

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

**Evaluation Report:
Smart Ideas for Your Business
Business Custom Program**

Presented to

Commonwealth Edison Company

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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 C&I Custom program¹. 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 Commonwealth Edison Company (ComEd) Smart Ideas for Your Business program provides incentives for business customers who upgrade their facilities with energy efficient equipment. There were two specific program elements that were available to ComEd customers during program year 2: a Custom program and a Prescriptive 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 Prescriptive program provides an expedited application approach for nonresidential 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. Relationships with trade allies are a key strategy for promoting prescriptive incentive availability to customers.

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

E.2 Evaluation Methods

ComEd's three-year Energy Efficiency and Demand Response Plan, filed in November 2007 and approved in February 2008,² anticipates that the Custom program will provide 24% of the business portfolio nonresidential energy savings.

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

² Commonwealth Edison Company's 2008 – 2010 Energy Efficiency and Demand Response Plan, Docket No. 07-0540, ComEd Ex. 1.0, November 15, 2007.

Table E-0-1 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.

For PY2 it was decided not to segment projects into measure categories as was done in PY1. The PY2 report did not independently examine ex post gross impacts for Custom Lighting projects. It should be noted that in PY3 lighting projects are largely being addressed in the Prescriptive program, by expanding the eligibility of the Prescriptive program to a wider list of lighting technologies.

Table E-0-1. 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	ComEd Online Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd Custom Program Staff	Contact from ComEd	C&I Custom Program Manager	1	April/May 2010
	Custom Program Implementers	Contact from ComEd	KEMA Program Implementation Staff	9	May and July 2010
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of Custom Program Participants	NTG: 20 Process: 42	July/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)	10	July – September 2010
On-Site Visits and Measurement					

E.3 Key Findings

The Custom program’s second year (PY2) began in June 2009 and ended May 31, 2010. Combined the Custom and Prescriptive programs exceeded PY2 goals.

Table E-0-2 below provides reported ex ante and evaluation-adjusted net savings impacts for the PY2 Custom program. As shown in Table E-0-3 and Table E-0-4, the PY2 evaluation found that verified gross energy savings were 15 percent lower than savings in ComEd’s tracking system, as indicated by the realization rates (realization rate = verified gross / tracking system gross). The verified net-to-gross ratio, 0.76, was slightly lower than ComEd’s planning value of 0.80.

Table E-0-2. PY2 Custom Program Net Savings

Net Savings Estimates	MWH	MW
ComEd Reported for PY2 (ex ante)	18,764	2.33
Total Second-Year Evaluation-Adjusted Net Savings (ex post)	17,255	2.20

Reported: Communication from ComEd. ComEd’s reported net savings include a net-to-gross ratio of 0.8.

Table E-0-3. Program-Level Evaluation-Adjusted Net kWh Impacts for PY2

Segment	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
Total	26,805,344	22,697,187	0.85	17,255,274	0.76

Source: Ex ante savings from ComEd online tracking system, July 14, 2010.

Table E-0-4. Program-Level Evaluation-Adjusted Net kW Impacts for PY2

Segment	Ex Ante Gross kW	Ex Post Gross kW	kW RR	Ex Post Net kW	NTGR (ex post gross)
Total	2,910	2,890	0.99	2,197	0.76

Source: Ex ante savings from ComEd online tracking system, July 14, 2010.

The relative precision at a 90% confidence level for the ten Custom projects in the sample is ± 10% for the kWh Realization Rate and 16% for the kW Realization Rate. The relative precision at a 90% confidence level for the program NTG ratio is ± 12%.

1.1.1 Key Impact Findings

- Based on the sample sizes evaluated in PY2, it appears that ComEd is continuing to do a good job of screening viable Custom energy efficiency projects for incorporation in the

program. The project documentation presented 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. From a technical perspective, ex ante savings estimates were reasonably accurate, although some equations were not well supported or sourced. While the baseline conditions selected for the impact calculations were generally reasonable, there were several instances where baseline adjustments were required to improve ex post savings estimates. Again, for PY2 no apparent project fraud or thoroughly unreasonable impact claims were encountered.

- The program still needs to do a better job of estimating peak demand savings. Peak demand savings is populated with zeros in more than 50% of the projects in the program tracking database. Peak kW estimates were improved over PY1, but accurate estimation of peak demand continues to be given a lower priority than energy savings.
- Free-ridership levels (at 24%) are particularly low for a Custom program. Participants report the program being a strong motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Mean free-ridership was relatively low across all project size categories (sampling strata).
- In the M&V sample, all measures were verified to be installed and operational, though not always operating in a fashion that is consistent with the ex ante documentation provided.
- Overall, ComEd's quality control and verification procedures for the Custom Program are rigorous and ensure high quality projects and tracking data. In particular, the program is strongest in the area of project screening and access to project documentation in electronic format.

1.1.2 Key Process Findings

Program Participation

Participation in the Custom Program dramatically increased in PY2, with 110 unique companies completing 340 projects. As in PY1, heavy industry accounted for the largest share of program savings. The addition of more chain company participants drove the average number of projects per participant – from 1.4 in PY1 to 3.1 in PY2 – and also accounted for significant increases in the number of projects in the grocery sector (1 project in PY1, 40 in PY2) and the retail/service sector (23 projects in PY1, 194 in PY2).

Customer Satisfaction

Satisfaction with the Custom Program across various program processes and components remains very high. Notably, 98% of participants are satisfied with their participation in the Custom Program overall, a rating of 7 or higher on a scale of 0 to 10. Very few participants encountered problems while participating and about three-quarters of interviewed participants (74%) plan on participating again.

Program Oversubscription

While in PY1 oversubscription of prescriptive measures affected the Custom Program, in PY2 this does not appear to be the case. Because only prescriptive lighting measures were waitlisted in PY2, recruitment of all custom projects continued throughout the program year. Increased communication efforts thwarted the adverse effects of oversubscription seen in PY1: program staff seemed to manage the process better, there was more proactive communication with trade allies, and the addition of a “fundometer” to the website was helpful in keeping all parties informed of the Custom program funding level status. As a result significantly fewer custom participants were aware of the waitlist in PY2, and less than 5% noted that the waitlist impacted their participation in the Custom Program.

Marketing and Outreach

Similar to PY1, there was limited emphasis on marketing as the strong demand for prescriptive lighting measures allowed the Smart Ideas for Your Business Program to exceed combined PY2 goals. The marketing that was done in PY2 was both recalled and well received. E-mail and contractors/trade allies remain the strongest sources of program awareness. Plans for PY3 include significantly increased marketing.

The Custom Program might have benefited from more specific and concentrated outreach to trade allies and customers. If attainment of goals by individual programs is desired, specific efforts should be made to promote participation in the Custom Program. Bonuses for trade allies and incentives for Account Managers, first implemented in early PY3, should help, especially if they are focused on larger projects. In addition, the program might consider offering increased customer incentives, for a limited period of time, to encourage participation in the Custom Program.

Trade Ally Network

Contractors play an integral role in the Custom Program. Eighty-four percent of PY2 custom projects were completed with help from a contractor. Notably, less than half of contractors who implemented a project in PY2 (48%) were registered trade allies. However, these trade allies accounted for 81% of all contractor-implemented projects. In general, customers do not believe

that it is important that their contractor is affiliated with the Smart Ideas for Your Business Program.

While the number of registered trade allies has grown to over 300 in PY2, about two-thirds of trade allies have completed no projects or only one project in PY2. Plans for trade allies in PY3 include the stipulation that they must complete a project through the program and attend a basic training in order to remain a registered trade ally. Contractors active in PY2 projects implemented an average of about three projects. However, this number was driven by a few contractors who implemented a very large number of projects for a chain.

Contractors implementing custom projects are clearly different from contractors implementing prescriptive projects: Only 28% of contractors involved in a custom project in PY2 also completed a prescriptive project. Therefore, marketing, training, and recruitment efforts should specifically target contractors capable of implementing custom projects.

Overall, participants are very satisfied with their contractor and 94% would recommend their contractor to others.

Account Managers

Although program staff report that Account Managers have become more active in the Smart Ideas for Your Business Program in PY2, additional opportunities for Account Managers to help increase participation in the program appear to exist. In general, program staff would still like to see increased involvement by Account Managers. Specific Account Manager goals planned for PY3 –include bringing customers to the Energy Efficiency Expo; bringing in a certain volume of projects; and attending a certain number of lunch-and-learns – plus incentives if these goals are met, should help the program in future years.

Section 1. Introduction to the Program

This evaluation report covers the Custom program element of the ComEd Smart Ideas for Your Business incentive program.

1.1 *Program Description*

The Commonwealth Edison Company (ComEd) Smart Ideas for Your Business program provides incentives for business customers who upgrade their facilities with energy efficient equipment. This incentive program is available to all eligible, nonpublic, commercial and industrial customers in ComEd's service territory. There were two specific program elements that were available to ComEd customers during program year 2 (PY2) under the ComEd Smart Ideas for Your Business incentives program:

- **Prescriptive Incentives** were available for energy-efficiency equipment upgrades and improvements including lighting, cooling, refrigeration, and motors. Incentives were paid based on the quantity, size, and efficiency of the equipment. Incentives were provided for qualified equipment commonly installed in a retrofit or equipment replacement situation.
- **Custom Incentives** were available to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom measure incentives were paid based on the first year energy (kWh) savings. All projects were required to meet ComEd's cost-effectiveness and other program requirements.

Measures that are available through the Prescriptive program are not eligible for custom incentives. However, the applicant has the option to apply for a custom incentive if the entire project involves a combination of prescriptive and custom measures. The Prescriptive and Custom programs continued into program year 3, with minor changes to custom incentive levels and rebate options.

Additional ComEd program offerings are provided under the Smart Ideas business program umbrella, including retrocommissioning and new construction services. The Illinois Department of Commerce and Economic Opportunity (DCEO) is responsible for delivering programs to ComEd customers targeted towards public nonresidential buildings such as government, municipal, and public schools.³ These ComEd and DCEO programs are evaluated and reported separately.

³ For more information on the DCEO programs please refer to (www.illinoisenergy.org).

The Smart Ideas for Your Business program is a key part of ComEd’s overall portfolio of programs approved by the Illinois Commerce Commission (ICC) as part of ComEd’s Energy Efficiency and Demand Response Plan, filed in November 2007 and approved in February 2008.⁴ The program is funded on an annual basis from June 1 to May 31 of each year.⁵ Funding in any given program year is limited to that year’s budgeted amount and, therefore, incentives are paid on a first-come, first-served basis until the program year’s incentive funds are exhausted. It should be noted that the Custom program is administered in conjunction with the Prescriptive program, which allows considerable flexibility to adjust program funding as needed between the Custom and Prescriptive programs. No Custom applicants were wait-listed in PY2 based on available funding and in anticipation that a portion of those projects may carry over to PY3.

The net MWh savings goals and budgets for the 2010 (PY2) Prescriptive and Custom incentives program are presented in Table 1-1.

Table 1-1. Smart Ideas for Your Business PY2 Planned Savings Goals and Budgets

Program Element	Plan Target Net MWh	Plan Target Net MW	Plan Target Total Cost
Prescriptive Incentives	86,510	24.7	13,900,000
Custom Incentives	74,475	13.7	10,500,000
Total	160,985	38.4	24,400,000

Source: Commonwealth Edison Company’s 2008 – 2010 Energy Efficiency and Demand Response Plan, Docket No. 07-0540, ComEd Ex. 1.0, November 15, 2007. The program’s net savings goals include a net-to-gross ratio of 0.8 and a gross realization rate of 0.95.

1.1.1 Implementation Strategy

ComEd retained KEMA Services Inc. as its program administrator responsible for day-to-day operations. The Custom program launched in June 2008.

ComEd has provided the evaluation team with a detailed Operations Manual and a Policies and Procedures Manual that describe the details of program implementation. Important aspects of program implementation are summarized below.

⁴ Commonwealth Edison Company’s 2008 – 2010 Energy Efficiency and Demand Response Plan, Docket No. 07-0540, ComEd Ex. 1.0, November 15, 2007.

⁵ Program year 2 ran from June 1, 2009 through May 31, 2010.

Incentive Caps: Incentives are subject to annual limits or caps that are set per facility per year. A facility is defined as contiguous property for which a single customer is responsible for paying the ComEd electricity bill. The Custom incentive cap for PY2 ending May 31, 2010 is \$200,000 per facility.

Incentive Limits: Project incentives cannot exceed 50 percent of the total project cost (includes costs of equipment and contractor labor; excludes in-house labor) and 100 percent of the incremental measure cost.

Pre-approval Application Submittal: Pre-approval is required for all Custom applications to reserve funding.

Pre-Review: The program reviews pre-approval applications for eligibility and completeness. The program contacts the customer or contractor to clarify details or obtain further information, to discuss the overall process and timelines, and to explain the process for inspections where they are required.

Pre-Inspection: Pre-inspections provide the program with the opportunity to verify the existing conditions at the site. They are performed as defined by quality assurance procedures based on the type of measures that the participant submits.

