's Smart Ideas for Your Business program and Ameren's Act on Energy program. While this additional marketing is helpful, given the limited staff and budget of the DCEO program, it can be problematic if the message delivered by ComEd and Ameren is in conflict with the message of the DCEO program. This occurred during PY1 when ComEd's C&I program was oversubscribed while the PSEE program still had funds available, causing some confusion among contractors and potential PSEE participants regarding the availability of program funds. As recommended above, closer coordination with the promotional messages from the utilities should be a priority of the program.

3.2.6 Barriers to and Benefits of Participation

Public sector entities face unique barriers to participation in programs like the PSEE programs. One major barrier, noted by the managers for both the Custom and the Standard Program, is the length of the budget planning process for many public sector entities. In many cases, public sector budgets are written and approved months and even years in advance. According to the Standard program manager, this might have presented a barrier to participation for schools in PY1, as they often implement capital projects during the summer months but had their budgets set several months before the program launched. In future program years, this barrier should decrease as public sector customers are aware of the program and can therefore factor participation into their budgeting process. However, long budget planning cycles also require certainty that the program will be there and funds will be available.

A full assessment of barriers to participation was not possible for this evaluation as interviews with non-participants and market actors were not conducted. However, in order to get a sense of potential barriers, participants were asked about their views of why other customers might not participate in the program. The main reason given was program awareness (70%) (see Figure 4). Given that the program fell short of its PY1 program goals, examination of barriers to participation should be an evaluation priority for the next evaluation cycle.

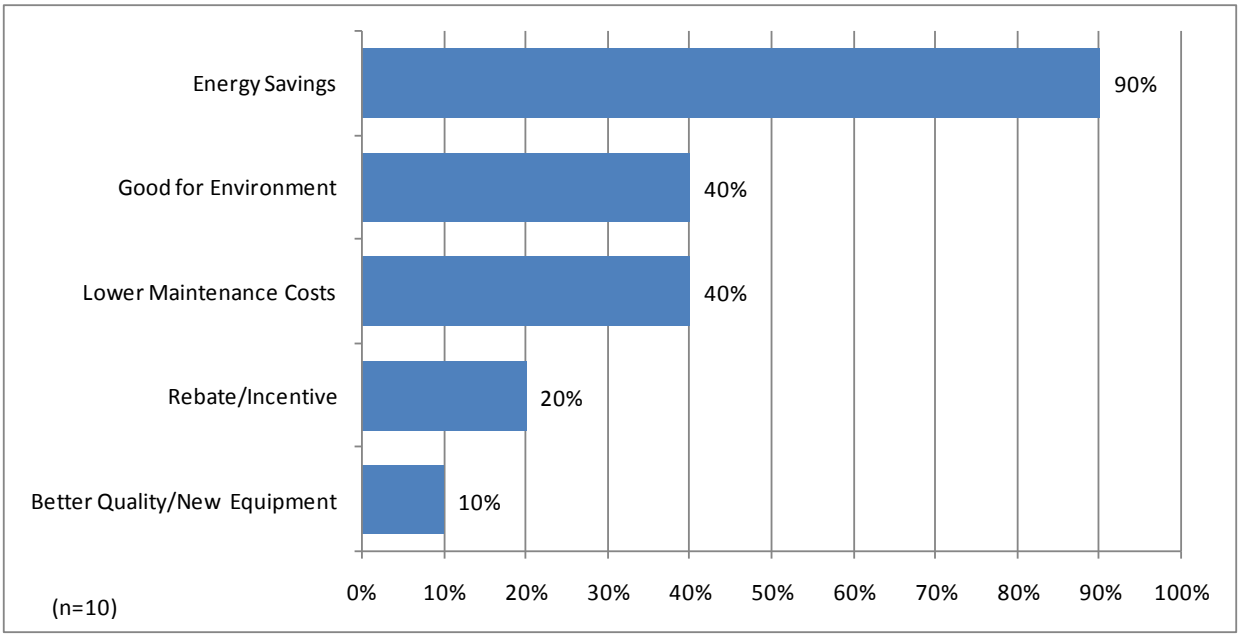
Figure 4. Barriers to Participation (Multiple Response)



Source: CATI Participant Survey.

