

**Commonwealth Edison Company
Energy Efficiency/Demand Response Plan
Plan Year 1 (6/1/2008-5/31/2009)
Evaluation Report:
Business Prescriptive Program**

December 2, 2009

**Submitted To:
ComEd**



Final Report

Submitted to:

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TABLE OF CONTENTS

E	Executive Summary	1
	E.1 Evaluation Objectives.....	1
	E.2 Evaluation Methods	1
	E.3 Key Findings	2
1	Introduction to Program.....	6
	1.1 Program Description	6
	1.1.1 Program Implementation.....	7
	1.1.2 Measures and Incentives for PY1.....	8
	1.2 Evaluation Questions	8
2	Evaluation Methods	10
	2.1 Analytical Methods.....	10
	2.1.1 Gross Program Savings.....	10
	2.1.2 Net Program Savings.....	12
	2.2 Data Sources.....	15
	2.3 Sampling	17
	2.3.1 Engineering Review Sample.....	20
	2.3.2 CATI Phone Survey	26
3	Program Level Results	29
	3.1 Impact.....	29
	3.1.1 Verification and Due Diligence.....	29
	3.1.2 Tracking System Review.....	30
	3.1.3 Default Savings Review	31
	3.1.4 Gross Program Impact Parameter Estimates.....	34
	3.1.5 Gross Program Impact Results	39
	3.1.6 Net Program Impact Parameter Estimates.....	39
	3.1.7 Net Program Impact Results	44
	3.2 Process.....	46
	3.2.1 Program Theory and Logic Model	46
	3.2.2 Participant Profile.....	51
	3.2.3 Program Implementation.....	52
	3.2.4 Program Design and Processes	54
	3.2.5 Program Marketing & Outreach	56
	3.2.6 Barriers to and Benefits of Participation	57
	3.2.7 Participant Satisfaction	58
	3.3 Cost Effectiveness Review	60
4	Conclusions and Recommendations	62
	4.1 Conclusions.....	62
	4.1.1 Program Impacts	62
	4.1.2 Program Processes.....	64
	4.2 Recommendations	65
	4.2.1 Impact Recommendations	65
	4.2.2 Process Recommendations	67
5	Appendices	69
	5.1 Data Collection Instruments	69

5.1.1	Interview Guide	69
5.1.2	Phone Survey	69
5.2	Other Appendices	69
5.2.1	PY1 Program Application Forms.....	69
5.2.2	Verification and Due Diligence Memo Report	69
5.2.3	Examples of M&V Site Plans.....	70
5.2.4	Default Savings Review	70

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 Plan Year 1 Business Prescriptive program.¹ The primary objectives of this evaluation are to quantify gross and net savings 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 business customers during program year 1: 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 / Demand Response Plan, filed in November 2007 and approved in February 2008,² anticipates that the Prescriptive program will provide the largest component of business savings to the portfolio with 57% of the nonresidential energy savings. Given the significant role in the energy savings plan and the initial strong response experienced by the program, the Prescriptive program received a high level of evaluation effort in PY1.

The data collected for evaluation of the PY1 Prescriptive program was gathered during a number of activities including tracking data analysis, in-depth phone interviews with program staff and program implementers, a participant phone survey, engineering review of project files, and on-site visits. Table 1 provides a summary of these data collection activities including the targeted population, the sample frame, and timing in which the data collection occurred.

¹ Plan Year 1 (PY1) began June 1, 2008 and ended May 31, 2009.

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

Table 1. Data Collection Activities for PY1

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Prescriptive program measures	ComEd Online Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd Prescriptive Program Staff	Contact from ComEd	Prescriptive Program Manager	2	April 2009
	Prescriptive Program Implementers	Contact from ComEd	KEMA Program Implementation Staff	3	April/May 2009
CATI Phone Survey	Prescriptive Program Participants	Tracking Database	Stratified Random Sample of Prescriptive Program Participants	95	August/Sept. 2009
Project File Engineering Review	Projects with incentives paid on prescriptive measures	Tracking Database	Stratified random sample by Prescriptive project-level kWh (3 strata)	80	September – October 2009
On-Site Visits	Large projects, non-lighting projects, T8/T5 plus occupancy sensor projects	Engineering Review Sample	Selected by the Evaluation team for informational value	16	September – October 2009

E.3 Key Findings

The Prescriptive program launched in June 2008 and quickly reached its funding target for the first program year and as a result, ComEd closed the PY1 program to new applicants effective November 1, 2008. Projects were placed on a wait list for participation as replacements and additions to program year 1 as cancellations and budget allowed, and as potential participants for the second program year.

Table 2 below provides an overview of planned, reported ex ante, and evaluation-adjusted net savings impacts for the PY1 Prescriptive program. The evaluation found that verified net energy impacts exceeded ComEd's plan target and reported ex ante savings. As shown in Tables 3 and 4, the PY1 evaluation found that verified gross impacts were significantly higher 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 was lower than ComEd's planning value of 0.80.

Table 2. PY1 Prescriptive Program Net Savings

Net Savings Estimates	MWH	MW
ComEd Plan Target	43,255	12.3
ComEd Reported for PY1 (ex ante)	71,656	
Total First-Year Evaluation-Adjusted Net Savings (ex post)	80,932	13.2

Source: Plan target: Commonwealth Edison Company's 2008 – 2010 Energy Efficiency / Demand Response Plan, Docket No. 07-0540, ComEd Ex. 1.0, November 15, 2007. Reported: Communication from ComEd. ComEd's planned and reported net savings include a net-to-gross ratio of 0.8 and a gross realization rate of 0.95.

Table 3. PY1 Prescriptive Program Gross and Net kWh Savings

End Use	Tracking Gross kWh	Verified Gross kWh	Realization Rate	Verified Net kWh	NTGR (verified gross)
Lighting	83,461,120	110,155,743	1.32	73,767,540	0.67
HVAC	6,598,992	9,851,596	1.49	6,770,708	0.69
Refrigeration	494,488	521,752	1.06	378,940	0.73
Motors	16,822	20,475	1.22	14,449	0.71
Program	90,571,422	120,549,567	1.33	80,931,636	0.67

Source: Tracking savings from ComEd online tracking system, July 7, 2009.

Table 4. PY1 Prescriptive Program Gross and Net kW Savings

End Use	Tracking Gross kW	Verified Gross kW	Realization Rate	Verified Net kW	NTGR (verified gross)
Lighting	17,971	17,934	1.00	12,192	0.68
HVAC	885	1,403	1.58	950	0.68
Refrigeration	33	31	0.94	22	0.73
Motors	3	3	1.05	2	0.70
Program	18,893	19,370	1.03	13,166	0.68

Source: Tracking savings from ComEd online tracking system, July 7, 2009.

The relative precision at a 90% confidence level for the program kWh Realization Rate is $\pm 8\%$, and for the kW Realization Rate it is $\pm 11\%$. The relative precision at a 90% confidence level for the program NTG ratio is $\pm 9\%$.

Key Impact Findings

- Program participation and net impacts were highly concentrated in large projects, lighting, in certain buildings types (warehouse, industrial), and in a subset of measures. Lighting measures accounted for 91% of net energy savings. Warehouses and manufacturing provided 63% of net energy savings by building type. The measure “New T8/T5 fixture” accounted for 56% of net energy savings, while occupancy sensors added another 7% to net savings. Among non-lighting measures, HVAC VSDs accounted for 6% of total net energy savings. The 27 largest projects of over 450 participating provided 31% of net savings.
- With only a few exceptions, ComEd's default savings values, both kW and kWh, are well documented, reasonable, and conservative in the savings they claim. Our recommended changes are included in this report. When we encountered a ComEd default value in the engineering file

review process or during on-site visits that we concluded should be revised, the savings for the measure were adjusted either higher or lower.

- To support the impact evaluation, the evaluation team was given direct access to ComEd's on-line tracking system and data. The project documentation in the tracking system was complete and greatly facilitated the evaluation. We did not find any savings data in the tracking system that we judged to be outliers. There were some instances of missing values and inconsistencies that we have identified in this report.
- The PY1 evaluation found that verified gross impacts were significantly higher than the savings recorded in ComEd's tracking system. As noted in the default savings review, ComEd's default savings assumptions were generally conservative in their savings claims. Through use of data from the phone survey, engineering review and on site visits, many of the lighting measures received significant hours of use increases relative to default assumptions.
- Although the program-level realization rate is greater than 1.0, the evaluation adjustments to tracking savings for individual measures resulted in increases (59% of measures reviewed), decreases (31%), and no change (10%) to reported savings. Reasons for adjustments are discussed in the report.
- The PY1 Prescriptive program evaluation found that verified net impacts (80,932 MWh) were significantly higher than ComEd's reported net savings (71,656 MWh). ComEd's verified net savings exceed the reported savings due to the high realization rate on gross impacts. The evaluated net-to-gross ratio is substantially lower than the value of 0.80 assumed by ComEd in their plan. Scoring results for the net-to-gross ratio are interpreted in this report.
- The PY1 evaluation found evidence of likely lighting spillover in 20% of phone survey respondents (17 of 85).

Key Process Findings

Program Participation

The Business Prescriptive Program was well received in PY1. Over 340 customers conducted more than 450 projects that accounted for 81 GWh and 13 MW of net savings. While lighting accounted for the vast majority of projects and savings – a typical observation for a new prescriptive program – PY1 participants represented a good range of business sectors, including warehouses, light and heavy industry, offices, and retail/service.

Customer Satisfaction

Customer satisfaction with various processes and components of the program was high, and few participants reported encountering problems during their participation. Participants provided the highest ratings for the Smart Ideas Program overall, the program measures offered, and the incentive amounts. Participants were less satisfied with the call center than with other program components. Some customers noted issues with reaching someone who could answer questions, receiving inconsistent information, and questions not being understood. When asked to suggest program improvements, participants most often cite higher incentives and better marketing/publicity.

Program Oversubscription

In PY1, interest in the program was so high that it became oversubscribed in September 2008 and had to begin wait-listing projects. While the oversubscription was a mark of success for the program – as evidenced by the program exceeding its PY1 goals – it also presented a challenge as some customers had to be waitlisted and others were not able to participate in PY1. Program staff therefore had to manage

customer expectations for PY1 while at the same time maintaining customer confidence and interest in the program for future program years. Another concern with this quick oversubscription is the possibility of free-ridership. Program staff referred to “pent up demand” in ComEd’s service territory, which points to the possibility of projects being delayed until incentive money became available.

How well program staff managed the oversubscription of the program could not be fully measured in this evaluation as no primary research with non-participants or market actors was conducted. However, this is a key area of concern for the program, especially since early results from PY2 show that the program is likely to become oversubscribed again. The PY2 evaluation should focus on how the oversubscription is handled and communicated to customers, non-participant and market actor perception of the program and issues of oversubscription, and how early oversubscription can be avoided in the future.

Marketing and Outreach

Necessarily, the oversubscription also meant that program implementation had to be adjusted. In specific, some of the anticipated promotional channels (Account Managers, marketing materials) were not utilized as planned since there was no need for additional program promotion. The limited marketing that was conducted during PY1 was recalled and well received by program participants. The most successful efforts were promotion via contractors/trade allies and account managers as well as the website, and e-mail.

Trade Ally Network

During PY1, trade allies were the main channel of promotion and communication for the Prescriptive program. Approximately 160 market actors joined the trade ally network during PY1. ComEd has put in a place a good process for its trade ally network. Market actors have to complete an application and attend a seminar or webinar that explains the program and program processes before they can become a trade ally. In return, ComEd trade allies are listed in a searchable directory on the ComEd website and can make use of the ComEd call center and technical staff. Additional support for trade allies to help promote the program is planned for future program years.

Awareness of contractor affiliation with the program is low among customers, and many customers do not think that program affiliation is important. Despite this, the trade ally network provides an excellent opportunity to promote program opportunities as contractors often specify the details of the installed equipment, inform the customers of the ComEd program and available incentives, and discuss the program with their customers. The program is therefore well justified in emphasizing trade allies in its program delivery and should be commended for building a solid foundation for its trade ally network in PY1. Given the importance of trade allies to program delivery, this should be another emphasis for evaluation in PY2.

1 INTRODUCTION TO PROGRAM

This evaluation report covers the Business Prescriptive 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 Illinois Service territory. There were two specific program elements that were available to ComEd customers during program year 1 under the ComEd Smart Ideas for Your Business incentives program:

- **Prescriptive** incentives are available for energy-efficiency equipment upgrades and improvements including lighting, cooling, refrigeration, and motors. Incentives are paid based on the quantity, size, and efficiency of the equipment. Incentives are provided for qualified equipment commonly installed in a retrofit or equipment replacement situation.
- **Custom** incentives are available to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom measure incentives are paid based on the first year energy (kWh) savings. All projects must 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 2, with minor changes to prescriptive 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.

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 / 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 the following 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.

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

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

⁵ Plan year 1 ran from June 1, 2008 through May 31, 2009.

The net MWH savings goals and budgets for the PY1 Business Prescriptive and Custom programs are:

Table 5. Smart Ideas for Your Business PY1 Planned Savings Goals and Budgets

Program Element	Plan Target Net MWH	Plan Target Net MW	Plan Target Total Cost
Business Prescriptive	43,255	12.3	\$7,000,000
Business Custom	18,932	3.5	\$2,500,000
Total	62,187	15.8	\$9,500,000

Source: Commonwealth Edison Company's 2008 – 2010 Energy Efficiency / 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 Program Implementation

ComEd retained KEMA Services Inc. as its program administrator responsible for day-to-day operations. The Prescriptive program launched in June 2008 and quickly reached its funding target for the first program year and as a result, ComEd closed the PY1 program to new applicants effective November 1, 2008. Projects were placed on a wait list for participation as replacements and additions to program year 1 as cancellations and budget allowed, and as potential participants for the second program year.

ComEd has provided the evaluation team with a detailed operations manual and a policies and procedures manual that describe program implementation. Important aspects of program implementation are summarized below.

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 incentive cap for PY1 ending May 31, 2009 is \$100,000 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.

Preapproval and Final Applications: Customers submit pre-applications and/or final applications depending on the scope of their project. Applications are required for prescriptive projects where the review team must verify the pre-existing conditions. While not mandatory, pre-applications are encouraged by ComEd for all other prescriptive projects in order to reserve funding. In PY1, pre-approval and pre-inspection was required for permanent lamp removal and new T8/T5 fixture retrofits.

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. In PY1, pre-approval and pre-inspection was required for permanent lamp removal and new T8/T5 fixture retrofits.

Reservation: The program reserves the project funds once the pre-inspection report and/or initial project review is approved. Projects that come in after funds are fully reserved are placed on a waiting list. 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 Submittal: 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. 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 measures.

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 the cancelled status. The project details remain in the database, but the project no longer counts towards the active program goals.

Wait List: If project applications and related funding requests reach the point where ComEd determines that further funding reservations can no longer be made, the program moves projects to a waiting list. Projects on the wait list will not be reserved or paid unless sufficient funding becomes available. Wait list projects are not included in the active program totals.

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 PY1

The PY1 program application form listing measures, eligibility criteria and incentive levels is provided in Appendix 5.2.1.

1.2 Evaluation Questions

The evaluation sought to answer the following key researchable questions:

Impact Questions

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

Process Questions:

The process evaluation questions focused on five key areas:

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

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

2 EVALUATION METHODS

2.1 Analytical Methods

2.1.1 Gross Program Savings

The objective of this element of the impact evaluation is to verify the original gross savings estimates in the Prescriptive program tracking system. The savings reported in ComEd's online tracking system was adjusted through a multistep process:

1. Engineering review of the algorithms used by the program to calculate default energy savings for all measures and the assumptions that feed those algorithms. Default savings values were either judged acceptable as documented by ComEd or adjusted by the evaluation team.
2. Review of ComEd's online tracking database to identify potential adjustments to reported tracking savings resulting from missing values, outliers, or changes to default values loaded into the database.
3. The results of the first two steps were summarized in a memo to ComEd and the findings communicated to the engineering team responsible for project file review.
4. Engineering review at the measure-level for a sample of 80 project files, with the following subcomponents:
 - a. Engineering review and analysis of measure savings based on project documentation and tracking data.
 - b. Review and application (if appropriate) of participant phone survey impact data (reported hours of use, reported baseline equipment) to projects in the engineering review sample.
 - c. On-site verification audits at 16 project sites selected from the engineering review sample. Performance measurements included spot measurements and run-time hour data logging for selected measures.
 - d. Calculation of a verified gross savings value (kWh and kW) for each measure within sample.

