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Energy Efficiency / Demand Response Plan: Plan Year 2 (6/1/2009-5/31/2010)

Evaluation Report:

Public Sector Electric Efficiency Custom Incentives Program

Presented to

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Section 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 2 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 2: 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 through a self-report survey in PY2 and is not factored into the net impacts.

[1] The Program Year 2 (PY2) program year began June 1, 2009 and ended May 31, 2010.

Table E-1 provides a summary of the principal data sources contributing to the evaluation of the PY2 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.

Table E-1. Principal Data Sources Contributing to the PY2 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
In-depth Phone Interviews	DCEO Management and Custom Program Staff	Contact from DCEO	DCEO PSEE Custom Program Manager Manager of Marketing and Outreach DCEO Management	3	July, Sept., Dec., 2010
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of DCEO Custom Program Participants	NTG: 14 Process: 15	August 2010
Follow-up Calls	Custom Program Participants and Vendors	Selected Net-to-Gross Sample	Selected Projects Where Warranted	Selected Projects Where Warranted	September 2010
Project Application File Review	Projects in the Custom Program	Tracking Database	Stratified Random Sample by Custom Project-Level kWh (3 Strata)	8	July – September 2010
On-Site Visits and Measurement					

E.3 Key Findings

Table E-2 below provides an overview of planned, reported ex ante net, and evaluation-adjusted net savings impacts for the PY2 Standard program along with the Custom and combined total Public Sector Electric Efficiency program. DCEO operates the PSEE program with a joint goal for energy savings that combines Standard and Custom program results, not as separate goals for each program.

Table E-2. PY2 Public Sector Electric Efficiency Program Net Savings

Net Savings Estimates	Standard MWH	Custom MWH	PSEE MWH
DCEO PY2 Plan Target	89,517	10,000	99,517
DCEO Reported for PY2 (ex ante net)	23,357	28,764	52,122
Total PY2Second-Year Evaluation-Adjusted Net Savings (ex post net)	29,220	13,972	43,191

Source: Plan target from Direct Testimony of Jonathan Feipel, DCEO, Docket No. 07-0541, Exhibit 1.2, November 15, 2007. Reported tracking savings from DCEO tracking system, October 6, 2010. DCEO's planned and reported net savings include a net-to-gross ratio of 0.8 and a gross realization rate of 0.95. DCEO does not track demand savings.

DCEO did not meet the PSEE PY2 plan target of 99.5 GWh for combined Custom and Standard energy savings, but DCEO's PY2 plan target was set high relative to baseline total usage in the public sector. If achieved, DCEO's PSEE goal of 99.5 GWh would save 1.07% of estimated public sector energy usage in PY2[2], substantially higher than the legislative goal of 0.40% for the second year of the energy efficiency portfolio standard. Combining Standard and Custom, the PY2 ex post net savings for PSEE (excluding the pilot Retro-commissioning program) of 43.2 GWh is 0.47% of 9,271 GWh base usage.

Table E-3 below provides a summary of reported ex ante savings from the DCEO tracking system, and evaluation-adjusted gross and net annual savings for the Statewide PY2 Custom Incentives program. As shown in the table, the PY2 Custom program evaluation found that verified gross impacts were equal to 56% 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.

Table E-3. Program-Level Evaluation-Adjusted Net kWh Impacts for PY2

Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
37,847,760	21,356,007	0.56	13,971,602	0.65

The chained realization rate (gross RR * NTG Ratio) is 0.36 for kWh (0.56 x. 0.65). This indicates that the Custom program evaluation-based (ex post) estimate of net savings is equal to 36 percent of the value claimed in the DCEO tracking system for gross savings. The relative

[2] Communication from David Baker, DCEO, December 6, 2010. Based on a public sector usage of 9,271,325 MWh for non-low income public sector energy consumption.

precision at a 90% confidence level[3] for the Custom projects is ± 6% for the kWh Realization Rate. The reported precision levels are for the sample frame (26 Custom projects) only and does not include the entire population (82 Custom projects). Utility specific impacts are provided in Appendix 5.2.1.

1.1.1 Key Impact Findings

- The project-specific M&V work led to adjustments in ex ante usage estimates and operating profiles for projects included in the M&V sample. This suggests that greater care may be needed in the review of application-based usage models for projects. To improve usage models and improve realization rates, the DCEO implementation team could do a better job of verifying operating hours and typical operating conditions of the installed equipment.

- It is recommended that DCEO apply the evaluation-based information from this report when conducting application reviews and adopt methods identified by the evaluation. One important example to consider would involve screening applications for baseline technology selection that is consistent with the evaluation approach. One relatively easy correction that would improve the realization rate would be the enforcement of identifying new equipment as the baseline when the existing equipment being removed has a relatively short remaining useful life or generally requires replacement. The age and operating condition of the existing equipment should be considered before accepting the existing equipment as baseline.

- 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 30-40%. Participants report that the program is a motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Free-ridership levels were somewhat higher in the size-based sampling strata containing larger projects.

- Enhanced electronic tracking of information within the program is needed, including real-time updates to the tracking system for completed projects.

[3] The sample was drawn from an incomplete program population. The confidence interval reported is smaller than it would have been, had the sample been drawn from the full population.

1.1.2 Key Process Findings

Program Participation

Participation in the Custom Program substantially increased in PY2, with 69 unique organizations completing 82 projects. Participation increased among all sectors but particularly among K-12 schools. Local governments continue to represent the largest share of participants (62%), projects (60%), and energy savings (39%). As in PY1, one university project accounted for a large percentage of total program savings (44% in PY1 and 30% in PY2).

PY2 ex ante energy savings more than doubled compared to PY1. The largest increase came from the federal government sector, where savings increased almost 10-fold, from 941 MWh in PY1 to 9,150 MWh in PY2. As a result of these strong gains, the program exceeded its PY2 ex ante energy savings goals.

Customer Satisfaction

Satisfaction with the Custom Program across various program processes and components remains very high. Notably, all interviewed participants are satisfied with the program overall and with DCEO (a rating of 7 or higher on a scale from 0 to 10). None of the interviewed participants reported experiencing any problems with their participation in the program and all plan to participate again in the future. This high level of satisfaction is commendable.

Program Design

Few program design changes were made in PY2. The program increased incentive levels from $0.07/kWh to $0.08/kWh and the incentive cap from $100,000 to $200,000. The most significant design changes were the introduction of an "Emerging Technologies" pilot, which offered incentives of $0.20/kWh for exterior LED and induction lighting, and the "Green Spring Sale," which offered a significant increase in incentives during the last three months of PY2. The program manager noted that approximately half of all PY2 applications came in during the "Green Spring Sale." The Green Spring Sale demonstrated that participation could be increased by increasing incentive levels, however, the optimum incentive levels to maximize program savings within the program budget is unknown.

Program Resources

DCEO took several steps to increase PSEE staff levels for PY2 and beyond. DCEO used its role in support of the American Recovery and Reinvestment Act of 2009 (ARRA) as an opportunity to hire six staff with primary responsibility to ARRA, but with the ability to support EEPS up to half time as time allowed. The ARRA hires will be able to transition full time to EEPS as ARRA work phases out for completion by January 2012. In addition, DCEO added two staff persons specifically for EEPS in PY2. Although staff faced challenges in PY2 to keep up with workload

during peak periods of ARRA work and the Green Spring sale, this is expected to ease over time as ARRA responsibilities conclude and staff transitions to PSEE. DCEO is planning for additional hires in PY3.

Beginning in PY1, it was more common for program staff to take assigned projects from start to completion with responsibility for all delivery roles. With the addition of staff resources in PY2 and PY3, DCEO is transitioning toward more specialization among staff for internal program delivery roles (application and payment processing, data entry, technical support, etc.) and market and geographic segmentation (K-12 schools contact, community college contact, ComEd municipalities, etc.). This is expected to allow program managers to spend more time on strategy and marketing.

Cooperation with ComEd and Ameren Illinois Utilities

In PY2, DCEO continued to leverage Ameren Illinois Utilities and ComEd activities in promoting the PSEE programs. Cooperation is enhanced through monthly conference calls between Ameren, ComEd and DCEO that discuss marketing and outreach and other issues. DCEO is given time to make presentations at account manager meetings. DCEO feedback suggests the utilities are generally receptive to including DCEO at events and in outreach efforts. DCEO helped fund and co-sponsor some larger outreach events with the utilities.

Trade Ally Network

Contractors remain an important part of the custom program: 67% of interviewed PY2 participants utilized a contractor for their project, 67% discussed the program with their contractor, and 36% name a contractor, equipment installer, designer, or consultant as providing the most assistance in the design and specification of the installed equipment. Satisfaction with contractors is unanimous: all interviewed participants who used a contractor found that the contractor was able to meet their project needs, and all would recommend their contractor to others.

DCEO has made presentations on the PSEE program at trade ally events and meetings throughout PY2, conducted webinars, and staffed table displays at larger events. DCEO is leveraging the trade ally network of SEDAC, Ameren Illinois Utilities and ComEd, referring potential participants looking for a qualified contractor to their lists. However, interviewed participants consider a contractor's affiliation with SEDAC or the utility programs only moderately important.

Given increased program goals for PY3, trade ally involvement will become more important to the success of the program, and the program should continue its marketing and outreach efforts to that group, and find additional ways to more closely engage them.

Marketing and Outreach

Overall program marketing activities increased in PY2 compared to PY1. DCEO identified 49 events and meetings where outreach activities were conducted in-person with an estimated total attendance of 3,790. Target audiences cover a range of public sectors (schools, municipalities, universities, state) and individuals (school boards, facility engineers, public officials, etc.), and trade allies (architects, electrical contractors, and engineers). DCEO has a prepared presentation with Q&A that is adjusted for each audience, and typically lasts from 20 minutes to an hour.

In addition, the program leveraged SEDAC, and to a lesser extent Ameren Illinois Utilities and ComEd, for marketing and outreach. DCEO has relationships with public-sector organizations, such as the Illinois Association of Regional Councils (ILARC), whereby those organizations assist DCEO in outreach and project facilitation with members. The DCEO EEPS program is featured prominently on the ILARC web site. As in PY1, one DCEO staff member had primary responsibility for marketing and outreach for the DCEO PSEE programs in PY2, with additional DCEO staff called in as needed.

In PY2, program participants *first* learned about the program through a variety of sources. Notably, 40% of interviewed participants first learned about the program at an event. Sources through which participants have obtained information about the program in the past include the DCEO and SEDAC websites (73%), contractors or trade allies (67%), and events (60%). All interviewed participants who saw program marketing materials found them to be useful. E-mail remains the preferred method of receiving information about energy efficiency opportunities. In fact, the share of interviewed participants who prefer to be contacted by e-mail increased from 40% in PY1 to 80% in PY2.

Account Managers

During PY2, DCEO marketing and outreach staff made presentations to ComEd and Ameren account managers to engage them in promoting the DCEO PSEE programs. The level of utility account manager support of DCEO programs is specific to individual and utility; DCEO reports some individuals are providing marketing support while others simply do referrals to DCEO.

Account managers for both utilities were involved in PY2 projects, and the DCEO program manager acknowledged their role in referring customers to the PSEE programs. Since account managers can be an effective vehicle for promoting the program – as they have established relationships with the customers targeted by this program, mainly larger customers – the program should find ways to more closely engage them.

Section 1. Introduction to the 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 2: 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, adding pipe insulation, retro-commissioning 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 two-thirds of the applications processed in PY2 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.

The PY2 program also included an addendum ("Have Green Spring" Campaign) to the program guidelines for the Public Sector Energy Efficiency Program. The Addendum to the program guidelines applied to new applications processed after March 5, 2010 and received by close of business April 22, 2010, for projects that were completed by the end of the Program Year, May 31, 2010. The applicants were eligible for either the Incentive Bonus or Special Incentive Rate based on eligibility. DCEO program staff determined the additional incentive depending on applicant eligibility and funding availability.

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 PY2 program application form lists measures, eligibility criteria and incentive levels. The measure list and incentives matched those offered by the utilities (ComEd & Ameren), except that DCEO offered incentives for LED traffic signals. The Standard and Custom programs were

continued in program year 3, with minor increases to custom incentive levels and changes to rebate options.

The net MWH savings goals for the PY2 Custom incentive program, as included in the Three-Year Plan approved by the Illinois Commerce Commission, are presented in Table 1-1.

Table 1-1. Public Sector Electric Efficiency Custom Program PY2 Planned Savings Goals

Utility	Plan Target Net MWh	Plan Target Net MW
ComEd Service Territory	7,352	1
Ameren Service Territory	2,648	0.3
Total	10,000	1.3

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

DCEO operates the PSEE program with a joint goal for energy savings that combines Standard and Custom program results, not as separate goals for each program. The combined Standard and Custom goal for PSEE net energy savings is 99,517 MWh.

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 the following key areas:

1. Program participation
2. Effectiveness of program design and processes
3. Effectiveness of program implementation
4. Marketing and outreach
5. Barriers to and benefits of participation
6. Participant satisfaction

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

Section 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 46 applications processed for ComEd customers involving an ex ante impact claim of 16.1 million kWh.
- There were 36 applications processed for Ameren customers involving an ex ante impact claim of 21.7 million kWh.

The evaluation plan calls for on-site visits and detailed M&V for 8 Custom projects to address the gross impact evaluation objectives, plus telephone surveys with Custom projects to address net impact objectives and the program process. 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 8 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 below). When warranted based on project size, the extra large net impact approach or the Enhanced approach was used in PY2.
- 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 Impact Evaluation Methods

Gross Program Savings

The objective of this element of the impact evaluation is to verify the PY2 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 used to estimate measure 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 engineering models or algorithms, 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. 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 existing equipment has a substantial enough remaining useful life (RUL) such that the existing equipment might have remained in place (and fully serviceable) for the majority of the effective useful life (EUL) of the new program induced equipment, then the existing equipment is selected as the predominant baseline condition. If the existing 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. If the existing 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 evaluation acknowledges that early replacement activities would normally yield an array of annual (and peak demand) savings throughout the effective useful life (EUL) of the new equipment, involving impacts in the first series of years that reflect differences in usage versus the pre-existing system, and in later years versus the likely equipment adoption in the absence of the program (i.e., two different baselines might be applied). However, this evaluation seeks to identify the predominant baseline condition, and derive a single (representative) year estimate of annual and peak demand savings. The point here is to simply illustrate that baseline determination and analysis are an integral and extremely important part of custom impact evaluation, and to acknowledge the complexities involved in the actual grid-level impacts.