Reservation: The program reserves the project funds once the pre-inspection report and/or initial project review is approved. Custom projects were not placed on a waiting list in PY2. In the event that a project is not completed within 90 days of the reservation and an extension has not been requested and granted, then the project is cancelled.

Final Application Submittal: The Final Application requires the submittal of documentation to demonstrate the installation of each energy efficiency improvement, including project invoices to document the costs to procure and install the project. Final applications must be submitted within 60 days of project completion and include the appropriate back-up documentation to verify the project is complete and meets the program requirements. ComEd reserves the right to request additional information from the sponsoring customer that demonstrates the effectiveness of the technology deployed. The program reviews final applications for eligibility and completeness.

Final Inspection: The program performs final inspections as defined by quality assurance/quality control procedures to verify the measure installations.

Incentive Payment: Once the program accepts a project for payment, incentives are processed and delivered.

Cancellation: When a project either does not meet the program guidelines or is cancelled by the customer, the project is moved to a cancelled status. The project details remain in the database, but the project no longer counts towards the active program goals.

Wait List: Custom projects were not placed on a waiting list in PY2.

Hold: Projects are placed on hold when a customer with a reserved project decides not to move forward in the current program year and indicates that they may move forward with their project in the following year. Projects on hold are not included in the active program totals.

1.1.2 Measures and Incentives for PY2

ComEd's Smart Ideas for Your Business Custom incentive program provides incentive payments for eligible energy efficiency projects. Custom program incentives are intended for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom incentives are available based on the project's kWh savings, assuming the project meets all program requirements. Incentives are based on the following formula:

- For projects with less than a 5-year life, or for any involving Energy Management System programming, the program pays an incentive of \$0.03/kWh
- For equipment with a 5-year life or greater, the program pays an incentive of \$0.07/kWh down to a minimum payback of one year and up to a maximum payback of 7 years.

The incentive amounts noted above are applied for the first \$100,000 in incentives and then half that amount for the next \$100,000 in incentives up to the project cost cap. Additionally, \$200,000 in incentives is available for both Prescriptive and Custom measure installations, up to a total project incentive cap of \$400,000. Project incentives cannot exceed 50 percent of the total project cost (includes costs of equipment and contractor labor; excludes in-house labor) and 100 percent of the incremental measure cost.

The PY2 program application form is provided in Appendix 5.2.1, and includes a listing of project eligibility criteria, incentive levels and the general application process.

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 for PY2 focused on the following key areas:

1. Program design and implementation changes in PY2
2. Changes to customer and trade ally program participation between PY1 and PY2
3. Effectiveness of program design and processes
4. Effectiveness of program implementation
5. Effectiveness of program marketing and outreach
6. Barriers to and benefits of participation
7. Participant satisfaction

Section 2. Evaluation Methods

This section describes the analytic methods and data collection activities implemented as part of the PY2 process and impact evaluation of the Custom program, including the data sources and sample designs used as a base for the data collection activities.

After careful examination of the Custom measures installed in PY2, it was decided not to segment projects into measure categories as was done in PY1. The PY1 report segmented on Custom Other and Custom Lighting, but did not independently examine ex post gross impacts for Custom Lighting projects. It should be noted that in PY3, lighting projects are largely being addressed in the Prescriptive program through a more comprehensive list of lighting technologies.

A total of 345 Custom measures were installed. These measures were submitted for incentive payments in a total of 340 applications. They included HVAC measures (such as VSDs/VFDs, free cooling installations, chiller upgrades, and centralized thermostat control systems, large commercial refrigeration measures, air compressor system upgrades, high-rise building domestic water pumping systems, industrial process renovations and custom, non-prescriptive lighting measures). Custom lighting measures are measures that are either not included under the Prescriptive program, or lighting measures that operate on a different schedule (i.e., 24/7) than the Prescriptive assumptions. Sometimes lighting measures that would qualify for the Prescriptive program, but the customer preferentially applies for the rebate under the Custom program. It is also noted that there are typically multiple lighting measures per tracking system record.

The final PY2 evaluation plan called for on-site visits and detailed M&V for 10 Custom projects to address the gross impact evaluation objectives, plus telephone surveys with 20 Custom projects to address evaluation process and net-to-gross objectives. The key evaluation activities were:

- Conduct on-site visits and M&V activities with a sample of 10 Custom projects. The M&V effort seeks to update, refine or replace the calculation procedures that were submitted as part of the final application submittal.
- Conduct CATI telephone surveys for 20 Custom projects to support the net impact approach (as described in greater detail in the Net Program Savings section, 2.1.2 below). As was the case for PY1, the Basic rigor NTG approach was predominantly used in PY2. Since the PY2 Custom projects were typically small only one project was sufficiently large to trigger a Standard rigor approach.
- CATI survey data were also collected to support the process evaluation. In addition to findings from the original 20 projects included in the gross impact sample, it was

decided to supplement this sample with an additional 22 CATI surveys to provide for more robust process findings. This made for a set of findings that was more representative of the program as a whole, and particularly the relatively large number of small projects found in the program population.

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 veracity and accuracy of the PY2 ex ante gross savings estimates in the Custom program tracking system. The savings reported in ComEd's online 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 ComEd's online tracking system, including the Final Application submittal and the application-based calculations. Sometimes each plan is further refined based on a brief interview with the customer representative over the phone.
2. Implement a site-specific data collection approach for each sampled project. The focus of the data collection is to verify and/or update the assumptions that feed into engineering algorithms of measure level savings. Data collection also includes verification of measure installation and that the systems are functioning and operating as planned, and if not then in what way(s) there is variance.
3. Perform on-site measurement or obtain customer-stored data to support downstream M&V calculations. Measurement data obtained from the sites are used to calibrate the analyses, as measured parameters typically have the least uncertainty of any of the data elements collected. Measurement includes spot measurements, run-time hour data logging, and post-installation interval metering. Customer-supplied data from energy management systems (EMS) or supervisory control and data acquisition (SCADA) systems are often used when available.
4. Complete ex post engineering-based estimates of gross annual energy (kWh) and summer peak demand (kW) impact for each sampled project. A site specific analysis is performed for each point in the impact sample. The engineering analysis methods and degree of monitoring will vary from project to project, depending on the complexity of the measures installed, the size of the associated savings and the availability and reliability of existing data. Gross impact calculation methodologies are generally based on IPMVP protocols, options A through D. At a minimum, the ex post impact evaluation

incorporates the following additional information that may not have been feasible to incorporate in Final Application submittal:

- a. Verification that measures are installed and operational, and whether or not the as-built condition will generate the predicted level of savings.
 - b. Observed post-installation operating schedule and system loading conditions.
 - c. A thorough validation of baseline selection, including appropriateness of a retrofit vs. replace on burnout claim.
 - d. Development of stipulated and measured engineering parameters that contribute to the impact calculations.
5. Prepare a detailed, site-specific impact evaluation report for each sampled site.
 6. Carry out a quality control review of the ex post impact estimates and the associated draft site reports and implement any necessary revisions.

A verified gross realization rate (which is the ratio of the ex post gross savings-to-reported tracking savings) was then estimated for the sample, by sampling stratum, 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 on the market. If the equipment is at the end of its life and there is variation among new equipment efficiencies, then the savings should be based on the delta between the efficiency of the standard baseline equipment and program induced installation. If the equipment is at the end of its life (i.e., no evidence of program-induced early replacement) and there is little or no difference in efficiencies among new equipment choices, then the savings will essentially be zero. The 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 program implementers, interviews with vendors and other Energy Efficiency Service Providers (EESPs)⁶ that participated in a given project.

Nine of the ten projects in PY2 gross impact sample utilized IPMVP approach A. One project utilized a hybrid IPMVP approach (approach D simulation of facility in conjunction with approach A).

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. Sometimes initial plans are adjusted to reflect actual in-field conditions. Where warranted the evaluation team refines the initial plan based on better/more information as each M&V site data collection and analysis effort develops. There are also situations where the favored data collection and analysis approach turns out to be infeasible – for example, if a site contact did not provide requested EMS trend data.

⁶ 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).

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.

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 spillover was not quantified.

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

$$\text{NTG Ratio} = 1 - \text{Free-ridership Rate}$$

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
<p>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:</p> <ul style="list-style-type: none"> 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 	<p>Maximum of A, B, C, D, and E</p>
<p>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?”</p>	<p>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</p>
<p>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?”</p> <p>Adjustments to the “likelihood score” are made for timing: “Without the program, when do you think you would have installed this equipment?” Free-ridership diminishes as the timing of the installation without the program moves further into the future.</p>	<p>Interpolate between No Program Likelihood Score and 10 where “At the same time” or within 6 months equals No Program score, and 48 months later equals 10 (no free-ridership)</p>
<p>Project-level Free-ridership (ranges from 0.00 to 1.00)</p>	<p>1 – Sum of scores (Program Components, Program Influence, No-Program)/30</p>
<p>PY2 Project level Net-to-Gross Ratio (ranges from 0.00 to 1.00)</p>	<p>1 – Project level Free-ridership</p>
<p>Apply score to other end-uses within the same project?</p>	<p>If yes, assign score to other end-uses of the same project</p>
<p>Apply score to other projects of the same end-use?</p>	<p>If yes, assign score to same end-use of the additional projects</p>

Standard Free-Ridership Assessment

For projects that receive greater program funding levels in excess of \$50,000, 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 provided, to ensure their transparency to the 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 score. In those instances interviews were conducted for sampled projects with a selected representative of the program implementer to better understand the evolution of each project from concept to installation, and gather any knowledge concerning project implementation, including vendors, utility staff, program staff and other players that had participated. 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 corporate 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; they were also done in cases where there was implementer or customer information provided that suggested the current net-to-gross ratio might significantly increase. Adjustments were made where warranted. Any adjustments made on this basis were carefully documented and the rationale for any adjustments is provided, to ensure their transparency to the 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 ComEd 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 ComEd 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 ComEd 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 ComEd program this influence rating?
11. If you had not participated in the ComEd 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. In the upcoming PY3 evaluation spillover could be quantified through 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 and (2) a quantitative telephone survey with 42 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	ComEd Online Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd Custom Program Staff	Contact from ComEd	C&I Custom Program Manager	1	April/May 2010
	Custom Program Implementers	Contact from ComEd	KEMA Program Implementation Staff	9	May/July 2010
CATI Phone Survey	Custom Program Participants	Tracking Database	Stratified Random Sample of Custom Program Participants	NTG: 20 Process: 42	July/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)	10	July – September 2010
On-Site Visits and Measurement					

2.2.1 Tracking Data

The tracking data delivered for this evaluation was extracted from a copy of the ComEd online database uploaded to the evaluation team SharePoint site on a periodic basis. The tracking data used to support this evaluation was uploaded on July 14, 2010. Half of the impact and survey samples were drawn from a database extract dated February 22, 2010 to allow an early start of the impact efforts; the second half of the samples were drawn from an extract dated June 8, 2010. The Custom measures show no substantive differences between the June 8, 2010 version and the final July 14, 2010 version.

2.2.2 Program and Implementer Staff Interviews

The program implementer and staff interviews conducted in PY2 were less formal and structured than those completed in PY1.

The ComEd Custom Program Manager (Sandra Henry) was interviewed or involved in evaluation-based discussions on two occasions in order to gain a solid understanding of program progress to date, issues and associated implementation adjustments, or changes in PY2 relative to PY1. These interviews were completed over the phone in April and May of 2010.

Representatives of the KEMA implementation team were interviewed in order to better understand the program role, vendor role and customer decision making process for projects in the PY2 sample. Interviews were conducted on two occasions with KEMA implementation staff (Operations Manager Charley Budd, Project Engineers Frank Powell and Tu La, as well as Tom Johanson, Brian Warren, Lauren, Joe St. John, in addition to NEXANT staff members Feng Huang and Chris McCabe). These interviews were completed in person on May 12, 2010 and over the phone on July 23, 2010.

Furthermore, the Custom evaluation team participated in a collaborative meeting in January with the implementers to discuss evaluation methods and approaches and the applicability or not of those methods to ex ante impact claim developments.

The evaluation team also reviewed program materials developed by KEMA and ComEd, including: KEMA's operations manual, a policies and procedures manual, a random sample of Custom Application documents, program tracking database documentation, and program scorecard reports.

2.2.3 CATI Phone Survey

A CATI telephone survey was conducted with a stratified random sample of 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 July and August of 2010.

The CATI survey was directed toward unique customer contact names drawn 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 an 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, project documentation in electronic format was obtained from the online tracking system, for each sampled project and several others that were randomly inspected. Documentation included some or all of scanned files of hardcopy

application forms and supporting documentation from the applicant (ex ante impact calculations, invoices, measure specification sheets, vendor proposals), pre-inspection reports and photos (when required), post inspection reports and photos (when conducted), and important email and memoranda.

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

ComEd's tracking database extract dated 2/22/2010 was used to select five M&V sample points. The tracking database extract dated 6/8/2010 was used to select five more M&V sample points, for a total of 10. Similarly, 10 sample points for the telephone survey were selected using the 2/22/2010 database extract, and 10 additional sample points were selected using the 6/18/2010 database extract.