A verified gross realization rate (which is the verified gross savings / reported tracking savings) was estimated from the sample and applied to the population of reported tracking savings. The result is a new estimate of verified gross savings for the Prescriptive program.

Default Savings Review

We conducted a technical review of measures with assigned default savings values to assess the reasonableness of underlying algorithms, technology assumptions, and calculated savings values. Our findings regarding individual assumptions and algorithms may be categorized as follows:

- 1) ACCEPTABLE AS IS: assumption or algorithm is reasonable and appropriate for ComEd
- 2) REVISE OVER TIME: the assumption or algorithm is acceptable for the near term but should be improved over time through the evaluation process, market research, or program experience.
- 3) ERROR OR DISAGREEMENT: We believe the assumption or algorithm contains an error or we disagree on the value or approach.

The preferred data sources for assumptions are recent local primary research, EM&V, and program experience. Since those sources were generally not available in Illinois when ComEd assembled documentation and developed default savings values, we understand that some assumptions must be drawn from data sources that involve a compromise between age, rigor, or location. When assumptions are described as “needing revision”, we may propose an existing alternative data source or suggest using the evaluation process, market research, or program experience to revise the assumption through a collaborative review process.

Several points in this default savings review discuss issues that EM&V *could* illuminate. This should not be construed as saying that EM&V work as defined in the current evaluation plans *will* address the issue. The current evaluation budget could not support detailed research on the full range of issues identified as potential targets for EM&V work. The EM&V deliverables within our current plans will be one of several sources of information to draw upon as default values are updated.

Following are the types of issues we considered in our reviews:

Measure definition – Provides a description of the efficient technology, the required technology performance specifications, and the applications where the technology is eligible. Potential issues include:

- Are the performance specifications complete to ensure the default savings will be achieved?
- Are the performance specifications independently rated or certified?

Measure Savings Engineering Analysis – provides the algorithms used to calculate non-coincident demand reduction, coincident demand reduction, and annual energy savings:

- Are the algorithms correct for the measure?
- Do the algorithms provide reasonable estimates for the range of applications and operating conditions of participants in the program?
- Are factors missing from the equation?

Measure Savings Assumptions – documents the wattages, efficiency ratings and operating assumptions for baseline and efficient equipment to calculate non-coincident demand reduction, coincident demand reduction, and annual energy savings. Potential issues include:

- Is the baseline equipment type and performance appropriate for the measure description?
- Are the efficiency ratings and wattages appropriate for the range of operating conditions expected of participants?
- Do the operating assumptions provide a reasonable representation for program participation?
- Are the coincident factors reasonable?
- Are the assumptions documented and are the data sources appropriate for ComEd?

Measure Savings Results – Presents the default values that are derived from the algorithms and assumptions. Potential issues include:

- Has the calculation been correctly performed to generate the default values (any math errors)?
- Is the weighting or averaging of data to derive a single default value reasonable?
- Do individual default values cover too broad of a range?
- Are the units for the savings correct and clearly presented?

Tracking System Savings Review

Under this task, we conducted a review of Prescriptive program data in the ComEd Online Tracking System, exported on July 7, 2009 to identify issues that could affect reported savings. During this review, we looked at project and measure data for outliers and missing information, and checked for incorrect default values in lookup tables used by the tracking system to report savings.

Engineering Review of Project Files

Michaels Engineering conducted a measure-level engineering review on a sample of 80 projects from PY1 to verify documentation, tracking system entries, installed measure characteristics, hours of operation, and characteristics of replaced equipment. For each measure in the sample, Michaels engineers reproduced the ex ante savings reported in the tracking system (kWh and kW), and then calculated an adjusted gross savings based on their review of documentation and engineering analysis. A gross savings realization rate was calculated for the sample, and then applied to the population.

To support this review, ComEd provided project documentation in electronic format for each sampled project. Documentation included some or all of scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, vendor proposals), pre-inspection reports and photos (when required), post inspection reports and photos (when conducted), calculation spreadsheets, and important email and memoranda. Where projects covered by the participant phone survey overlapped with the engineering review sample, relevant impact data from the phone survey (reported hours of use, reported baseline equipment) was applied to projects.

On-Site Verification

Michaels Engineering conducted on-site verification for 16 projects selected from the engineering review sample. The site visits included a detailed inventory of measures, customer interview regarding baseline equipment and operating parameters, and measurement of important assumptions. Performance measurements included spot measurements and run-time hour data logging for one or more weeks for selected measures. The site visit approach was determined on a case by case basis, and summarized in an M&V plan prior to the visit.

Findings from site visits are reflected in adjustments to adjusted gross savings from the engineering file review to yield an ex post gross savings value.

2.1.2 Net Program Savings

Net Program Savings

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

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

spillover was examined qualitatively in PY1. A more extensive effort will be undertaken to quantify spillover in PY2, commensurate with the evidence of spillover found in PY1.

Once free-ridership (and spillover beginning PY2) have been estimated the Net-to-Gross (NTG) ratio is calculated as follows:

$$\text{NTG Ratio} = 1 - \text{Free-ridership Rate} + \text{Spillover Rate (beginning PY2)}$$

Free-Ridership

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

- A **Program Components** score that reflects the influence of the most important of various program and program-related elements in the customer's decision to select specific program measures at this time.
- 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 Prescriptive program is a multi-step process. After asking the customer impact related questions about the measures installed for one end-use (lighting, HVAC, refrigeration, or motors) at the specific site address that defines the project, the survey covers a battery of questions used to assess net-to-gross ratio for the specific end-use and site. If a project includes multiple end-uses, the questions are asked about the end-use providing the largest contribution to ex ante project savings. Customers are then asked if the responses also apply to the end-use with second highest contribution to project savings.

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 for measures of that end-use.

This scoring approach is summarized in Table 6.

Table 6. Net-to-Gross Scoring Algorithm for the PY1 Prescriptive 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 rebate B. Recommendation from program staff C. Information from utility or program marketing materials D. Endorsement or recommendation by a utility account rep 	<p>Maximum of A, B, C, and D</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)</p> <p>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?” (The NTG algorithm computes the No-Program likelihood score as 10 minus the respondent’s answer).</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>$1 - \text{Sum of scores (Program Components, Program Influence, No-Program)}/30$</p>
<p>PY1 Project level Net-to-Gross Ratio (ranges from 0.00 to 1.00)</p>	<p>$1 - \text{Project level Free-ridership}$</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-uses of the additional projects</p>

Spillover

For the PY1 Prescriptive program evaluation, a battery of questions to assess spillover qualitatively was asked regarding the end use addressed in the survey (the end use with the greatest contribution to ex ante savings for the project). Below is a paraphrased version of the spillover questions for lighting:

1. Since June 2008 have you purchased and installed any energy efficient lighting equipment WITHOUT an incentive from the Smart Ideas for Your Business program or another utility program?
2. You said you installed equipment at another facility owned by <COMPANY>. Can you please give me the address?
3. On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much did your experience with the Smart Ideas for Your Business program influence your decision to install high efficiency lighting equipment on your own?
4. Why did you purchase this lighting equipment without the financial assistance available through the Smart Ideas for Your Business program?
5. What type of lighting equipment was installed without an incentive?

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

2.2 Data Sources

The data collected for evaluation of the PY1 Prescriptive program was gathered during a number of activities including tracking data analysis, in-depth phone interviews with program staff and program implementers, a participant phone survey, project file engineering review, and on-site visits. Table 7 below provides a summary of these data collection activities including the targeted population, the sample frame, and timing in which the data collection occurred.

Table 7. Data Collection Activities for PY1

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Prescriptive program measures	ComEd Online Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd Prescriptive Program Staff	Contact from ComEd	Prescriptive Program Manager	2	April 2009
	Prescriptive Program Implementers	Contact from ComEd	KEMA Program Implementation Staff	3	April/May 2009
CATI Phone Survey	Prescriptive Program Participants	Tracking Database	Stratified Random Sample of Prescriptive Program Participants	95	August/Sept. 2009
Project File Engineering Review	Projects with incentives paid on prescriptive measures	Tracking Database	Stratified random sample by Prescriptive project-level kWh (3 strata)	80	September – October 2009
On-Site Visits	Large projects, non-lighting projects, T8/T5 plus occupancy sensor projects	Engineering Review Sample	Selected by the Evaluation team for informational value	16	September – October 2009

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. Program samples were drawn from the version uploaded by ComEd on July 7, 2009. The most recent version supplied to the evaluation team was uploaded September 17, 2009.

Program and Implementer Staff Interviews

Five in-depth interviews were conducted as part of this evaluation. Two of these interviews were conducted with the ComEd Business Program Manager (Steve Baab) and the ComEd Business Prescriptive Program Manager (Erinn Monroe); the other three interviews were conducted with KEMA implementation staff (Operations Manager Charley Budd, and Directors Dan Waitroob and Wendy Tobiasson). These interviews were completed over the phone in April and May of 2009. The interviews with the ComEd Program Managers focused on program processes to better understand the goals of the program, how the program was implemented, the perceived effectiveness of the program, and also verified evaluation priorities. The interview with the implementation staff explored the implementation of the program in more detail and also covered areas of data tracking and quality assurance. The interview guide used for these interviews is included in Appendix 5.1.1.

The evaluation team also reviewed program materials developed by KEMA and ComEd, including: KEMA's operations manual, a technical reference manual documenting prescriptive savings (Appendix A of the operations manual), application forms (Appendix B), forms and checklists (Appendix C), a policies and procedures manual, program tracking database documentation, and program scorecard reports. ComEd's tracking system programming contractor conducted user training for program staff and evaluators in February 2009.

CATI Phone Survey

A CATI telephone survey was conducted with a sample of Prescriptive program participants. This survey focused on questions to estimate the gross and net program impacts and to support the process evaluation. All CATI surveys were completed by Opinion Dynamics Corporation (ODC) in late August and early September 2009.

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

Project Documentation

To support the engineering review, ComEd provided project documentation in electronic format for each sampled project. Documentation included some or all of scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, vendor proposals), pre-inspection reports and photos (when required), post inspection reports and photos (when conducted), calculation spreadsheets, and important email and memoranda. While this documentation is available by downloading from the ComEd online tracking system, ComEd provided the data on CDs due to the combined size of the files for the 80 projects included in the engineering file review.

Site Visits

Michaels Engineering conducted on-site verification for 16 projects selected from the engineering review sample. The site visits included a detailed inventory of measures, customer interview regarding baseline equipment and operating parameters, and measurement of important assumptions. Performance measurements included spot measurements and run-time hour data logging for one or more weeks for selected measures. The site visit approach was determined on a case by case basis, and summarized in an M&V plan prior to the visit. Two examples of M&V plans are provided in Appendix 5.2.3.

2.3 Sampling

The tracking data delivered for this evaluation was extracted from a copy of the ComEd online database uploaded to the evaluation team SharePoint site by ComEd on July 7, 2009.

Profile of Population

The Prescriptive program evaluation team developed SAS® program code to extract key Prescriptive program participation data from ComEd’s July 7, 2009 tracking data. Tables 8, 9, and 10 below provide a profile of PY1 Prescriptive program participation.

Participation is highly concentrated in lighting, in certain buildings types (warehouse, industrial), and in a subset of measures. While warehouse and industry account for 61% of ex ante kWh saved, size is relative – hotels and motels account for only 4% of program savings, but they still provide a significant contribution to ComEd’s program portfolio. Five measure types supply 82% of kWh savings, and seven measure types provide 92% of energy savings.

Table 8. PY1 Prescriptive Program Participation by Business Type

Business Type	Project Count		Measure Count		Ex Ante kWh		Ex Ante kW	
Warehouse	67	15%	131	13%	22,429,024	25%	4,653	25%
Light Industry	103	23%	251	24%	18,671,670	21%	4,483	24%
Heavy Industry	34	7%	74	7%	13,524,153	15%	3,264	17%
Retail/Service	73	16%	170	16%	10,550,978	12%	2,241	12%
Office	85	19%	190	18%	8,014,954	9%	1,826	10%
Miscellaneous	35	8%	70	7%	5,256,937	6%	858	5%
Medical	15	3%	40	4%	5,139,398	6%	628	3%
Hotel/Motel	11	2%	24	2%	3,832,239	4%	398	2%
Grocery	21	5%	69	7%	2,107,951	2%	296	2%
College / University	4	1%	6	1%	618,831	1%	177	1%
Restaurant	5	1%	11	1%	380,668	0%	59	0%
K-12 School	2	0%	9	1%	44,619	0%	10	0%
TOTAL	455	100%	1045	100%	90,571,422	100%	18,893	100%

Source: Evaluation analysis of tracking savings from ComEd online tracking system, July 7, 2009.

Table 9. PY1 Prescriptive Program Participation by Measure Type

Rank	Measure Type	Measure Count		Ex Ante kWh			Ex Ante kW	
1	New T5/T8 Fixture	221	21%	47,894,934	53%	53%	10,782	57%
2	Delamp 4' with or w/o reflector	130	12%	7,644,412	8%	61%	1,580	8%
3	Integral CFL	102	10%	7,191,795	8%	69%	1,262	7%
4	Occupancy Sensors	112	11%	6,399,401	7%	76%	1,452	8%
5	Reduced Wattage T8 (4') and Ballast	82	8%	5,395,722	6%	82%	1,036	5%
6	VSD for HVAC	73	7%	4,516,040	5%	87%	408	2%
7	HP T8 (4') and ballast	100	10%	4,337,050	5%	92%	955	5%
8	Water Cooled Chiller	7	1%	1,885,401	2%	94%	314	2%
9	HW CFL	25	2%	1,389,139	2%	96%	292	2%
10	Delamp 8' with or w/o reflector	34	3%	1,209,173	1%	97%	279	1%
11	Exit Signs	70	7%	899,460	1%	98%	108	1%
12	Reduced Wattage T8 (4') Lamp Only	17	2%	646,420	1%	99%	120	1%
13	EC Motor	8	1%	269,285	0%	99%	27	0%
14	Metal Halides	8	1%	206,204	0%	99%	51	0%
15	Anti-sweat controls	2	0%	174,870	0%	99%	3	0%
16	Reduced Wattage T8 (8') and Ballast	6	1%	154,643	0%	100%	34	0%
17	Unitary HVAC	25	2%	95,732	0%	100%	64	0%
18	Cold Cathode	5	0%	92,767	0%	100%	20	0%
19	Room AC	1	0%	68,907	0%	100%	64	0%
20	PTAC	2	0%	32,913	0%	100%	35	0%
21	Strip Curtains	1	0%	22,240	0%	100%	2	0%
22	Vending Controllers	4	0%	18,055	0%	100%	-	0%
23	Premium Motors	9	1%	16,822	0%	100%	3	0%
24	Ice Makers	1	0%	10,038	0%	100%	1	0%
	TOTAL	1,045	100%	90,571,422	100%		18,893	100%

Source: Evaluation analysis of tracking savings from ComEd online tracking system, July 7, 2009.

Table 10. PY1 Prescriptive Program Participation by End-Use

End-use	Measure Count		Ex Ante kWh		Ex Ante kW	
	Count	%	kWh	%	kW	%
Lighting	912	87%	83,461,120	92%	17,971	95%
HVAC	108	10%	6,598,992	7%	885	5%
Refrigeration	16	2%	494,488	1%	33	0%
Motors	9	1%	16,822	0%	3	0%
Total	1045		90,571,422		18,893	100%

Source: Evaluation analysis of tracking savings from ComEd online tracking system, July 7, 2009.

2.3.1 Engineering Review Sample

The sample for the engineering review of PY1 paid Prescriptive program projects was selected from data in the ComEd online tracking system, version uploaded on July 7, 2009. Data review was undertaken before the sample was pulled to check for outliers and missing values, and then matched to ComEd’s reported demand and 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, 63 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.

The program-level Prescriptive savings data was analyzed by end use, building type, measure type, and project size to inform sample design. After analysis, the sample design selected for the Prescriptive evaluation was stratification by project size, where project size is defined as the sum of all ex ante kWh for Prescriptive measures installed within a project (as defined by unique project IDs assigned by ComEd). Projects were sorted from largest to smallest Prescriptive kWh, and placed into one of three strata that each contained one-third of the program total kWh. Thus, the 27 largest projects comprising one-third of program savings were assigned to “strata 1,” the 74 next largest were assigned to “strata 2,” and the smallest 354 projects were assigned to “strata 3.”

The Prescriptive evaluation plan called for a target sample of 80 projects to be selected for engineering review. This sample was drawn as follows: all 27 projects in strata 1 were selected, 27 of 74 projects in strata 2 were randomly selected, and 26 of 354 projects in strata 3 were randomly selected.