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 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 interviews with program implementers, vendors and other Energy Efficiency Service Providers (EESPs)[4] 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 facility's 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.

[4] Energy Efficiency Service Providers are supply-side market actors that might assist customers in completing one or more tasks for a given project. This might include consultants, designers, vendors, contractors and energy services companies (ESCO's).

Conduct Site-Specific Impact Calculations and Prepare Draft Site Reports

After all of the field data is collected, including any monitoring data, annual 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 program 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 and demand 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.

For this study, peak hours are defined as non-holiday weekdays between 1:00 PM and 5:00 PM Central Prevailing Time (CPT) from June 1 to August 31. This is in accordance with the PJM manual 18, *Energy Efficiency and Verification,* of Mar 1 2010.

Peak demand savings for both baseline and post retrofit conditions are the average demand kW savings for the 1 pm to 5 pm weekday time period. If this energy savings measure is determined to have weather dependency then the peak kW savings are based on the zonal weighted temperature humidity index (WTHI) standard posted by PJM. The zonal WTHI is the mean of the zonal WTHI values on the days in which PJM peak load occurred in the past ten years. This mean WTHI value is 80.4. Demand savings is the difference in kW between the baseline and post retrofit conditions.

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.

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 PY2, 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 in PY2, but not quantified as a component of the NTG ratio for each point in the sample.

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

NTG Ratio = 1 – Free-ridership Rate

Basic Free-Ridership Assessment

Free ridership was assessed using a 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 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 end-use and site.

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 2-1.

Table 2-1. Basic Net-to-Gross Scoring Algorithm for the PY2 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. Technical assistance from utility or program staff C. Recommendation from utility or program 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 utility 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	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-

Scoring Element	Calculation
installed this equipment?" Free-ridership diminishes as the timing of the installation without the program moves further into the future.	ridership)
Project-level Free-ridership (ranges from 0.00 to 1.00)	1 – Sum of scores (Program Components, Program Influence, No-Program)/30
PY2 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

Standard Free-Ridership Assessment

For projects in strata 1 and strata 2 of the sample, an effort is made during the customer telephone survey to more completely examine project influence sources in order to allow for any analyst-determined adjustments to customer self-reported score calculations using the Basic approach outlined above. Additional survey batteries examine other project decision-making influences including the vendor, age and condition of existing equipment, corporate policy for efficiency improvements and so on. Any adjustments made on this basis are carefully documented and the rationale for any adjustments is recorded, to ensure their transparency to an independent reviewer.

Additional Data Sources, Call-Backs and Free-Ridership Adjustments

All project free-ridership scores and responses (including open-ends) were carefully reviewed prior to finalization and, in certain instances, additional data sources were examined and follow-up calls were found to be warranted in order to finalize and adjust each free-ridership component score. Callbacks were placed with the respondents to 1) resolve apparent discrepancy in responses, 2) obtain a clearer understanding of the equipment installation decision making, 3) examine the influence of organization-level policy and 4) examine any other project influences. Calls were placed with the vendors associated with a given project where their customer-supplied importance scores (that is, project influence) warranted it. Adjustments were made where warranted. Any adjustments made on this basis were carefully documented and the rationale for any adjustments recorded, to ensure their transparency to an independent reviewer.

Spillover

For the PY2 Custom program evaluation, a battery of questions was asked to 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 allow us 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 with the further use of follow-up questioning and site visits on potential spillover occurrences reported by the participants.

2.1.2 Process Evaluation Methods

Two research activities were conducted in support of the process evaluation: (1) an interview with the program manager, one interview with the manager of marketing and outreach, and one interview with DCEO management and (2) a quantitative telephone survey with 15 participating customers. Both are further described in the section below.

2.2 *Data Sources*

Table 2-2 provides a summary of the principal data sources contributing to the evaluation of the PY2 Custom program. For each data element listed, the table provides the targeted population, the sample frame, sample size and timing of data collection.

Table 2-2. Principal Data Sources Contributing to the PY2 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
In-depth Phone Interviews	DCEO Management and Custom Program Staff	Contact from DCEO	DCEO Custom Program Manager Manager of Marketing and Outreach DCEO Management	3	July, Sept., Dec., 2010
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of DCEO Custom Program Participants	NTG: 14 Process: 15	August 2010
Follow-up Calls	Custom Program Participants and Vendors	Selected Net-to-Gross Sample	Selected Projects Where Warranted	Selected Projects Where Warranted	September 2010
Project Application File Review	Projects in the Custom Program	Tracking Database	Stratified Random Sample by Custom Project-Level kWh (3 Strata)	8	July – September 2010
On-Site Visits and Measurement					

2.2.1 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 July 14, 2010.

2.2.2 Program Staff Interviews

A phone interview was conducted with Tom Coe, the Custom Program manager. The interview focused on the changes to program design and implementation compared to PY1 and the effects of those changes on program administration and participation.

2.2.3 CATI Phone Survey

A CATI telephone survey was conducted with 15 Custom program participants. This survey focused on two key areas: (1) questions to estimate net program impacts and (2) questions to support the process evaluation. All CATI surveys were completed in August 2010.

The CATI survey was directed toward unique customer contact names from the tracking system for PY2 paid Custom projects. The survey data collected supports PY2 free-ridership estimation, process evaluation inputs (including business demographics), and a qualitative assessment of spillover. The CATI survey instrument used for this evaluation is included in Appendix 5.1.1.

2.2.4 Project Application File Review

To support Final Application file review for the gross impact M&V sample, project documentation was obtained from DCEO files for each project in the main M&V sample, as well as for backup points that were selected. 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, post inspection reports and photos, and important email and memoranda.

2.2.5 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

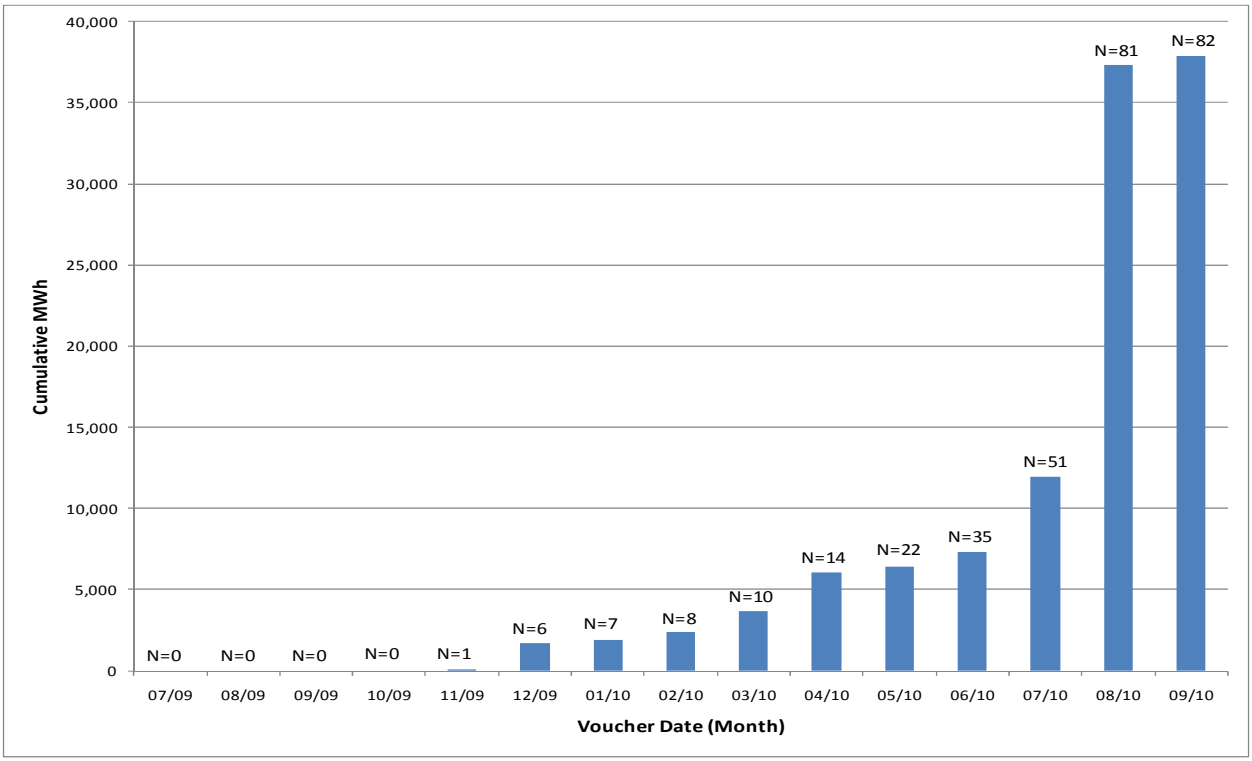
The tracking data delivered for this evaluation was provided as an Excel spreadsheet by DCEO on July 14, 2010 (for sampling purposes) and October 6, 2010 (providing the full population of PY2 projects). As discussed in detail in the section that follows, the selected tracking system records from the July extract (that made up the sample frame) was incomplete for two reasons: 1) the bulk of PY2 project savings had yet to be recorded in the tracking system and 2) the voucher out date was not updated in a timely manner for 15 projects. Voucher out date was used as the basis for identifying completed projects. Only the projects with voucher out date populated in the spreadsheet provided on July 14, 2010 were included for sampling.

2.3.1 Profile of Population and Representativeness of the Sample Frame

The final tracking data delivered for this evaluation was provided as an Excel spreadsheet by DCEO on October 6, 2010. A total of 82 completed Custom projects, installed by 65 unique

customers, were identified in the tracking data. The total energy savings for population of 82 completed projects is 37.8 million. Following this delivery the evaluation team was informed that the voucher out date had not been populated for all the completed projects in a timely manner in previous data extracts. Due to missing voucher out date, the July 14, 2010 tracking data used for sampling did not include (15) projects that were completed at the time. Subsequently, several new installed projects were added to the population based on the October tracking data extract (that were not previously recorded in the July tracking data extract that was used for sampling). The Figure 2-1 below shows that two-thirds of kWh savings for the program year is due to projects added to the program after the July extract. As a result, from a net impact perspective, the sample drawn using the July 14 extract is not representative of the final population of custom projects.

Figure 2-1. Monthly Record of Completed Projects for Program Year 2



2.3.2 Profile of Sample Frame

The tracking data provided as an Excel spreadsheet by DCEO on July 14, 2010 was used for the sample frame. Consistent with the PY1 evaluation, only the Custom projects with voucher out date populated in the spreadsheet were included in the sample frame.

Table 2-3 below provides a profile of PY2 Custom program participation in the sample frame. 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, and for 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 2-3 presents each of three strata developed for sampling, among 26 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 four largest applications that make up all the strata 1 and 2 projects account for 66% of the kWh-based ex ante impact claim in the sample frame.

Table 2-3. PY2 Custom Program Participant Sample Frame by Sampling Strata

Sampling Strata	Ex Ante kWh Impact Claimed	Percent of Total kWh Claimed	Applications	Incentive Paid to Applicant
1	1,431,627	28%	1	$114,530
2	1,925,114	38%	3	$115,130
3	1,737,463	34%	22	$28,218
TOTAL	5,094,204	100%	26	$257,878

2.3.3 Gross Impact M&V Sample

The sample for the PY2 Custom program was selected from project 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, 7 projects required coordination between the two evaluations.

Custom savings data for a heterogeneous mix of projects in the sample frame were analyzed by project size to inform the sample design. 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 less than one-third of the program savings was assigned to strata 1, the next 3 largest records comprising over 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 8 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 3 records in strata 2 were selected, and 4 records out of 22 were randomly selected in strata 3.

Profile of the Gross Impact M&V Sample

Table 2-4 provides a profile of the gross impact M&V sample for the Custom program in comparison with the sample frame. Shown is the resulting sample that was drawn, consisting of 8 applications, responsible for 3.6 million kWh of ex ante impact claim and representing 71% of the ex ante impact claim for the sample frame. Also shown is 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 2-4. Profile of the Gross Impact M&V Sample by Strata

Custom Sample Frame Summary				Sample		
Sampling Strata	Number of Applications (N)	Ex Ante kWh Impact Claimed	kWh Weights	n	Ex Ante kWh	Sampled % of Frame
1, 2	4	3,356,741	0.66	4	3,356,741	100%
3	22	1,737,463	0.34	4	258,006	15%
TOTAL	26	5,094,204	-	8	3,614,747	71%

2.3.4 CATI Telephone Survey

A CATI telephone survey was implemented with a stratified random sample of 14 Custom Incentive Program participants for net program impacts and one additional Custom Incentive Program participant for process evaluation. This survey focused on questions to estimate net program impacts and to support the process evaluation. All CATI surveys were completed in August of 2010.

Sampling

The CATI phone survey drew a sample from the Custom program sample frame, with a target to achieve 15 completed telephone interviews to estimate net program impacts and to support the process evaluation, each 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. Using the sample frame, Custom savings data were analyzed by project size to inform the sample design. 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 sample frame-based total kWh claim. The strata that were developed were already identified above under gross impact M&V, Table 2-3.