Finally, participants were asked what they considered to be the main benefits of participating in the program. Overwhelmingly, participants cite energy savings as a program benefit (90%) (see Figure 5).

Figure 5. Benefits of Program Participation (Multiple Response)



Source: CATI Participant Survey.

Information on both potential barriers to and benefits of participation should be utilized when planning messaging for future marketing efforts.

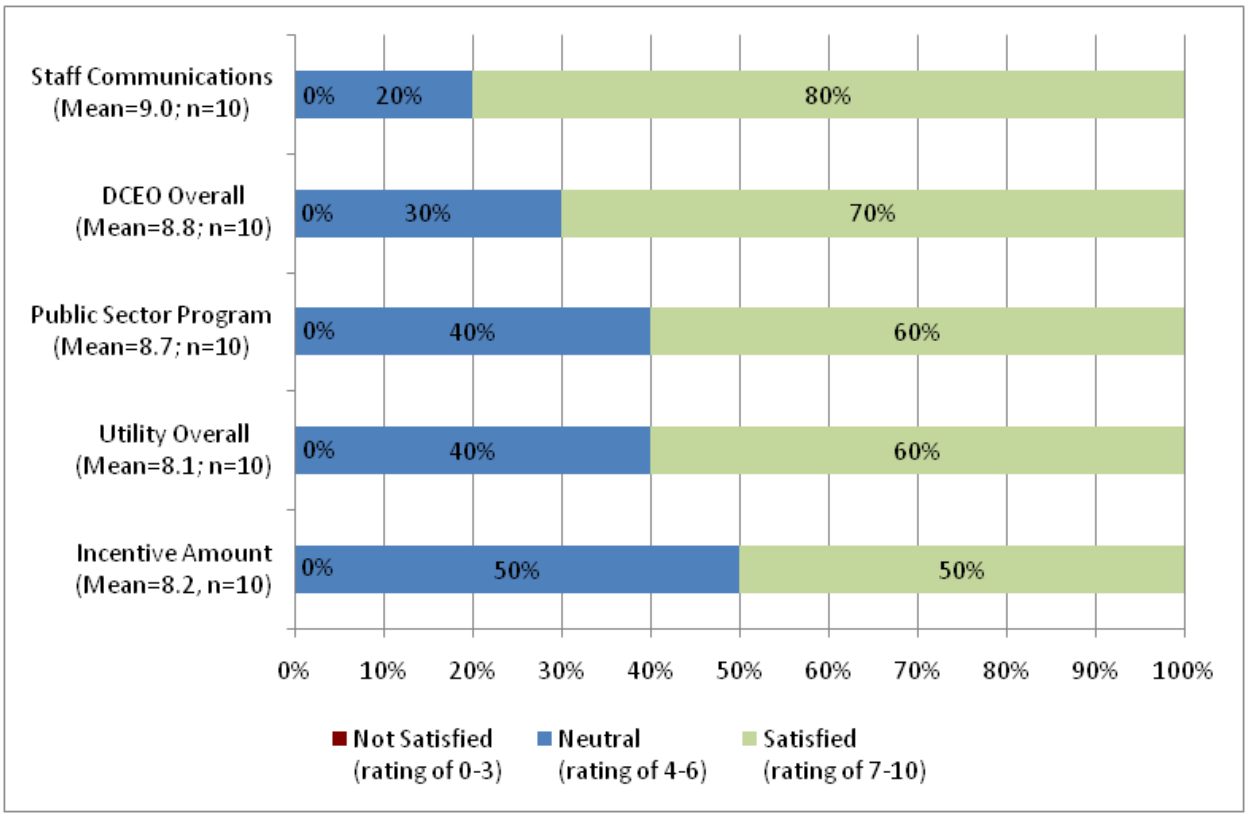
3.2.7 Participant Satisfaction

Participants are satisfied with most aspects of the program. Customers were asked to rate – on a scale of 0 to 10, where 0 means "very dissatisfied" and 10 means "very satisfied" – several aspects of the program. Satisfaction is highest with Staff communications (80% satisfied) and the DCEO overall (70% satisfied). Participants report relatively lower satisfaction with the incentive amount, but half of all interviewed customers are still satisfied.