Profile of Engineering Review Sample

Tables 11, 12, 13, 14, and 15 below provide a profile of the Engineering Review Sample for the Prescriptive program in comparison with the program population.

Table 11. Profile of the Engineering Review Sample by Strata

Population summary						Target sample
Strata	N	Ex Ante kWh	kWh Weights	Ex Ante kW	kW Weights	n
1	27	29,950,231	0.331	6,094	0.323	27
2	74	30,276,667	0.334	6,162	0.326	27
3	354	30,344,524	0.335	6,637	0.351	26
	455	90,571,422		18,893		80

Table 12. Profile of the Engineering Review Sample By Business Type

Business Type	Project Count							
	Strata 1		Strata 2		Strata 3		Total	
	Pop	Sample	Pop	Sample	Pop	Sample	Pop	Sample
Office	1	1	7	2	77	6	85	9
K-12 School	-	-	-	-	2	-	2	-
College / University	-	-	-	-	4	-	4	-
Retail/Service	2	2	10	5	61	3	73	10
Restaurant	-	-	1	-	4	-	5	-
Hotel/Motel	2	2	2	1	7	-	11	3
Medical	3	3	5	2	7	1	15	6
Grocery	-	-	1	-	20	2	21	2
Warehouse	10	10	17	7	40	2	67	19
Heavy Industry	5	5	7	1	22	1	34	7
Light Industry	4	4	17	6	82	8	103	18
Miscellaneous	-	-	7	3	28	3	35	6
Totals	27	27	74	27	354	26	455	80

Table 13. Profile of the Engineering Review Sample by Business Type

Business Type	Sample kWh		Population kWh		Sampled %
Office	2,072,234	5%	8,014,954	9%	26%
K-12 School	-	0%	44,619	0%	0%
College / University	-	0%	618,831	1%	0%
Retail/Service	4,563,715	10%	10,550,978	12%	43%
Restaurant	-	0%	380,668	0%	0%
Hotel/Motel	2,845,389	6%	3,832,239	4%	74%
Medical	3,227,967	7%	5,139,398	6%	63%
Grocery	261,673	1%	2,107,951	2%	12%
Warehouse	13,803,968	32%	22,429,024	25%	62%
Heavy Industry	8,496,306	19%	13,524,153	15%	63%
Light Industry	6,680,891	15%	18,671,670	21%	36%
Miscellaneous	1,829,528	4%	5,256,937	6%	35%
	43,781,671	100%	90,571,422	100%	48%

Table 14. Profile of the Engineering Review Sample by End-Use

End Use	Sample kWh		Population kWh		Sampled %
HVAC	398,684	1%	2,082,953	2%	19%
HVAC VSD	1,858,275	4%	4,516,040	5%	41%
Refrigeration	261,673	1%	494,488	1%	53%
Motors	2,078	0%	16,822	0%	12%
Lighting	41,260,961	94%	83,461,120	92%	49%
TOTAL	43,781,671	100%	90,571,422	100%	48%

Table 15. Profile of the Engineering Review Sample by Measure Type

Measure Type	Sample (count, kWh, kWh%)			Population kWh		Sampled kWh %
	Count	kWh	kWh%	kWh	kWh%	
New T5/T8 Fixture	49	25,216,660	58%	47,894,934	53%	53%
Delamp 4' with or w/o reflector	27	3,083,980	7%	7,644,412	8%	40%
Integral CFL	24	3,835,425	9%	7,191,795	8%	53%
Occupancy Sensor Lighting	20	3,850,803	9%	6,399,401	7%	60%
Reduced Wattage T8 (4') and Ballast	17	1,997,543	5%	5,395,722	6%	37%
VSD for HVAC	21	1,858,275	4%	4,516,040	5%	41%
HP T8 (4') and ballast	17	1,141,090	3%	4,337,050	5%	26%
Water Cooled Chiller	1	398,684	1%	1,885,401	2%	21%
HW CFL	3	899,046	2%	1,389,139	2%	65%
Delamp 8' with or w/o reflector	8	333,824	1%	1,209,173	1%	28%
Exit Signs	15	443,574	1%	899,460	1%	49%
Reduced Wattage T8 (4') Lamp Only	3	340,918	1%	646,420	1%	53%
EC Motor	4	141,073	0%	269,285	0%	52%
Metal Halides	2	62,730	0%	206,204	0%	30%
Anti-sweat control system	1	120,600	0%	174,870	0%	69%
Reduced Wattage T8 (8') and Ballast	1	38,778	0%	154,643	0%	25%
Unitary HVAC	0	-	0%	95,732	0%	0%
Cold Cathode	1	15,800	0%	92,767	0%	17%
Room AC	0	-	0%	68,907	0%	0%
PTAC	0	-	0%	32,913	0%	0%
Strip Curtains	0	-	0%	22,240	0%	0%
Vending Controllers	0	-	0%	18,055	0%	0%
Premium Motors	4	2,867	0%	16,822	0%	17%
Ice Makers	0	-	0%	10,038	0%	0%
TOTAL	218	43,781,671		90,571,422		48%

Profile of On-Site Verification Sample

On-site verification was conducted for 16 projects selected from the 80 projects in the engineering review sample. The sites were not randomly selected, but reflected the judgment of the evaluation team to identify projects of high information value to the Prescriptive program. The criteria used to select the projects were:

- **Non-lighting measures:** Projects in any strata that included non-lighting measures were a priority for selection in PY1. Non-lighting measures, particularly chillers and HVAC variable speed drives, have impacts that are dependent on proper installation and have more uncertainty than

lighting. The intention was to gather lessons-learned and reduce savings uncertainty for non-lighting measures.

- **Projects combining T8/T5 fixtures and Occupancy Sensors.** These were targeted because they combine prominent measures in the Prescriptive program and were an important measure in industrial and warehouse business types. The default savings review indicated a need for ComEd specific data on hours of use in warehouse and industrial buildings and occupancy sensor savings.
- **Large projects with high uncertainty:** An on-site visit allows the engineering review team to improve gross savings estimates by conducting a detailed inventory, interviewing the facility operator, and taking performance measurements. The PY1 evaluation budget allowed for 16 site visits, and selecting larger sites allowed us to obtain a better gross savings estimates on a larger proportion of program savings.

Table 16. Projects Selected for On-site Visits

PJ_ID	Ex Ante kWh	Ex Ante kW	Business Type	Strata	Reason for Site Visit
10	1,066,372	256.1	Light Industry	1	T8/T5 plus occupancy sensors
45	1,917,839	423.1	Retail/Service	1	Large lighting: mall
78	306,187	72.9	Light Industry	2	T8/T5 plus occupancy sensors
84	909,463	215.7	Office	1	Motors, VSDs, Lighting
117	1,238,589	305.4	Heavy Industry	1	T8/T5 fixtures
131	869,489	191.1	Warehouse	1	T8/T5 plus occupancy sensors
135	1,476,510	304.1	Warehouse	1	T8/T5 plus occupancy sensors
148	1,178,062	242.2	Warehouse	1	T8/T5 plus occupancy sensors
177	3,056,660	736.9	Heavy Industry	1	T8/T5 plus occupancy sensors
178	506,100	52.5	Office	2	VSD for HVAC
185	214,490	22.3	Office	3	VSD for HVAC
425	27,715	2.9	Office	3	VSD for HVAC
438	1,826,739	383.0	Warehouse	1	T8/T5 plus occupancy sensors
477	513,225	104.7	Warehouse	2	T8/T5 fixtures
767	398,684	44.9	Medical	2	Water Cooled Chiller
801	201,957	10.0	Grocery	3	Refrigeration
TOTAL, On-sites	15,708,081	3,368	16 Projects		These 16 projects comprise 17% of program savings
TOTAL, Engr Review	43,781,671	8,842	80 Projects		
On-sites, % of Engr Review	36%	38%	20%		
Multiple attempts to schedule visit failed, site removed from list and replaced with alternates:					
211	423,647	94.1	Retail/Service	2	Retail lighting
126	1,184,582	284.4	Heavy Industry	1	Large lighting: T8/T5 plus occupancy sensors
143	1,677,078	399.1	Heavy Industry	1	Large lighting: T8/T5 plus occupancy sensors
697	750,880	52.0	Retail/Service	1	VSD for HVAC

2.3.2 CATI Phone Survey

A CATI telephone survey was conducted with a stratified random sample of 95 Prescriptive Program participants. This survey focused on questions to estimate the gross and net program impacts and to support the process evaluation. All CATI surveys were completed by Opinion Dynamics Corporation (ODC) in late August and early September of 2009.

The CATI survey was directed toward unique customer contact names drawn from the tracking system for PY1 paid Prescriptive projects. The survey assessed all of the parameters necessary to calculate PY1 free-ridership, and supported gross savings analysis by collecting self reported data for end-use hours of operation and characterization of removed and installed equipment. Additional data was collected to support the process evaluation (such as program design and implementation, program marketing and awareness, customer satisfaction), a qualitative assessment of spillover, and business demographics for the process component of the evaluation. The CATI survey instrument used for this evaluation is included in Appendix 5.1.2.

Sampling

The CATI phone survey drew a sample from the Prescriptive program population to achieve a minimum of 80 completed phone interviews. An important difference between the phone survey and engineering review is that the phone survey must target unique contact names to avoid a burden on the respondent of discussing multiple projects. Many businesses submitted projects for multiple locations (e.g. chain stores) and listed a single contact person for all projects. These duplicates had to be removed from the sample.

Starting with the population of all projects with Prescriptive measures, projects with duplicate contact names were removed, as were customer contacts without phone numbers, and contacts for combined Custom and Prescriptive projects that were being targeted by the Custom phone survey. Given the smaller population of Custom projects, the Custom program was given priority for calling combined project contacts.

The stratified approach from the engineering review sample was retained. Stratified sampling weights were applied in the net-to-gross estimate. The evaluation team concluded that an un-weighted analysis provided the best representation for process results.

Survey Disposition

Table 17 below shows the final dispositions of the 346 unique participants in the Prescriptive Program. As this table shows, contact with all but 15% of the sample was attempted at least once, and these contacts resulted in 95 completed surveys. The survey center was unable to make contact with 35% of contacts for a variety of reasons including: no one answered the phone, an answering machine picked up, or the phone line was busy. The phone numbers provided for 5% of the sample had problems such as being disconnected, blocked, or an incorrect number.

Overall, the response rate for this survey was 37%, computed as the number of completed surveys divided by the number of eligible respondents.⁶

Table 17. Sample Disposition

Sample Disposition	Customers	%
Population of Unique Customers	346	100%
Completed Survey	95	27%
Not Dialed / Moved to Custom Sample	52	15%
Unable to Reach	120	35%
Non-Specific Callback/Appointment Scheduled	28	8%
Refusal	17	5%
Phone Number Issue	17	5%
Knowledgeable Person No Longer There/Not Available	8	2%
Could Not Confirm Participation	4	1%
Mistakenly Reported Survey Done Online	3	1%
Project Not Complete	2	1%

Source: ODC CATI Center

Profile of Survey Respondents

Over 70% of survey respondents represent one of four business sectors: industry/manufacturing (30%), warehousing/distribution (17%), offices (15%), or retail/service (10%). This distribution is similar to that of all 346 companies that participated in the Prescriptive Program in PY1. Table 18 presents the comparison of business sectors for survey respondents and the population of participants.

Table 18. Business Sector of Survey Respondents

Sector	Survey Respondents (n=93)	Population (N=346)
Industry/Manufacturing	30%	36%
Warehouse/Distribution	17%	17%
Office	15%	19%
Retail/Service	10%	8%
Medical	8%	4%
Other	20%	15%

Source: PY1 Participant Survey.

⁶ Eligible respondents include the following dispositions: a) Completed Survey, b) Unable to Reach, c) Non-Specific Callback/Appointment Scheduled, and d) Refusal.

About half of respondents who occupy the facilities at which the prescriptive projects were installed consider themselves medium-sized facilities compared to other companies in their industry; 32% consider themselves large, and only 17% consider themselves small.

Table 19. Size of Company Compared to Other Companies in the Same Industry

Size of Company	Percent of Participants who Occupy Facility (n=90)
Small	17%
Medium	49%
Large	32%
Don't know	1%

Source: PY1 Participant Survey.

3 PROGRAM LEVEL RESULTS

This section presents the results of the impact and process evaluations of the Business Prescriptive program.

3.1 Impact

3.1.1 Verification and Due Diligence

This section provides a summary of the results of Task 3 – Verification and Due Diligence. Under this task, we explored the quality assurance and verification activities currently carried out by program and implementation staff. We compared these activities to industry best practices⁷ for similar Business programs to determine:

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

This assessment primarily relied on in-depth interviews with program and implementation staff and documentation of current program processes, where available.

The complete report on this task is provided in Appendix 5.2.2. The report includes a summary of key quality assurance and verification activities currently conducted by ComEd's Smart Ideas for Your Business programs and recommendations for improvement; an overview of data collection activities carried out for this task; and detailed findings on current quality assurance and verification activities by the program. The summary and recommendations section of the report is copied below.

Summary and Recommendations Business Prescriptive Program

Overall, ComEd's quality control and verification procedures for the Business Prescriptive and Custom Incentive Programs are rigorous and ensure high quality projects and tracking data. In particular, the programs are strongest in the area of post-inspection and access to project documentation in electronic format. Suggested improvements focus on the technical review at the pre-approval stage, maintaining accurate measure quantities in the tracking system throughout the various stages of project completion, verifying qualifying specifications, and potentially refining sampling practices for inspections.

⁷ See the Best Practices Self Benchmarking Tool developed for the Energy Efficiency Best Practices Project: <http://www.eebestpractices.com/benchmarking.asp>.

Table 20 summarizes the quality assurance and verification activities currently carried out by the Business Prescriptive and Custom Programs. It also features recommended changes to current procedures, as well as suggestions regarding additional activities that ComEd could implement to enhance current quality assurance and verification.

Table 20. Summary of QA Activities in Place and Recommendations

QA Activities in Place	Recommended Changes
<p>Pre-Approval</p> <ul style="list-style-type: none"> • Eligibility and completeness checks • Technical review • Pre-inspections 	<p>Pre-Approval</p> <ul style="list-style-type: none"> • Revise procedures for technical review, pre-inspection, and tracking system data entry to minimize adjustment of incentives at final approval stage. • Consider adding screening procedures to reduce free-ridership. • Revise eligibility and completeness check for lighting to ensure that lamps and ballasts (if part of measure) meet all required qualifying specifications. • For prescriptive HVAC measures, develop a consistent approach for entering tracking system data on equipment type, make, and model. • For custom projects, consider an enhanced pre-review of the appropriate baseline. • After the pre-inspection, include a consistency check on measure quantities between pre-review, pre-inspection, and the tracking system.
<p>Final Approval</p> <ul style="list-style-type: none"> • Eligibility and completeness checks • Engineering review • Post-ins • Inspections 	<p>Final Approval</p> <ul style="list-style-type: none"> • Consider post-inspections for contractors new to the program and for a random selection of projects by measure type • Revise eligibility and completeness check for lighting to ensure that lamps and ballasts (if part of measure) meet all required qualifying specifications • Ensure that tracking system quantities match final approval and post-inspection. • For occupancy sensors, confirm both the number of fixtures and lamps per fixture controlled.

3.1.2 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. This level of access and documentation is highly commendable for a first-year 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 were some instances of inconsistency regarding field names and data input. Both must be consistent or the data may not be properly analyzed if the evaluation team does not catch the inconsistency.

When pulling 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.

The other major consistency issue is the data entered into the dataset. For numerical values it is vital that all the values have the same unit measure such as kWh vs. MWh. For character values such as names of organizations and personal names, there is a need to be consistent or they will not be accurately analyzed.

We did not find any Prescriptive savings data in the tracking system that we judged to be outliers. There were a few missing values in unitary HVAC that could have affected the impact evaluation had the evaluation team not recognized the issue. There were also inconsistencies observed in unitary HVAC measure data entry. ComEd should develop a consistent approach for entering energy equipment type, make and model information for unitary HVAC equipment. Data entry for all HVAC measures should be reviewed.

There were also some instances of inconsistency between the default values documentation and the database lookup tables.

3.1.3 Default Savings Review

With only a few exceptions, ComEd's default savings values, both kW and kWh, are well documented, reasonable, and conservative in the savings they claim. In the engineering project review process for the PY1 gross impact evaluation, we found reason to increase energy savings for many of the installed measures. It was necessary for ComEd to rely heavily on secondary data for PY1, much of it from California, so we believe that research and evaluation in Illinois targeting key assumptions would improve the default savings values for use in ComEd service territory.