The sample was drawn as follows from the July 14, 2010 extract: a census of one application in strata 1 was selected, a census of 3 applications out of 3 was selected in strata 2 and 10 applications out of 22 were randomly selected in strata 3. After initially attempting completes with just the targeted applications, the sample was eventually opened up to the remaining points in strata 3 in order to collect the full number of targeted completes. Telephone calls were placed with additional participating customers from the August 11, 2010 extract of the tracking system, yielding one additional telephone survey complete, and fulfilling the target of 15 sample points.

Since the sample of unique customers as of the August extract (27) was relatively small compared to the targeted number of completes (15), we called a census of unique customers in order to fulfill the target of 15 completes. Given that this is a census attempt for process evaluation purposes, there is no need for estimating precision levels for the sampling effort. In other words, there is no sampling error and the error bounds are zero. Additionally, the evaluation team concluded that an un-weighted analysis provided the best representation for process results.

Survey Disposition

Table 2-5 shows the resulting ex ante-based kWh sample weights for each of two resulting strata. Strata 1 and 2 of the sample were collapsed for the purpose of calculating net-to-gross ratios so that the standard deviation of the result can be estimated (there can be no standard deviation estimate if the sample comprises only one point, as is the case here for stratum 1). Ex ante-based kW weights were not developed because peak demand impact estimates are not tracked within the program.

Table 2-5 also provides the net impact sample disposition for the Custom program evaluation. Shown is the resulting number of survey completes, consisting of 14 Custom applications (out

of a target of 15). The resulting net impact survey completes represent 3.8 million kWh of ex ante impact claim, which is 75% of the ex ante impact claim of the sample frame. Fourteen of the 15 survey data points corresponded to projects included in the July 14, 2010 sample frame. The 15th and final survey data point corresponded to a project that was rebated after July 14, 2010. In order to ensure that the resulting NTG sample represents the July 14, 2010 sample frame, the 15th survey data point was excluded from the NTG analysis.

Table 2-5. Profile of the Participant Survey Sample by Strata

Program Sample Frame Summary				Sample		
Sampling Strata	Number of Applications (N)	Ex Ante kWh Impact Claimed	kWh Weights by Strata	n	Ex Ante kWh	Sampled % of Frame
1, 2	4	3,356,741	0.66	4	3,356,741	100%
3	22	1,737,463	0.34	10	440,034	25%
TOTAL	26	5,094,204	-	14	3,796,775	75%

Table 2-6 below shows the final disposition of the 27 unique contacts targeted with the participant survey. The dispositions show that the survey was completed with 56% of the available contacts. Overall, the effort resulted in response rate of 60%, computed as the number of completed surveys divided by the number of eligible respondents.[5] For this survey, only two respondents were ineligible due to problems with the phone number (disconnected phone and computer tone).

[5] Eligible respondents include the following dispositions: (1) Completed Survey, (2) Unable to Reach, (3) Callback, and (4) Refusal.

Table 2-6. Disposition for the Participant Survey

Disposition	Customers	%
Population of Unique Customers	27	100%
Completed Survey	15	56%
Unable to Reach	6	22%
Callback	3	11%
Refusal	1	4%
Phone Number Issue	2	7%
Response Rate	*60%*	

Source: ODC CATI Center.

Representativeness of Survey Results – Process Evaluation

As discussed in Section **Error! Reference source not found.**, the population was not finalized at the time our evaluation activities took place. As a result, the survey only included 27 of the final 65 unique contacts, introducing a potential for coverage bias, i.e., the exclusion of otherwise qualifying participants from the survey effort. While non-sampling errors, such as coverage bias and non-response error, cannot be quantified, the evaluation team conducted a qualitative assessment of the potential bias resulting from the exclusion of 38 qualifying contacts. We compared the distribution of completed surveys with that of the survey population and the final population for three characteristics: (1) sector, (2) end use, and (3) project size (see Table 2-7, Table 2-8, and Table 2-9 below). This comparison provides an indication of how representative the completed interviews are of the final population.

- **Sector.** The comparison by sector shows that the completed interviews are reasonably representative of the final population, with the exception of colleges and universities. While the final population includes six participants representing colleges and universities (10%), none were interviewed as part of the survey process. The population at the time of the survey included two colleges, but neither one responded to the survey. Our survey results therefore do not represent the opinions and experiences of colleges and universities. If their responses were different from participants in the other sectors, then overall survey results cannot be assumed to represent them. However, we have no reason to believe that this is the case.

- **End use.** Our comparison by end use included lighting and non-lighting projects. The distribution by end use is almost identical for survey respondents and the final population. We therefore conclude that, with respect to end use, survey results are representative of the whole PY2 population.

- **Project size.** For the comparison by project size, we used the stratum definitions used for the impact analysis, i.e., Stratum 1 includes large projects, Stratum 2 includes medium sized projects, and Stratum 3 includes small projects. This comparison shows that survey respondents are reasonably representative of the final population, with a slight over-representation of medium-sized projects and a slight under-representation of small projects.

Based on these comparisons, we conclude that survey responses to process questions are reasonably representative of the final PY2 population. The only exception is the lack of representation of colleges and universities among survey respondents, who represent 10% of the total population. Based on this analysis, we have no reason to believe that survey results would be substantially different, if the final population had been available at the time of the survey.

Table 2-7. Comparison of Completed Interviews and Population by Sector

Sector	Completed Interview		Survey Population		Final Population	
	#	%	#	%	#	%
Local Government	8	53%	15	56%	38	58%
K-12 Schools	5	33%	7	26%	14	22%
Federal Government	2	13%	3	11%	7	11%
College	0	0%	2	7%	3	5%
University	0	0%	0	0%	3	5%
TOTAL	**15**		**27**		**65**	

Source: Program tracking database; results of CATI telephone survey.

Table 2-8. Comparison of Completed Interviews and Population by End Use

End Use	Completed Survey		Survey Population		Final Population	
	#	%		%	#	%
Lighting	10	67%	17	63%	42	65%
Non-Lighting	5	33%	10	37%	23	35%
TOTAL	**15**		**27**		**65**	

Source: Program tracking database; results of CATI telephone survey.

Table 2-9. Comparison of Completed Interviews and Population by Project Size

Project Size	Completed Survey		Survey Population		Final Population	
	#	%		%	#	%
Large Projects	1	7%	1	4%	6	9%
Medium Projects	3	20%	5	19%	9	14%
Small Projects	11	73%	21	78%	50	77%
TOTAL	**15**		**27**		**65**	

Source: Program tracking database; results of CATI telephone survey

Section 3. Program Level Results

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

3.1 Impact

3.1.1 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 July 14, 2010 and October 6, 2010. The file 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. It has much less functionality than either the ComEd or Ameren tracking systems.

One aspect of the tracking system that affected the evaluation was the reporting of the voucher out date for the completed Custom projects. The voucher out date for the completed Customer projects was not populated in a timely manner. For this reason, the evaluation team was not able to identify all the completed Custom projects. This affected the critical sampling phase of the evaluation.

Other notable areas for tracking system improvement includes a desire for electronic record keeping of contact information for vendors or contractors, and that the electronic measure description was found lacking in detail surrounding the measures and related equipment in each application.

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 accordingly. Given current measure labeling practices such evaluation efforts were not deemed reasonable to produce.

There were a couple data accuracy issues identified where the data in the PSEE spreadsheet (contains individual project records) did not match EEPS spreadsheet records (contains tracking data). The evaluator worked with DCEO to reconcile these differences.

Also, the tracking spreadsheet did not provide the breakdown of the energy savings for projects that included both the Custom and Standard portion of the program. The evaluator had to check the individual project spreadsheet to identify the savings breakdown.

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 would require that DCEO consistently estimate summer peak demand, and then store those data in the tracking system.

One aspect of the tracking system that has improved compared to the previous year was the addition of participating customer contact information in electronic format. This includes applicant contact name, applicant phone number, applicant e-mail and applicant address.

3.1.2 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 eight applications.

Realization Rates for the Custom 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.[6] 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.

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

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 Table 3-1 and

Table 3-2. Gross kWh Realization Rates and Relative Precision at 90% Confidence Level

below. The realization rate for energy savings is 0.56. The relative precision and confidence intervals[7] are estimated based on the sample frame, not the program population. A realization rate for peak demand impact could not be estimated due to the fact that the program does not estimate kW savings.

Table 3-1. Gross Impact Realization Rate Results for the Selected Custom 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
175	1,431,627	-	1	1.00	346,145	1	0.24
219	922,970	-	2	0.48	473,304	64	0.51
137	512,022	-	2	0.27	466,952	53	0.91
218	490,122	-	2	0.25	204,035	0	0.42
257	112,000	-	3	0.43	87,645	10	0.78
327	59,822	-	3	0.23	57,565	7	0.96
625	46,756	-	3	0.18	26,428	1	0.57
268	39,428	-	3	0.15	33,884	0	0.86

[7] The sample was drawn from an incomplete program population. The confidence interval reported is smaller than it would have been, had the sample been drawn from the full population.

Table 3-2. Gross kWh Realization Rates and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low	Mean	High
Stratum 1+2	0%	0.44	0.44	0.44
Stratum 3	13%	0.70	0.80	0.90
Total kWh RR	6%	0.53	0.56	0.60

3.1.3 Gross Program Impact Results

Based on the gross impact parameter estimates described in the previous section, gross program impacts were derived for the PY2 Custom program.

The EM&V team has provided to DCEO 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 from details in those reports, especially given that the PY2 sample does not represent the actual program population, there may be valuable lessons to be learned in those reports as they relate to submitted impact calculations, the approach applied and parameters used.

Some general observations from the gross impact sample:

- Ex ante baseline equipment selection was adjusted in 25% (two out of 8) of the projects. The baseline equipment selected in both cases (project #218 & #257) was the existing system, but was found to be very old and in need of replacement. In such cases a new code compliant or market baseline system should instead be specified.

- In some cases, the ex ante reported operating conditions were found to be different than actual verified conditions. For project #219, the ex ante savings calculations for the fans assumed that each of the fans would have the speed reduced by 30% compared to the ex post verified fan speed reduction of 16.7%. Also, for projects #175 & #218 the ex ante assumed operating conditions were different from the ex post verified operating conditions.

- In some cases, documented ex ante equipment operating hours were found to be different than the actual post-installation condition based on field-measurement (such as equipment operation reports or logger data) -- which necessitated modification of baseline operating hours. The baseline operating hours were changed for projects #268 & #625.

- For two lighting projects, the ex ante estimated wattages of the fixtures were found to be different than the ex post verified wattages. Such instances were found in projects #137 & #625.
- For project #268, it was reported in the application that controls were installed on fixtures but the ex post verification found that no controls were installed.
- For projects #218 and #219 the load factor assumed to calculate equipment power in the ex ante calculations was found to be overestimated.
- For project #175, the post retrofit equipment was not operating as intended by the customer for about a year after installation.
- In summary, estimates should be based upon appropriate verification of installed equipment, actual operating conditions, normalization of hours of operation, and careful application of assumptions made when estimating energy usage of equipment.
- For lighting projects, the ex ante savings estimation approach was generally found to be solid and the realization rates for lighting projects were higher than the overall mean realization rate.

3.1.4 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 PY2 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 PY2. The weighted mean results and relative precision at a 90% confidence level[8] is provided in Table 3-3. The relative precision and confidence intervals are estimated based on the sample frame, not the program population.

[8] The sample was drawn from an incomplete program population. The confidence interval reported is smaller than it would have been, had the sample been drawn from the full population.

Table 3-3. NTG Ratio and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low	Mean	High
1, 2	0%	0.60	0.60	0.60
3	22%	0.59	0.76	0.93
Total	14%	0.56	0.65	0.75

The measured NTG ratio in the program sample was high overall, with substantial free-ridership (above about 40%) observed in 7 out of 14 completed estimates. However, the remaining 7 estimates had relatively high NTGR estimates, averaging 84%. All but five out of fourteen Program component 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 fourteen were greater than 7.5.

The resulting overall mean NTGR for the program in PY2 is 0.65. This estimate is lower than the estimate from PY1 (0.72), meaning free-ridership measured in PY2 has increased relative to PY1.

Projects with the lowest Program Components scores tend to have lower NTG ratios, while those with higher Program Component scores have NTG ratios that are among the highest. For example, all projects with Program Components scores of 7 or lower have NTG ratios that are somewhat low, below 72%.

Spillover

Spillover effects were addressed in the PY2 evaluation, based on responses to a battery of spillover questions in the phone survey. The evidence of spillover for the Custom Incentive program is summarized in Table 3-4 below.

Table 3-4. Evidence of Spillover in PY2

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 15 survey respondents that responded to this question, 2 said "Yes" (13%). These 2 respondents implemented a total of 3 energy efficiency measures.
What type of energy efficiency measure was installed without an incentive?	(1) Linear fluorescent (T-8) (1) Controls/Occupancy sensors (1) Strip curtains

Spillover Question	Evidence of Spillover
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 measures?	For the 3 implemented measures: (2) Rating between 0 and 3 (0) Rating between 4 and 6 (0) Rating between 7 and 10 (1) Refused/Don't know
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 3 implemented measures: (0) Rating between 0 and 3 (0) Rating between 4 and 6 (2) Rating between 7 and 10 (1) Refused/Don't know
Why did you purchase this energy efficiency measure without the financial assistance available through the DCEO's program?	For the 3 implemented measures: (1) Did not fill out the applications yet (1) Unaware of the program (1) Don't know

These findings suggest that spillover effects for PY2 are relatively small to negligible. While participating customers are installing other energy efficiency improvements outside of the program, they attribute little influence to the program in their decision to install these additional measures and further state that these actions generally would have been implemented regardless of their program participation experiences. In addition, the respondents indicated that they had not pursued rebates through the DCEO program, but when asked why that was the case no trends were apparent in the responses provided. The EM&V team will likely collect spillover data in this same manner for the PY3 evaluation, without any attempt to quantify impacts, due to the relatively small amount of program influenced-spillover identified in this evaluation.