2.3.1 Profile of Population

Using the 2/22/2010 tracking extract, custom records were sorted and placed in three strata using ex ante savings kWh to create roughly equal contributions to total program savings. When the 6/8/2010 extract became available, the strata boundaries defined on 2/22/2010 were preserved. The five additional M&V sample points were selected so that the sample reflects the final population distribution of savings within each stratum.

Sampling for the Custom program was completed for ex post gross M&V-based evaluation, as well as a telephone survey supporting ex post net impact evaluation and the process evaluation.

Table 2-3 presents each of three strata developed for sampling within the Custom Program, which consists of a total of 345 tracking records comprising 340 unique Custom applications. The number of records is presented by strata, along with ex ante gross kWh claimed, ex ante gross kW claimed, and the amount of incentive paid. Note that the Custom tracking system-based peak demand estimates are populated better than in PY2, with only 188 out of 345 records showing zero kW savings. If the actual savings are non-zero for a portion of those 188 records then this would be expected to make estimating gross kW impacts for the program problematic – less accurate than optimum.

Table 2-3. PY2 Custom Program Participation by Sampling Strata

Sampling Strata	Ex Ante kWh Impact Claimed	Ex Ante kW Impact Claimed	Measures	Incentive Paid to Applicant
1	3,922,851	448	1	\$274,600
2	15,714,556	1,546	47	\$1,007,469
3	7,167,937	915	297	\$483,694
TOTAL	26,805,344	2,910	345	\$1,765,763

Source: Evaluation analysis of tracking savings from ComEd online tracking system, July 14, 2010.

2.3.2 Gross Impact M&V Sample

Before final sample selection, the tracking extract was reviewed to check for outliers and missing values, and then matched to ComEd’s reported energy savings. Some projects contain both Custom and Prescriptive measures (combined projects). The Custom and Prescriptive programs were evaluated through different approaches by necessity, so the evaluation team included all custom measures within the Custom evaluation, and all prescriptive measures within the Prescriptive evaluation. As a result, 173 combined projects have measures within each of the two evaluations. Site visits and phone surveys were coordinated by assigning combined projects to one evaluation or the other to avoid multiple contacts.

Program-level Custom savings data were analyzed by project size to inform the sample design for this population of heterogeneous measures. Using the 2/22/2010 extract, projects were stratified at tracking record level using the ex ante kWh impact claim. Records were sorted from largest to smallest Custom kWh claim, and placed into one of three strata such that each contains one-third of the program total kWh claim. The project distribution changed between 2/22/2010 and the final extract dated 7/14/2010, but the strata boundaries defined using the 2/22/2010 extract were preserved. In the final extract, the 1 largest record was assigned to “strata 1,” the next largest 47 records were assigned to “strata 2,” and the smallest 297 records were assigned to “strata 3.”

The Custom evaluation plan called for a target sample of 10 applications in the ex post gross impact M&V sample. This sample was drawn such that the sample represents the final population distribution by strata: the one record in strata 1 was selected, 6 records out of 47 were randomly selected in strata 2, and 3 records out of 297 were randomly selected in strata 3. Each of the ten records selected represents just one Custom application.

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 Custom program population. Shown is the resulting sample that was drawn, consisting of 10 applications, responsible for 5.6 million kWh of ex ante impact claim and representing 21% of the ex ante impact claim for the program population. Also shown are the ex ante-based kWh sample weights for each of two strata. Strata 1 and 2 of the sample were collapsed for the purpose of calculating realization rates 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 also developed.

Table 2-4. Profile of the Gross Impact M&V Sample by Strata

Custom Population Summary				Sample		
Sampling Strata	Number of Applications (N)	Ex Ante kWh Impact Claimed	kWh Weights	n	Ex Ante kWh	Sampled % of Population
1, 2	48	19,637,406	0.73	7	5,412,915	28%
3	297	7,167,937	0.27	3	142,350	2%
TOTAL	345	26,805,344	-	10	5,555,265	21%

2.3.3 CATI Telephone Survey

A CATI telephone survey was implemented with a stratified random sample of 20 Custom Program participants for net impact analysis plus an additional 22 participants for process evaluation purposes.

Sampling

The sampling unit for the CATI telephone survey was the unique program participant. Overall, 111 unique participant contacts completed 340 projects in PY2. The CATI phone survey drew a sample from the Custom program population, yielding 42 completed surveys. Duplicate contact names, where a single person was involved in more than one project application, were removed from the sample.

To best support estimation of the net-to-gross ratio for the program, a stratified random sampling approach was employed for this survey. Projects were stratified by savings, using the ex ante kWh impact reported in the tracking database. Records were sorted from largest to smallest Custom project kWh claim and placed into one of three strata such that each contains a proportion of the program total kWh claim. The strata boundaries were selected in the first

wave of sampling (Feb '10), and then subsequently retained for additional sampling (June '10), resulting in a larger stratum 2 savings claim than in the other two strata. The one largest application was assigned to “stratum 1,” the next 47 largest applications were assigned to “stratum 2,” and the smallest 292 applications were assigned to “stratum 3.”

The Custom evaluation plan called for a target sample of 20 interviews in PY2. This sample was drawn as follows: the 1 application in stratum 1 was selected, 12 applications out of 47 were randomly selected in stratum 2, and 7 applications out of 297 were randomly selected in stratum 3. After initially targeting completes with just the targeted 20 applications, an additional 7 sample points were added in an attempt to collect the full number of targeted completes.

While this approach of oversampling projects with larger sampling yielded sufficient statistical precision for the net-to-gross analysis, additional survey completes were required to achieve 90/10 precision for the process analysis. This is due to the fact that process findings are based on “participants” and do not take into account the size of the completed projects. As a result, to be able to report findings that are representative of all 111 unique participant contacts, we conducted an additional 22 interviews (including process questions only), for a total of 42 completed interviews. Since the original sampling strategy oversampled larger projects, all additional 22 process interviews were conducted with participants who have completed smaller stratum 3 projects.

Table 2-5 provides a summary of the sampling approach used for the process analysis. The table shows that the 42 completed interviews represent 38% of unique contacts in the population.

Table 2-5. Summary of Sampling Approach for Process Analysis

Sampling Strata	Number of Unique Contacts in Population (N)	Number of Surveyed Contacts (n)	% of Contacts Surveyed
1	1	1	100%
2	41	12	29%
3	69	29	42%
TOTAL	111	42	38%

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

For the process analysis, the evaluation team concluded that an un-weighted analysis provided the best representation of results. The analysis largely features the reporting of response frequencies, and it was decided to give equal weight to each response. Had the evaluation approach instead featured the reporting of mean scores then further consideration would have been given to applying weights.

Table 2-6 presents a profile of the 20 participant interviews completed in support of the NTG analysis, and also provides the net impact sample disposition for the Custom program. Shown is the number of survey completes, consisting of 20 Custom applications (out of a target of 20). The resulting survey completes represent 7.8 million kWh of ex ante impact claim, which is 29% of the ex ante impact claim of the program population. 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.)

Table 2-6. Profile of the Participant Survey Net-to-Gross Sample by Strata

Program Population Summary				Net-to-Gross Sample		
Sampling Strata	Number of Applications (N)	Ex Ante kWh Impact Claimed	kWh Weights by Strata	n	Ex Ante kWh	Sampled % of Population
1, 2	48	19,637,406	0.73	13	7,467,895	37%
3	297	7,167,937	0.27	7	559,079	8%
TOTAL	345	26,805,344	-	20	7,846,974	29%

Survey Disposition

Table 2-7 below shows the final disposition of the participant survey, for both the net-to-gross and the process parts of the survey. The dispositions show the concerted effort expended to complete the interviews for the net-to-gross analysis with a very small sample: We only attempted to contact 27 participants (24% of the population) to complete 20 interviews. This effort to complete the interviews with a small sample was necessary because of the desire to have as much overlap as possible between the gross impact sample and the net-to-gross sample. The resulting response rate was 77% (computed as the number of completed surveys divided by the number of eligible respondents⁷).

For the additional 22 process interviews, we released more sample. Overall, we attempted to reach 83 participants (75% of the population), resulting in a response rate of 53%. We were unable to make contact with 19% of contacts for a variety of reasons such as: no one answered the phone, an answering machine picked up, or the phone line was busy.

⁷ Eligible respondents include the following dispositions: (1) Completed Survey, (2) Unable to Reach, (3) Callback, and (4) Refusal.

Table 2-7. Sample Disposition for NTG and Process Analyses

Sample Disposition	NTG Questions		Process Questions	
	Customers	%	Customers	%
Population of Unique Customer Contacts	111	100%	111	100%
Completed Survey	20	18%	42	38%
Not Dialed	84	76%	28	25%
Unable to Reach	2	2%	21	19%
Callback	0	0%	12	11%
Refusal	4	4%	5	5%
Phone Number Issue	0	0%	2	2%
Could Not Confirm Participation	1	1%	1	1%
<i>Response Rate</i>	77%		53%	

Source: ODC CATI Center.

Profile of Survey Respondents

The highest number of survey respondents is from one of three business sectors: light industry, heavy industry, and office. This distribution is largely similar to that of all 110 companies that participated in the Custom Program in PY2.⁸ However, these three sectors are somewhat overrepresented among respondents to the net-to-gross part of the survey. This is not surprising, given that the sampling strategy focused on projects with the highest savings, and projects in these sectors tend to be larger than in the other sectors. Similarly, the retail/service and warehouse sectors, which have among the smallest per project savings, are underrepresented in the NTG responses.

Table 2-8 presents the comparison of business sectors for net-to-gross survey respondents, process survey respondents, and the overall population of participating companies.

⁸ Note that the number of unique *companies* (110) is slightly different from the number of unique *contacts* (111). This is due to the fact that, in some cases, the same person was listed as the project contact for more than one company and, in other cases, one company has more than one contact person.

Table 2-8. Business Sector of Survey Respondents

Sector	NTG Respondents (n=20)	Process Respondents (n=42)	Population (N=110)
Light Industry	20%	17%	17%
Heavy Industry	25%	17%	17%
Office	20%	17%	14%
Retail/Service	5%	12%	12%
Medical	5%	2%	7%
Warehouse	0%	7%	6%
Hotel/Motel	5%	2%	5%
Grocery	0%	0%	4%
Restaurant	5%	2%	1%
Miscellaneous	15%	24%	17%

Source: Program Tracking Database.

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**

To support the impact evaluation, the evaluation team was given direct access to ComEd's on-line tracking system and data. The on-line system was easy to work with and provided viewing access to the project tracking data plus downloading rights to project documentation in electronic format for each project. This documentation was complete and greatly facilitated the evaluation, while removing a step that commonly impedes evaluation progress: a data request for the very information that ComEd made available in the tracking database itself. This level of access and documentation is highly commendable and represents best practice in this area for a Custom program.

The evaluation team worked off of a copy of the tracking system data uploaded by ComEd to their secure SharePoint site on a periodic basis. While working with the database, the most important issue for the evaluation team is consistency of the data.

When reading datasets into SAS, if the field names change for the same information it takes several steps to correct this. The first step requires contacting the person who created the dataset to make sure it is the same information. The next step is to alter the SAS programming to account for the field name change. Complete documentation that explains the field names and how they are used in tracking data reporting would be useful. This recommendation was also made in the PY1 report, and continues to be valid for PY2.

The tracking data appears not to be completely populated for peak demand impact (kW). Demand savings were listed as zero kW in 188 out of 345 records. If those demand impact estimates are actually missing (not estimated) but are instead set to zero, then the implication is that this prevents evaluators from confidently and accurately representing the program population using a sample of selected projects.

Measure description information is reasonably 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. ComEd 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 for either the program staff or the EM&V team to produce measure-based summary statistics and

more precisely track program accomplishments. Because measure labeling practices continue to be problematic with many inconsistencies, the EM&V team did not attempt to produce those summary statistics.

3.1.2 Gross Program Impact Parameter Estimates

Ex post gross program impacts were developed for this evaluation for the Custom program based on detailed M&V for a selected sample of ten 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.⁹ In the case of a separate ratio estimator, a separate gross kWh savings realization rate is calculated for each stratum and then combined. In the case of a combined ratio estimator, a single gross kWh savings realization rate is calculated directly without first calculating separate realization rates by stratum.

The separate ratio estimation technique was used to estimate verified gross kWh savings for the Custom program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework. These steps are matched to the stratified random sampling method that was used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of verified gross kWh. The results are summarized in Table 3-1, Table 3-2, and Table 3-3 below. The realization rate for demand savings is 0.99, while the realization rate for energy is 0.85. The energy realization rate of 0.85 reflects the combined effect of a realization rate of 0.96 for strata 1 and 2 which is offset somewhat by a significantly lower realization rate of 0.54 for stratum 3.

As mentioned previously the tracking system records for ex ante peak demand impact (kW) were often populated with zeroes in the Custom program population. The estimation of precision around the ex post peak demand realization rate is based on all non-zero kW estimates. This led to less sample-based coverage for demand realization rate estimates in comparison with energy realization rate coverage, especially in stratum 3, and resulted in larger error bounds around the gross kW realization rate result.