Figure summarizes participant satisfaction with the various aspects of the program. Notably, not a single participant reported dissatisfaction (a score of 3 or less) with any of the program aspects. Given the limited budget and staff associated with the PSEE program, these satisfaction scores are impressive, and the program staff should be commended for their efforts in maintaining high customer satisfaction with the program.

Importantly, the high level of customer satisfaction is also evident in the fact that 90% of participants are planning to participate in the PSEE Custom Incentive program again in the future.

Figure 6. Program Satisfaction



Source: CATI Participant Survey.

When asked about recommendations to improve the program, participants most often mentioned higher incentives (60%) and better program information (50%).

3.3 Cost Effectiveness

This section addresses the cost effectiveness of the Public Sector Custom program. Cost effectiveness is assessed through the use of the Total Resource Cost (TRC) test. The TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

> *" 'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side*

program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases."[9]

For the DCEO Ameren programs, assessment of cost-effectiveness begins with a valuation of each conservation program's net "total resource" benefits, as measured by the electric avoided costs, total incremental costs of measures installed, and administrative costs associated with the program. A program is deemed cost-effective if its net "total resource" benefits are positive, i.e.,:

$$\frac{Total\ Resource\ Benefits}{Total\ Resource\ Costs} \geq 1$$

where,

$$Total\ Resource\ Benefits = \text{PV}\left(\sum_{year=1}^{measurelife}\left(\sum_{i}^{i=8760}(impact_i \times avoidedcost_i)\right)\right)$$

and,

Total Resource Cost = PV (Incremental Measure Costs + Utility Costs).

Benefits used in the TRC test calculation include the full value of time and seasonally differentiated generation, transmission and distribution, and capacity costs and also take into account avoided line losses. For each energy-efficiency measure included in a program, hourly (8,760) system-avoided costs were adjusted by the hourly load shape of the end use affected by the measure to capture the full value of time and seasonally-differentiated impacts of the measure. Evaluated impacts were provided to AIU for the DCEO program. End-use load shapes were also employed in calculating peak load impacts for energy-efficiency measures in AIU programs. To calculate the peak load impacts from energy-efficiency measures, end-use load shapes were used to identify the average reduction in demand over AIU's top hours defined as summer weekdays from 3 p.m. until 7 p.m. Non-energy benefits such as water savings were not factored into the calculation. Additionally, consistent with The State of Illinois Commerce Commission Order 07-0539 ("the Order") Section 12-103(f)(5), gas benefits were not accounted for under the program.

Future benefits for the TRC are discounted by 9% based on Ameren's weighted average cost of capital (WACC). Benefits are also adjusted for line losses. Annual avoided costs were adjusted to an hourly stream of costs using hourly system load data to capture seasonality and pricing differences. Consistent with the Order, avoided costs include estimates for financial costs associated with legislation and regulation related to greenhouse gas emissions. The carbon costs are introduced in the 2014 (Program Year 6) costs, valued at $15 per ton.

The cost component of the analysis considered incremental measure costs and direct utility costs. Incremental measure costs are the incremental expenses associated with installation of energy-efficiency

[9] Illinois Power Agency Act SB1592, pages 7-8.

measures and ongoing operation and maintenance costs, where applicable. These costs include the incentive as well as the customer contribution. Utility costs include any customer payments and the expenses associated with program development, marketing, delivery, operation, and evaluation, or monitoring and verification (EM&V).