3.1.5 Net Program Impact Results

Net program impacts were derived by multiplying gross program savings by the estimated NTG ratio. Table 3-5 provides the program-level evaluation-adjusted net impact results for the PY2 Custom program. The NTG ratio for energy savings is 0.65, calculated using the responses from each contributing participant (and other sources) and kWh-based weights. The NTG ratio for demand savings could not be estimated due to the fact that the program does not estimate kW savings. The chained realization rate (gross RR * NTG Ratio) is 0.36 for kWh. Utility specific impacts are provided in Appendix 5.2.1.

Table 3-5. PY2 Gross and Net Parameter Estimates for Selected Custom Sample

Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
37,847,760	21,356,007	0.56	13,971,602	0.65

3.2 Process Evaluation Results

The process component of the PSEE Custom Incentive Program evaluation focused on program implementation, changes to program design and processes, program marketing and outreach, and participant satisfaction. The primary data sources for the process evaluation were one in-depth interview with the program manager, an interview with the manager of marketing and outreach and DCEO management, and a telephone survey with 15 program participants. Of the 15 respondents to the participant telephone survey, six are in ComEd's service territory and nine are in Ameren Illinois Utilities' service territory.

When reviewing the results of the process evaluation, the reader should keep in mind the following:

- At the time of the survey, contact names for only 27 of 65 unique PY2 participants were available to the evaluation team (see also discussion in Section **Error! Reference source not found.**). We note that colleges and universities were not represented in the survey but account for 10% of the final PY2 population. While we have no evidence that colleges and universities would have answered survey questions differently from other participants, we note that the survey results presented in this section might not be representative of these two sectors.

- In support of this evaluation, a total of 15 interviews were conducted. To facilitate data presentation and comparisons with PY1, we present many of the results as percentages of respondents. However, it should be noted that when sample sizes are small, such as in this survey, a single response can have a large impacts on overall results. The reader should keep this in mind when drawing conclusions from survey results.

3.2.1 Program Theory and Logic Model

Given modest changes in the program design, the program theory/logic model was not revised for PY2. Please refer to the PY1 report for more information on this topic and the program theory and logic model for the PSEE Custom Program.

3.2.2 Participant Profile

In PY2, 69 participants[9] completed a total of 82 custom projects that accounted for 38 GWh of ex ante gross savings.[10] PY2 participants represent a range of sectors. Key observations, by sector, are:

- Local governments represent the largest share of participants (62%), projects (60%), and energy savings (39%).
- Universities, while representing only 4% and 5%, respectively, of participants and projects, account for over a third (34%) of PY2 ex ante gross savings. This is the result of one large project which accounted for over 11 GWh in savings.
- K-12 schools represent about one-fifth of participants and projects. However, since the average project in this sector is small, K-12 schools only account for 3% of PY2 savings.
- Savings in the federal government sector increased almost 10-fold from PY1 to PY2. Projects in this sector tend to larger than those in other sectors (with the exception of universities), with four out of nine projects exceeding 1 GWh.
- Over 80% of PY2 participants only completed one custom project in PY2.

Table 3-6 summarizes the distribution of PY2 participants, projects, and energy savings by sector.

[9] *Participants* refer to unique organizations that participated in the program. The total number of participants is slightly higher than the total number of unique *contacts*, used for survey fielding purposes, as several projects did not have a contact listed.

[10] Ex ante gross savings reported in this section are based on the program tracking database.

Table 3-6. PY2 Distribution of Participants, Projects and Savings by Sector

	Participants		Projects		Projects/ Participant	Ex Ante Savings		kWh/ Project
	#	%	#	%		kWh	%	
Local Government	43	62%	49	60%	1.1	14,585,678	39%	297,667
K-12 Schools	14	20%	17	21%	1.2	981,581	3%	57,740
Federal Government	6	9%	9	11%	1.5	9,149,513	24%	1,016,613
College	3	4%	3	4%	1.0	167,064	<1%	55,688
University	3	4%	4	5%	1.3	12,963,924	34%	3,240,981
TOTAL	**69**		**82**		**1.2**	**37,847,760**		**461,558**

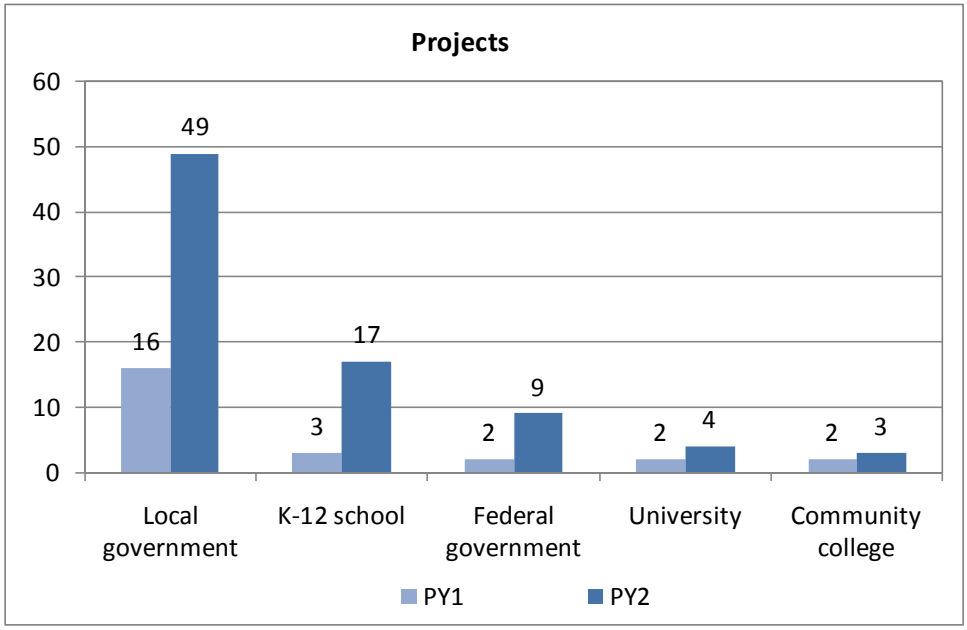
Source: Program tracking database.

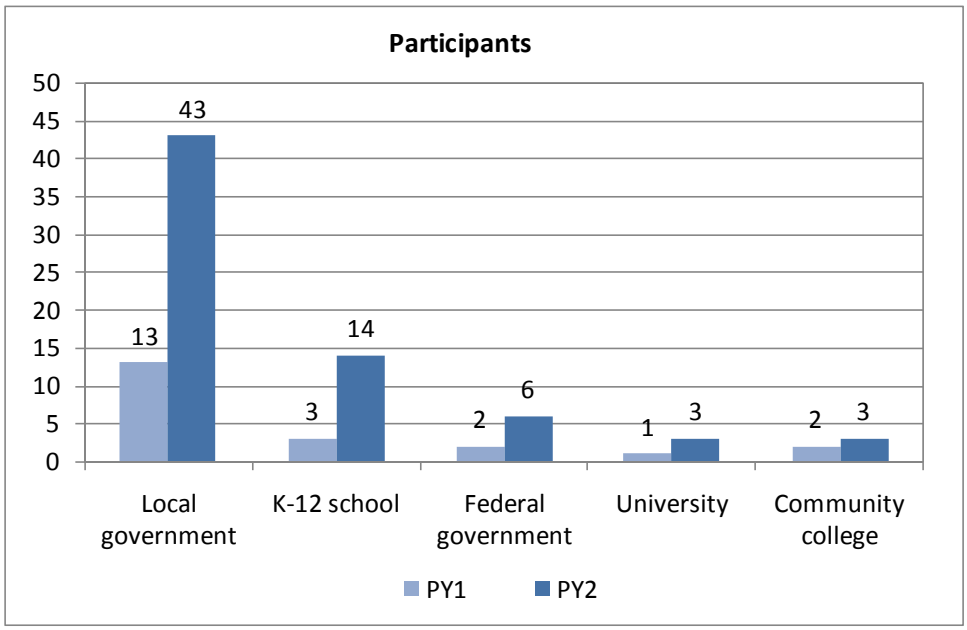
Overall, program participation increased substantially compared to PY1, from 25 projects completed by 21 entities to 82 projects completed by 69 entities. In addition, ex ante gross energy savings more than doubled compared to PY1.

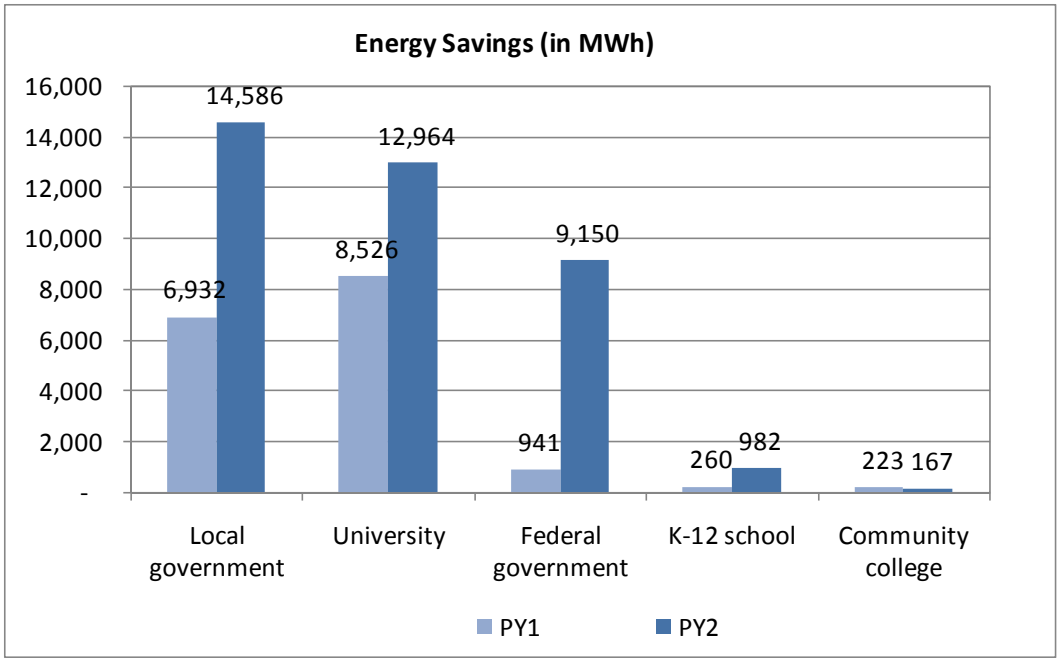
The distribution of program projects and participants across sectors in PY2 is overall similar to PY1, with local government representing the largest share. The share of ex ante gross savings also remained similar to PY1 among local governments, K-12 schools, and community colleges. However, the contribution to program savings increased significantly for the federal government sector (24% in PY2 vs. 6% in PY1) but decreased in the university sector (34% in PY2 vs. 52% in PY1). Notably, during both program years, the same university accounted for a considerable amount of total program savings (7.5 GWh in PY1 and over 11 GWh in PY2).

Figure 2-1 compares the number of projects, participants, and ex ante gross energy savings by sector and program year.

Figure 3-1. Projects, Participants, and Ex Ante Gross Savings by Sector and Program Year







Source: Program Tracking Database.

3.2.3 Program Design and Processes

Overall, changes made to the Custom Program in PY2 were modest. Specific changes and enhancements included in the subsections below.

Application Process

Aside from several minor changes made to the program application to increase its clarity, the application process for the Custom Program remained the same as in PY1.

Similar to PY1, the application process includes a pre-approval application (not required of all projects) and a final application. Program guidelines stipulate that projects must be completed within 90 days of pre-approval, and the final paperwork needs to be submitted within 60 days of project completion. Overall, few participants meet the 90-day project completion deadline, but most require less than 60 days to file the final paperwork.

About three-quarters of interviewed participants (11 out of 15) reported that they filled out the project application themselves, a rate similar to PY1 (8 out of 10). Most of these applicants found that the application form clearly explains the program requirements and how to participate, and they rate the overall application process as easy.[11]

Participation Process

The participation process has remained largely unchanged from PY1. Every custom project still has to undergo several steps, including project application, final paperwork, payment processing, and incentive disbursement. In addition, certain projects are subject to pre- and post-inspections to qualify for an incentive. According to the program manager, more pre- and post-inspections were conducted in the PY2 than in PY1, although the ability to do so was limited by staff availability (see also discussion of Program Resources in Section 3.2.4).

None of the program participants experienced any problems with the program in PY2, and all said they were satisfied with the program (see also Section 3.2.7).

Incentives

In order to induce participation, a few changes have been made to the program incentive structure in PY2. The maximum incentive for custom projects was increased from $0.07/kWh in PY1 to $0.08/kWh in PY2. According to the program manager, however, this increase did not have a strong impact on program participation.

In addition to the increase in the per kWh incentive, the incentive cap was increased from $100,000 to $200,000. In most cases, this cap did not limit the scope of projects; in cases where the cap presented a barrier to participation, program staff worked with the customer to reasonably adjust the cap. In PY2, 11 of the 82 projects exceeded $100,000 in incentives of which three exceeded $200,000 (the largest being close to $900,000). Only two out of 15 interviewed participants said that the scope of their project was limited by the program's incentive cap.

As noted in the PY1 report, lifting the cap and 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 or if the realization rate for the project is low.[12] While exercising discretion when handling the incentive cap might be beneficial when recruiting big public entities with multiple buildings, such as universities or federal entities, DCEO should continue to monitor such exceptions.

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

[12] Note that this issue could not be assessed in the PY2 evaluation as the five largest projects were not part of the initial sample frame for the impact evaluation. Therefore, realization rates and net-to-gross ratios for these projects were not assessed.

Emerging Technologies Pilot

In PY2, the program also introduced an "Emerging Technologies" pilot, which offered incentives of $0.20/kWh for exterior LED and induction lighting. Current regulations allow program administrators to expend 3% of the annual program budget on emerging energy efficiency technologies without a need to meet minimum cost-effectiveness requirements. According to the program manager, the pilot was successful in stimulating program participation and installation of energy efficiency lighting equipment. This pilot will continue to run in PY3, with planned increases in incentives compared to the PY2 pilot.

