NAVIGANT

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

Evaluation Report: Summary Report

Presented to

Commonwealth Edison Company

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Presented by

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NAVIGANT

Table of Contents

NAVIGANT

Section E. Executive Summary

The goal of this report is to present a summary of the findings and results from the Impact and Process Evaluation of the energy efficiency and demand response programs offered by ComEd in Plan Year 2, which ran from June 1, 2009 to May 31, 2010.

E.1 Impact Evaluation

On the whole, ComEd exceeded their statutory requirements for net program savings for the second program year for both demand and energy (Table E-1). The achieved net energy savings for PY2 was 13.6 MW and 472,132 MWh, versus the statutory requirements of 11.1 MW and 312,339 MWh. They exceeded their demand reduction requirements by 23% and their energy savings requirements by 51%. Based on these savings and portfolio expenditures, the PY2 portfolio cost effectiveness, based on the Illinois TRC, is 2.84 (see section 3.3. for details).

In PY1, ComEd exceeded its statutory requirement by 14,875 MWh, and was able to "bank" PY2 savings up to 10% of its statutory requirement of 148,842 MWh, or 14,884.2 MWh for use in future years if needed. In PY2, ComEd exceeded its statutory requirement by 159,973 MWh, and will be able to "bank" PY2 savings up to 10% of its statutory requirement of 312,339 MWh, or 31,234 MWh. At the end of PY2, ComEd's total "banked" savings is 46,109 MWh.

Table E-1. Portfolio Year 2 Results – Planned and Net Savings

	Revised Net PY2 Target		PY 2 Ex-Post Net Results	
	MW	**MWh**	**MW †**	**MWh**
Energy Efficiency				
Residential Energy Star Lighting	NA	127,011	28.4	202,557
Appliance Recycling	NA	23,628	5.5	32,624
All-Electric Efficiency Upgrade	NA	1,782	0.2	1,840
All-Electric Single Family Home Energy Performance Tune-Up	NA	399	0.1	638
Central Air Conditioning Efficiency Services	NA	3,893	3.8	1,964
Business Prescriptive	NA	152,100	45.1	191,896
Business Custom	NA		2.2	17,255
C&I Retro-Commissioning	NA	5,780	10.3	6,574
C&I New Construction	NA	630	0.2	803
Portfolio Total		**315,223**	**95.8**	**456,151**
Demand Response				
Central Air Conditioning Cycling	11.1	NA	**13.6**	NA
Carryover from PY1				
Residential Energy Star Lighting	NA	NA	0.8	12,973
Small C&I CFL Intro Kit	NA	NA	0.7	3,008
Total PY1 Carryover			**1.5**	**15,981**
Portfolio Total with Carryover			**110.9**	**472,132**
Statutory Requirements	11.1	312,339	11.1	312,339
Comparison to Statutory Requirements‡			**2.5**	**159,793**

† MW reductions are reported peak values

‡ Demand saving are set at the total for the Central Air Conditioning Cycling program alone.

Table E-2 shows that the ComEd program tracking systems reported 604,981 MWh of gross savings at the portfolio level for PY2. Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 113% of the estimated gross savings had been realized. Additional evaluation work to estimate free riders and spillover effects resulted in an overall net-to-gross ratio of 0.67. The results of all the individual program reviews was an ex-post estimate of 456,151 MWh of verified net savings at the portfolio level (not counting PY1 CFL carryover).

Table E-2. Portfolio Year 2 Results – Ex Ante and Ex Post Savings

	Ex-Ante Gross (MWh)	Realization Rate	Ex-Post Gross (MWh)	Net-to-Gross Ratio	Ex-Post Net (MWh)
Residential Energy Star Lighting	295,307	117%	346,526	0.58	202,557
Appliance Recycling	50,147	87%	43,788	0.75	32,624
All-Electric Efficiency Upgrade	3,094	68%	2,090	0.80	1,840
All-Electric Single Family Home Energy Performance Tune-Up	672	107%	721	0.88	638
Central Air Conditioning Efficiency Services	5,972	33%	1,964	1.00	1,964
Business Prescriptive	213,522	121%	259,093	0.74	191,896
Business Custom	26,805	85%	22,697	0.76	17,255
C&I Retro-Commissioning	7,847	91%	7,174	0.92	6,574
C&I New Construction	1,615	85%	1,368	0.59	803
ComEd Total	**604,981**	**113%**	**685,421**	**0.67**	**456,151**
PY1 CFL Carryover					
Residential Lighting	18,761	100%	18,761	0.69	12,973
Small C&I CFL Intro Kit	5,371	100%	5,371	0.56	3,008
Total PY1 Carryover	**24,132**		**24,132**		**15,981**
Portfolio Total with Carryover	**629,113**		**709,553**		**472,132**