Table 26 summarizes the unique inputs used to assess the TRC ratio for the Public Sector Custom program in PY1. Most of the unique inputs come directly from the evaluation results presented previously in this report. DCEO administration, implementation and other costs come from the budgets filed as part of the 2008 DCEO Energy Efficiency Plan.[10] Incentive costs come from the DCEO program tracking data. The participant contribution to incremental measure costs is patterned after the customer cost shares documented in the ComEd tracking system for their Business Custom program. Avoided costs for both demand and energy match what was used by AIU for assessing the TRC ratio of their own energy efficiency projects. Avoided costs include estimates for financial costs associated with legislation and regulation related to greenhouse gas emissions. The carbon costs are introduced in the 2014 (Program Year 6) costs, valued at $15 per ton.

Table 26. Inputs to TRC Assessment for Public Sector Custom Program

Item	Value
Measure Life (years)	15
Participants	1
Annual Gross Energy Savings (MWh)	7,443
Gross Coincident Peak Savings (MW)	.610
Net-to-Gross Ratio	72%
DCEO Incentive Costs	$669,960
Participants Contribution to Incremental Measure Costs	$254,585
DCEO Administration Costs	$25,946

Based on these inputs, the TRC for this program is 4.74 and the program passes the TRC test.

[10] Exhibits 1.2 through 1.10 in DCEO testimony filed in Docket Nos. 07-0539 and 07-0540.

4 CONCLUSIONS AND RECOMMENDATIONS

This section highlights the findings and recommendations from the PY1 evaluation of DCEO's Public Sector Electric Efficiency Custom Incentive program. The primary evaluation objectives includes quantify the gross and net energy impacts resulting from the rebated measures and assessing program theory, design, and delivery. Below are the key conclusions and recommendations.

4.1 Conclusions

In conducting the PY1 Custom Incentive program evaluation, the evaluation team has drawn a number of conclusions that are enumerated in this section.

4.1.1 Program Impacts

Lessons to be Learned in the Project-Specific M&V Reports

Appendix 5.2.3 to this report contains site-specific M&V reports for each Custom gross impact sample point. These site-specific draft impact evaluation reports summarize the ex ante savings in the Final Application submitted, the ex post M&V plan, the data collected at the site, and all of the calculations and parameters used to estimate savings. While it probably is not reasonable to draw generalized conclusions in this section from details in those report from a PY1 sample size of just five projects, there may be valuable lessons to be learned in those reports, as they relate to submitted impact calculations, the approach applied and parameters input/used. With larger sample sizes in PY2 and PY3 it should be feasible to summarize the cumulative lessons learned.

Tracking System

One aspect of the tracking system that affected the evaluation was the availability of basic contact information in electronic format. This includes applicant contact name, applicant phone number, applicant e-mail and applicant address. This is standard practice in energy efficiency program implementation to have this data available electronically and is an area where improvement is likely needed. The evaluation team had to photocopy this information from DCEO hard copy files and then enter this information into a database to support evaluation activities, such as telephone surveys.

Furthermore, the tracking system did not include electronic information with vendor or contractor contact information. Lastly, the measure description was found lacking in detail on the measures and related equipment in each application. These are also areas for improvement.

Measure description information was populated in the tracking system but there is room for improvement in consistently labeling individual measures. Currently applications involving more than one measure appear as a single record and therefore the measure descriptions tend towards a mixture of rough information concerning the measures installed. DCEO should consider tracking modifications that would isolate individual records for each measure installed and achieve greater levels of consistency in reporting variables that describe measures and end uses affected. With these improvements in place it would be possible to provide measure-based summary statistics and track program accomplishments. Given current measure labeling practices such evaluation efforts were not deemed reasonable to produce.

DCEO does not track summer peak demand impact (kW). This prevents evaluators from confidently and accurately representing the program population using a sample of selected projects. To do so will require consistent estimation summer peak demand, as well as storing those data in the tracking system.

Gross Impacts

Based on the relatively small sample sizes evaluated in PY1 it appears that DCEO is allowing some projects to enter the program and receive incentives that are overly optimistic with regard to the underlying assumptions that lead to savings. Although the project documentation that was reviewed generally presents a reasonably clear description of how a given project saves energy (and the energy efficiency measures included in the program all appear to have a reasonable basis for claiming energy savings), the underlying assumptions were found in some cases to be overly optimistic. While the baseline condition selected for the impact calculations was generally reasonable, some project input assumptions resulted in higher than reasonable impact claims among large projects.