Green Spring Sale

In addition to the increases in incentive amounts and caps, the program launched a special promotion, known as the Green Spring Sale, during the last three months of PY2. As part of this promotion, all municipal customers were eligible for a 50% increase in incentives, while universities and state and federal governments qualified for a 15% incentive increase. According to the program manager, this promotion was very successful in enticing participation in the program: Approximately half of all PY2 applications came in during the 3-month period of the sale. Five out of fifteen interviewed program participants were aware of the Green Spring Sale, and two of those applied for the bonus incentive. Sources of information about the incentive included the Internet, email, and utility account managers. The only customer feedback on the sale was to do it again and increase incentives even further.

3.2.4 Program Implementation

In PY2, DCEO relied upon internal staff to deliver and market the program, supplemented by SEDAC staff for technical assistance and outreach. DCEO leveraged Ameren and ComEd marketing and outreach channels to promote the program to public entities. However, the program manager cited a desire for better communication and collaboration with the utilities when promoting the PSEE programs to prospective customers, noting missed opportunities in PY2.

Program Resources

DCEO took several steps to increase PSEE staff levels for PY2 and beyond. DCEO used its role in support of the American Recovery and Reinvestment Act of 2009 (ARRA) as an opportunity to hire six staff with primary responsibility to ARRA, but with the ability to support EEPS up to half time as time allowed. The ARRA hires will be able to transition full time to EEPS as ARRA work phases out for completion by January 2012. In addition, DCEO added two staff persons specifically for EEPS in PY2. Although staff faced challenges in PY2 to keep up with workload during peak periods of ARRA work and the Green Spring sale, this is expected to ease over time as ARRA responsibilities conclude and staff transitions to PSEE. DCEO is planning for additional hires in PY3.

Beginning in PY1, it was more common for program staff to take assigned projects from start to completion with responsibility for all delivery roles. With the addition of staff resources in PY2 and PY3, DCEO is transitioning toward more specialization among staff for internal program delivery roles (application and payment processing, data entry, technical support, etc.) and market and geographic segmentation (K-12 schools contact, community college contact, ComEd municipalities, etc.). This is expected to allow program managers to spend more time on strategy and marketing.

Although staff faced challenges in PY2 to keep up with workload during peak periods of ARRA work and the Green Spring sale, this is expected to ease over time as ARRA responsibilities conclude and staff transitions to PSEE. With goals increasing for PY3, staff resources continue to be a factor to monitor for the DCEO PSEE programs

Smart Energy Design Assistance Center (SEDAC)

SEDAC plays an important role in supporting the implementation of the DCEO PSEE programs. Initially created by DCEO to provide design assistance to small private sector businesses, the introduction of the Illinois Energy Efficiency Portfolio Standard (EEPS) resulted in the expansion of SEDAC's role to also include public sector facilities. SEDAC is currently co-sponsored by DCEO, ComEd, and Ameren Illinois Utilities to provide assistance to clients in both the private and public sectors. However, because of its origin, its physical location at the University of Illinois, and the Standard Program Manager's managerial role at SEDAC, SEDAC has a much closer relationship with DCEO than the utilities. This relationship is apparent in the mix of customers SEDAC currently serves. While public sector entities made up about 44% of clients in PY1, this share has increased to approximately 56% in PY2 and 70% in the first few months of PY3.

SEDAC currently supports several key functions for the PSEE programs. These functions are generally conducted in collaboration with DCEO and supported by DCEO funding. They include:

- **Marketing.** Key SEDAC marketing activities include development and distribution of marketing materials and strategic outreach.
    - Marketing materials: Key marketing materials include (1) A monthly electronic newsletter, distributed to about 4,000 market actors and potential customers from SEDAC's contact lists; this newsletter is also provided to DCEO to distribute to its own contacts; (2) case studies and "niche market" educational materials directed towards targeted sectors, like water treatment facilities, within the public sector; and (3) e-mail blasts promoting SEDAC training events.
    - Strategic Outreach: SEDAC's strategic outreach includes face-to-face meetings, teleconferences, presentations, and participation in conferences that are often

geared toward public sector clients. These outreach activities focus on energy savings opportunities and promoting the EEPS incentives programs.

- **Training.** The trainings SEDAC holds in collaboration with DCEO are intended to educate public entities about the PSEE programs – including measures offered and application processes – through workshops, lunch sessions, seminars, and occasionally client-focused sessions. In PY2, SEDAC organized six training sessions for the public sector, up from only two in PY1.
- **Technical design and implementation assistance**. In addition to maintaining a list of screened contractors on its website, SEDAC offers four levels of technical design assistance that are heavily utilized by public sector clients:
    - Level 1, Initial Consultation: Initial Consultation occurs when clients call or e-mail SEDAC for technical advice and direction or for funding information. At this stage SEDAC experts usually, but not consistently, inform clients about the PSEE programs.
    - Level 2, Energy Audits: In Level 2, SEDAC technical staff analyzes current energy consumption of a facility and suggests measures to reduce energy consumption. Any PSEE incentive opportunities and amounts associated with the recommended measures are listed in the report.
    - Level 3, Design Assistance: In Level 3, the analyst estimates the cost of doing the project and conducts a life cycle cost analysis. Clients receive Level 3 assistance based on the amount of potential savings SEDAC considers could be achieved if the project is implemented.[13]
    - Level 4, Implementation Support: Level 4 occurs when (1) clients need help navigating their interactions with service providers because of conflicting information; (2) clients want advice out of a desire to achieve even greater savings through additional measures; or (3) SEDAC technical staff members follow up with clients to learn if the client has implemented the recommended measures.

[13] SEDAC determines if it will provide a client with Level 3 service after a review of the client's utility bills from the previous twelve months. The utility bills indicate (1) the energy savings potential – those with higher utility bills demonstrate a larger potential to achieve savings and are viewed as a more worthwhile use of SEDAC's resources and (2) the motivation of the client, indicating their likelihood to move forward with implementation – clients who are unwilling to put in the time to collect these documents indicate less of a commitment to putting in the required effort needed to implement projects.

Results from the process evaluation indicate that SEDAC plays a key role in supporting DCEO and that it is effectively channeling participants into the PSEE program. Specific findings include:

- **SEDAC Newsletter**. More than one-third of participants (36%) have received information about the PSEE programs through the SEDAC newsletter, up from 24% in PY1 (difference not statistically significant).
- **Outreach and Trainings.** Slightly more program participants recall attending a SEDAC event that discussed the PSEE programs in PY2 (37%) than in PY1 (30% – difference not statistically significant). SEDAC management and technical staff considers identifying public sector entities the most challenging part of the outreach process.
- **Contractors.** Program participants generally are not aware of their contractors' association with SEDAC. When asked if their contractor is affiliated with SEDAC, over half of PSEE participants who used a contractor (54%) do not know; 32% believe the contractor is affiliated with SEDAC and 14% believe the contractor is not affiliated.
- **Channeling Participation.** Approximately 20% of PSEE program participants in PY2 used some level of SEDAC design assistance.[14] Conversely, approximately 65% of public sector clients who received SEDAC's Level 2, 3, or 4 assistance in PY2 received DCEO incentives for one or more facilities.[15] Notably, this rate of participation by public sector SEDAC customers in the DCEO programs is substantially higher than that of private sector SEDAC customers in the ComEd or Ameren Illinois Utilities programs. SEDAC staff suggests this high rate of program participation is due to the amount of attention public sector clients receive from SEDAC, targeted marketing, and the networking that occurs in partnership with DCEO. One suggestion to channel even more clients into the DCEO programs, provided by SEDAC staff, is to receive more frequent updates on which clients have received incentives.[16] This would allow SEDAC staff to more efficiently identify and follow up with customers who have received implementation recommendations but have not begun or completed implementation. Ideally the new PSEE client database, currently under development, will facilitate this process by giving SEDAC regular access to current information.

DCEO and SEDAC have been working collaboratively for nearly five years. The relationship functions well, and both groups are satisfied with communication. Overall, the Custom

[14] Source: Interview with SEDAC's Research Specialist in Planning (9/22/10).
[15] Source: *The Illinois Smart Energy Design Assistance Program EEPS Annual Performance Evaluation, 6/1/09 through 5/31/10*, submitted by University of Illinois at Urbana-Champaign and 360 Energy Group, LLC. (7/30/10).
[16] Currently, DCEO transmits their participation list to SEDAC at the end of the program year. SEDAC then cross-references their customer list with that of DCEO.

Incentives Program is making good use of SEDAC's services and should continue to do so in future program years.

Cooperation with ComEd and Ameren Illinois Utilities

In PY2, DCEO continued to leverage Ameren Illinois Utilities and ComEd activities in promoting the PSEE programs. Cooperation is enhanced through monthly conference calls between Ameren, ComEd and DCEO that discuss marketing and outreach and other issues. DCEO is given time to make presentations at account manager meetings. DCEO feedback suggests the utilities are generally receptive to including DCEO at events and in outreach efforts. DCEO helped fund and co-sponsor some larger outreach events with the utilities.

Trade Allies

DCEO is leveraging the trade ally network of SEDAC, Ameren Illinois Utilities and ComEd, referring potential participants looking for a qualified contractor to their lists. DCEO has made presentations on the PSEE program at trade ally events and meetings throughout PY2, conducted webinars, and staffed table displays at larger events.

In PY2 both Ameren Illinois Utilities and ComEd made steps to refine their trade ally networks by introducing mandatory ally training and providing higher visibility to program-active allies. Ameren Illinois Utilities also introduced a trade ally bonus for bringing in projects over $10,000, which was very successful in increasing participation. ComEd introduced a similar bonus in the fall of 2010. Although a contractor/trade ally bonus may not be feasible for DCEO, DCEO can target the utilities' high performing, active trade allies with a more intense level of outreach than might be provided to a larger list. For example, some programs use breakfast meetings or "lunch and learn" events at trade ally offices to cater to high-profile trade allies.

The telephone survey with program participants included questions about their use of contractors, their contractors' affiliation with SEDAC or the utility trade ally networks, and satisfaction with their contractors. Responses to the survey show that contractors play an important role in the implementation of projects. However, many participants do not believe that it is important that the contractor is affiliated with SEDAC or a utility. Specific findings from the survey include:

- Ten out of 15 interviewed participants (67%) used a contractor for their project.
- Only one out of 15 interviewed participants (7%) first heard about the program from a contractor.
- Ten out of 15 interviewed participants (67%) discussed the program with a contractor.
- Eight out of fifteen interviewed participants (53%) named a contractor, equipment installer, designer, or consultant as providing the most assistance in the design and

specification of the installed equipment; four (27%) named an equipment distributor, supplier, or vendor.

- A contractor's affiliation with SEDAC or the utility programs is only moderately important to program participants: Only three out of 15 interviewed participants (20%) considered it important that their contractor is affiliated with an electric utility program.[17] Only one of 10 interviewed participants with a contractor-implemented project confirmed that their contractor is affiliated with SEDAC; however, four did not know.
- Participant satisfaction with the contractors who helped implement the projects was high. Interviewed participants uniformly said that their contractor was able to meet their project needs[18] and that they would recommend their contractor to others.

Given increased program goals for PY3, trade ally involvement will become more important to the success of the program. We recommend that the program continue to capitalize on the trade ally networks created by ComEd and Ameren Illinois Utilities. In addition, the program should also try to differentiate itself from the utility programs and more independently reach out to trade allies.

Account Managers

During PY2, DCEO marketing and outreach staff made presentations to ComEd and Ameren account managers to engage them in promoting the DCEO PSEE programs. The level of utility account manager support of DCEO programs is specific to individual and utility; DCEO reports some individuals are providing marketing support while others simply do referrals to DCEO.

Account managers for both utilities were involved in PY2 projects, and the DCEO program manager acknowledged their role in referring customers to the PSEE programs. Interviewed program participants provided the following information about account managers:

- Seven out of 15 interviewed program participants reported having an account manager.
- Five out of the seven participants with an account manager discussed the program with their account manager.
- Two out of the seven participants with an account manager reported that their account manager assisted them with the project they implemented through the DCEO program.

[17] A score of 7 or higher on a scale from 0 to 10, where 0 is "not at all important" and 10 is "very important."
[18] A score of 7 or higher on a scale from 0 to 10, where 0 is "not at all able to meet needs" and 10 is "completely able to meet needs."

- None of the interviewed participants first found out about the program from an account manager.

Account managers can be an effective vehicle for promoting the program as they have established relationships with the customers targeted by this program (mainly larger customers). With increasing savings goals in PY3, the program should continue to reach out to account managers and try to engage them to a greater extent in promoting the program. Ameren Illinois Utilities and ComEd have both started an account manager bonus/incentive system to get them more engaged in promoting the utility programs. Although DCEO cannot offer incentives to utility account managers, DCEO should poll account managers for ideas on ways that DCEO could support them in return for their assistance with PSEE.