⁹ A full discussion and comparison of separate vs. combined ratio estimation can be found in [Sampling Techniques](#), Cochran, 1977, pp. 164-169.

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	Sample-Based Ex Post Gross kWh Realization Rate
2006	3,922,851	448	1	0.72	3,922,851	448	1.00	0.96
1238	127,084	28	2	0.02	97,664	22	0.77	
2303	124,045	17	2	0.02	51,135	2	0.42	
2727	149,316	40	2	0.03	143,343	23	0.76	
2797	172,339	24	2	0.03	272,707	35	1.58	
2180	484,676	18	2	0.09	208,895	24	0.43	
2142	432,604	56	2	0.08	489,708	86	1.13	
1542	30,334	5	3	0.21	20,983	3	0.69	0.54
2927	22,528	0	3	0.16	17,009	0	0.76	
2748	89,488	4	3	0.63	38,668	5	0.43	
TOTAL	5,555,265	640	-	NA	5,268,963	648	NA	0.85

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

Sampling Strata	Relative Precision			
	± %	Low	Mean	High
Stratum 1+2	11%	0.86	0.96	1.06
Stratum 3	31%	0.37	0.54	0.70
Total kWh RR	10%	0.76	0.85	0.93

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

Sampling Strata	Relative Precision			
	± %	Low	Mean	High
Stratum 1+2	10%	0.91	1.01	1.12
Stratum 3	46%	0.51	0.95	1.38
Total kW RR	16%	0.84	0.99	1.15

3.1.3 Gross Program Impact Results

Based on the gross impact parameter estimates described previously, gross program impacts were derived for the PY2 Custom program. The results are provided in Table 3-4.

Table 3-4. Gross Parameter and Savings Estimates

Sampling Strata	kWh, Ex Ante	kWh, Ex Post	kWh RR	kW, Ex Ante	kW, Ex Post	kW RR
1,2	19,637,406	18,837,055	0.96	1,994	2,024	1.01
3	7,167,937	3,860,132	0.54	915	867	0.95
Total	26,805,344	22,697,187	0.85	2,910	2,890	0.99

The EM&V team has provided to ComEd 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.

Some general observations from the gross impact sample:

- Ex ante baseline usage estimates were adjusted in 60% (six out of 10) of the projects, including numbers #1238, #1542, #2180, #2727, #2303, and #2927. For two of these the ex ante estimates had used another store (project #2927) or laboratory results (project #1542) to derive energy savings and assumed identical operating conditions; both showed variances. For project #2727 ex ante energy saving claims were based on overestimated lamp quantities.
- 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. For project #2927, #2303 and #2748 implementers had assumed 24-hour seven-day a week operation for retrofitted equipment that was verified to be at times not operating. The three lowest realization rates were around 43%, of which two (or 20% of the sample) were domestic water booster pumping system projects that erroneously assumed that auxiliary (seldom used) pumps in series operated similarly to the primary pumps in parallel (project #2303 and #2748).
- For project #2303, motor nameplate data was used in the ex ante calculations, assuming 100% loading; conversely ex post analysis used motor loading factors based on pre-retrofit data.

- The realization rate for project #2142 (113%) was due to an error or oversight in the ex ante calculation (missing the $\sqrt{3}$ factor). Absent this error, the realization rate for this project likely would have been around 65%.
- In another case (project #2180) the implementers used an energy rate (energy use per unit of production) as a savings metric, hours of operation including non-production (idle) hours were not considered in the ex ante calculations, skewing ex ante estimates and ignoring overall equipment energy usage. Logged electric power data obtained during EM&V exposed the error. Equipment operating profiles should incorporate production energy, non-production (idle periods) energy, and non-operation periods.
- For project #2180, the specific method used to calculate demand savings was not included in the application and could not be determined from the information provided. In addition, the ex ante estimates assumed and used a linear relationship between air compressor energy use and projected annual production, while the pre-retrofit logged data shows a non-linear or logarithmic relationship.
- In one of the projects (project #2797), where the kWh realization rate was 158%, the post retrofit conditions showed that the associated ex-ante pre-install monitoring was during a lower production period than normal, and therefore ex post energy savings was much greater than ex ante.

In summary, estimates should be based upon appropriate application of diversity factors, normalization of hours of operation or production, and careful application of assumptions made when estimating energy usage per unit of production.

In September of 2010 ComEd held a meeting with the evaluation team and implementation team to discuss the PY2 Custom M&V results (and other topics) as a means to share information and ultimately improve ex ante and ex post estimates.

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. However spillover effects were examined in this evaluation and their magnitude was found to be quite small as discussed below.

The relative precision at a 90% confidence level is provided in Table 3-5.

Table 3-5. NTG Ratio and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low	Mean	High
1, 2	8%	0.71	0.77	0.83
3	13%	0.64	0.73	0.83
Total	12%	0.67	0.76	0.85

The measured Year 2 NTG ratio of 0.76 was higher than in PY1 (0.72), meaning free-ridership was lower. Significant free-ridership (above 40%) was found in 4 out of 19 evaluated projects, of which only one had a resulting NTG ratio below 0.20. One project with substantial free-ridership had very low Program Influence¹⁰ and No-Program¹¹ scores. The other three projects with substantial free-ridership all had relatively low No-Program scores —two instances of zero scores and one instance with a score of 4 on a scale of 0 to 10.

Projects with the lowest Program Components¹² 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 65%. The average NTG ratio across all of these projects is 0.39. In contrast, the lowest NTG ratio in the group with a Program Components score of 9 or greater is 0.73, and the mean NTG ratio across all such projects is 0.85.

Relatively high and relatively low NTG scores in the sample are not directly affected to the same extent by the Program Influence score. That is, the correlation between the Program Influence score and resulting NTG is not as significant as is the correlation with the No-Program and Program Components scores.

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 program is presented in Table 3-6 below.

¹⁰ A Program Influence score reflects the degree of influence the program had on the customer’s decision to install the specified measures.

¹¹ A No-Program score 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.

¹² A Program Components score reflects the importance of various program and program-related elements in the customer’s decision and timing of the decision in selecting specific program measures.

Table 3-6. Evidence of Spillover in PY2

Spillover Question	Evidence of Spillover
<p>Since your participation in the ComEd program, did you implement any additional energy efficiency measures at this facility that did NOT receive incentives through any utility or government program?</p>	<p>Of the 20 survey respondents that responded to this question, 8 said “Yes” (40%). These 8 respondents implemented a total of 9 energy efficiency measures.</p>
<p>What type of energy efficiency measure was installed without an incentive?</p>	<p>(1) Lighting Controls (1) Linear fluorescent (1 T-5) (1) Unitary/Split Air Conditioning System (3) Efficient motors (1) Heating (1) Freezer fan motor relocation (1) Rectifiers</p>
<p>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 ComEd program in your decision to implement this energy efficiency measures?</p>	<p>For the 9 implemented measures: (7) Rating between 0 and 3 (1) Rating between 4 and 6 (1) Rating between 7 and 10</p>
<p>If you had not participated in the ComEd 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?</p>	<p>For the 9 implemented measures: (0) Rating between 0 and 3 (1) Rating between 4 and 6 (6) Rating between 7 and 10 (2) Refused/Don’t know</p>
<p>Why did you purchase this energy efficiency measure without the financial assistance available through the ComEd’s program?</p>	<p>For the 9 implemented measures: (1) Did not have time to apply (1) Lack of time (1) No time for paperwork (1) Did not involve management (1) Rebate too small (1) Unaware of the program (1) Struggled to quantify energy savings (1) Project was too small (1) Don’t know</p>

These findings suggest that spillover effects for PY2 are relatively small. 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 did not pursue rebates through the ComEd program for a number of reasons, of which the most frequently cited was a lack of available time on the part of the customer. The EM&V team will likely collect spillover data in this same manner for the PY3 evaluation. The decision to conduct additional evaluation activities to quantify spillover in PY3 will be examined as part of the evaluation planning effort.

3.1.5 Net Program Impact Results

Net program impacts were derived by multiplying gross program savings by the estimated NTG ratio. Table 3-7 and Table 3-8 provide the program-level evaluation-adjusted net impact results for the PY2 Custom program. The NTG ratio for both energy and demand savings is 0.76, and is based upon responses from each contributing participant in the sample (and other sources) and the use of kWh-based weights.

The chained realization rate (gross RR * NTG Ratio) is 0.64 for kWh and 0.76 for kW.

Table 3-7. Program-Level Evaluation-Adjusted Net kWh Impacts for PY2

Sampling Strata	Ex Ante Gross kWh	Ex Post Gross kWh	kWh RR	Ex Post Net kWh	NTGR (ex post gross)
1,2	19,637,406	18,837,055	0.96	14,495,080	0.77
3	7,167,937	3,860,132	0.54	2,836,696	0.73
Total	26,805,344	22,697,187	0.85	17,255,274	0.76

Table 3-8. Program-Level Evaluation-Adjusted Net kW Impacts for PY2

Sampling Strata	Ex Ante Gross kW	Ex Post Gross kW	kW RR	Ex Post Net kW	NTGR (ex post gross)
1,2	1,994	2,024	1.01	1,557	0.77
3	915	867	0.95	637	0.73
Total	2,910	2,890	0.99	2,197	0.76

3.2 Process Evaluation Results

The process component of the Smart Ideas for Your Business Custom program evaluation focused on program design and processes, program implementation, marketing and outreach, and participant satisfaction. The primary data source for the process component was a telephone survey with 42 program participants.

The sampling unit for the participant survey was a unique customer contact name. We interviewed 42 out of 111 contacts (38%) with custom projects.¹³

3.2.1 Program Theory and Logic Model

Based on information provided by the program manager, there were no significant changes to the desired outcomes of the program nor were other activities undertaken to achieve these outcomes. As a result, 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 Custom Program.

3.2.2 Participant Profile

In PY2, 110 companies completed a total of 340 custom projects that accounted for 26,805,344 kWh and 2,910 KW of ex ante gross savings.¹⁴ PY2 participants represent a range of business sectors. Light and heavy industry represent the largest share of participants (17% each), energy savings (35% and 12%, respectively), and demand savings (35% and 14%, respectively). The retail/service sector accounts for 57% of total projects, but represents a relatively smaller share of participants (12%), resulting in the highest number of projects per participant (average of 14.9). One retail/service company completed 104 custom projects, while another completed 27 projects. On average, each participating company received an incentive for 3.1 custom projects in PY2. The increased involvement of chain companies in PY2 explains the higher ratio of projects per participating company than in PY1. This is not surprising in Custom programs, as it often takes longer for chain businesses to receive corporate approval to participate in energy efficiency programs and complete projects. Lastly, within the grocery sector, three store chains comprised 39 of the 40 projects. Table 3-9 summarizes the distribution of PY2 participants, projects, and energy savings by business sector.

¹³ Note that these 111 unique contacts are associated with 110 unique companies. Since contacts are only of interest as the sampling unit for the telephone survey, the remainder of this report will refer to 110 companies or participants.

¹⁴ Gross savings reported in this section are based on the program tracking database.

Table 3-9. Participants, Projects, and Ex Ante Savings by Business Sector

Sector	Participants		Projects		Projects / Participant	Ex Ante Energy Savings		kWh / Project	Ex Ante Demand Savings	
	#	%	#	%		kWh	%		kW	%
Light Industry	19	17%	23	7%	1.2	3,330,832	12%	144,819	407	14%
Retail/Service	13	12%	194	57%	14.9	2,214,464	8%	11,415	120	4%
Office	15	14%	16	5%	1.1	2,190,804	8%	136,925	333	11%
Heavy Industry	19	17%	21	6%	1.1	9,307,475	35%	443,213	1,023	35%
Warehouse	7	6%	7	2%	1.0	360,398	1%	51,485	23	1%
Hotel / Motel	5	5%	7	2%	1.4	1,863,985	7%	266,284	251	9%
Medical	8	7%	10	3%	1.3	2,589,299	10%	199,177	106	4%
Grocery	4	4%	40	12%	10.0	2,817,317	11%	70,433	372	13%
Other	20	18%	22	7%	2.1	2,130,770	8%	130,355	275	9%
TOTAL	110		340		3.1	26,805,344		78,839	2,910	

Source: Program Tracking Database.

Program participation increased substantially compared to PY1, from 87 projects completed by 64 companies, to 340 projects completed by 110 companies. Ex ante energy savings increased from 8.4 GWh to 26.8 GWh, while ex ante demand savings increased from 339 kW to 2,910 kW. These increases are expected, as participation in PY1 was limited by the oversubscription of the Prescriptive Program. In addition, increased participation is expected as a program matures and traction among market actors and customers increases.