One exception worth noting is the full load cooling hours assumed for HVAC measures. We believe they overstate the energy savings from cooling efficiency improvements in ComEd service territory and should be revised. Default savings for permanent lamp removal (delamping), although well documented and not necessarily overstating or understating the savings, has in our opinion too much uncertainty and should be revisited during PY2 after reviewing PY1 results.

Finally, we have identified several instances where we believe a math error or typo occurs in the documentation that should be corrected – in some cases the error carries over into the tracking system lookup tables, in other instances the tracking system contains the corrected values. When we encountered

a ComEd default value in the engineering file review process that we concluded contained an error, the savings for the measure were adjusted.

Our preliminary review of default savings values as documented in Appendix A of the program operations manual was sent to ComEd on June 17, 2009. An updated version of that review is provided in Appendix 5.2.4. Below is a summary of key observations, issues and recommendations from the default review:

Crosscutting issues

- Most of the ComEd measure-level default savings vary by “business type” selected on the application form, while default savings in the documentation vary by “building type.” Responses from the phone survey suggest that some participants may select a business type on the application form that does not match the building type that set default savings (e.g., selecting a warehouse business type for a company office space project). Table 21 below compares tracking system business type to responses given by the phone survey respondents when asked about the business sector of the facility where the equipment was installed.
- Early participants targeted by trade allies were likely to have higher lighting hours of use than the averages ComEd has borrowed from California. The PY1 evaluation efforts have found significantly longer hours of use in many building types than the defaults.
- Default lighting operating hours for industrial, warehouses, and hotel/motel are reasonable but not well supported, and should be a priority for improvement.
- The use of DEER as a starting data source for coincidence factors is reasonable, and we support case-by-case revisions for specific buildings types when a solid case can be made for an alternate source, or as Illinois data becomes available.
- We recommend a set of HVAC interaction factors that are specific to Illinois be developed.
- ComEd often uses un-weighted averaging when combining multiple assumptions into a single default value. A weighted average approach based on program participation profile and characteristics for ComEd customers would be a better method of combining data values. A simple average is acceptable for calculating initial default values entirely from secondary data, but should be revisited in future years as local data becomes available.

Lighting

- There are several sources of significant uncertainties in the default savings values for the “permanent lamp removal” measure (delamping). We recommend updating this default value in PY2 based on evaluation findings and program experience from PY1.
- Lighting default values make assumptions about the base fixture types and wattages that are reasonable for PY1 but need to be confirmed through market research, program results, and evaluation M&V.
- There are math errors in the savings table entries for reduced wattage eight foot T8 lamps and metal halide fixtures.
- ComEd should consider using separate demand and energy savings fractions for occupancy sensors, and revisit occupancy off rates after EM&V results.

Cooling

- Throughout the cooling section, the cooling equipment run time and kWh usage are based on a percentage of lighting hours of operation. There are no technical references provided for using that approach, and the percentages of lighting hours have no supporting documentation. We

would recommend that ComEd seek out literature on estimated run time hours for cooling instead of basing it on lighting hours, or use a bin analysis. As one alternative, the 2007 ASHRAE Handbook lists equivalent full load cooling hours for Chicago, based on a 2000 study by CDH Energy (Chapter 32).

- We believe there is math error (wrong value) in the calculation of impacts for unitary HVAC that overstates impacts for units over 5 tons by about 14%.
- Compared with default values in other states, ComEd has used conservative (low) coincidence factors and redundancy factors (redundancy accounts for unit oversizing and installing excess cooling capacity that will not operate at full load; many default savings databases do not account for this but we recommend including it).
- We believe the estimate of 988 cooling full load hours for PTAC/HP units in the hotel/motel sector will greatly overstate the impacts from their common application in guest units.
- We believe the installation of a variable speed drive on an existing chiller should be a custom measure.
- The assumption of 19% energy savings for HVAC VSDs and the resulting average energy savings of 371 kWh per HP are conservative (low) values. The savings are built up from undocumented assumptions and should be revisited in PY2.

Refrigeration

- The application of DEER weather sensitive data from even northern California to Illinois is problematic. Wet bulb temperature is much higher in Illinois than in Northern California most of the time. Midwest sources should be explored for default savings values.
- The default savings values, assumptions and algorithms are acceptable for the near term but should be improved over time using information that may be available from EM&V results, market research, and program experience.

Motors

- Instead of using motor horsepower to determine operating hours, the operating hours could be determined by gathering basic information through the application form. A better default value for load factor and coincident demand might also be obtainable through this method if the participant is asked to identify the motor application.

Table 21 below compares the business type taken from the application form and entered in the tracking system to answers given by the phone survey respondents when asked about the business sector of the facility where the equipment was installed. Approximately one-third of the responses indicated a difference compared with the tracking system. The most frequent differences showed up in warehouses.

Table 21. Comparison of Tracking System Business Type with Phone Survey Responses

Tracking System Business Type	Survey Response (N = 95)										
	Same	Diff.	Survey Response if Different from Tracking System								
			Retail / Svs	Office	Ware house	Light Ind.	Hvy. Ind.	Other Mfg.	Other Spec. Don't Know	Med	Hotel / Motel
Office	17	4	1		1			1		1	
K-12 School		0									
College / Univ.		0									
Retail /Service	3	2				1					1
Rest.		0									
Hotel /Motel		0									
Medical	5	0									
Grocery		1	1								
Warehouse	10	11	3	1				4	3		
Heavy Industry	6	2			2						
Light Industry	18	6	1		3		2				
Misc.	5	5		1		1		2		1	
Total	64	31	6	2	6	2	2	7	3	2	1

3.1.4 Gross Program Impact Parameter Estimates

Michaels Engineering conducted an engineering review of all 218 measures within the 80 projects that were selected in the gross savings review sample for PY1. For each measure in the sample, Michaels' engineers attempted to reproduce the ex ante savings reported in the tracking system (kWh and kW), drawing upon the default savings assumptions in Appendix A of ComEd's program operations manual. Michaels engineers then calculated an adjusted gross savings for each measure (kWh and kW) drawing upon multiple sources of data. A gross savings realization rate for each of the three strata was calculated from the sampled measures, and then applied to the remainder of the population by strata.

The following data sources were used in making gross impact adjustments to reported measure tracking savings:

- a. Awareness of issues with the potential to affect impacts identified through the default savings and tracking system reviews (e.g., cooling load full load hours, accounting for savings when delamping is combined with lamp rebates in the same retrofit, etc.).
- b. Review and application (if appropriate) of impact data from the participant phone survey (reported hours of use, reported baseline equipment characteristics) to projects that were also in the engineering review sample.
- c. Engineering review and analysis of measure savings based on project documentation and tracking system data, supported by standard engineering methods and sources (e.g., ASHRAE data and algorithms).
- d. On-site verification consisting of inventory audits, customer interviews, and performance measurement at 16 project sites selected from the engineering review sample. Performance measurements included spot measurements and run-time hour data logging for selected measures.

Michaels Engineering created an Access database to record their adjustments for each measure reviewed. The database includes project and measure data pulled from ComEd’s tracking system, and adds fields including commentary on the ex ante savings calculation, a description of the ex post adjustments and findings from the site visit (if done), phone survey reported hours of use (if a respondent), checkboxes to record common reasons for adjustment, and ex ante and ex post kW and kWh.

The checkboxes for adjustment include inappropriate assumption, tracking difference (including difference in unit counts), calculation error, and operating difference (include hours of use adjustments). These reasons are recorded for file review and on-site ex post adjustments, and are summarized in Table 22 below.

Table 22. Reasons for Engineering Adjustments

Reason Cited for Adjustment	Adjustments to Ex Ante Savings, File Review and On-Sites (218 measures reviewed, 196 measures adjusted)
Inappropriate Assumption	32
Tracking Difference	54
Calculation Error	12
Operating Difference	84
Other	14

It is worth noting that the reasons for adjustment in Table 22 apply when savings are overstated or understated, such as when an assumption is conservative (“Inappropriate Assumption”) and the adjustment increases savings.

Within each project reviewed, individual measures may have savings adjusted up, down, or kept the same. Table 23 below provides a count of the number of measures that had savings adjusted upward, downward, or kept the same.

Table 23. Evaluation Adjustments to Tracking Savings from File Review and On-Sites

Type of Evaluation Adjustment to Measure-Level Tracking Savings	Number of Measures with Adjustments to Tracking Savings File Review or On-Sites (218 measures reviewed)	Number of Measures with Adjustments to Tracking Savings On-Site M&V only (57 measures reviewed)
Adjusted downward	68 (31%)	20 (35%)
No change	22 (10%)	3 (5%)
Adjusted upwards	128 (59%)	34 (60%)

Hours of Use Impact Adjustments

As noted in the default savings review, significant hours of use adjustment was anticipated in the evaluation. Through use of data from the phone survey, engineering review and on site visits, many of the lighting measures received significant hours of use increases relative to default assumptions. Table 24 compares default hours of use by building type for non-CFL lighting with data collected through the impact evaluation.

Table 24. Results from Phone Survey Hours of Use Question Module

Business Type	Default Non CFL Annual Lighting Operating Hours	Un-weighted Average			kWh Weighted for Projects also in Engineering File Review	
		Count	Hours	Ratio vs. Default	Count	Hours
Office	2,808	19	4,254	1.52	6	3,543
K-12 School	1,873	0		-		
College / University	3,433	0		-		
Retail/Service	4,210	4	6,636	1.58		
Restaurant	5,278	0		-		
Hotel/Motel	4,941	0		-		
Medical	6,474	5	5,842	0.90	1	8,760
Grocery	5,824	1	4,437	0.76		
Warehouse	4,160	21	6,129	1.47	9	6,777
Heavy Industry	4,290	7	6,179	1.44	4	5,426
Light Industry	4,290	22	4,910	1.14	6	7,331
Miscellaneous	4,325	10	6,312	1.46	3	4,589
Average	4,326	89	5,439	1.26	29	

It is significant that business types with the greatest contribution to program savings (warehouse, industry, office and retail) show significantly higher operating hours of use than ComEd has used in default assumptions.

The on-site visits (not a random sample) found longer hours of use compared with the default assumptions for key building types. The un-weighted average for warehouse lighting measures was 5,755 hours, and for light industrial it was 7,846 hours, while all the heavy industrial projects were 8,760 hours.

Key Adjustments from the On-Site Visits

Data collected on 57 measures at 16 on-sites resulted in a significant increase to verified gross savings (24,607 MWh ex post versus 15,708 MWh ex ante for the 16 sites). The gross realization rates ranged from 0.00 to 6.80 for individual measures, with 20 measures having savings adjusted downward, 34 measures adjusted upward, and 3 remained the same. In addition to the common finding of verified hours of use being higher than the default assumptions, occupancy sensors and HVAC VSDs were two measures that had significant upward adjustments in savings as a result of the site visit.

Occupancy sensor measures were evaluated at 8 sites using customer interviews and lighting loggers to verify both the annual hours of use and the off time. For the eight measures the combined the gross realization rate was 1.40 (2,902 MWh ex post, 2,080 MWh ex ante). Six of the measures provided higher savings, while 2 provided lower energy savings. Five of the sites measured off time at greater than 60%.

There were 14 HVAC VSD measures verified at 4 office sites, installed on fans and pumps. The combined gross realization rate for these measures was 2.76 (3,057 MWh ex post, 1,107 MWh ex ante). Only two of the 14 measures had impacts reduced.

As noted in the default review, ComEd had used relatively conservative savings assumptions, and two of the sites were large installations with significant opportunity. The hours of operation observed were significantly greater than the hours presented in the default assumptions. This is in part due to the default assumption used that the average hours of operation for an HVAC fan/pump would be 70% of the lighting hours of operation for a similar type of building. HVAC systems often run longer, when people *could be* in the facility and lights are off.

Realization Rates for the Engineering Review Sample

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.⁸ 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.

When sample sizes are small within each stratum, Cochran recommends using a combined ratio estimator. Since the sample sizes are 27, 27, and 26 within each stratum in this study, a separate ratio estimation technique was used to estimate verified gross kWh savings for the Prescriptive program.⁹

⁸ A full discussion and comparison of separate vs. combined ration estimation can be found in [Sampling Techniques](#), Cochran, 1977, pp. 164-169.

⁹ As described in Section 2.3.1, the engineering review sample was stratified by project size, where project size is defined as the sum of all ex ante kWh for Prescriptive measures installed within a project (as defined by unique project IDs assigned by ComEd). Projects were sorted from largest to smallest Prescriptive kWh, and placed into one of three strata that each contained one-third of the program total kWh. Thus, the 27 largest projects comprising one-third of program savings were assigned to “strata 1,” the 74 next largest were assigned to “strata 2,” and the smallest 354 projects were assigned to “strata 3.”

The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework. These steps are matched to the stratified random sampling method that was used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of verified gross kWh. The results are summarized in Tables 25, 26, and 27 below.

The realization rates for demand savings are much less than energy, 1.03 versus 1.33, because the main effects from the energy realization rates were an increase in hours of use estimates. To achieve a relative precision of ± 10 or less for the demand realization rate, the engineering review sample would need to expand beyond the 218 measures to cover an additional 10 to 15 measures in stratum 2 or stratum 3.

Table 25. Realization Rates for the Engineering Review Sample

Stratum	kWh, Ex Ante	kWh, Ex Post	kWh RR	kW, Ex Ante	kW, Ex Post	kW RR
Stratum 1	29,950,231	42,692,783	1.43	6,094	6,232	1.02
Stratum 2	11,011,120	14,427,450	1.31	2,196	2,325	1.06
Stratum 3	2,820,320	3,549,172	1.26	552	551	1.00

Table 26. kWh Realization Rates and Relative Precision at 90% Confidence Level

Stratum	Relative Precision \pm %	Low	Mean	High
Stratum 1	-	1.43	1.43	1.43
Stratum 2	10%	1.19	1.31	1.44
Stratum 3	15%	1.07	1.26	1.45
Total kWh RR	8%	1.23	1.33	1.44

Table 27. kW Realization Rates and Relative Precision at 90% Confidence Level

Stratum	Relative Precision \pm %	Low	Mean	High
Stratum 1	-	1.02	1.02	1.02
Stratum 2	12%	0.93	1.06	1.19
Stratum 3	20%	0.80	1.00	1.19
Total kW RR	11%	0.91	1.03	1.14

3.1.5 Gross Program Impact Results

Based on the gross impact parameter estimates described in the previous section we estimated the gross program impacts resulting from the PY1 Prescriptive program. The results are provided in Tables 28.

Table 28. Gross Parameter and Savings Estimates

Stratum	kWh, Ex Ante	kWh, Ex Post	kWh RR	kW, Ex Ante	kW, Ex Post	kW RR
Stratum 1	29,950,231	42,692,783	1.43	6,094	6,232	1.02
Stratum 2	30,276,667	39,670,361	1.31	6,162	6,525	1.06
Stratum 3	30,344,524	38,186,423	1.26	6,637	6,614	1.00
Total	90,571,422	120,549,567	1.33	18,893	19,370	1.03

3.1.6 Net Program Impact Parameter Estimates

Once gross program impacts have been estimated, net program impacts are calculated by multiplying the gross impact estimate by the Program Net-to-Gross (NTG) ratio. As mentioned above, the NTG ratio for the PY1 Prescriptive 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). Once this parameter has been estimated, the PY1 NTG ratio is calculated as:

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

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

Free-ridership

The customer self-report method uses participant phone survey data and the algorithm outlined in Section 2.1.2 to calculate the following three scores for each respondent (on a scale of 0 to 10 where 0 equals a full free-rider and 10 equals a non free-rider):

- A **Program Components** score that reflects the influence of the most important of various program and program-related elements in the customer’s decision to select specific program measures at this time.
- 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. Free-ridership diminishes as the timing of the installation without the program moves further into the future.