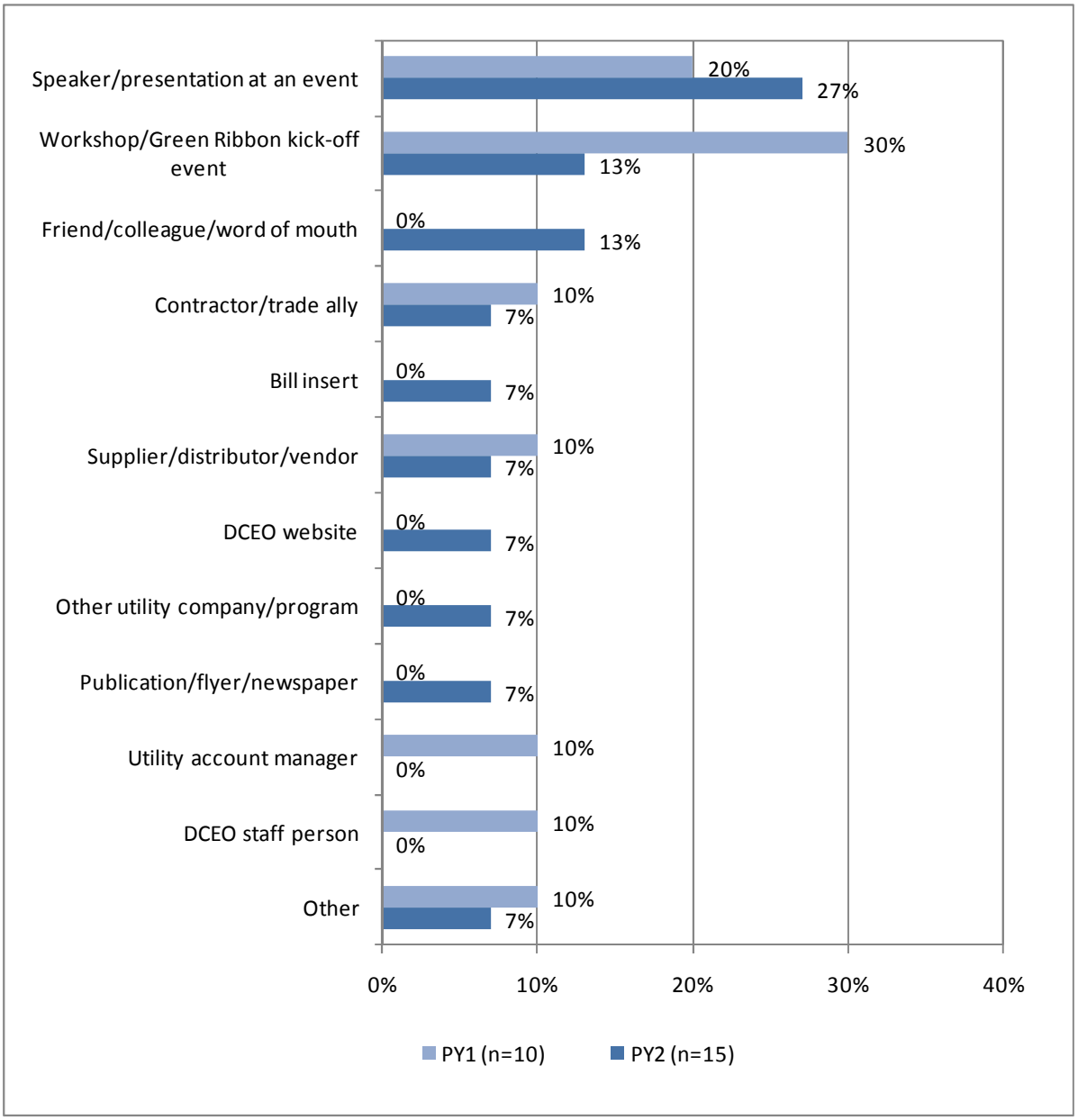
3.2.5 Program Marketing and Outreach

Overall program marketing activities increased in PY2 compared to PY1. DCEO identified 49 events and meetings where outreach activities were conducted in-person with an estimated total attendance of 3,790. Target audiences cover a range of public sectors (schools, municipalities, universities, state) and individuals (school boards, facility engineers, public officials, etc.), and trade allies (architects, electrical contractors, and engineers). DCEO has a prepared presentation with Q&A that is adjusted for each audience, and typically lasts from 20 minutes to an hour.

In addition, the program leveraged SEDAC, and to a lesser extent Ameren Illinois Utilities and ComEd, for marketing and outreach. DCEO has relationships with public-sector organizations, such as the Illinois Association of Regional Councils (ILARC), whereby those organizations assist DCEO in outreach and project facilitation with members. The DCEO EEPS program is featured prominently on the ILARC web site. As in PY1, one DCEO staff member had primary responsibility for marketing and outreach for the DCEO PSEE programs in PY2, with additional DCEO staff called in as needed.

In PY2, a variety of sources first informed participants of the program. Notably, six out of 15 interviewed participants (40%) first learned about the program at an event. Two interviewed participants found out about the program through word of mouth. Any other sources of information were noted by only one person.

Figure 3-2. How Participants First Learned about the Program (Unprompted)



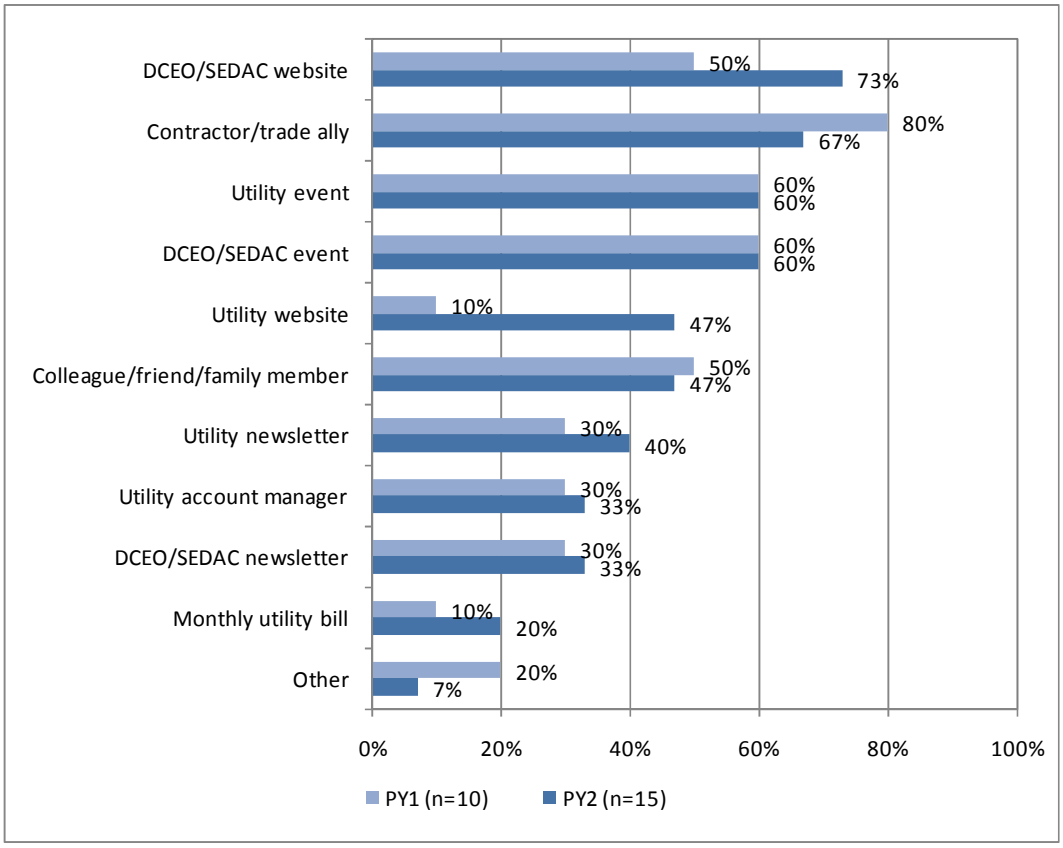
Source: PY1 and PY2 CATI Participant Survey.

The survey also asked participants about a series of sources through which they might have obtained information about the program in the past. Findings include:

- The DCEO and SEDAC websites (73%), contractors or trade allies (67%), and events (60%) were the most common sources of information in PY2.

- Use of websites (DCEO and SEDAC as well as the utility websites) to obtain program information increased substantially compared to PY1.
- Most other sources of information were used at similar rates in PY1 and PY2.

Figure 3-3. Sources of Information about the Public Sector Electric Efficiency Program (Prompted)



Source: PY1 and PY2 CATI Participant Survey.

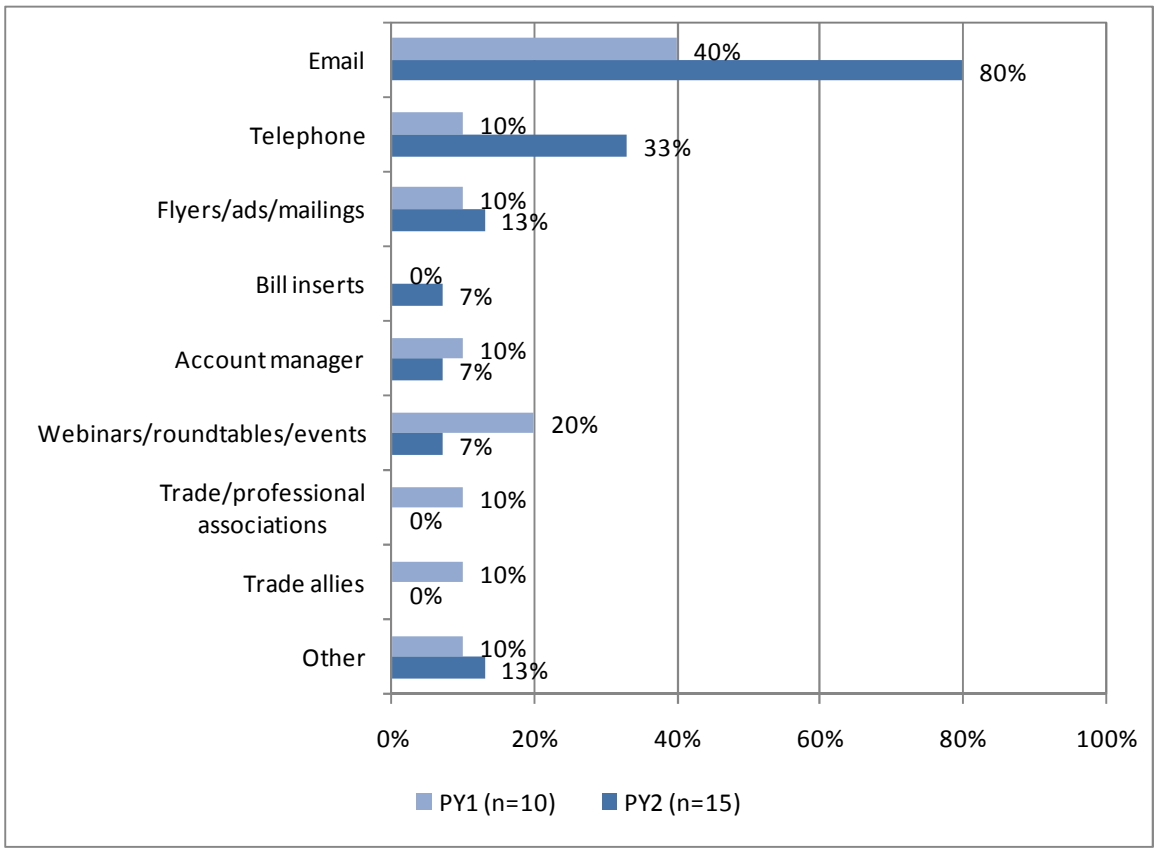
In addition to recalling program marketing materials, all interviewed participants who saw program marketing materials found them to be useful.[19]

Similar to PY1, e-mail was cited as the preferred method of receiving information about energy efficiency opportunities. Notably, the share of interviewed participants who prefer to be contacted by e-mail increased from 40% in PY1 to 80% in PY2. The program should consider increased use of e-mail in reaching out to potential participants and disseminating program

[19] A response of "very useful" or "somewhat useful."

information, e.g., new initiatives or changes to incentives. Figure 3-4 summarizes preferred methods of contact.

Figure 3-4. Preferred Methods of Contact (Multiple Response, Unprompted)

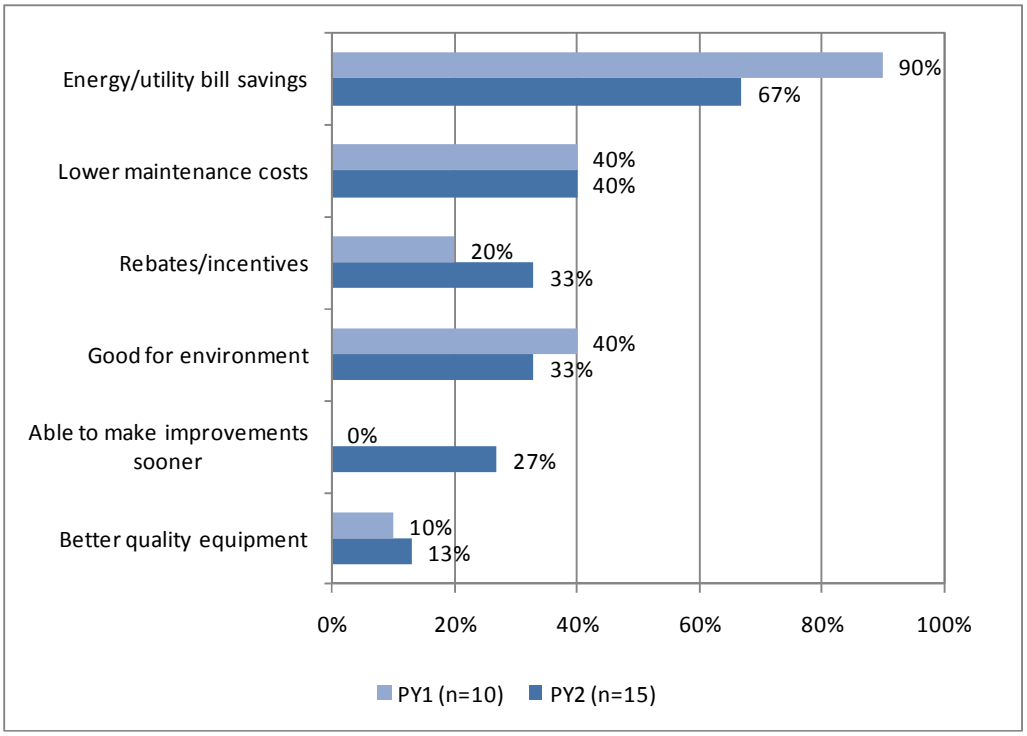


Source: PY1 and PY2 CATI Participant Survey, note responses under 5% are not included.