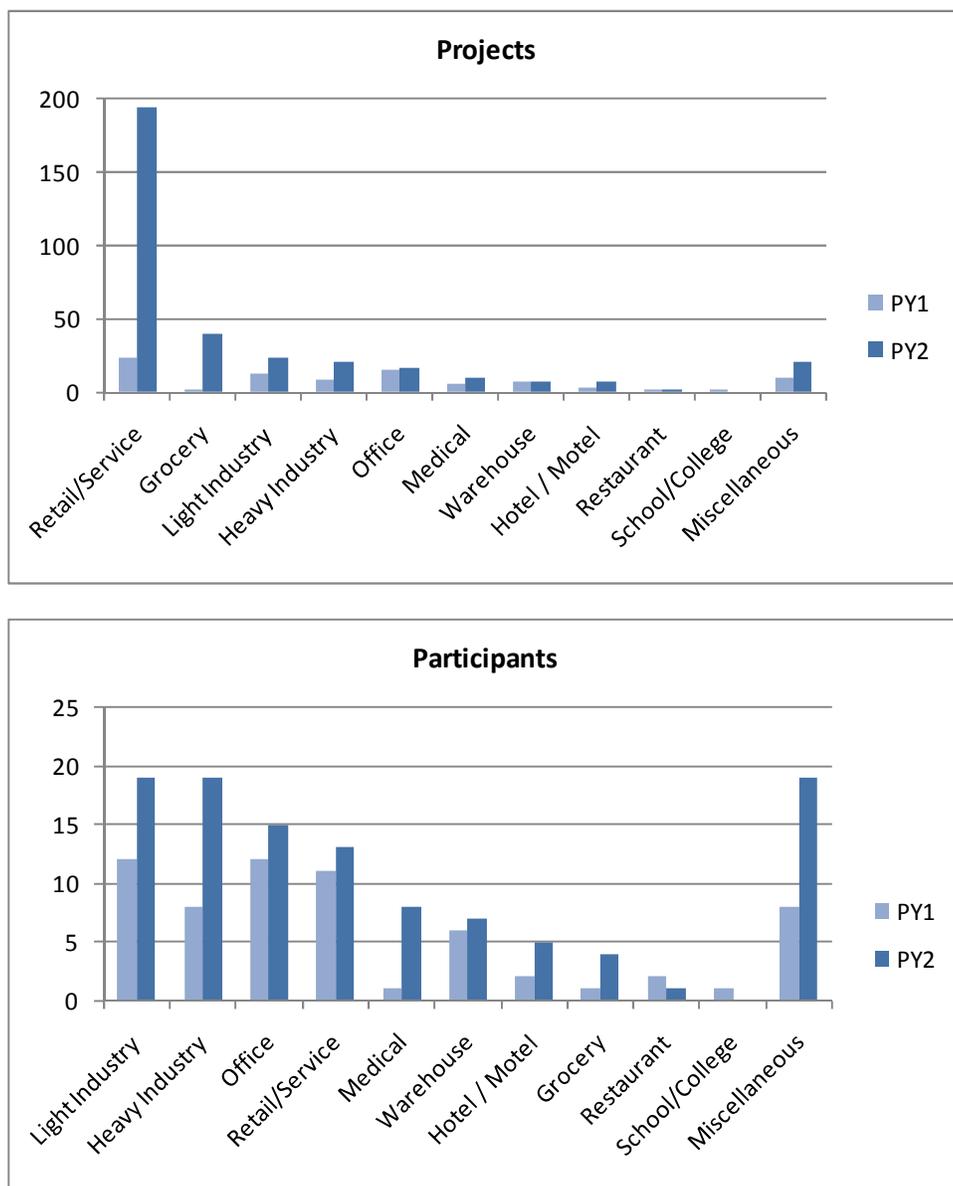
Key participation characteristics include:

- Participation in PY2 increased within both the light and heavy industry sectors. While these two sectors account for a relatively small share of projects and participants, projects in these sectors tend to be large. As a result, savings from these two sectors increased significantly, driving the overall increase in savings. Heavy industry accounts for 35% of ex ante energy savings, averaging 443,213 kWh per project. Light industry projects produced the second highest energy and demand savings in PY2.
- The growth of projects in the grocery sector, from 1 project in PY1 to 40 in PY2, also greatly improved the program’s overall savings. The grocery sector represented 11% of energy savings and 13% of demand savings in PY2.

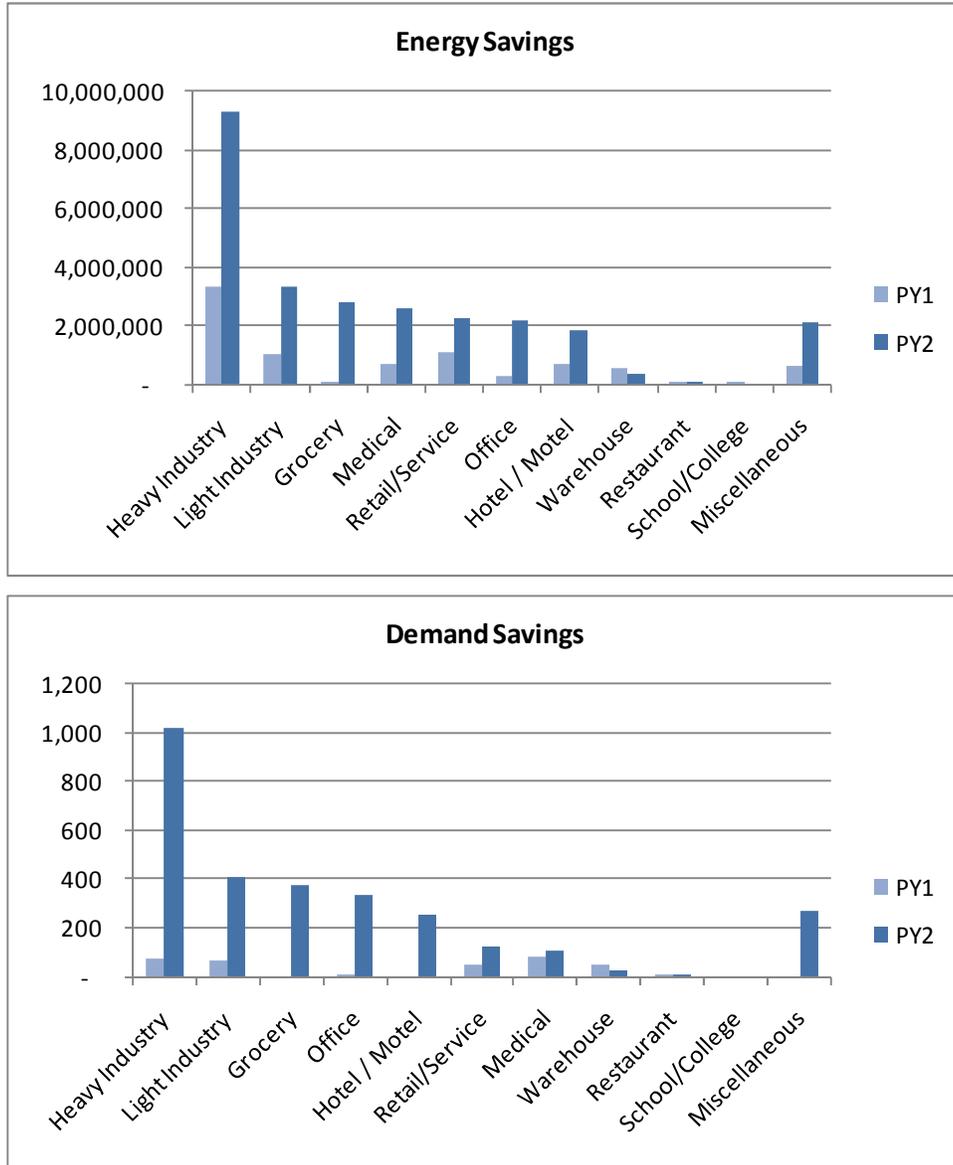
- The retail/service sector had the largest increase in the number of projects, from 23 in PY1 to 194 in PY2. This increase was largely driven by one single company that accounted for 104 projects in PY2. However, since per project savings in this sector are small, the overall impact on program savings was not as dramatic as for most of the other sectors.

Figure 3-1 compares the number of projects, participants, and ex ante energy and demand savings by business sector and program year.

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



**Figure 3-1. Projects, Participants, and Ex Ante Savings by Business Sector and Program Year
(Continued)**



Source: PY2 Program Tracking Database.

Other characteristics of program participants – based on survey results – include:

- About one half (52%) of program participants report that the participating facility is one of several facilities owned by the company.
- Forty-seven percent of participants describe their companies as large, compared to other companies in the same industry.
- Nearly all participants (81%) own their facility.

3.2.3 Program Design and Processes

ComEd's Smart Ideas for Your Business Custom program offers incentives designed to encourage implementation of energy-efficiency measures. The Custom Program offers incentives for those eligible improvements that are not included in the prescriptive measure list. To be eligible for custom incentives, measures must result in a reduction in electric energy use due to the improvement in system efficiency.

Application Process

The application process did not change compared to PY1. All projects have to submit a pre-approval application as well as a final application. Program guidelines stipulate that projects must be completed within 90 days of pre-approval; however, many projects apply for and are granted an extension. The length of extensions is based on the need of the customer and can be significant. Program participants must submit the final approval application within 60 days of project completion.

A majority of participants filled out either the initial or final program paperwork themselves (74%). Of these participants, most feel that the application forms clearly explain the program requirements and participation process (84%) and rate the application process as easy (81%).¹⁵

When participants do not fill out the pre-approval and final applications themselves, this is most often done by a supplier/distributor/vendor or the contractor.

Pre-Review of Applications

Upon receipt of an application, a pre-review is conducted by the program implementer (KEMA) to determine customer and measure eligibility. At the same time the application undergoes a completeness check for contact and technical information. Finally, the application is reviewed to determine if a pre-inspection is needed and to verify funding availability. Every application is

¹⁵ A score of 7 or higher on a scale from 0 to 10, where 0 is "very difficult" and 10 is "very easy."

reviewed by KEMA administrative and technical staff. Upon completion of the pre-review the application is entered into the tracking database and a letter of reservation of funds is sent to the customer.

Our PY1 evaluation recommended that pre-review of applications should be enhanced to avoid customer dissatisfaction with incentives that are being reduced at the final application stage. According to the program manager, “KEMA is required to conduct a thorough review and analysis of Custom projects at the pre-approval phase, rather than at the final application phase, including instituting a peer review process at the KEMA level and at the ComEd level” (ComEd feedback on PY1 evaluation recommendations). In addition, planned program modifications for PY3 include tying KEMA’s incentive to savings realization rates.¹⁶

During our PY2 evaluation, several instances emerged of customer dissatisfaction with lower than expected incentive amounts. However, it appears that in most cases, the discrepancy between expected and actual incentives was the result of the vendor promising a higher incentive, which was then reduced once KEMA conducted their review and analysis. While this is an issue that is caused by vendors, rather than implementation staff, it still presents a problem to the program as it leads to customer dissatisfaction (and the customer might not necessarily differentiate between issues caused by their vendor as opposed to program affiliated staff). The enhanced trade ally training – implemented in PY3 – should help alleviate this problem (only 19% of contractor projects in PY2 are implemented by contractors who are not registered trade allies). In addition, the program should clearly communicate to customers that the expected savings and incentive amounts are set with the approval of the pre-application (and are still subject to change in case of changes to the project) and might differ from amounts determined by the vendor.

Participation Process

The participation process has not changed since PY1. Program implementers still have several project milestones at which they communicate with the participant, including a reservation letter following receipt of the pre-approval application, a reminder letter and phone call when it is getting close to the date of the reservation expiring, an extension letter when an extension is granted, a cancellation letter if the reservation expires, and a final letter with the rebate check to close out completed projects.

Customers were asked if they experienced any problems during the participation process. Six of the 42 interviewed customers (14%) reported that they did. Complaints included the length of

¹⁶ It should be noted that this latter measure will only address the issue of changing incentive levels between the pre-approval and final application phases if the additional due diligence that can be expected during application review is applied at the point of pre-approval rather than the final application.

the process, low incentives, and other communication problems with regards to their request for an extension.

Customer Service

The Smart Ideas for Your Business Program employs the ComEd call center to field questions from program participants. Thirty-eight percent of PY2 participants report having called the call center during the participation process. Almost all of the customers who contacted the call center were satisfied with the call center's ability to answer questions.

3.2.4 Program Implementation

Program Oversubscription

Similar to PY1, the Smart Ideas for Your Business program in PY2 experienced strong demand for prescriptive measures. However, unlike in PY1, only prescriptive *lighting* measures were subject to wait-listing in PY2. Program staff decided to keep available non-lighting incentives, both for prescriptive and custom measures, in an attempt to diversify the program away from a heavy reliance on lighting. Because recruitment of non-lighting projects was open all year, more non-lighting projects were completed. However, lighting projects still accounted for a large part of the Custom Program in PY2.

The waitlist in PY2 was not as long as it was in PY1 and program staff seemed to manage the process better. There was more proactive communication with trade allies and the addition of a "fundometer" on the website was helpful in keeping all parties informed of Custom Program funding level status. Furthermore, the waitlist for prescriptive lighting measures did not affect the Custom Program nearly as much as it did in PY1. Only 45% of custom participants were aware of the waitlist for prescriptive lighting measures, significantly fewer than in PY1 (75%). More importantly, less than 5% of custom participants report that the waitlist impacted their projects in any way.