The customer-level free-ridership is equal to:

$$\text{Customer-level Free-Ridership} = 1 - \frac{(\text{Program Components} + \text{Program Influence} + \text{No-Program})}{30}$$

The Net-to-Gross ratio is equal to:

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

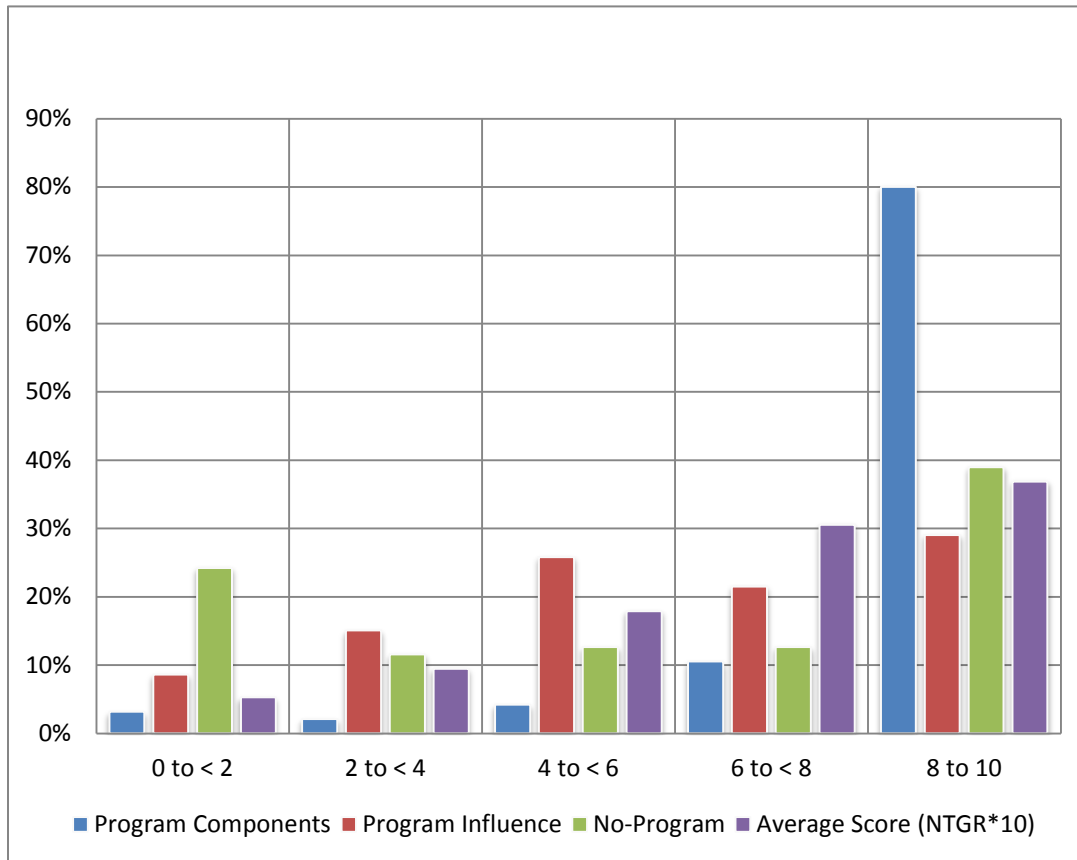
Or,

$$\text{NTG Ratio} = \frac{\text{Average of Scores (Program Components, Program Influence, No-Program)}}{10}$$

We calculated the three free-ridership scores and a NTG ratio for each of the 95 completed phone surveys. The distribution of project-level scores is shown in Figure 1. A few observations:

- The Program Components score was between 8 and 10 for 80% of the respondents (n=76). This indicates one or more program components (availability of the program rebate, recommendation from program staff, information from utility or program marketing materials, or endorsement or recommendation by a utility account rep) had a strong influence on the participant, increasing the NTG ratio.
- The No-Program score had the highest percentage of respondents that tended toward full free-ridership – 23 of the 95 respondents had a score between 0 and 2. This result can be paraphrased as customers who report they would be very likely to have installed exactly the same equipment at exactly the same time (or within 6 months) in the absence of the program.
- The Program Influence score had 49% of respondents with a score of 6 or less (n=46). The response data identified 13 respondents who reported learning about the program AFTER they had decided to implement the measure, causing their reported program influence score to be cut in half.
- The average of the three free-ridership scores is equal to 10 times the NTG ratio. The average score for 35 of 95 respondents (37%) was in the range of 8 to 10 (a NTG ratio of 0.8 to 1.0). Another 29 respondents (31%) had a score between 6 and 8, so that 68% had average scores of 6 or greater (NTG ratio of 0.6 or greater).
- Of the roughly one-third of projects with an average score below 6 (NTG ratio less than 0.6), low No Program and Program Influence scores are primary reason. As described above, low scores in these two categories can be traced to two issues:
 - Respondents who learned about the program after they decided to implement the measure, and
 - Respondents who claimed they would have installed exactly the same equipment at the same time in the absence of the program.

Figure 1. Distribution of Project-level Free-ridership Scores



Contacts with duplicate projects were asked if other projects within the same end use used the same decision process as the project they had just responded to in the net-to-gross questions. A total of 6 respondents indicated they each had one additional project within the PY1 Prescriptive program involving the same end-use that used the same decision process. The NTG scores calculated for the sampled project were applied to the additional projects, which all fell into strata 3. One respondent had measures in multiple end-uses within the project. This person responded that the other end-use followed the same design process, so the entire savings of that project was included in the weighting analysis.

Table 29 below shows the distribution of the 95 survey participants across the three strata, along with the analysis weights for the population estimate.

Table 29. Respondents and Analysis Weights by Strata.

Strata	Respondents	Projects included in Population Analysis	Weights for Population Analysis
Strata 1	11	11	0.331
Strata 2	18	18	0.334
Strata 3	66	72	0.335
Total	95	101	1.000

The individual project level responses were combined into a program level estimate of the NTG ratio by first weighting responses within each of the three strata to obtain a NTG ratio for the strata, and then applying the strata weights for the population (i.e., roughly one-third weighting for each of the three strata) to obtain a population estimate. Weighting was done with project-level ex ante kWh savings. Table 30 provides a summary of the scoring by strata and for the population.

Table 30. NTG Ratio Scoring Summary

NTG Ratio Scoring by Strata					
	Weights for Population Level Analysis	Program Components Score	Program Influence Score	No-Program Score	Final NTG Ratio Score
Strata 1	0.3307	0.87	0.51	0.40	0.59
Strata 2	0.3343	0.92	0.66	0.57	0.72
Strata 3	0.3350	0.89	0.60	0.68	0.73
Population	1.0000	0.90	0.59	0.55	0.68

The relative precision at a 90% confidence level is provided in Table 31.

Table 31. NTG Ratio and Relative Precision at 90% Confidence Level

Stratum	Relative Precision ± %	Low	Mean	High
Stratum 1	13%	0.52	0.59	0.67
Stratum 2	9%	0.65	0.72	0.78
Stratum 3	5%	0.69	0.73	0.76
Population	9%	0.62	0.68	0.74

Spillover

A quantification of spillover was not included in the calculation of NTG ratio for PY1. The phone survey was designed to identify evidence of spillover, and if so, did it appear significant enough to attempt to quantify it in future evaluations. The evidence of spillover for lighting is summarized in Table 32 below.

Table 32. Evidence for Spillover for Lighting in PY1

Spillover Question for Lighting	Evidence of Spillover
Since June 2008 have you purchased and installed any energy efficient lighting equipment WITHOUT an incentive from the Smart Ideas for Your Business program or another utility program?	Of 85 participants that responded to this question, 33 said “Yes” (39%): (19) the same facility, (8) a different facility, or (6) both.
On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much did your experience with the Smart Ideas for Your Business program influence your decision to install high efficiency lighting equipment on your own?	Of the 33 respondents who answered “Yes,” 17 reported a program influence score of 7 or higher. This is 20% of the 85 total respondents (17/85).
Why did you purchase this lighting equipment without the financial assistance available through the Smart Ideas for Your Business program?	For those reporting program influence 7 or greater: Program out of funds (2 responses) Too much paperwork (2 responses) Cost or energy savings (4 responses) Replacement equipment (2 responses) In another state (2 responses)
What type of lighting equipment was installed without an incentive?	(7) Linear fluorescent (2) HIDs (1) Lighting Controls Project IDs 73, 93, 226, and 721 identified T8 and T5 lighting in open ended responses, had an average spillover influence scores of 8 or 9, and an average NTG ratio of 0.71 in their rebated projects.

The results of the phone survey suggest an effort to quantify spillover be included in the PY2 evaluation. Options to consider include more detailed surveys and on-site visits.

3.1.7 Net Program Impact Results

The program level net savings were calculated by first assigning a NTG ratio to each measure in the program – either the actual value calculated from the phone survey data for respondents or the mean value for the strata for the non-respondents. For example, a NTG ratio of 0.59 was assigned to each of the 16 projects of strata 1 that did not provide a response to the phone survey, while the respondents in strata 1 were assigned their calculated values that ranged from 0.17 to 0.93. Net program impacts were derived by multiplying verified gross savings by the estimated NTG ratio for each measure in the program, and summing the net savings.

Table 33 provides the program-level evaluation-adjusted net impact results for the PY1 Prescriptive program. The chained realization rate (gross RR * NTG Ratio) is 0.89 for kWh, and 0.70 for kW.

Table 33. Program-Level Evaluation-Adjusted Net kWh Impacts for PY1

By Strata	Ex Ante Gross kWh	Ex Post Gross kWh	Realization Rate	Net kWh	NTGR (ex post gross)
Strata 1	29,950,231	42,692,783	1.43	24,963,851	0.58
Strata 2	30,276,667	39,670,361	1.31	28,190,252	0.71
Strata 3	30,344,524	38,186,423	1.26	27,777,532	0.73
Program	90,571,422	120,549,567	1.33	80,931,636	0.67

Table 34. Program-Level Evaluation-Adjusted Net kW Impacts for PY1

By Strata	Ex Ante Gross kW	Ex Post Gross kW	Realization Rate	Net kW	NTGR (ex post gross)
Strata 1	6,094	6,232	1.02	3,669	0.59
Strata 2	6,162	6,525	1.06	4,681	0.72
Strata 3	6,637	6,614	1.00	4,816	0.73
Program	18,893	19,370	1.03	13,166	0.68

Table 35. Program-Level Evaluation-Adjusted Net kWh Impacts for PY1

By End Use	Ex Ante Gross kWh	Ex Post Gross kWh	Realization Rate	Net kWh	NTGR (ex post gross)
Lighting	83,461,120	110,155,743	1.32	73,767,540	0.67
HVAC	6,598,992	9,851,596	1.49	6,770,708	0.69
Refrigeration	494,488	521,752	1.06	378,940	0.73
Motors	16,822	20,475	1.22	14,449	0.71
Program	90,571,422	120,549,567	1.33	80,931,636	0.67

Table 36. Program-Level Evaluation-Adjusted Net kW Impacts for PY1

By End Use	Ex Ante Gross kW	Ex Post Gross kW	Realization Rate	Net kW	NTGR (ex post gross)
Lighting	17,971	17,934	1.00	12,192	0.68
HVAC	885	1,403	1.58	950	0.68
Refrigeration	33	31	0.94	22	0.73
Motors	3	3	1.05	2	0.70
Program	18,893	19,370	1.03	13,166	0.68

Table 37. Program-Level Evaluation-Adjusted Net kWh Impacts for PY1

Business Type	Ex Ante Gross kWh	Ex Post Gross kWh	Realization Rate	Net kWh	NTGR (ex post gross)
Office	8,014,954	12,234,345	1.53	8,475,098	0.69
K-12 School	44,619	56,150	1.26	40,797	0.73
College / University	618,831	778,755	1.26	565,827	0.73
Retail/Service	10,550,978	11,304,355	1.07	7,968,335	0.70
Restaurant	380,668	496,190	1.30	356,554	0.72
Hotel/Motel	3,832,239	3,822,999	1.00	2,461,323	0.64
Medical	5,139,398	5,794,857	1.13	3,964,991	0.68
Grocery	2,107,951	2,574,377	1.22	1,953,748	0.76
Warehouse	22,429,024	28,070,864	1.25	19,177,246	0.68
Heavy Industry	13,524,153	24,622,937	1.82	14,572,471	0.59
Light Industry	18,671,670	24,889,035	1.33	17,035,166	0.68
Miscellaneous	5,256,937	5,904,703	1.12	4,360,079	0.74
Program	90,571,422	120,549,567	1.33	80,931,636	0.67

Table 38. Program-Level Evaluation-Adjusted Net kWh Impacts for PY1

Top Measures plus All Others	Ex Ante Gross kWh	Ex Post Gross kWh	Realization Rate	Net kWh	NTGR (ex post gross)
New T5/T8 Fixture	47,894,934	67,662,252	1.41	45,145,597	0.67
Occupancy Sensor Lighting	6,399,401	8,883,968	1.39	5,606,618	0.63
Delamp 4' with or w/o reflector	7,644,412	9,000,581	1.18	6,377,100	0.71
Reduced Wattage T8 (4') and Ballast	5,395,722	6,415,180	1.19	4,556,259	0.71
VSD for HVAC chillers, fans, and pumps	4,516,040	7,199,908	1.59	4,872,499	0.68
All Other Measures	18,720,914	21,387,679	1.14	14,373,562	0.67
Program	90,571,422	120,549,567	1.33	80,931,636	0.67

3.2 Process

The process component of the Smart Ideas for Your Business Prescriptive program evaluation focused on program implementation, program design and processes, marketing and outreach, and participant satisfaction. Data sources for the process component include a review of program materials, a telephone survey with 95 program participants, and five in-depth interviews with program staff and implementers (n=5). Of the 95 respondents to the participant telephone survey, 85 installed lighting measures through the program, while 10 installed HVAC measures.

3.2.1 Program Theory and Logic Model

This section contains the program theory, logic model, and performance indicators of the Smart Ideas for Your Business Prescriptive Program. We created this model using discussions with program management and implementers as well as program documentation. The purpose of program theory and logic models is to serve as:

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

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

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

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

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

Creation of the logic model

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

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

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

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

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

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

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

Expanding the Impact Logic Model

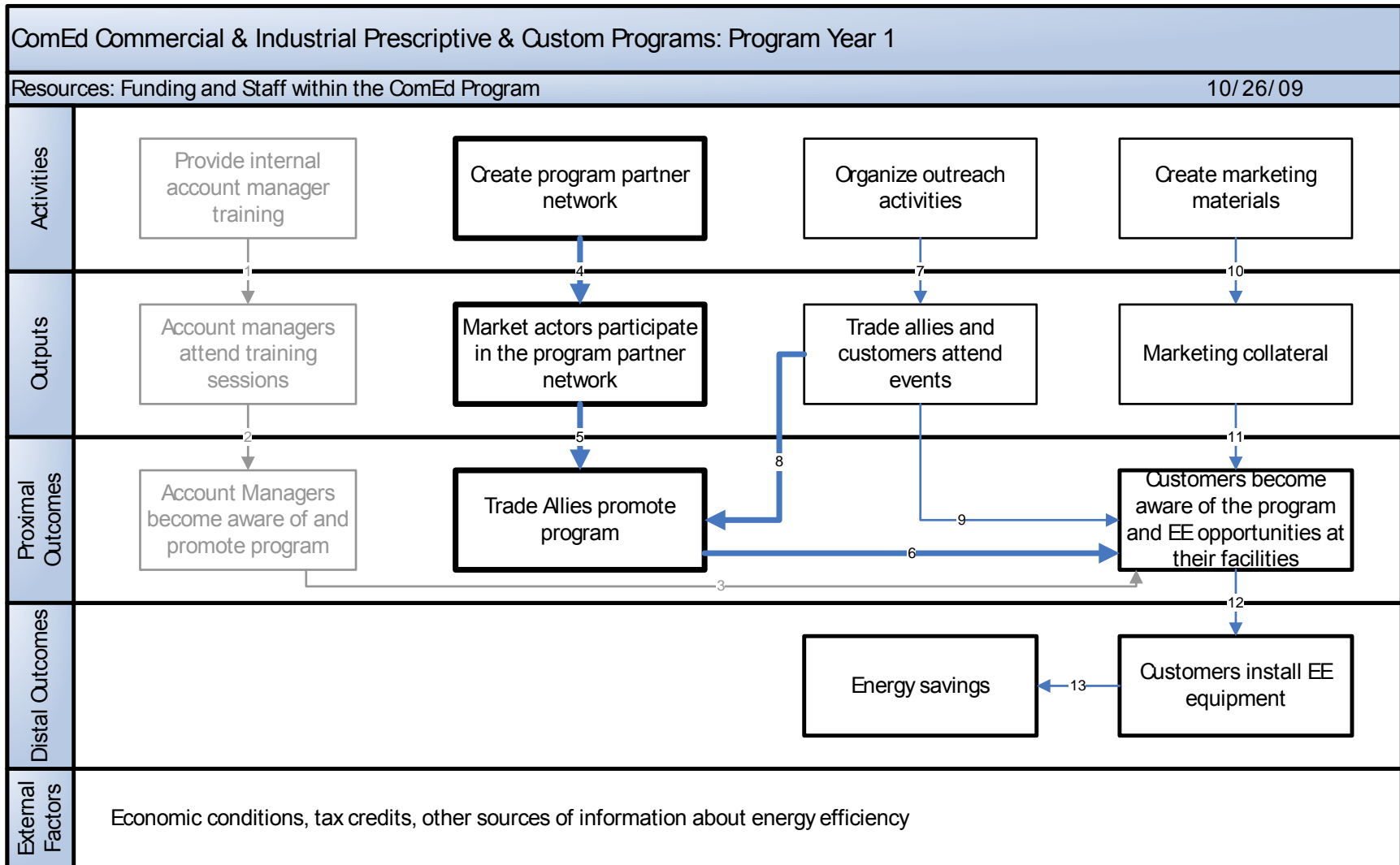
Once the impact logic model was drafted, a table was created that describes the links, the potential performance indicators that could be used to test the link, the potential success criteria that would indicate the link was successful, and potential data sources of the link.