3.2.6 Barriers to and Benefits of Participation

Interviewed participants consider energy and bill savings the major benefit of participating in the Custom Program (67%, down from 90% in PY1). A benefit cited by four of the fifteen interviewed participants (27%), which was not mentioned in PY1, was the ability to make improvements sooner. Figure 3-5 summarizes participant responses about the benefits of program participation.

Figure 3-5. Benefits of Program Participation (Unprompted, Multiple Response)

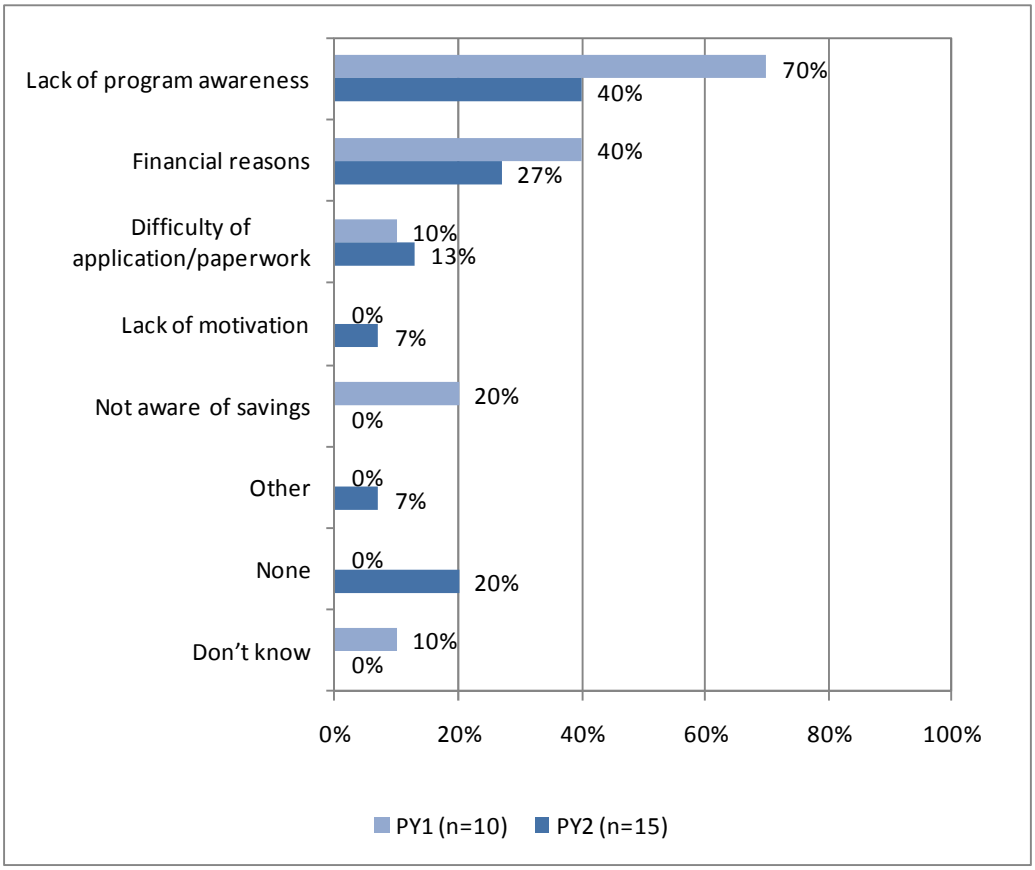


Source: PY1 and PY2 CATI Participant Survey.

The majority of program participants (53%) believe that the program has no drawbacks. Few survey respondents noted that the paperwork is too burdensome (13%). Any other issues were noted by only one interviewed participant.

Barriers to participation could not be fully assessed as interviews with non-participants and market actors were not conducted for PY2. 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. While lack of program awareness remains the most commonly cited barrier in PY2 (40%), the share of participants mentioning it decreased from PY1 (70%). Other potential barriers include financial reasons (27%) and a cumbersome application process (13%).

Figure 3-6. Barriers to Participation (Unprompted, Multiple Response)



Source: PY1 and PY2 CATI Participant Survey.

3.2.7 Participant Satisfaction

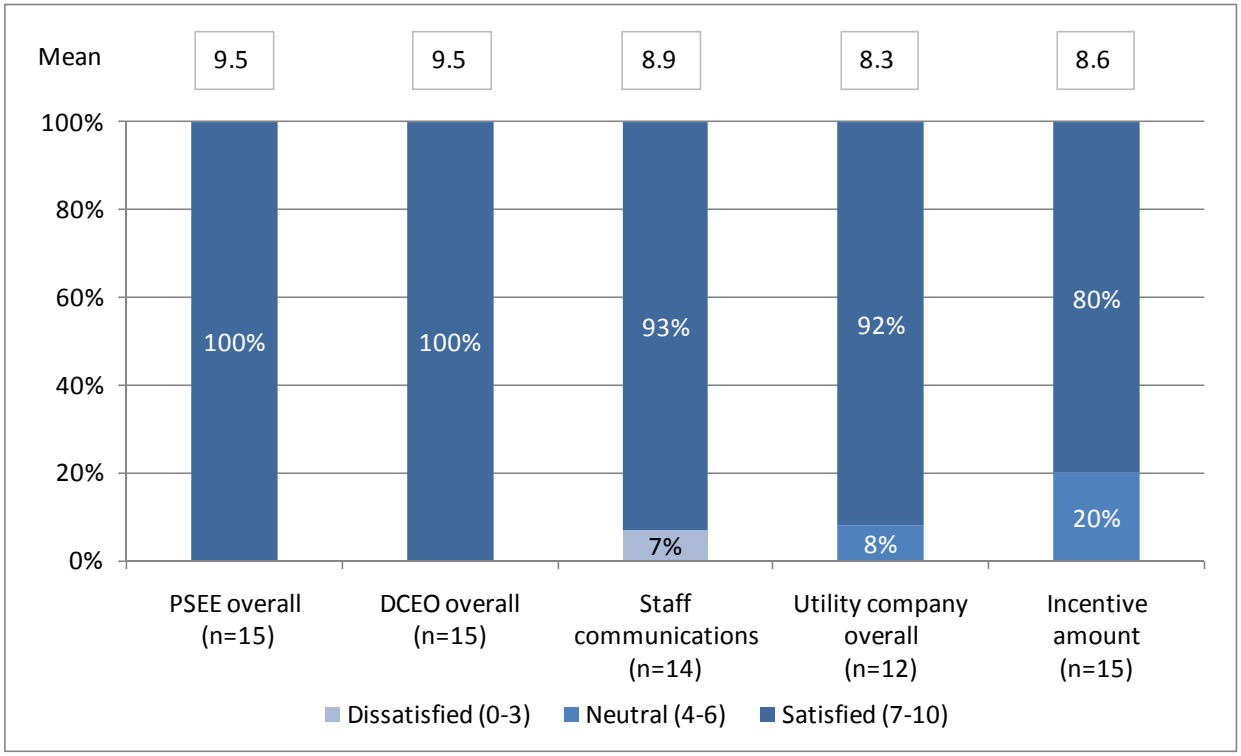
Participants are satisfied with most aspects of the Custom Program. Survey respondents were asked to rate – on a scale of 0 to 10, where 0 means "very dissatisfied" and 10 means "very satisfied" – several aspects of the program. The highest satisfaction is with the program overall and with DCEO, where all interviewed of participants are satisfied,[20] including 80% that provided a rating of 9 or 10. Participants are least satisfied with the incentive amounts (80%). Although 92% of participants are satisfied with their utility company, the mean rating was the lowest among all elements included in the survey (8.3). This is largely due to the fact that few respondents (33%) provided a rating of 9 or 10.

It is noteworthy that satisfaction with the program and its elements in PY2 is largely unchanged from PY1. Given the limitations in staffing and resources and the resource constraints faced in

[20] A rating of 7 or higher.

the beginning of the program year, program staff should be commended for keeping customer satisfaction high.

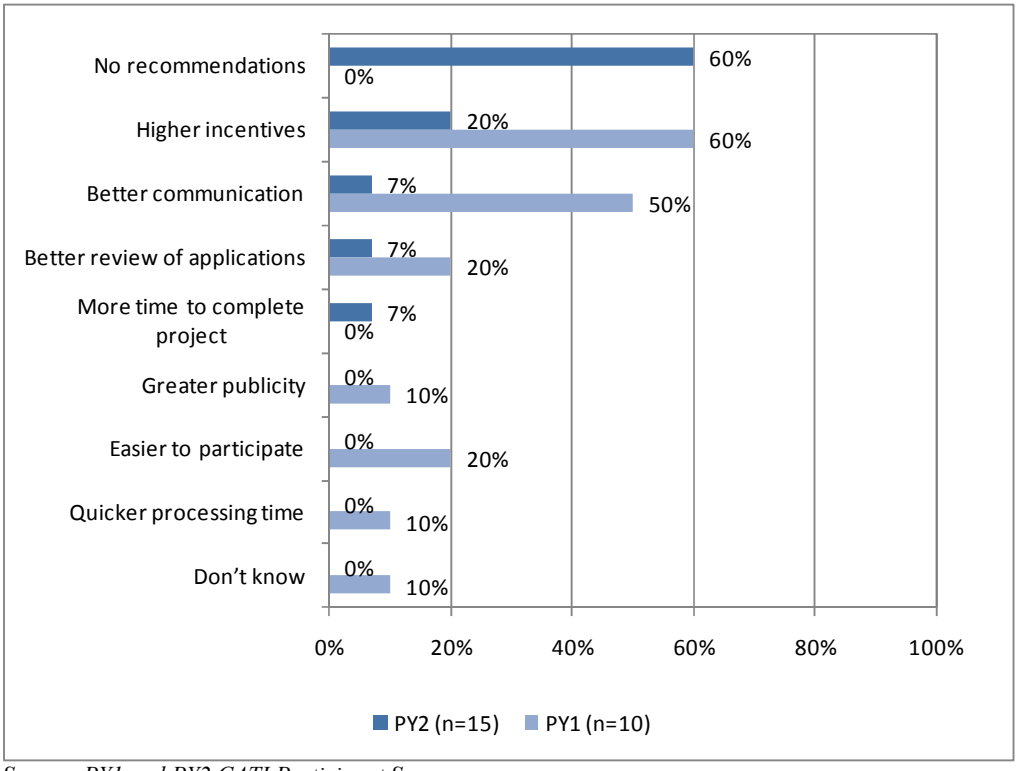
Figure 3-7. Program Satisfaction



Source: PY2 CATI Participant Survey.

Given the high satisfaction scores, it is not surprising that all interviewed participants plan to participate again in the future. When asked what could be done to improve the program, nine out of 15 interviewed participants had no recommendations. The few recommendations provided include higher incentives (three out of 15) and better communications, better review of applications, and more time to complete projects (one out of 15 each). Notably, the share of respondents who recommended higher incentives and better communication decreased sharply compared to PY1.

Figure 3-8. Recommended Program Improvements by Program Year



Source: PY1 and PY2 CATI Participant Survey.

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."*[21]

Table 3-7 summarizes the unique inputs used in a spreadsheet model to assess the TRC ratio for the Public Sector Custom program in PY2. Most of the unique inputs come directly from the evaluation results presented previously in this report. Incentive costs come from the DCEO program tracking data. Avoided costs for both demand and energy match what was used by ComEd in DSMore™ for assessing the TRC ratio of their own energy efficiency projects.

Table 3-7. Inputs to TRC Assessment for Public Sector Custom Program

Item	ComEd	Ameren
Measure Life	15 years	15 years
Annual Gross Energy Savings	9,104 MWh	12,252 MWh
Gross Coincident Peak Savings	0.000 MW	0.000 MW
Net-to-Gross Ratio	65%	65%
DCEO Administration Costs	$196,901	$63,906
DCEO Implementation Costs	$0	$0
DCEO Other Costs	$0	$0
DCEO Incentive Costs	$1,648,113	$2,217,925
Participant Contribution to Incremental Measure Costs	$2,477,700	$3,334,331

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

Based on these inputs, the TRC for this program is 1.48 for ComEd and 1.07 for Ameren and the program passes the TRC test.

Environmental benefits have been quantified for CO_2 reductions using a value of $0.013875 per kWh.

Section 4. Conclusions and Recommendations

This section highlights the findings and recommendations from the PY2 evaluation of DCEO's Public Sector Electric Efficiency Custom Incentive program. The primary evaluation objectives include quantifying 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 PY2 Custom Incentive program evaluation, the evaluation team has drawn a number of conclusions that are enumerated in this section.

4.1.1 Program Impacts

Tracking System

DCEO is in the process of a major upgrade to its project tracking systems. The EM&V team strongly endorses the need for that effort and expects that the issues we identified with the current system are being addressed in the new system.

One aspect of the tracking system that affected the evaluation was the reporting of the voucher out date for the completed Custom projects. The voucher out date for the completed projects was not populated in a timely manner. For this reason, the evaluation team was not able to identify all the completed Custom projects at the time the sample was drawn for field verification and the participant survey.

Other notable areas for tracking system improvement includes a desire for electronic record keeping of contact information for vendors or contractors, and that the electronic measure description was found to be lacking in detail surrounding the measures and related equipment in each application.

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 accordingly. 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 would require that DCEO consistently estimate summer peak demand, and then store those data in the tracking system.

One aspect of the tracking system that was improved compared to the previous year was the addition of participating customer contact information in electronic format. This includes applicant contact name, applicant phone number, applicant e-mail and applicant address.

Gross Impacts

While 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 unreasonable.

While the baseline condition selected for the impact calculations was found to be acceptable in 6 out of 8 projects evaluated, for two of the projects the age of the existing equipment was not considered to be a factor in selecting an appropriate baseline condition.