With one exception in the M&V sample, involving computer controls that were not fully applied (and thereby affecting the energy savings claim), all measures were verified to be installed and fully operational.

As noted above, the program needs to incorporate estimates of peak demand savings. Apparently peak demand impact estimation is given a lower priority than energy savings, due to the fact that incentive levels are tied to energy savings and not peak demand reduction.

Net Impacts

Free-ridership levels measured are better than expected for a Custom program at roughly 30%. Participants report that the program being a strong motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Low free-ridership was observed across all project size categories (sampling strata).

4.1.2 Program Processes

Program Participation

The Public Sector Electric Efficiency Custom Incentive program was well received in PY1. Twenty-one public sector customers conducted 25 projects that accounted for 16.9 GWh of ex-ante gross savings. Municipal governments accounted for almost two-thirds of participants and projects, while universities accounted for over half of ex ante gross energy savings in PY1.

The program met its savings goals for PY1, while building a good foundation for future program years. This is especially impressive given the limited program resources and the challenging economic climate. Examination of paths to participation will be an evaluation objective for the next evaluation cycle to ensure continuing success.

Customer Satisfaction

Customer satisfaction with various processes and components of the program is high and few participants report encountering problems during their participation. Participants provide the highest ratings for staff communications, DCEO overall, and the PSEE Custom program. Participants were less satisfied with their electric utility than with other program components. When asked to suggest program improvements, participants most often cite higher incentives and better program information.

Incentives

The maximum incentive rate for custom projects – $0.07/kWh in PY1, set to be consistent with the ComEd and Ameren programs – might not be sufficient for some potential participants to overcome the first cost barrier to the adoption of energy efficient equipment. For PY2, the incentive rate was adjusted slightly, to $0.08/kWh.

The program design included a $100,000 incentive cap in PY1 (the cap was raised to $200,000 for PY2). The program exercised discretion in making exceptions to the cap, which is appropriate for a new program, especially since incentive funds were not exhausted during PY1. The Program allowed incentives greater than $100,000 if the entity had multiple projects. However, a high concentration of incentive money in a single customer or project carries risk for the program and program savings, e.g., if the customer is found to be a free-rider.

Application Process

The application process includes both a pre-approval and final approval application. Program guidelines stipulate that projects must be completed within 90 days of pre-approval. However, this deadline is not enforced as custom projects in the public sector almost always take longer than 90 days. According to the program manager, this deadline sometimes causes initial concern among participants.

The application process does not appear to clearly define what constitutes a "project" as evidenced by some participants including multiple sites or locations in a single application. This results in inconsistencies within the program tracking database, particularly when diverse measures are bundled within a single application, and presents difficulties for program evaluation and tracking.

The payment process for incentives of $10,000 or more must meet several accounting and legal requirements before payment can be made to the customer. These requirements can cause the process to take several months from the time a completed final application is received to the time that the incentive is paid to the customer. Because pre-approval applications are not required for all custom incentive projects, large incentive requests that are submitted without a pre-approval application might not be paid out for several months.

Implementation

The assigned program staff targeted their efforts at core activities related to processing applications, participant implementation assistance, marketing, and inspections. While the program has achieved significant savings in PY1, future growth of the program and attainment of program goals will require additional resources (staff and dollars) to expand the depth and breadth of program activities undertaken.

Implementation of the PSEE Custom Incentive Program relies heavily on existing delivery channels such as SEDAC and outreach activities by the ComEd and Ameren C&I Incentive programs. This approach is both cost-effective and practical. However, relying on ComEd's and Ameren's outreach activities also means limited control over the content, timing, and frequency of messages being sent. This became a problem for the program in PY1, when the ComEd program became oversubscribed. ComEd ended much of its program promotion, and market actors mistakenly thought that incentive money had also run out for public sector projects, negatively affecting the PSEE program.