Account Managers

According to the ComEd program manager, Account Managers are being engaged more closely in the Smart Ideas for Your Business Program. For example, the "Smart Ideas Team has developed a toolkit for Account Managers, and provides training opportunities and "Lunch & Learns" to educate and inform the Account Managers" (ComEd feedback on PY1 evaluation recommendations). However, the program manager also noted that Account Manager involvement is still moderate and an increase in involvement continues to be a goal for the program.

According to the program tracking database, 271 of the 340 PY2 projects (80%) were implemented by customers with an Account Manager. In comparison, 24 of the 42 interviewed

PY2 participants (57%) have an Account Manager. Program participants report the following involvement of Account Managers during PY2:

- Overall, about one-half (48%) of interviewed participants indicate that their utility account manager assisted with the project, representing approximately the same share as in PY1 (54%). It should be noted, however, that participants' responses in some cases contradicted information in the program database: 7 out of 24 participants (29%) who, according to the database, have an account manager reported that they do not have one; on the other hand, 6 out of 18 participants (33%) who, according to the database, do not have an account manager reported that their account manager assisted with the project.
- In PY2, 17% of participants first heard about the Smart Ideas for your Business Program through a ComEd Account Manager, a similar share as in PY1 (21%).
- In PY2, 43% of participants discussed the program with a ComEd Account Manager, compared to 54% in PY1 (difference not statistically significant).

The C&I program managers have indicated that they plan to more fully integrate Account Managers in PY3. Account Managers will have goals and receive incentives for bringing in projects starting in PY3. This is a positive change to the program and should contribute to increasing overall participation levels.

ComEd Trade Ally Network

Trade allies continue to be an important part of the Custom Program. Similar to PY1, to become a trade ally market actors have to complete an application and attend a seminar or webinar that explains the program and program processes. Currently, there are over 300 registered trade allies on the ComEd website. However, about two-thirds of trade allies have completed no projects or only one project in PY2. Plans for trade allies in PY3 include the stipulation that they must complete a project through the program and attend a basic training in order to remain a registered trade ally.

Program staff noted that enrollment of non-lighting trade allies still falls short of expectations. This is particularly true for trade allies able to implement custom projects. For trade allies that implement lighting projects, the C&I programs have begun to increase the focus on the quality of contractor work, including submitted applications, rather than attempting to enroll additional trade allies. This is particularly important as some customer dissatisfaction in PY2 came from incorrect incentive calculations by the contractor,¹⁷ which resulted in lower incentives than expected. Focusing on the quality of trade allies and providing additional

¹⁷ Of the known instances of dissatisfaction over this issue, most, but not all, contractors are registered trade allies.

educational opportunities should help reduce the number of application mistakes and dissatisfaction among customers.

Contractors remain an integral component for a successful program. Review of the program tracking database shows that 84% of custom projects were implemented with contractor support. Seventy-one unique contractors participated in custom projects in PY2, compared to 44 in PY1. About half of PY2 participating contractors (48%) are registered trade allies, but they account for 81% of PY2 contractor-implemented projects.

As seen in Table 3-10, most of the contractors involved in custom projects (69%) implemented a single project in PY2, while five contractors (7%) completed ten or more projects. However, the five contractors that completed ten or more projects accounted for 64% of all contractor projects. Notably, these projects were all implemented at chains and four of the five contractors implemented all of their projects for a single company.

Table 3-10. PY2 Contractor Projects

Contractors with...	Custom Projects		
	Number of Contractors	Percent of Contractors (n=71)	Percent of Contractor Projects (n=284)
1 project	49	69%	17%
2 projects	11	15%	8%
3 projects	3	4%	3%
4-9 projects	3	4%	7%
10+ projects	5	7%	64%

Source: Program Tracking Database.

The telephone survey with program participants included questions about their use of contractors, their contractors' affiliation with the ComEd Trade Ally Network, and their satisfaction with their contractors. Seventy-nine percent of interviewed participants report having used a contractor to complete the project.¹⁸ All participants who completed multiple custom projects in PY2 used a contractor. Responses to the survey show that contractors play an important role in the implementation of custom projects. However, many participants do not believe that it is important that the contractor is registered with the program. Specific findings from the survey include:

¹⁸ Note a slight discrepancy with the program tracking database, which shows that 74% of projects were implemented with a contractor.

- **Participants in the Custom Program are satisfied with their contractors:** Almost all interviewed program participants (91%) who used a contractor to install their project report that their contractor met their needs (a score of 7 or higher on a scale from 0 to 10). Ninety-four percent of participants would recommend their contractor to others.
- **Participants discuss the program with their contractor:** 71% of custom participants report having discussed the Custom Program with a contractor or trade ally.
- **Few participants find out about the program from a contractor:** Only 7% of participants first find out about the program through a contractor or trade ally.
- **Participants do not believe it is important to use contractors that are registered trade allies:** Almost half (48%) of custom participants who used a contractor report that the contractor is **not** affiliated with the Smart Ideas for Your Business program.¹⁹ Notably, participants often do not know if their contractor is affiliated with the program (36%). Thirty-one percent of custom participants believe that when implementing an energy efficiency project it is not at all important (a score of 0 on a scale from 0 to 10) to use a contractor that is affiliated with the Smart Ideas for Your Business Program.

All but two contractors who completed more than four custom projects also completed projects that received incentives from the Prescriptive program. These active contractors clearly have a large market presence and are involved in projects supported by both the Custom Program and the Prescriptive Program. However, overall only 28% of contractors involved in a custom project in PY2 also completed a project for the Prescriptive Program. It is clear that contractors active in the Custom Program are different from those involved in the prescriptive program, and therefore marketing and recruitment efforts should specifically target contractors capable of implementing custom projects.

3.2.5 Program Marketing and Outreach

Marketing efforts are combined for both the Prescriptive and Custom Programs. Because of the strong demand for prescriptive lighting projects, the Smart Ideas for your Business Program as a whole met PY1 and PY2 targets with minimal marketing. As a result, the PY2 evaluation did not focus on marketing and outreach.²⁰ Findings, based on the participant survey, include:

- Most participants (81%) have heard about the program through an e-mail. This marks an increase from PY1 (67%), although not statistically significant. Many participants have

¹⁹ Based on the program tracking database, the contractor actually was a registered trade ally for 4 of the 16 respondents who reported their contractor is not affiliated with the program.

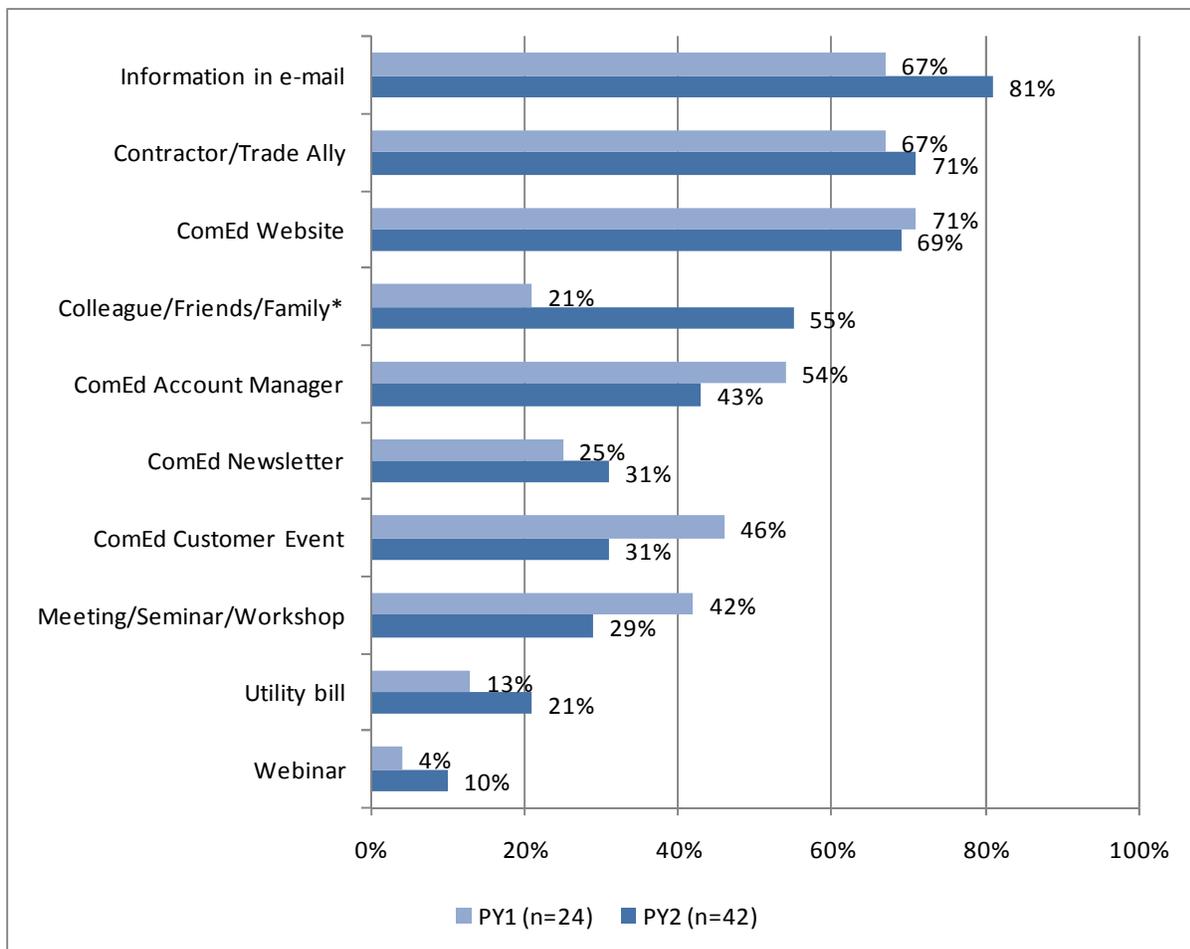
²⁰ Due to a dramatic increase in program goals for PY3, however, more robust marketing efforts are planned. The PY3 evaluation should explore the effectiveness of these efforts in more detail.

also discussed the program with a contractors/trade allies (71%) or seen information on the ComEd website (69%).

- Significantly more participants heard about the program through colleagues, friends, or family in PY2 (55%) compared to PY1 (21%). This is not surprising as word-of-mouth typically increases as a program gains traction.
- Participants with an account manager are significantly more likely to (1) attend a ComEd event where the program is discussed (46%); (2) see information about the program on the ComEd website (79%); and (3) attend a meeting, seminar, or workshop where the program is presented (42%) compared to participants without an account manager.

Figure 3-2 summarizes participant responses about program information sources.

Figure 3-2. Sources of Program Information (Prompted)

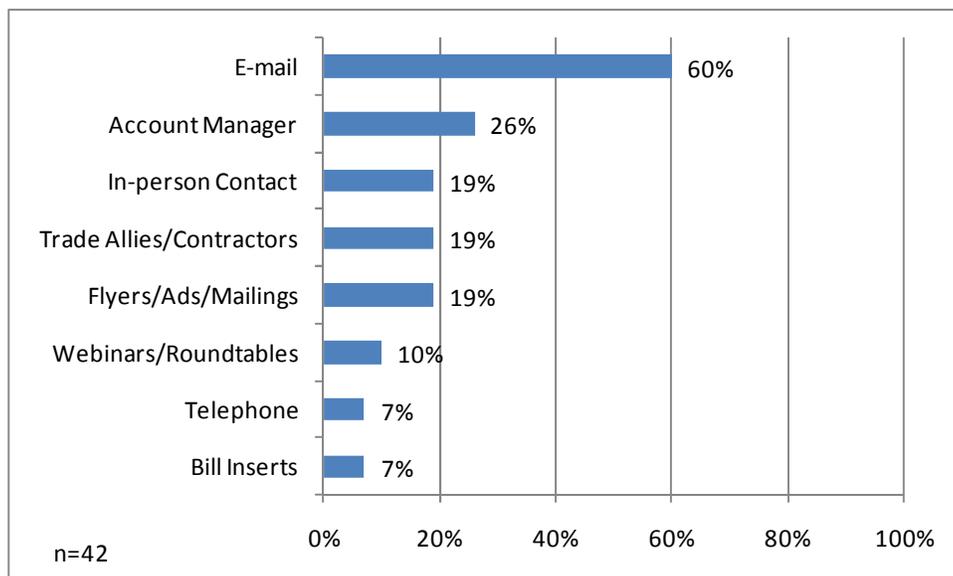


Note: * denotes a significant difference between PY1 and PY2 at the 90% confidence level.
 Source: PY1 and PY2 CATI Participant Surveys.

Most participants (81%) found the marketing materials to be useful.²¹ Participants with an account manager are significantly more likely to find the program materials very useful (25%) than participants who do not have an account manager. Only a few participants noted that the program materials could have more detailed information or better direct people to additional information.