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

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

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

Figure 2. Preliminary Logic Model



Notes: Boxes in light gray shading represent activities that are part of the program design but were not fully implemented in PY1. Thicker lines indicate a greater emphasis of activity in program implementation.

Table 39. Performance Indicators Table

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
1	ComEd provides internal account manager training on program opportunities at staff meetings and monthly lunch and learns.	1. Percent of account managers who participate in training	This activity was not fully implemented in Plan Year 1 as the program was oversubscribed.	Not evaluated in Plan Year 1
2	Training sessions provide pertinent information to account managers. Account managers become familiar with the program and promote it to their customers.	1. Percent of account managers familiar with program 2. Percent of trained account managers who promote the program to their customers	This activity was not fully implemented in Plan Year 1 as the program was oversubscribed.	Not evaluated in Plan Year 1
3	Customers are not aware of the program or the EE opportunities it offers. They learn about the program and the available incentives from their account manager.	1. Percent of customers with account manager who were informed of the program by their account managers	This activity was not fully implemented in Plan Year 1 as the program was oversubscribed.	Not evaluated in Plan Year 1
4	ComEd creates a program partner network to inform trade allies of program opportunities. Information is disseminated through a newsletter and the program website. By having a program partner network, ComEd has a captive audience that can be informed of program opportunities.	1. Percent of market actors aware of the program 2. Percent of market actors aware of the program partner network 3. Percent of Trade Allies that are high quality	1. 50% of market actors are aware of the program 2. 50% of market actors are aware of the program partner network 3. X% of participants who use Trade Allies are satisfied with Trade Allies	1/2. Trade ally interviews - not conducted for PY1 3. Participant survey
5	Trade allies promote the program to their customers.	1. Percent of trade allies who promote the program to their customers	1. 95% of trade allies report promoting the program to their customers	1. Trade ally interviews - not conducted for PY1
6	Customers are not aware of the program or the EE opportunities it offers. They learn about the program and the available incentives from their trade ally.	1. Percent of customers who were informed of the program by their trade ally	1. 25% of customers report having heard about the program from a trade ally	1. Participant & Non-participant surveys (NP survey was not conducted for PY1)
7	ComEd hosts outreach events for customers ("Green Ribbon" kickoffs) and trade allies (trade ally forums and seminars). These events provide a venue for customers and trade allies to find out about program opportunities.	1. Number of customer events 2. Number of customers in attendance 3. Number of trade ally events 4. Number of trade allies in attendance	1. X customer events 2. X customers in attendance 3. X trade ally events 4. X trade allies in attendance	Program documentation
8	The information provided in outreach events increases trade ally awareness and knowledge of the program and allows them to promote it more effectively to their customers.	1. Percent of trade allies who found events informative 2. Percent of trade allies who think event helps them to promote the program's offerings	1. 75% of trade allies who attended an event found it informative 2. 75% of trade allies who attended an event say it helped them promote the program	1. Survey of trade allies who attended an event - not conducted for PY1
9	Customers are not aware of the program or the EE opportunities it offers. They learn about the program and the available incentives through the outreach events.	1. Percent of customers who found events informative	1. 75% of customers who attended an event found it informative	1. Survey of customers who attended an event - not conducted for PY1
10	ComEd creates and distributes marketing	1. Marketing materials are effective	1. Marketing materials provide information	1. Review of marketing materials

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
	materials (including a website, bill inserts and newsletters) that provide information about program opportunities.	2. Number of website hits, bill inserts, and newsletters sent	and contain messages that will induce customers to participate 2. 25% increase in website hits year to year, 2-4 bill inserts, 4 newsletters	2. Program documentation
11	Customers are not aware of the program or the EE opportunities it offers. They view the program marketing materials and learn about the program and the available incentives.	1. Percent of customers who have seen marketing material 2. Percent of customers who found marketing material useful	1. 10% of customers report having seen marketing materials 2. 75% of customers who have seen marketing materials found it useful	1/2. Participant & Non-participant surveys (NP survey was not conducted for PY1)
12	ComEd business customers have not adopted energy efficient equipment because of awareness, information, and cost barriers. The program makes customers aware of EE opportunities and lowers the information cost as well as the up-front cost through the incentive. Customers participate in the program and install EE equipment.	1. Benefits of products offered through the program are recognized by business customers 2. Incentive offered will induce customers to install promoted products 3. Program savings realized	1. 75% of business customers who have seen program material recognize potential benefits of program-targeted measures 2. 75% of customers believe incentives are "good deal" 3. Program reaches target savings goals.	1/2. Participant & Non-participant surveys (NP survey was not conducted for PY1) 3. Program documentation
13	When EE equipment incented through the program is installed, energy savings are realized because the equipment that has been installed is more energy efficient than the equipment that it is replacing.	1. Type of equipment that was replaced 2. Program savings realized	1. 95% of the replaced equipment was less efficient than the installed equipment 2. Program meets is savings goals	1/2. Impact analysis

3.2.2 Participant Profile

In Plan Year 1 (PY1) over 340 customers conducted more than 450 projects that accounted for 81 GWh and 13 MW of net savings. PY1 participants represent a range of business sectors. Light industry, offices, and warehousing are among the top sectors in terms of number of participants and number of projects. Retail/service, while only accounting for 8% of all participants, represents 16% of PY1 projects. Participants in this sector have more projects per participant (an average of 2.5) than other sectors (an average of 1.3), which is mainly the result of multiple projects conducted by national retailers such as Home Depot and Sears. Warehouse (25%), Light Industry (21%), and Heavy Industry (15%) are the sectors with the largest energy savings. Heavy Industry and the Medical sector, while accounting for relatively few participants and projects, tend to have the largest kWh savings per project.

Table 40 summarizes the distribution of PY1 participants, projects, and energy savings by business sector.

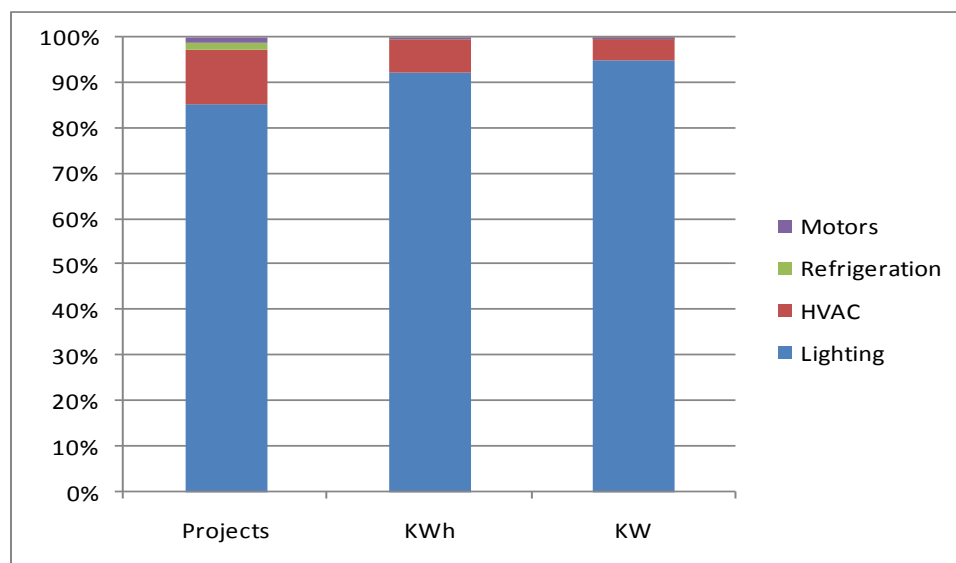
Table 40. Distribution of Participants, Projects, and Savings by Business Sector

	Participants		Projects		KWh Savings		Projects / Participant	kWh / Project
	#	%	#	%	#	%		
Light Industry	93	27%	103	23%	18,671,670	21%	1.1	181,278
Office	67	19%	85	19%	8,014,954	9%	1.3	94,294
Warehouse	60	17%	67	15%	22,429,024	25%	1.1	334,762
Heavy Industry	31	9%	34	7%	13,524,153	15%	1.1	397,769
Retail/Service	29	8%	73	16%	10,550,978	12%	2.5	144,534
Medical	14	4%	15	3%	5,139,398	6%	1.1	342,627
Other	52	15%	78	17%	12,241,245	14%	1.5	156,939
TOTAL	346		455		90,571,422		1.3	199,058

Source: Program Tracking Database.

In PY1, more than 85% of projects, 92% of energy savings, and 95% of demand savings were associated with lighting measures. HVAC measures accounted for 12% of projects, 7% of energy savings, and 5% of demand savings. Few PY1 projects included refrigeration measures or motors, and savings from these two end-use categories accounted for less than 1% of energy and demand savings in PY1 (see also Figure 3). While lighting measures were installed in all business sectors, most of the HVAC measures (including VSD drives) were installed in Offices and Retail/Service.

Figure 3. Distribution of Projects and Savings by End-use



Source: Program Tracking Database.

A majority of participants (74%) report that they own and occupy the facility at which the prescriptive project was installed, while 17% rent their facility. The remaining 9% own the facility but rent it to another company. Nearly half of respondents (49%) report that the facility is their company's only location.

3.2.3 Program Implementation

ComEd's Smart Ideas for Your Business Prescriptive program exceeded its goals for PY1. In fact, the program became oversubscribed in September 2008 and had to waitlist projects after this time. Program implementers attribute the quick oversubscription to a large amount of pent-up demand for the measures incentivized through the program. Because of the oversubscription, the program de-emphasized several marketing activities in PY1, including promotion through Account Managers and direct marketing. Most program promotion in PY1 happened through trade allies, and the implementers laid a strong foundation for a trade ally network that will be useful in future program years once the immediate demand for the program-promoted measures subsides.

Program Oversubscription

While the oversubscription was a mark of success for the program, it also presented a challenge as some customers had to be waitlisted and others were not able to participate in PY1. Program staff therefore had to manage customer expectations for PY1 while at the same maintaining customer confidence and interest in the program for future program years.

This evaluation only included primary research with program participants; interviews with non-participants and trade allies were not conducted for the PY1 evaluation. As a result, the evaluation team could not fully assess how the program handled the oversubscription and communicated it to its customers. Interviews with program participants showed a high level of awareness (63%) that the program was oversubscribed in PY1. Most often participants were informed of this by their Account Manager (23%), a contractor or trade ally (15%), or a supplier/vendor/distributor (13%). Among those participants who were aware of the program oversubscription, only 17% (or 11% of all participants)

report that their participation was impacted by the oversubscription. The main impact on participation was that projects were accelerated to be completed before funding ran out and that additional projects could not be completed or did not receive a rebate.

ComEd Trade Ally Network

During PY1, trade allies were the main channel of promotion and communication for the Prescriptive program. Approximately 160 market actors joined the Trade Ally Network during 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. ComEd trade allies are listed in a searchable directory on the ComEd website and can make use of the ComEd call center and technical staff. In addition, ComEd produced three trade ally newsletters during the second half of PY1. Additional support, planned for future program years, includes a trade ally certificate of participation as well as Smart Ideas decals or stickers that trade allies can display on their vehicles.

Since the PY1 evaluation did not include research with market actors, a formal analysis of the trade ally network was not conducted. However we did review program tracking data and trade ally network documentation, and included a discussion of the trade ally network in our in-depth interviews with program and implementation staff. We also asked program participants about their use of contractors, their contractors' affiliation with the ComEd Trade Ally Network, and their satisfaction with their contractors.

Based on program tracking data, 417 of the 455 PY1 projects (92%) were implemented with contractor support. Overall, 156 unique contractors participated in PY1 projects.¹⁰ Nearly two-thirds of contractors (63%) implemented a single project (24% of contractor projects), while seven contractors (5%) completed 10 or more projects and were responsible for over a quarter of the contractor projects completed in PY1 (see also Table 41). Of the seven contractors with 10 or more program projects, six implemented projects for a variety of customers, showing high levels of program promotion among these market actors.

Table 41. PY1 Contractor Projects

Contractors with...	Number of Contractors	Percent of Contractors (n=156)	Percent of Contractor Projects (n=417)
1 project	98	63%	24%
2 projects	20	13%	10%
3 projects	11	7%	8%
4 projects	9	6%	9%
5-9 projects	11	7%	18%
10 or more projects	7	5%	27%

Source: Program Tracking Database.

Our survey of participants indicated low awareness of the Trade Ally Network among participating customers. Just over one quarter (26%) of participants who used a contractor report that the contractor is

¹⁰ It should be noted that the contractor used was “unknown” for 23 of the 455 projects.

affiliated with the Smart Ideas for Your Business program. Notably, 30% of participants do not know whether their contractor is affiliated with the program, and many do not think that program affiliation is important: When asked to rate the importance of using a contractor affiliated with the program – on a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important” – 39% of participants give a rating of 0; the mean rating was 4.1.

While a contractor’s status as a trade ally may not be of high importance to customers, the trade ally network provides an excellent opportunity to promote program opportunities because:

- in 50% of HVAC and 31% of lighting projects contractors specified the details of the installed equipment;
- in 50% of HVAC and 27% lighting projects contractors informed the customer of the ComEd incentive;
- 68% of participants report having discussed the Prescriptive program with a contractor or trade ally; and
- 25% of participants name contractors/trade allies as the first source of information about the program.

Given this strong influence of contractors on program participants, the program is well justified in emphasizing trade allies in its program delivery and should be commended for building a solid foundation for its trade ally network in PY1. To work effectively, however, the trade ally network must recruit high quality trade allies. While program tracking data do not allow to identify which projects were installed by a trade ally and which by a non-participating contractor, almost *all* participating customers who used a contractor were extremely satisfied with their performance: Over two-thirds rate the contractor’s ability to meet their needs in terms of implementing the project as a 9 or 10 on a scale from 0 to 10 (mean score 9.45), and 99% would recommend their contractor to others.

3.2.4 Program Design and Processes

ComEd’s Smart Ideas for Your Business Prescriptive program includes new lighting, cooling, refrigeration, and motor equipment upgrades for ComEd’s business customers. The application process includes both a pre-approval and final approval application. While a pre-approval application is only required for permanent lamp removal and T8/T5-fixture lighting retrofit projects, it is strongly encouraged for all prescriptive projects. Program guidelines stipulate that projects must be completed within 90 days of pre-approval; however, many projects apply for and are granted an extension. Program participants must submit the final approval application within 60 days of project completion.

Overall, participants find the application process (both pre-approval and final) to be easy. A majority of customers noted that the application materials clearly explain the program requirements and participation process. However, participants did report some issues with the program participation process, including receiving inconsistent information regarding participation status and the participation process generally taking too long.

Application Process

While it is not required for most prescriptive measures, 96% of participating customers report submitting a pre-approval application. Of these, 70% filled it out themselves. Most of the customers who completed the application themselves feel that the pre-approval application clearly explains the program requirements and participation process (80%) and rate the application process as easy (70%).¹¹ Those that rate the process as difficult most often note that the application was difficult to understand. Similarly, 73% of participating customers report filling out the final application themselves. Eighty-three percent of these customers rate the final application process as easy.

When the customers do not complete the applications themselves, this is most often done by the contractor or trade ally.

Participation Process

Customers were asked if they experienced any problems during the participation process. Fourteen percent of participants reported that they did. The most common complaints include receiving inconsistent information about program approval status, the process taking too long, and the program's oversubscription.

The program has a goal of two to four weeks between receiving the complete final application materials and issuing the rebate check. According to program staff, this time frame was typically met during PY1, unless there was a scheduling conflict with an inspection. In addition, the program implementers 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, and a cancellation letter if the reservation expires. Waitlisted applicants were also sent a letter, and a final letter closing out the project is sent with the rebate check.