SEDAC Network

During PY1, the program made effective use of the existing SEDAC network to promote the program. This included making use of SEDAC's monthly newsletter that is sent to more than 3,000 market actors and customers. In addition, SEDAC experts often recommend participation in the PSEE programs for public entities. The PY2 evaluation will consider SEDAC's role in generating spillover savings for the program.

ComEd and Ameren Trade Ally Networks

The PSEE programs leveraged the ComEd and Ameren trade ally networks in PY1. However, coordination of outreach activities with the utilities waned over the course of PY1. Since contractors play an important role in promoting the PSEE Custom Incentive Program, successful use of the ComEd and Ameren trade ally networks is key to the growth of the PSEE programs.

Account Managers

DCEO recognizes that utility account managers play a key role in successful custom programs as they have established relationships with targeted customers. PSEE program participants cite their Account Manager as an information resource and as providing assistance during the participation process. During PY1, outreach to utility account managers included outreach in the program start-up phase and ongoing fielding of telephone calls.

Marketing and Outreach

The level of marketing activity conducted in PY1 was limited by staffing availability. In PY1 DCEO assigned one full time staff person to focus on marketing. In addition to this full time staff member, other program staff participated in marketing activities as part of their normal job duties. The program heavily leveraged activities by SEDAC, ComEd, and Ameren. The marketing that was conducted was recalled and well received by program participants. The most successful efforts were promotion via market actors and customer events.

Participants prefer to be informed about opportunities such as the PSEE incentive programs by e-mail. DCEO currently uses e-mail when distributing its monthly SEDAC newsletters.

4.2 Recommendations

4.2.1 Impact Recommendations

Lessons to be Learned in the Project-Specific M&V Reports

1. It is recommended that selected DCEO staff review the content of the site reports in Appendix 5.2.3 to better understand the reasons underlying the ex post realization rate results. Again, making generalizations from a sample of five points is probably not warranted in this section of the report.

Tracking System

1. Consideration should be given to enhancing the DCEO tracking system for Custom measures to ensure measure-level tracking, with use of common measure descriptions and "reporting" across

projects. This might include tracking the relevant size, quantity and efficiency of each item-level measure installation, including the appropriate units. (For example, measure = chiller replacement, number of units = 2, total capacity = 600, units of capacity = rated cooling tons, efficiency = 0.60, efficiency units = kW/ton, and detailed measure type = rotary screw water-source chiller replacement.) Currently the tracking system often lists multiple measures under a single line item, and disaggregation for reporting is either very difficult or not feasible. Working towards a tracking system model that is closer to a standard program model would enhance reporting of measure installations, both within the program and within the annual evaluation.

2. Enhanced electronic tracking of participant contact information is needed. The same is true, though less critical, for vendors and contractors associated with each project. A relational database structure might better allow for tracking of project-level customer data in one table, contractor and vendor data in another table, and measure level data associated with multiple project or vendor/contractor records in another table. These examples of tracking enhancements should be considered, along with other designs not specified here.

3. The program should estimate and track summer peak demand savings.

Application Quality Assurance

1. Consider increases in the level of technical documentation required for the largest, most complex projects. There is a balance between keeping the application process and forms from being overly complex and costly to navigate, while at the same time providing adequate levels of documentation for verification and savings analyses. Application documentation should not be over-simplified given the complexity of measures and range of site-specific characteristics in this program.
2. Better documentation may also be needed regarding pre-installation or pre-retrofit operating conditions. In particular, large complex projects might be required to submit a greater level of site-specific application data than smaller projects, since (a) they contribute disproportionately to total program savings; (b) the large incentive payments increase the temptation for gaming or fraud; (c) measures implemented are often site-specific or industry-specific, and (d) savings may be very sensitive to baseline conditions.
3. Requirements for large project in-program M&V should also be considered. This might also emphasize an enhanced up-front application review for projects to check for reasonableness of measure savings calculations inputs and results.
4. DCEO should also consider an application requirement for reporting baseline system use, to allow a comparison between the estimated impact size and the estimated size of baseline use. This information might facilitate enhanced review of the reasonableness of measure impact claims.