As shown in Figure 3-3, survey responses also confirmed that participants are receiving information through their preferred methods of contact. E-mail overwhelmingly remains the best way to reach participants (60%) and is also the most common source of program awareness (81%).

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



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

3.2.6 Barriers to and Benefits of Participation

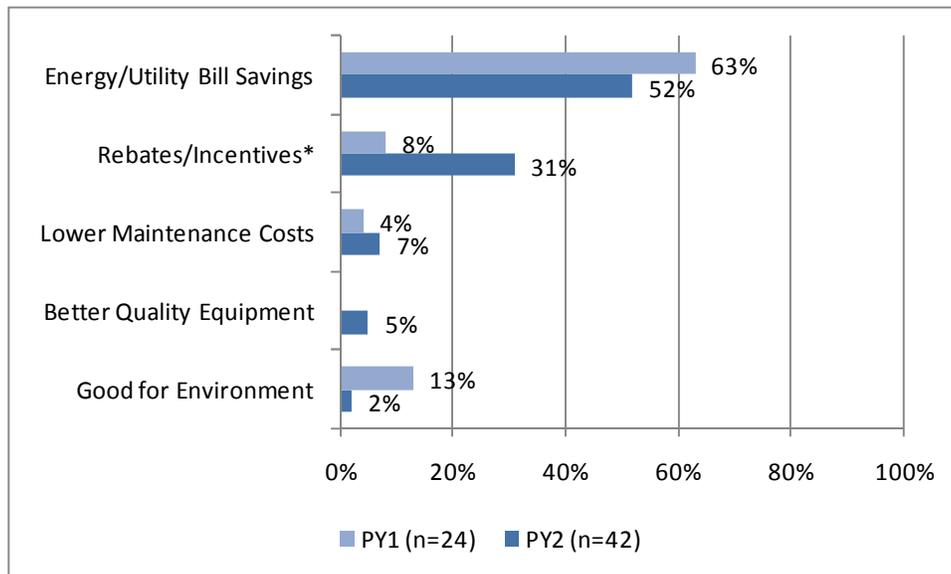
The PY2 evaluation did not include interviews with non-participants and market actors. Therefore, barriers to participation could not fully be assessed. However, in order to get a sense of potential barriers to participation, participants were asked about their views of why other customers might not participate in the program. Lack of program awareness remains the largest cited barrier (55%) followed by financial reasons (33%).

Given the increased program goals for PY3 the EM&V team will consider including an assessment of barriers to participation in the PY3 evaluation.

²¹ Includes participants who rated the program materials as “very useful” or “somewhat useful”

Program participants were also asked about the benefits to participating in the program. In both PY1 and PY2 a majority of participants cited energy and utility bill savings as the main benefit to participation in the Custom Program. In PY2 significantly more participants (31%) felt that the rebate/incentive was the greatest benefit, compared to PY1 (8%). Figure 3-4 summarizes participant responses about the benefits of program participation.

Figure 3-4. Benefits of Program Participation (Multiple Response; Unprompted)

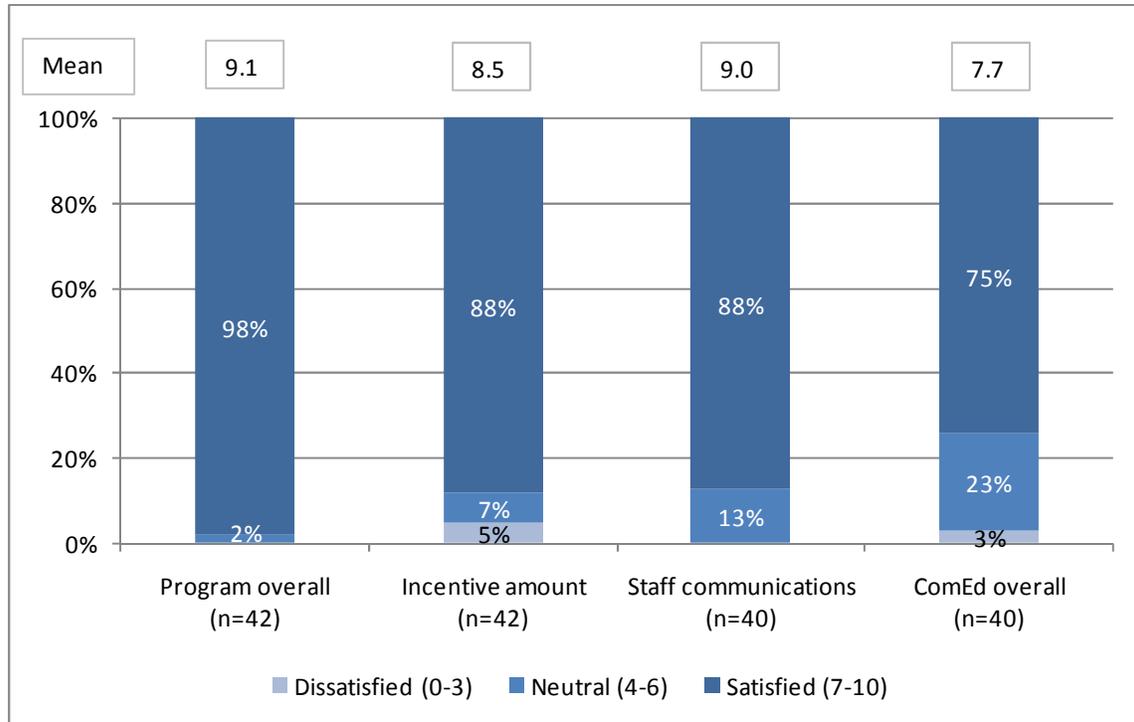


*Note: * denotes a significant difference between PY1 and PY2 at the 90% confidence level.
Source: PY1 and PY2 CATI Participant Surveys.*

3.2.7 Participant Satisfaction

Participants are satisfied with most aspects of the program. Customers were asked to rate – on a scale of 0 to 10, where 0 means “very dissatisfied” and 10 means “very satisfied” – several aspects of the program. The highest satisfaction comes from the program overall, where 98% of participants are satisfied, including 52% that report being very satisfied (a rating of 10).

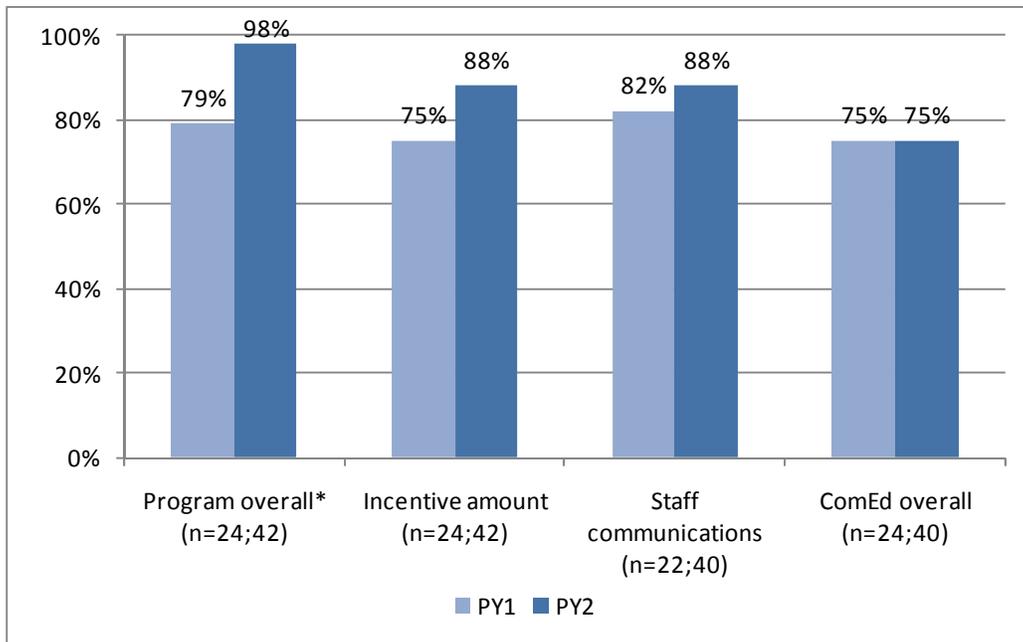
Figure 3-5. Program Satisfaction



*Note: This graph presents valid percentages, i.e., don't know, refused, and not applicable responses are excluded.
Source: PY2 CATI Participant Survey.*

Satisfaction with program processes, depicted in Figure 3-5, tends to be higher in PY2 than in PY1, although the difference is only significant for satisfaction with the program overall (98% in PY2 compared to 79% in PY1).

Figure 3-6. Percent Satisfied by Program Year



Note: * denotes a significant difference between PY1 and PY2 at the 90% confidence level.
 Source: PY1 and PY2 CATI Participant Surveys.

Given the high satisfaction scores, it is not surprising that 74% of participants plan to participate again in the future. When asked what could be done to improve the program, participants most often mentioned higher incentives (31%) and better communications/improvement of program information (21%).

3.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the C&I 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.”²²

ComEd uses DSMore™ software for the calculation of the TRC test.²³ The DSMore model accepts information on program parameters, such as number of participants, gross savings, free ridership and program costs, and calculates a TRC which fits the requirements of the Illinois legislation. Environmental benefits have been quantified for CO₂ reductions, using a value of \$0.013875 per kWh.

One important feature of the DSMore model is that it performs a probabilistic estimation of future avoided energy costs. It looks at the historical relationship between weather, electric use and prices in the PJM Northern Illinois region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact on electric prices that comes from extreme weather conditions. Extreme weather creates extreme peaks which create extreme prices. These extreme prices generally occur as price spikes and they create a skewed price distribution. High prices are going to be much higher than the average price while low prices are going to be only moderately lower than the average. DSMore is able to quantify the weighted benefits of avoiding energy use across years which have this skewed price distribution.

Table 3-11 summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the C&I Custom program in PY2. Most of the unique inputs come directly from the evaluation results presented previously in this report. Measure life estimates and program costs come directly from ComEd. All other inputs to the model, such as avoided costs, come from ComEd and are the same for this program and all programs in the ComEd portfolio.

²² Illinois Power Agency Act SB1592, pages 7-8.

²³ Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

Table 3-12. Inputs to DSMore Model for C&I Custom Program

Item	Value Used
Measure Life	11 years
Participants	340
Annual Gross Energy Savings	22,697 MWh
Gross Coincident Peak Savings	2.9 MW
Net-to-Gross Ratio	76%
Utility Administration and Implementation Costs	\$84,881
Utility Incentive Costs	\$2,704,415
Participant Contribution to Incremental Measure Costs	\$24,914

Based on these inputs, the Illinois societal TRC for this program is 1.82 and the program passes the TRC test. The standard TRC calculation produced by DSMore is 1.18.

Section 4. Conclusions and Recommendations

This section highlights the conclusions and recommendations from the PY2 evaluation of ComEd's Smart Ideas for your Business Custom Program. The primary evaluation objectives include quantifying the gross and net energy and demand impacts resulting from the rebated measures and assessing program marketing, and delivery. Below are the key conclusions and recommendations.

4.1 *Conclusions*

In conducting the PY2 Custom program evaluation, the evaluation team has drawn a number of conclusions that are enumerated in this section.

4.1.1 **Program Impacts**

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

The EM&V team has provided to ComEd site-specific M&V reports for each Custom gross impact sample point. These 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. Summarized findings based on the site reports are presented above under Section 3.1.3.

In the September 2010 meeting between the implementation team and the evaluation team, site-specific M&V findings were discussed, along with the rationale for the methods applied. The principal objective of the meeting was to identify what could be done to continue to work in PY3 towards closer agreement between the in-sample ex ante and ex post gross impact estimates. In addition, the following topics were discussed: when metering by the implementers is appropriate; the importance of normalizing data seasonally, or for changes in production levels between pre- and post-retrofit measurement periods; the appropriate use of modeling software; model calibration using actual weather data; use of typical weather data to represent the baseline and post-installation conditions; a possible fast track review process for the implementation team for projects receiving small incentives; the move in PY3 of all lighting measures into the Prescriptive Program; development of a standardized Workpaper or worksheet approach for commonly implemented measures; as well as other topics.

Tracking System

To support the impact evaluation, the evaluation team was given direct access to ComEd's on-line tracking system and data. The on-line system was easy to work with and provided viewing access to the project tracking data plus downloading rights to project documentation in electronic format for each project. This documentation was complete and greatly facilitated the evaluation while removing a step that commonly impedes evaluation progress: a data request

for the very information that ComEd made available in the tracking database itself. This level of access and documentation represents best practice in this area for a Custom program.

The evaluation team worked off of a copy of the tracking system data uploaded by ComEd to their secure SharePoint site on a periodic basis. While working with the database, the most important issue for the evaluation team is consistency of the data. There continued to be some instances of inconsistency regarding field names and data input. Both must be consistent or the data may not be properly read-in and analyzed if the evaluation team does not catch the inconsistency. Complete documentation that explains the field names and how they are used in tracking data reporting would be useful.