When asked about any drawbacks to participating in the program, 68% of participants could not name any, 11% think the paperwork is too burdensome, and 5% noted that the program ran out of money. The incentive cap was an issue for 14% of participants who reported that the cap limited their participation.

Customer Service

The Smart Ideas for Your Business Program employed the ComEd call center to field questions from program participants. Forty-two percent of participants report calling the call center during the participation process. The majority (68%) of participants making use of the call center were satisfied with the call center's ability to answer questions, but 15% noted dissatisfaction. Issues with the call center included difficulty in reaching someone who could answer questions, receiving inconsistent information, and questions not being understood.

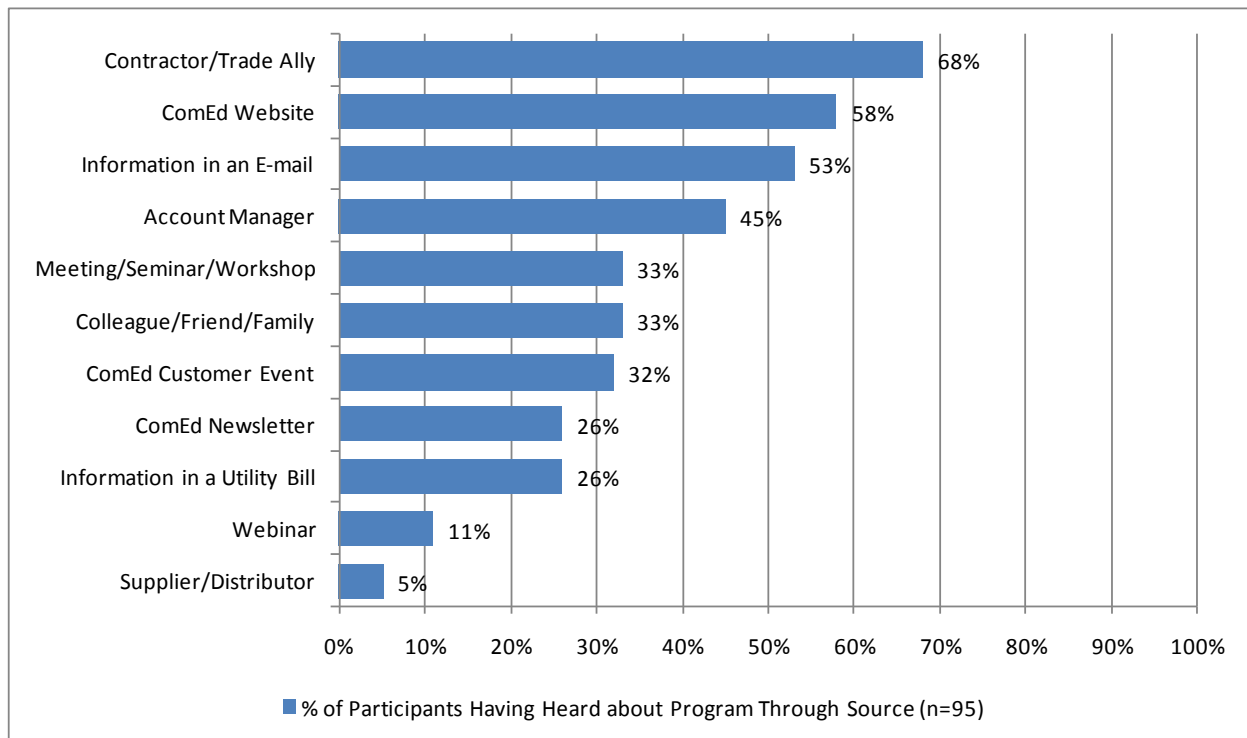
¹¹ A score of 7 or higher on a scale from 0 to 10 point scale, where 0 is "very difficult" and 10 is "very easy."

3.2.5 Program Marketing & Outreach

Due to the early oversubscription of the Prescriptive program, very limited marketing activities were conducted in PY1. However, the program did undertake several marketing and outreach efforts including customer and trade ally “kick-off” events, several bill inserts, a trade ally newsletter, and multiple webinars and speaking events. Most of the marketing and outreach efforts were focused on the customer and trade ally “kick-off” events. These events were held just before and after the program launch in May and June 2008 and were used to educate both trade allies and customers on the available programs and participation processes.

Despite the limited marketing efforts, participants recall hearing about the program through a number of different channels. The top three sources of program information are a contractor or trade ally (68%), the ComEd website (58%), and information provided in an e-mail (53%). Contractors or trade allies were also most often named as the *first* source of information about the program (25%). Figure 4 summarizes participant responses about program information sources (questions were prompted).

Figure 4. Sources of Information About the Smart Ideas for Your Business Program

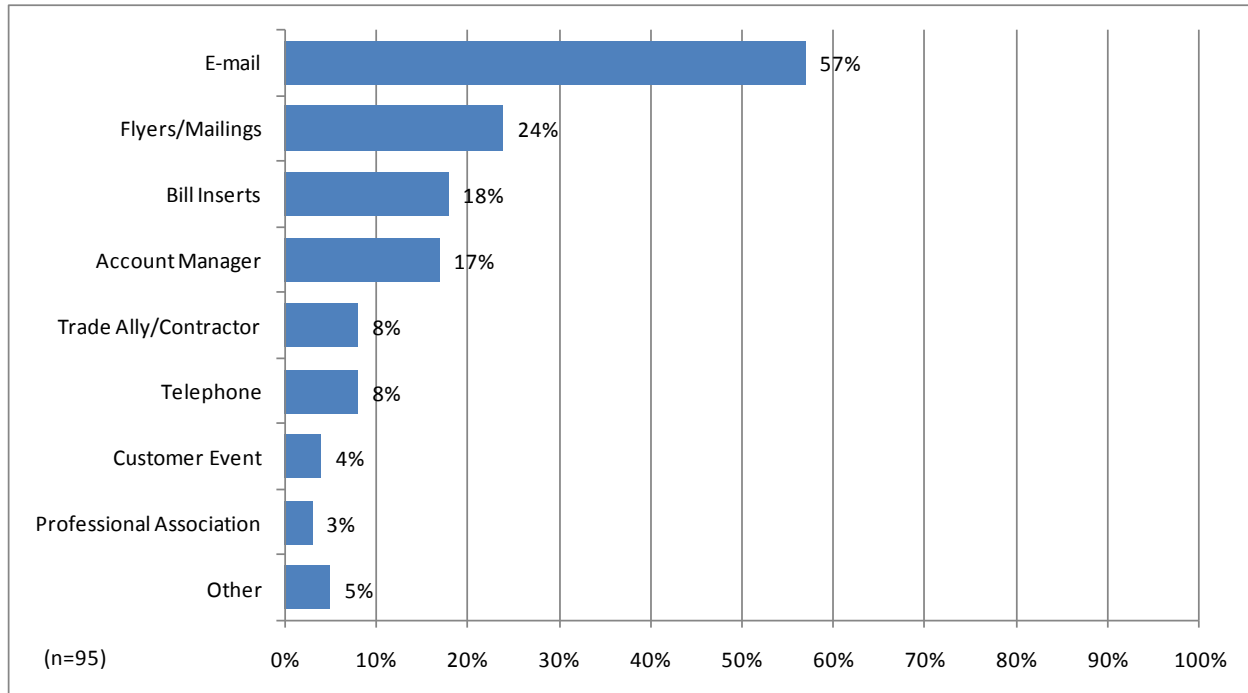


Source: CATI Participant Survey.

In addition to recalling program marketing materials, a large majority of participants (83%) also found the materials to be useful. Only a few participants noted that the materials could provide more detail or more accurate information.

Participants also confirmed that ComEd is already using the marketing channels they prefer. As shown in Figure 5 participants overwhelmingly cite e-mail as the best method of contact (57%), followed by flyers/mailling (24%) and bill inserts (18%).

**Figure 5. Preferred Methods of Contact
(Multiple Response)**



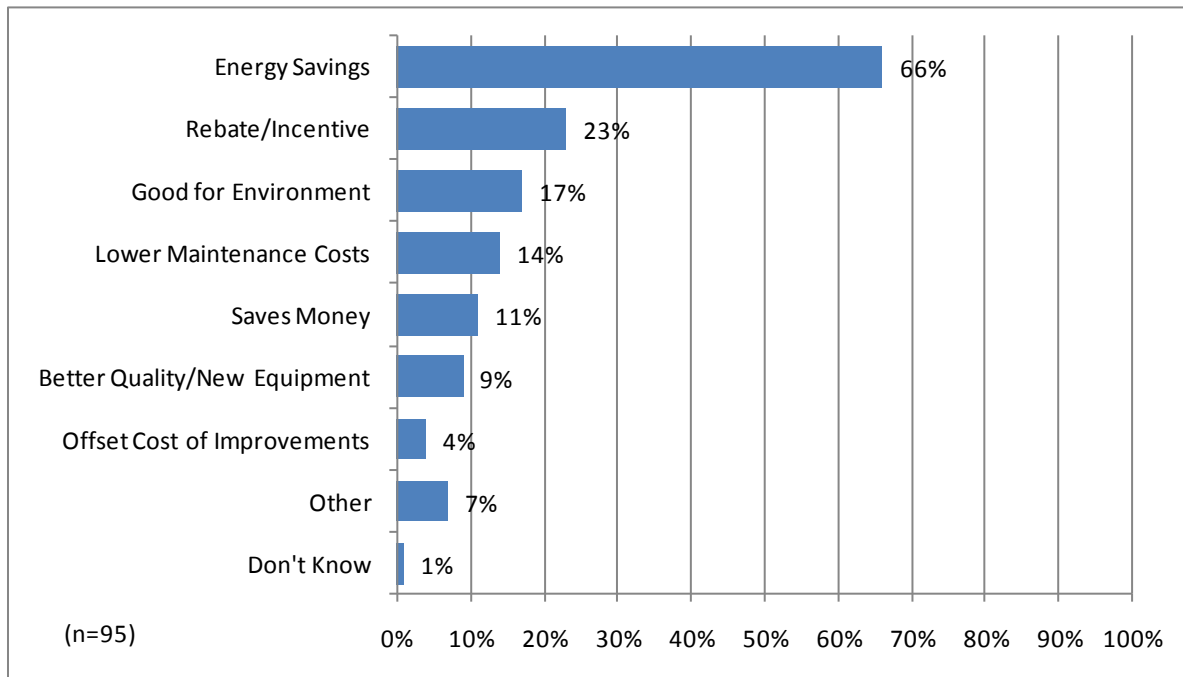
Source: CATI Participant Survey.

3.2.6 Barriers to and Benefits of Participation

An assessment of barriers to participation was not warranted given the quick oversubscription of the program in PY1. In addition, such an assessment would require interviews with non-participants and, ideally, market actors, which were not conducted for this evaluation. 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. The responses included program awareness (48%), financial reasons (31%), customers not aware of the possible savings (8%), and the difficulty of the application/paperwork (3%).

Finally, participants were asked what they considered to be the main benefits of participating in the program. Overwhelmingly, participants cite energy savings as a program benefit (66%). All other benefits are mentioned by less than a quarter of participants (see Figure 6).

Figure 6. Benefits of Program Participation



Source: CATI Participant Survey.

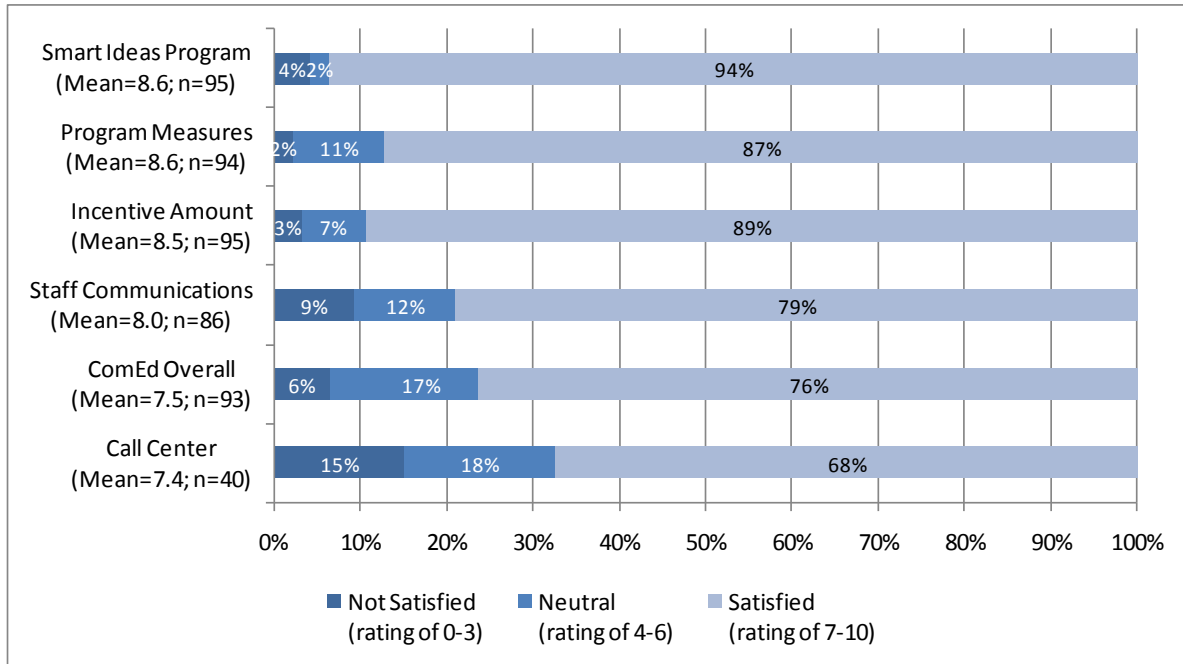
Information on both potential barriers to and benefits of participation should be utilized when planning messaging for future marketing efforts.

3.2.7 Participant Satisfaction

Participants are satisfied with most aspects of the program. Customers were asked to rate – on a scale of 0 to 10, where 0 means “very dissatisfied” and 10 means “very satisfied” – several aspects of the program. Satisfaction is highest with the selection of program measures, the incentive amount, and the Smart Ideas Program overall. The lowest satisfaction is reported for the ComEd call center but 68% were still satisfied with the call center (see also discussion in Section 3.2.4 above). Figure 7 summarizes participant satisfaction with the various aspects of the program.

Importantly, the high level of customer satisfaction is also evident in the fact that 71% of participants are planning to participate in the Smart Ideas for Your Business Program again in the future.

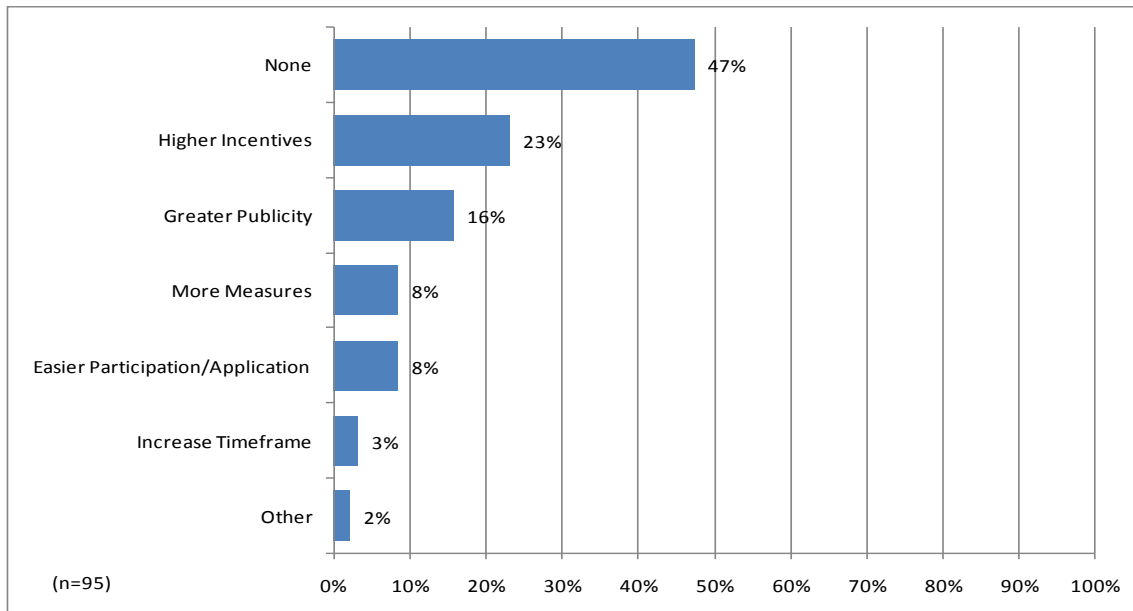
Figure 7. Program Satisfaction



Source: CATI Participant Survey.