Gross and Net Impacts

1. Free-ridership is an inherent attribute of rebate programs. While it is challenging to screen out free-riders and maintain ease of participation, DCEO should consider the following:
    - Monitor free-ridership among participants and measures to assess the ongoing risk of low NTG ratios.
    - Proactively seek participation from business types, measures, and projects with low free-ridership rates to balance business types and measures that tend to have higher free-ridership.
    - Actively work with customers to identify energy efficiency projects (and thus gain customer perceived credit for those efforts) and conversely be cautious of projects that

are far along in conception or implementation when the customer learns about available rebates.

4.2.2 Process Recommendations

Program Participation

1. Consider ways to increase participation by sectors currently less active in the program, such as colleges and universities.

2. Take steps to reduce barriers to participation presented by the public sector budgeting process by creating confidence among public sector customers that the program will be active in future years. This is especially true as demand for the incentives increases and the program becomes more fully subscribed.

Incentives

1. Consider increasing the per kWh incentive rate, subject to consideration of impacts on cost-effectiveness and further research into non-participant barriers to participation.

2. As participation in the program increases, consider applying the incentive cap to the entity rather than the building or site.

3. Monitor the use of exceptions to imposing the incentive cap. If the program becomes fully subscribed it might be necessary to limit exceptions for projects or customers that exceed the cap.

Application Process

1. Consider increasing the time limit between pre-application and project completion.

2. Define a project as a single location as opposed to multiple locations and require that applicants fill out a separate application for each unique site.

3. If program participation approaches a level of being fully subscribed, consider requiring pre-approval applications for all projects with an incentive of $10,000 or greater. This would allow program staff to begin some of the processing while the project is still being completed, cutting down on the delay in incentive payment, and would also provide more certainty about the level of program activity earlier in the program year.

Implementation

1. If possible, add more staff to the program to allow for additional activities to be conducted.

2. Continue to leverage existing delivery channels currently used to promote the program. However, also consider ways to differentiate program from the utility programs and to more independently reach out to key parties such as trade allies and account managers.

SEDAC Network

1. Continue to leverage the SEDAC network. The newsletter and network of energy service providers are effective channels of reaching customers.

ComEd and Ameren Trade Ally Networks

1. Try to increase involvement in promotional messages to ComEd and Ameren trade allies. Also try to more independently reach out to trade allies.

Account Managers

1. Continue to use Ameren and ComEd's Account Managers to market the program to potential public sector participants. Survey responses indicated that Account Managers were an effective channel for reaching out to potential participants.

Marketing and Outreach

1. Continue leveraging outreach activities by SEDAC, ComEd, and Ameren.

2. As the program matures, be prepared to make greater use of certain program delivery channels, including direct marketing and utility Account Managers, to build program awareness and participation among customers who may not be easily reached by other delivery channels.

3. Monitor the possibility of confusion regarding the availability of program funds if ComEd and/or Ameren's programs become oversubscribed in PY2. If confusion does result, consider independent messaging that will clarify the availability of funding from the PSEE programs. This could include links to the DCEO program from the ComEd and Ameren program websites.

4. Consider expanding the use of e-mail for recruiting new participants into the program.

5 APPENDICES

5.1 Data Collection Instruments

5.1.1 Interview Guide

DCEO
Custom-Standard Dep

5.1.2 Phone Survey

DCEO Public Sector
Electric Efficiency Pro

5.2 Other Appendices

5.2.1 2008 Program Application Forms

The application forms for the 2008 program are provided in the Guidelines and Application document.

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5.2.2 Verification and Due Diligence Memo Report

This memo provides results of Task 3 – Verification and Due Diligence. Under this task, we explored the quality assurance and verification activities currently carried out by program and implementation staff.

DCEO PSEE Standard
and Custom QAQC 2(

5.2.3 M&V Site Reports

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