Much of the tracking data was populated with zeros for peak demand impact (kW), affecting the reliability and accuracy of the evaluation results. Specifically the extrapolation of the evaluation estimates to the program population (using a sample of selected projects) was somewhat compromised.

Measure description information is reasonably 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. ComEd 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 for either the program staff or the EM&V team to produce measure-based summary statistics and more precisely track program accomplishments. Because measure labeling practices continue to be problematic with many inconsistencies, the EM&V team did not attempt to produce those summary statistics.

Gross Impacts

Based on the sample sizes evaluated in PY2 it appears that ComEd is continuing to do a good job of screening viable Custom energy efficiency projects for incorporation in the program. Some common Custom program issues were not encountered. The project documentation presented 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. Ex ante savings estimates were reasonably technically accurate, although some equations were not well supported or sourced. While the baseline conditions selected for the impact calculations were generally reasonable, there were several instances where baseline adjustments were required to improve ex post savings estimates. No apparent project fraud or thoroughly unreasonable impact claims were encountered.

In the M&V sample all measures were verified to be installed and operational, though not always operating in a fashion that is consistent with the ex ante documentation provided. In general the implementation team did a very good job of ensuring the appropriate technical baseline was selected. The implementation team also reached out to the evaluation team in PY2 for guidance on baseline specification for selected projects. There are also plans in PY3 for the evaluation team to review selected ex ante calculations, and provide input on baseline specification, and the impact rationale and calculations applied by the implementation team.

PY2 energy savings realization rate results indicate that the stratum 1+2 projects realized a greater proportion of the ex ante claims than the stratum 3 projects. It is hypothesized that this may be due to a lower level of project oversight by implementation engineers, which would be appropriate for those smaller projects. Still, results suggest overall, and especially among smaller projects in stratum 3 (n=3), that ex ante estimates could be improved.

As noted above, the program needs to do a better job of estimating peak demand savings. Peak demand is populated with zeros in more than 50% of the projects. Peak kW estimates were improved over PY1, but accurate estimation of peak demand continues to be 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 are especially low for a Custom program at 24%. Participants report the program being a strong motivating factor in their decision to upgrade to efficient equipment at the time they elected to do so. Mean free-ridership was relatively low across all project size categories (sampling strata).

Overall, ComEd's quality control and verification procedures for the Custom Program are rigorous and ensure high quality projects and tracking data. In particular, the program is strongest in the area of project screening and access to project documentation in electronic format.

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. Furthermore, many respondents indicated that they did not pursue rebates through the ComEd program for a variety of reasons, of which the most frequently cited was a lack of available time on the part of the customer.

4.1.2 Program Processes

Program Participation

Participation in the Custom Program dramatically increased in PY2, with 110 unique companies completing 340 projects. As in PY1, heavy industry accounted for the largest share of program savings. The addition of more chain participants drove the average number of projects per participant – from 1.4 in PY1 to 3.1 in PY2 – and also accounted for significant increases in the number of projects in the grocery sector (1 project in PY1, 40 in PY2) and the retail/service sector (23 projects in PY1, 194 in PY2).

Customer Satisfaction

Satisfaction with the Custom Program across various program processes and components remains very high. Notably, 98% of participants are satisfied with their participation in the Custom Program overall (a rating of 7 or higher on a scale of 0 to 10). Very few participants encountered problems while participating and about three-quarters of interviewed participants (74%) plan on participating again.

Program Oversubscription

While oversubscription of prescriptive measures affected the Custom Program in PY1, this does not appear to be the case in PY2. Because only prescriptive lighting measures were waitlisted in PY2, recruitment of all custom projects continued throughout the program year. Increased communication efforts thwarted the adverse effects of oversubscription seen in PY1: program staff seemed to manage the process better, there was more proactive communication with trade allies, and the addition of a fundometer to the website was helpful in keeping all parties informed of funding status. As a result significantly fewer custom participants were aware of the waitlist in PY2, and less than 5% noted that the waitlist impacted their participation in the Custom Program.

Account Managers

While program staff reports that Account Managers have become more active in the Smart Ideas for Your Business Program in PY2, additional opportunities for Account Managers to help increase participation in the program appear to exist. In general, program staff would still like to see increased involvement by Account Managers. Specific Account Manager goals planned for PY3 – bringing customers to the Energy Efficiency Expo, bringing in a certain volume of projects, and attending a certain number of lunch-and-learns – plus incentives if these goals are met, should help the program in future years.

Trade Ally Network

Contractors play an integral role in the Custom Program. Eighty-four percent of PY2 custom projects were completed with help from a contractor. Notably, less than half of contractors who implemented a project in PY2 (48%) were registered trade allies. However, these trade allies accounted for 81% of all contractor-implemented projects. In general, customers do not believe that it is important that their contractor is affiliated with the Smart Ideas for Your Business Program.

While the number of registered trade allies has grown to over 300 in PY2, about two-thirds of trade allies have completed no projects or only one project in PY2. Plans for trade allies in PY3 include the stipulation that they must complete a project through the program and attend a basic training in order to remain a registered trade ally. Contractors active in PY2 projects implemented an average of about three projects. However, this number was driven by a few contractors who implemented a very large number of projects for a chain.

Contractors implementing custom projects are clearly different from contractors implementing prescriptive projects: Only 28% of contractors involved in a custom project in PY2 also completed a prescriptive project. Therefore, marketing, training, and recruitment efforts should specifically target contractors capable of implementing custom projects.

Overall, participants are very satisfied with their contractor, and 94% would recommend their contractor to others.

Marketing and Outreach

Similar to PY1, there was limited emphasis on marketing as the strong demand for prescriptive lighting measures allowed the Smart Ideas for Your Business Program to exceed combined PY2 goals. The marketing that was done in PY2 was both recalled and well received. E-mail and contractors/trade allies remain the strongest sources of program awareness. Plans for PY3 include significantly increased marketing.

The Custom Program might have benefited from more specific and concentrated outreach to trade allies and customers. If attainment of goals by individual programs is desired, specific efforts should be made to promote participation in the Custom Program. Bonuses for trade allies and incentives for Account Managers, first implemented in early PY3, should help, especially if they are focused on larger projects. In addition, the program might consider offering increased customer incentives, for a limited period of time, to encourage participation in the Custom Program.

4.2 *Recommendations*

4.2.1 **Impact Recommendations**

Ex Ante Baseline Estimates

The project-specific M&V work led to adjustments in ex ante baseline usage estimates for 6 out of the 10 projects included in the M&V sample. This suggests that greater care is needed in the development of baseline models for the majority of the projects. To improve this and reduce the chance of low realization rates, the ComEd implementation team could do a better job of verifying the following:

- During program implementation determine whether pre or post measurement data will require normalization to properly adjust for typical plant production (including appropriate adjustments for weekly or seasonal variations or for economic fluctuations).
- Carefully verify **all** ex ante pre-retrofit and post-retrofit equipment quantities and associated hours of operation for each piece of equipment included in the retrofit measure.
- When developing equipment operating profiles, incorporate overall production energy, including non-production (idle periods) energy, and non-operation periods.
- Base estimates upon appropriate application of diversity factors, normalization of hours of operation or production.
- When verifying or estimating energy per unit of production carefully identify all assumptions made (both explicit and implicit), and ensure that the application of those assumptions are sound., and
- Continue to ensure that appropriate technical baseline is being applied.

Gross Impact Results

The gross impact results yielded an energy realization rate of 0.85. The implementation team should make efforts to close this gap. Findings suggest that site-specific M&V differences between the ex ante and ex post evaluations include baseline definitions, ex ante calculation errors, lighting fixture counts, and equipment operating profiles and sequences being applied. If possible, it would be desirable to have these differences addressed in the ex ante calculations.

Free-Ridership Results

Some level of free-ridership is unavoidable in rebate programs. Nationally franchised businesses present higher risk of free ridership as decisions are made at the national level

independent of local conditions and incentives. If the Custom program implementation team is aware that these businesses are implementing franchise-wide, state-wide, or even nationwide projects, they might want to incorporate a likelihood-of-free-rider factor into the final ex ante energy saving and demand estimates.

Spillover Results

Spillover results suggest that the program had little influence on the customers' decision to implement additional energy efficient measures. When some participants implemented additional measures they did not pursue rebates through the ComEd program for a variety of reasons. In PY3 the EM&V team will likely continue to track and report spillover actions, and the decision to conduct additional evaluation activities to quantify spillover in PY3 will be examined as part of the evaluation planning effort.

Tracking System

Consideration should be given to enhancing the ComEd 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 prescriptive program model would enhance reporting of measure installations, both by program staff and within the annual evaluation.

Enhanced efforts are needed to quantify demand savings. It was not clear whether the PY2 tracking system demand savings estimates that are set to zero truly reflect an estimate of zero demand savings or rather are set to zero when they should be set to missing. The preponderance of cases with peak demand set equal to zero may lead to less reliable evaluation-based peak demand estimates (if the zeros are truly missing or not estimated in some instances). It is recommended that the implementers populate the ex ante demand savings variable in the tracking system with non-zero values where appropriate.

The evaluation team notes again in PY2 that Access database field names and data entry were not always consistent with each extract received. This could introduce errors in the evaluation data and results if such changes are not identified and addressed. It is recommended that care be taken to ensure consistent database formats, variable order, variable coding and so forth and pro-active communication with the evaluation team when the data structure must change.

The evaluation team recommends that ComEd provide a database map that explains the field names and their relevance for program tracking and reporting.

4.2.2 Process Recommendations

Program Participation

Increased program goals in PY3 for the Custom and Prescriptive programs combined means that participation needs to increase and/or that larger projects need to be recruited to meet those goals. The programs already implemented several steps to achieve this goal, including goals and incentives for Account Managers, bonuses for trade allies, and increased marketing efforts. The programs should also consider increased use of e-mail to reach out to potential participants as e-mail was the strongest source of program awareness and is the preferred method of contact. Other ways of increasing participation that have successfully been employed by other custom programs include use of a special “sale” during which increased customer incentive levels are offered as well as focused outreach and program offerings to specific sectors or specific end uses (including bundling sets of measures to facilitate the application process). Program staff might wish to consider use of these approaches to help meet PY3 goals.

Customer Satisfaction

Participant satisfaction is very high. One area of dissatisfaction among some participants was receiving a lower incentive than estimated by their vendor. While this is not directly within control of program staff, additional education of trade allies and emphasis on quality of applications (as planned for PY3) should help. The program might also wish to clearly communicate in program materials that incentive levels are set with the pre-approval letter and might therefore vary from estimates provided by vendors. Program staff should also include this guidance in trade ally training and ask contractors to communicate this information to their customers. While ComEd stakeholders are reluctant to appear to endorse specific trade allies, some type of recognition for trade allies that submit high quality applications should be considered, e.g., an award at the end of the program year.

Trade Ally Network

While the trade ally network has grown in PY2, about two-thirds of trade allies are only minimally engaged with only one or no projects in PY2. Given the importance of contractors in project implementation, increasing trade ally activity should be a primary goal for PY3. The trade ally bonus, started in September 2010, should help towards this goal. Limiting the bonus to incentive amounts over \$10,000 makes sense for the Custom Program – while only 11% of projects received an incentive over \$10,000, these projects accounted for 66% of PY2 program savings. The program should also continue to actively target trade allies capable of implementing custom projects, as they tend to differ from contractors currently implementing prescriptive projects.

The program should also consider assigning contractors a unique contractor ID and use this ID for program tracking, instead of contractor name (which is prone to typos and differences in

spelling across different projects implemented by the same contractors). This would facilitate tracking of contractor activity – especially as trade ally requirements are being enhanced – as well as program evaluation.

Account Managers

Account Manager activity in PY2 – while improved over PY1 – is still not as strong as desirable for a C&I custom program. However, the program has already implemented the necessary steps to get Account Managers more engaged, including specific goals with respect to bringing customers to the Energy Efficiency Expo, bringing in projects, and attending lunch-and-learns, and an ability to earn incentives if these goals are met. The effectiveness of these steps will need to be assessed before additional recommendations with respect to Account Managers can be made.

Marketing and Outreach

To meet increased PY3 program goals, aggressive marketing and outreach is clearly necessary. The Smart Ideas for Your Business Program is already planning a PY3 marketing campaign that is much enhanced compared to PY1 and PY2. Goals and incentives for Account Managers and bonuses for trade allies should greatly contribute to outreach efforts through those two important channels. If meeting of program-specific goals is desired, special emphasis should be placed on customers likely to implement custom projects as well as trade allies capable of implementing them. The program should also consider increased use of e-mail (see above).

Section 5. Appendices

5.1 *Data Collection Instruments*

5.1.1 **Phone Survey**



ComEd PY2 CI
Custom Participant Su

5.2 *Other Appendices*

5.2.1 **2009 Program Application Forms and ComEd Operations Manual**

The application forms for the 2009 program are provided along with a draft version of ComEd's Operations Manual.



SIB_PY2_CustomApp
lication.pdf



ComEd Operations
Manual 2009 Draft.doc