When asked about recommendations to improve the program, almost half of participant did not have any suggestions. Participants who did have recommendations most often mentioned higher incentives (23%) and better marketing/publicity of the program (16%). Figure 8 summarizes recommendations provided by program participants.

Figure 8. Areas for Program Improvement (Multiple Response)



Source: CATI Participant Survey.

3.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the C&I Prescriptive 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.”¹²

ComEd uses DSMore™ software for the calculation of the TRC test.¹³ 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.

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 MISO 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 42 summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the C&I Prescriptive program in PY1. 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.

¹² Illinois Power Agency Act SB1592, pages 7-8.

¹³ Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

Table 42. Inputs to DSMore Model for C&I Prescriptive Program

Item	Value Used
Measure Life	12 to 15 years
Participants	346
Annual Gross Energy Savings	120,549 MWh
Gross Coincident Peak Savings	19.13 MW
Net-to-Gross Ratio	67% to 73%
Utility Administration and Implementation Costs	\$2,607,815
Utility Incentive Costs	\$6,201,031
Participant Contribution to Incremental Measure Costs	\$6,560,441

Based on these inputs, the TRC for this program is 2.43 and the program passes the TRC test.

At this time, additional benefits related to reduction of greenhouse gas emissions have not been quantified in the calculation of the TRC. These additional benefits would increase the given TRC benefit/cost ratio.

4 CONCLUSIONS AND RECOMMENDATIONS

This section highlights the findings and recommendations from the PY1 evaluation of ComEd's Smart Ideas for your Business Prescriptive Program. The primary objectives of this evaluation were to quantify the gross and net energy impacts resulting from the rebated measures and to assess program theory, marketing, and delivery. Below are the key conclusions and recommendations.

4.1 Conclusions

The data collected for evaluation of the PY1 Prescriptive program was gathered during a number of activities including tracking data analysis, in-depth phone interviews with program staff and program implementers, a participant phone survey, engineering review of project files, and on-site visits. Following are the key conclusions drawn from those activities.

4.1.1 Program Impacts

Default Savings Review

With only a few exceptions, ComEd's default savings values, both kW and kWh, are well documented, reasonable, and conservative in the savings they claim. When we encountered a ComEd default value in the engineering file review process or during on-site visits that we concluded should be revised, the savings for the measure were adjusted either higher or lower. It was necessary for ComEd to rely heavily on secondary data when they developed PY1 default values. Much of the secondary data is from California, where program efforts are mature and the climate is substantially different. We found reason to revise energy savings relative to default values for many of the installed measures reviewed during the engineering review process for the PY1 gross impact evaluation.

Tracking System

To support the impact evaluation, the evaluation team was given access to ComEd's on-line tracking system and data. The on-line system provides the project tracking data plus uploaded project documentation in electronic format for each project. This documentation was complete and greatly facilitated the evaluation. This level of documentation is highly commendable for a first-year program.

We did not find any savings data in the tracking system that we judged to be outliers. There were a few missing values in unitary HVAC that could have affected the impact evaluation had the evaluation team not recognized the issues.

While working with the database, the most important issue for the evaluation team is consistency of the data. There were some instances of inconsistency regarding field names and data input. Both must be consistent or the data may not be properly analyzed if the evaluation team does not catch the inconsistency. Inconsistency was observed in unitary HVAC measures data entry. There were also some instances of inconsistency between the default values documentation and the database lookup tables.

Gross Impacts

The PY1 evaluation found that verified gross impacts were significantly higher than the savings recorded in ComEd's tracking system. The PY1 Prescriptive program had an overall realization rate on tracking savings of 1.33 for energy and 1.03 for coincident demand reduction. The relative precision at a 90% confidence level for the program kWh Realization Rate is $\pm 8\%$, and for the kW Realization Rate it is $\pm 11\%$. The evaluation-adjusted realization rates are greater than the 0.95 value ComEd had assumed their program planning documents.

As noted in the default savings review, ComEd's default savings assumptions were generally conservative in their savings claims. Through use of data from the phone survey, engineering review and on site visits, many of the lighting measures received significant hours of use increases relative to default assumptions.

In addition to the common finding of verified hours of use being higher than the default assumptions, occupancy sensors and HVAC VSDs were two measures that had significant upward adjustments in savings as a result of the on-site visit M&V. Lighting logger data indicated that occupancy sensors were being applied on fixtures with longer operating hours than the default, and also that most had greater off time than the default assumption. Similarly, data collected during the on-site visits indicated that HVAC VSDs were being generally applied in buildings with longer operating hours and with more favorable opportunities than the default.

Net Impacts

The PY1 Prescriptive program evaluation found that verified net impacts (80,932 MWh) were significantly higher than ComEd's reported net savings (71,656 MWh). ComEd's verified net savings exceed the reported savings due to the high realization rate on gross impacts. The PY1 Prescriptive program had an evaluated Net-to-Verified Gross ratio of 0.67 for energy savings and 0.68 for coincident demand reduction. The relative precision at a 90% confidence level for the program NTG ratio is $\pm 9\%$. The evaluated net-to- gross ratio is substantially lower than the value of 0.80 assumed by ComEd in their plan.

The lower NTG ratio can be traced mainly to two issues: 1) respondents who learned about the program after they decided to implement the measure, and 2) respondents who claimed they would have installed exactly the same equipment at the same time (or within 6 months) in the absence of the program. ComEd's NTG score was raised by the strong influence of various program components (rebates, recommendations, and program materials) on customer decisions, where 80% of respondents gave a score that translates to 0.8 to 1.0 for that component of the NTG score (weighted one-third of overall score).

The PY1 evaluation found evidence of likely lighting spillover in 20% of phone survey respondents (17 of 85).

Program participation and net impacts were highly concentrated in large projects, lighting, in certain buildings types (warehouse, industrial), and in a subset of measures. Lighting measures accounted for 91% of net energy savings. Warehouses and manufacturing provided 63% of net energy savings by building type. The measure "New T8/T5 fixture" accounted for 56% of net energy savings, while occupancy sensors added another 7% to net savings. Among non-lighting measures, HVAC VSDs accounted for 6% of total net energy savings. The 27 large projects of strata 1 provided 31% of net savings. While ComEd has easily met program savings goals in PY1, this concentration carries risk for PY2 and beyond:

- Among the high impact measures in PY1, most had realization rates well above 1.0, but a few were substantially below 1.0. As a program where trade allies drive the selection of participating projects, there is a risk of finding a large number of installations from measures that end up with low realization rates.
- As measures become accepted as standard practice, the potential for free-ridership increases and the net-to-gross ratio could decrease substantially.
- As goals increase it may be necessary to branch into additional measures, end-uses, and customer types. That they have not shown up in the first year is an indication that these other markets could be more challenging to bring into the program. This suggests marketing efforts need to begin in advance of the time that savings are needed to meet goals.
- In the first year, trade allies are likely to target the best opportunities, those with longer hours of use and other favorable characteristics. Over time, these prime opportunities become less common, and realization rates are likely to decline.
- Larger projects (in strata 1) had substantially lower NTG ratios than medium and small projects. This was counterbalanced by higher realization rates.

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

One issue discovered during the engineering review and site visits was lighting equipment that did not meet all required qualifying criteria. These instances resulted in a number of reductions to claimed savings.

4.1.2 Program Processes

Program Participation

The Business Prescriptive Program was well received in PY1. Over 340 customers conducted more than 450 projects that accounted for 81 GWh and 13 MW of net savings. While lighting accounted for the vast majority of projects and savings – a typical observation for a new prescriptive program – PY1 participants represented a good range of business sectors, including warehouses, light and heavy industry, offices, and retail/service.

Customer Satisfaction

Customer satisfaction with various processes and components of the program was high, and few participants reported encountering problems during their participation. Participants provided the highest ratings for the Smart Ideas Program overall, the program measures offered, and the incentive amounts. Participants were less satisfied with the call center than with other program components. Some customers noted issues with reaching someone who could answer questions, receiving inconsistent information, and questions not being understood. When asked to suggest program improvements, participants most often cite higher incentives and better marketing/publicity.

Program Oversubscription

In PY1, interest in the program was so high that it became oversubscribed in September 2008 and had to begin wait-listing projects. While the oversubscription was a mark of success for the program – as evidenced by the program exceeding its PY1 goals – it also presented a challenge as some customers had to be waitlisted and others were not able to participate in PY1. Program staff therefore had to manage

customer expectations for PY1 while at the same time maintaining customer confidence and interest in the program for future program years. Another concern with this quick oversubscription is the possibility of free-ridership. Program staff referred to “pent up demand” in ComEd’s service territory, which points to the possibility of projects being delayed until incentive money became available.

How well program staff managed the oversubscription of the program could not be fully measured in this evaluation as no primary research with non-participants or market actors was conducted. However, this is a key area of concern for the program, especially since early results from PY2 show that the program is likely to become oversubscribed again. The PY2 evaluation should focus on how the oversubscription is handled and communicated to customers, non-participant and market actor perception of the program and issues of oversubscription, and how early oversubscription can be avoided in the future.

Marketing and Outreach

Necessarily, the oversubscription also meant that program implementation had to be adjusted. In specific, some of the anticipated promotional channels (Account Managers, marketing materials) were not utilized as planned since there was no need for additional program promotion. The limited marketing that was conducted during PY1 was recalled and well received by program participants. The most successful efforts were promotion via contractors/trade allies and account managers as well as the website, and e-mail.

Trade Ally Network

During PY1, trade allies were the main channel of promotion and communication for the Prescriptive program. Approximately 160 market actors joined the trade ally network during PY1. ComEd has put in a place a good process for its trade ally network. Market actors have to complete an application and attend a seminar or webinar that explains the program and program processes before they can become a trade ally. In return, ComEd trade allies are listed in a searchable directory on the ComEd website and can make use of the ComEd call center and technical staff. Additional support for trade allies to help promote the program is planned for future program years.

Awareness of contractor affiliation with the program is low among customers, and many customers do not think that program affiliation is important. Despite this, the trade ally network provides an excellent opportunity to promote program opportunities as contractors often specify the details of the installed equipment, inform the customers of the ComEd program and available incentives, and discuss the program with their customers. The program is therefore well justified in emphasizing trade allies in its program delivery and should be commended for building a solid foundation for its trade ally network in PY1. Given the importance of trade allies to program delivery, this should be another emphasis for evaluation in PY2.

4.2 Recommendations

4.2.1 Impact Recommendations

Default Savings Review

1. We believe that research and evaluation M&V in Illinois targeting key assumptions would improve the default savings values for use in ComEd service territory. Priorities for improved, local knowledge are:

- Lighting hours of use in warehouses, manufacturing, office, retail, and hotel/motel business types
 - Occupancy sensor applications in warehouse and industrial settings
 - Coincidence factors for lighting measures
 - Coincidence and redundancy factors for cooling measures (redundancy accounts for reduced per unit savings due to unit oversizing and installing excess cooling capacity)
 - HVAC interaction factors for lighting measures
 - Cooling full load hours
 - HVAC Variable Speed Drive applications in large offices
2. The four HVAC related default value issues on the priorities list above could be bundled into one technical research project for an engineering firm with energy modeling experience.
 3. There are several minor typos and math errors in the documentation of default assumptions. Some of these have been corrected in the database lookup tables while others have not. While we conclude the impact of these minor errors on tracking savings is small, the default assumptions documentation is a primary resource used during the engineering review process, and should be as accurate as possible.

Tracking System

1. ComEd should develop a consistent approach for entering energy equipment type, make and model information for unitary HVAC equipment.
2. While working with the database, the most important issue for the evaluation team is consistency of field names and of the data entered. Both must be consistent or the data may not be properly analyzed if the evaluation team does not catch the inconsistency.
3. Complete documentation that explains the field names and how they are used in tracking data reporting would be useful.

Gross and Net Impacts

1. Gross and net savings are highly concentrated by end-use, building type, and measure, and this carries a risk for program performance. To achieve goals in future years and maintain high NTG ratios, ComEd should identify the next tier of participation targets by end-use, building type, and measure, and develop plans to gain their participation.
2. ComEd should consider conducting market research to determine whether the high realization rates that resulted from long lighting hours of use in PY1 represented a first-year anomaly or whether customers in ComEd service territory are different than those of secondary data sources. For example, obtaining a distribution of lighting hours of use by building type would allow ComEd to assess the size of the “high-hours of use” savings opportunity.
3. ComEd should consider conducting market and technology research to determine whether the high realization rates found in PY1 for occupancy sensors and HVAC VSDs represent substantially greater savings potential for PY2 and beyond than indicated by secondary data, or whether PY1 attracted the best opportunities from a limited market opportunity.

4. Free-ridership is an inherent attribute of a trade ally driven rebate program. While it is challenging to screen out free-riders and maintain ease of participation, ComEd should consider the following:
 - Monitor free-ridership among participants and measures to assess the ongoing risk of low NTG ratios.
 - Proactively seek participation from business types, measures, and projects with low free-ridership rates to balance business types and measures that tend to have higher free-ridership.
 - The initial evaluation plan for PY2 included research to estimate spillover. The results of the phone survey confirm that the effort to quantify spillover be retained.
5. Suggested improvements in the QA/QC process focus on the technical review at the pre-approval stage, maintaining accurate measure quantities in the tracking system throughout the various stages of project completion, verifying qualifying specifications of equipment, and potentially refining sampling practices for inspections.

4.2.2 Process Recommendations

Program Participation

1. The program should consider ways to increase the share of non-lighting measures. This could be done through heavier promotion of non-lighting measures or a shift in incentive amounts. While heavy reliance on lighting is common for new programs, a better mix of end-uses will make the program more sustainable in the long-term.
2. Continue to recruit a mix of business types into the program.

Program Oversubscription

1. Continue to carefully manage the oversubscription of the program. This includes managing customer expectations and communicating the status of waitlisted projects in a timely manner. Handling of the oversubscription should be a primary focus of the process evaluation for PY2.
2. The stop-and-go nature of programs that oversubscribe and have to be suspended create uncertainty in the market. The program should explore the reasons for oversubscription and consider ways to prevent this from happening in future program years. This could include revisiting program planning assumptions and program design, adjusting incentive levels and/or the overall incentive budget,¹⁴ changing eligibility criteria (i.e., payback period and percentage of incremental cost incented), and additional steps in project screening.
3. Conduct customer research on financial criteria such as ROI and required payback period to inform potential adjustments of incentive levels.

¹⁴ This has already been implemented for PY2: The total incentive budget was doubled and per unit incentives for certain measures were reduced.

4. Continue to monitor free-ridership. The heavy demand on the program raises the possibility of free-ridership. The program should consider additional steps during the application/approval process to help screen out potential free-riders.

Marketing and Outreach

1. The program should continue to market the program through contractors/trade allies. This includes building on the existing trade ally network to recruit more trade allies and raising awareness of the program via these market actors.
2. As the program's pent up demand wanes, ComEd should be prepared to make greater use of certain program delivery channels, including direct marketing and Account Managers, to build program awareness and participation among customers who may not be easily reached by trade allies.

Trade Ally Network

1. Continue development of the Trade Ally Network. Trade allies are an effective channel of reaching customers.
2. Consider ways to increase the visibility of the "trade ally" designation. Customers currently are not aware of their contractor's status as a trade ally and do not place importance on this. However, status as a trade ally can be a powerful promotional tool for contractors and provide them with additional incentive to promote the program.
3. As the program matures and the Trade Ally Network grows, consider additional ways to reward trade allies that are especially active in the program. This could be done through an identifier in the trade ally directory or through some formal recognition at the end of a program year.
4. Identify registered trade allies in the program tracking database. The database currently lists the contractor who implemented the project but does not indicate whether the contractor is a trade ally. By assigning a unique identification number to each trade ally, ally activity can be more easily monitored. This would be beneficial for both program tracking and for evaluation purposes.

5 APPENDICES

5.1 Data Collection Instruments

5.1.1 Interview Guide



ComEd CI
PM-Implementer Guid

5.1.2 Phone Survey



ComEd C&I
Prescriptive Participar

5.2 Other Appendices

5.2.1 PY1 Program Application Forms

The application forms for the PY1 program are provided in the Operations Manual Appendix B



Operations Manual
2008-12 Appendix B -

5.2.2 Verification and Due Diligence Memo Report

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



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5.2.3 Examples of M&V Site Plans



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5.2.4 Default Savings Review



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