With one exception in the M&V sample, involving lighting controls that were not installed (and thereby affecting the energy savings claim), all measures were verified to be installed and fully operational, though not always operating in a fashion that is consistent with the ex ante documentation provided.

As noted above, the program needs to incorporate estimates of peak demand savings. Peak demand impact estimation is likely 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 30-40%. Participants report that the program is a motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Free-ridership levels were somewhat higher in the size-based sampling strata containing larger projects.

While spillover results suggest that participating customers are installing other energy efficiency improvements outside of the program, they attribute little influence to the program to their decision to install these additional measures and indicate that these actions generally would have been implemented regardless of their program participation experiences.

4.1.2 Program Processes

Program Participation

Participation in the Custom Program substantially increased in PY2, with 69 unique organizations completing 82 projects. Participation increased among all sectors but particularly among K-12 schools. Local governments continue to represent the largest share of participants (62%), projects (60%), and energy savings (39%). As in PY1, one university project accounted for a large percentage of total program savings (44% in PY1 and 30% in PY2).

PY2 ex ante energy savings more than doubled compared to PY1. The largest increase came from the federal government sector, where ex ante savings increased almost 10-fold, from 941 MWh in PY1 to 9,150 MWh in PY2. As a result of these strong gains, the program exceeded its PY2 ex ante energy savings goals.

Customer Satisfaction

Satisfaction with the Custom Program across various program processes and components remains very high. Notably, all interviewed participants are satisfied with the program overall and with DCEO (a rating of 7 or higher on a scale from 0 to 10). None of the interviewed participants reported experiencing any problems with their participation in the program and all plan to participate again in the future. This high level of satisfaction is commendable.

Program Design

Few program design changes were made in PY2. The program increased incentive levels by approximately 10% and the incentive cap from $100,000 to $200,000. The most significant design change was the "Green Spring Sale," which offered a significant increase in incentives in certain sectors during the last three months of PY2. Program staff estimated that approximately half of all PY2 applications came in during the Green Spring Sale.

The Green Spring Sale demonstrated that participation could be increased by increasing incentive levels, however, the optimum incentive levels to maximize program savings within the program budget is unknown. There should be sufficient data from the PY2 experience for DCEO to run planning scenarios to explore extending higher incentive levels across more sectors and for longer periods of time.

Program Resources

DCEO took several steps to increase PSEE staff levels for PY2 and beyond. DCEO used its role in support of the American Recovery and Reinvestment Act of 2009 (ARRA) as an opportunity to hire six staff with primary responsibility to ARRA, but with the ability to support EEPS up to half time as time allowed. The ARRA hires will be able to transition full time to EEPS as ARRA

work phases out for completion by January 2012. In addition, DCEO added two staff persons specifically for EEPS in PY2. Although staff faced challenges in PY2 to keep up with workload during peak periods of ARRA work and the Green Spring sale, this is expected to ease over time as ARRA responsibilities conclude and staff transitions to PSEE. DCEO is planning for additional hires in PY3.

With the addition of staff resources in PY2 and PY3, DCEO is transitioning toward more specialization among staff for internal program delivery roles (application and payment processing, data entry, technical support, etc.) and market and geographic segmentation (K-12 schools contact, community college contact, ComEd municipalities, etc.). This is expected to allow program managers to spend more time on strategy and marketing.

Cooperation with ComEd and Ameren Illinois Utilities

In PY2, DCEO continued to leverage Ameren Illinois Utilities and ComEd activities in promoting the PSEE programs. Cooperation is enhanced through monthly conference calls between Ameren, ComEd and DCEO that discuss marketing and outreach and other issues. DCEO is given time to make presentations at account manager meetings. DCEO feedback suggests the utilities are generally receptive to including DCEO at events and in outreach efforts. DCEO helped fund and co-sponsor some larger outreach events with the utilities.

Trade Ally Network

Contractors remain an important part of the custom program: 67% of interviewed PY2 participants utilized a contractor for their project, 67% discussed the program with their contractor, and 36% name a contractor, equipment installer, designer, or consultant as providing the most assistance in the design and specification of the installed equipment. Satisfaction with contractors is unanimous: all interviewed participants who used a contractor found that the contractor was able to meet their project needs, and all would recommend their contractor to others.

DCEO has made presentations on the PSEE program at trade ally events and meetings throughout PY2, conducted webinars, and staffed table displays at larger events. DCEO is leveraging the trade ally network of SEDAC, Ameren Illinois Utilities, and ComEd, referring potential participants looking for a qualified contractor to their lists. However, interviewed participants consider a contractor's affiliation with SEDAC or the utility programs only moderately important.

Given increased program goals for PY3, trade ally involvement will become more important to the success of the program, and the program should continue its marketing and outreach efforts to that group, and find additional ways to more closely engage them.

Account Managers

During PY2, DCEO marketing and outreach staff made presentations to ComEd and Ameren account managers to engage them in promoting the DCEO PSEE programs. The level of utility account manager support of DCEO programs is specific to individual and utility; DCEO reports some individuals are providing marketing support while others simply do referrals to DCEO.

Account managers for both utilities were involved in PY2 projects, and the DCEO program manager acknowledged their role in referring customers to the PSEE programs. Since account managers can be an effective vehicle for promoting the program – as they have established relationships with the customers targeted by this program, mainly larger customers – the program should find ways to more closely engage them.

Marketing and Outreach

Overall program marketing activities increased in PY2 compared to PY1. DCEO identified 49 events and meetings where outreach activities were conducted in-person with an estimated total attendance of 3,790. Target audiences cover a range of public sectors (schools, municipalities, universities, state) and individuals (school boards, facility engineers, public officials, etc.), and trade allies (architects, electrical contractors, and engineers). DCEO has a prepared presentation with Q&A that is adjusted for each audience, and typically lasts from 20 minutes to an hour.

In addition, the program leveraged SEDAC, and to a lesser extent Ameren Illinois Utilities and ComEd, for marketing and outreach. DCEO has relationships with public-sector organizations, such as the Illinois Association of Regional Councils (ILARC), whereby those organizations assist DCEO in outreach and project facilitation with members. As in PY1, one DCEO staff member had primary responsibility for marketing and outreach for the DCEO PSEE programs in PY2, with additional DCEO staff called in as needed.

In PY2, program participants *first* learned about the program through a variety of sources. Notably, 40% interviewed participants first learned about the program at an event. Sources through which participants have obtained information about the program in the past include the DCEO and SEDAC websites (73%), contractors or trade allies (67%), and events (60%). All interviewed participants who saw program marketing materials found them to be useful. E-mail remains the preferred method of receiving information about energy efficiency opportunities. In fact, the share of interviewed participants who prefer to be contacted by e-mail increased from 40% in PY1 to 80% in PY2.

4.2 *Recommendations*

4.2.1 Impact Recommendations

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

The EM&V team has provided to DCEO site-specific M&V reports for each Custom gross impact sample point. DCEO can use these reports in order to gain a thorough understanding of evaluation methods and procedures and use that information base to proactively improve program performance going forward. It is recommended that DCEO apply the evaluation-based information from this report when conducting application reviews and to adopt program rules that enforce methods identified by the evaluation. One important example to consider would involve screening applications for baseline technology selection that is consistent with the evaluation approach. One relatively easy correction that would improve the realization rate would be the enforcement of identifying new equipment as the baseline when the existing equipment being removed has a relatively short remaining useful life or generally requires replacement. The age and operating condition of the baseline equipment should be considered before accepting the existing equipment as baseline.

The project-specific M&V work led to adjustments in ex ante usage estimates and operating profiles for projects included in the M&V sample. This suggests that greater care may be needed in the review of application-based usage models for projects. To improve usage models and improve realization rates, the DCEO implementation team could do a better job of verifying the following:

- Verify the ex ante estimates of operating hours and typical operating conditions of the installed equipment.
- Confirm proper operation of the installed equipment.
- Review calculations for proper normalizing across the baseline and new equipment conditions, and ensure careful application of assumptions made when estimating energy usage of equipment.

Gross Impact Results

The gross impact results yielded an energy realization rate of 0.56. The implementation team should make efforts to improve this rate. Site-specific M&V differences between the ex ante and ex post evaluation include baseline definitions, modeled operating conditions, installation incomplete, and equipment operating profiles and inputs being applied. The realization rate could be significantly improved if these differences were addressed in the ex ante calculations. At a minimum extensive engineering review and modeling is recommended for the largest projects.

Free-Ridership Results

Some level of free-ridership is unavoidable in rebate programs. While it is challenging to screen out free-riders and maintain ease of participation, DCEO should consider the following:

1. Monitor free-ridership among participants and measures to assess the ongoing risk of low NTG ratios.
2. Proactively seek participation from participants, measures, and projects with low free-ridership rates to balance participants and measures that tend to have higher free-ridership.
3. 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.

Tracking System

DCEO is in the process of a major upgrade to its project tracking systems, converting them to a relational database structure. The EM&V team strongly endorses the need for that effort and expects that the following issues we identified with the current system are being addressed in the new 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 within the program is needed, including real-time updates to the tracking system for completed projects. The tracking system should also include information about the 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.

4.2.2 Process Recommendations

Marketing and Outreach

- **Continue to monitor exceptions to incentive caps.** In the first two program years, incentive caps were increased, on a case-by-case basis, to accommodate larger projects. This approach is reasonable, especially since the program did not fully utilize its budget. However, the program should continue to monitor such exceptions. As noted in the PY1 report, lifting the cap and 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 or if the realization rate for the project is low. (The PY2 evaluation could not assess if this was an issue, as the five largest projects were not included in the sample frame for the impact analysis and could therefore not be assessed.)
- **Improve data tracking procedures.** DCEO is in the process of developing an improved tracking database. As part of this effort, we recommend adding identifiers for key program information, such as participation in pilot efforts or special promotions (e.g., Emerging Technologies Pilot and the Green Spring Sale). This information would help

the program better assess the effectiveness of such initiatives. In addition, key process information should be tracked, e.g., whether a pre-inspection or a post-inspection was conducted. This information would facilitate program management as well as program evaluation. Program staff should also ensure that the database is updated in a timely manner.

Program Resources

- **Ensure adequate program staffing for PY3.** Adequate program staffing requires having enough staff across each program delivery function to meet the program goals. DCEO should continue the steps already taken to increase PSEE staff levels for PY2 and beyond. DCEO hired six staff with primary responsibility to ARRA, but with the ability to transition to full time on EEPS as ARRA work phases out for completion by January 2012. In addition, DCEO added two staff persons specifically for EEPS in PY2. DCEO is planning for additional hires in PY3. With the addition of staff resources in PY2 and PY3, DCEO is transitioning toward more specialization among staff for internal program delivery roles (application and payment processing, data entry, technical support, etc.) and market and geographic segmentation (K-12 schools contact, community college contact, ComEd municipalities, etc.). This is expected to allow program managers to spend more time on strategy and marketing.

Cooperation with ComEd and Ameren Illinois Utilities

- **Expand joint marketing efforts among DCEO, Ameren Illinois Utilities and ComEd.** With increases in program goals on both the utility and the DCEO side, both parties benefit from increased cooperation, for example if marketing resources can be pooled for certain outreach activities.

Trade Ally Network

- **Further engage trade allies with the program.** Contractors and trade allies are one of the primary sources of information for customers and play a significant role in the specification of new equipment. To better leverage the ComEd and Ameren Illinois Utilities trade ally networks, program staff should try to become more closely involved in the promotional messages sent to trade allies registered with the utilities. In addition, 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 utility trade allies and would allow the program to provide its own messaging.

- **Conduct intense outreach to high performing trade allies.** Although a trade ally bonus such as the utilities are offering may not be feasible for DCEO, DCEO can target the utilities' high performing, active trade allies with a more intense level of outreach than

might be provided to a larger group. For example, some programs use breakfast meetings or "lunch and learn" events at trade ally offices to cater to high-profile trade allies.

Marketing and Outreach

- **Continue to differentiate the DCEO PSEE program from the utility programs.** Confusion about DCEO and utility program offerings, special promotions, and fund availability is still present in the marketplace. Further differentiation and separation of the PSEE program will help create a more prominent image of the program and will also keep the program from having to adjust to the activities and promotions run by ComEd and Ameren Illinois Utilities. Some strategies might include providing specific messaging in marketing, supplying trade allies with DCEO-labeled marketing materials for co-branding, and increasing communication with and education of account managers and trade allies on the program and its offerings.
- **Utilize Ameren Illinois Utilities and ComEd marketing and outreach infrastructure.** Leveraging the marketing channels already established by ComEd and Ameren Illinois Utilities is an effective way of outreach. Increased collaboration, e.g., through financial contributions by DCEO to utility marketing efforts, would be beneficial to all parties and would provide DCEO with an established and cost-effective way to market the PSEE program to potential customers.
- **Consider increased use of e-mail.** E-mail is the preferred method of receiving information about energy efficiency opportunities, mentioned by 80% of interviewed PY2 participants. The program should consider increased use of this low-cost channel to reach out to potential participants and disseminate program information, e.g., about new initiatives.

Account Managers

- **Increase outreach to Account Managers.** Account managers can be an effective vehicle for promoting the program as they have established relationships with the customers targeted by this program, mainly larger customers. The program should find ways to more closely engage them.

Section 5. Appendices

5.1 *Data Collection Instruments*

5.1.1 Phone Survey

2010 DCEO PSEE Participant Survey - F

5.2 *Other Appendices*

5.2.1 2009 Utility specific savings

Table 5-1. Utility Specific Evaluation-Adjusted Net kWh Impacts for PY2

Utility	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
Ameren	21,713,058	12,251,827	0.56	8,015,434	0.65

Table 5-2. Utility Specific Evaluation-Adjusted Net kWh Impacts for PY2

Utility	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
ComEd	16,134,702	9,104,180	0.56	5,956,169	0.65