Definitions

- Ex-Ante Gross MWh are the expected total savings based on installed measures under the program. This information comes from ComEd's data tracking system.
- The realization rate represents the percentage of Gross MWh accepted after verification by evaluators.
- Ex-Post Gross MWh are the accepted savings from program after verification by evaluators.
- Net-to-Gross (NTG) is the ratio of accepted program savings due to program influence over accepted program savings.
- Ex-Post Net MWh are the accepted savings due to program influence.

E.2 Process Evaluation

The primary objective of the process evaluation effort is to gather market intelligence to help program designers and managers structure their programs to achieve cost-effective savings while maintaining high levels of customer satisfaction. Specific process evaluation methods and objectives vary based on each individual program's needs and stage of development, and detailed process findings are reported separately for each program in the individual evaluation reports. However, customer satisfaction is a key component of each process evaluation and a comparison of customer satisfaction scores across programs is presented in Table E-3. While there are slight differences in how each score is assessed, it can be seen that all scores indicate high levels of customer satisfaction.

Table E-3. Summary of Customer Satisfaction Scores

	Sector	Customer Satisfaction	
Energy Efficiency		Score	Details
Residential Energy Star Lighting	Residential	78%	*Satisfaction with bulbs purchased*
Appliance Recycling	Residential	94%	*Score of 7 to 10 on a 10-point scale* *Convenience of home pick-up is biggest reported benefit*
All-Electric Efficiency Upgrade	Residential	95%	*Average Score of 9.3 for residents* *Average score of 8.5 for building owners and managers*
All-Electric Single Family Home Energy Performance Tune-Up	Residential	92%	*Score of 7 to 10 on a 10-point scale* *Program staff received high praises*
Central Air Conditioning Efficiency Services	Residential	NA	*Contractors generally satisfied with program administration*
Business Prescriptive	C&I	97%	*Customer satisfaction is high.* *Contractors are satisfied with the program.*
Business Custom	C&I	98%	*Customers, contractors are satisfied.* *Small sample size.*
C&I New Construction	C&I	NA	*Participants are satisfied with the program. Small sample size.*
C&I Retro-Commissioning	C&I	NA	*Participant and RSP satisfaction with the program is very high.* *Small sample size.*
Small C&I CFL Intro kit	C&I	NA	*Process evaluation not conducted in PY2.*
Demand Response			
Central Air Conditioning Cycling	Residential	78%	*Customers report highest satisfaction with monthly bill credit.*

E.3 High Level Conclusions and Recommendations

The program tracking systems continue to be generally well designed and populated with the information needed for program evaluation purposes. Improvements could be made in some programs to customer information tracked.

ComEd program managers examined the EM&V recommendations from the PY1 reports and in some cases made adjustments to assumptions and algorithms used to calculate savings for PY2 projects. In part because of this effort, the gross savings realization rates improved for several programs. The EM&V team made further suggestions for areas to make progress in this area in the future.

Similarly, the net-to-gross ratio dropped modestly from 0.68 to 0.67.

Customer satisfaction rates continued to be quite high, with several programs with satisfaction rates above 90%. This indicates that the programs are being well run, and no major changes are needed to address program process issues.

Contractors were found to be very important drivers to several programs. ComEd should continue and consider expanding targeted trade ally recruitment, marketing, and training. Contractors generally found training events to be useful in explaining the program requirements.

The evaluation team found that several programs made significant improvements in communication among stakeholders. Effective communication could still be enhanced in several programs, according to stakeholders.

Customer awareness of ComEd programs remains a barrier to participation. To the extent feasible, ComEd should consider strategic opportunities to increase customer awareness about energy efficiency programs through public events, online and social media avenues, billing inserts and other opportunities.

Several programs reported that the economic environment was a barrier to participation for many stakeholders. Despite the difficult economic circumstances, several programs demonstrated flexibility to adapt to external circumstances and improve their likelihood of success.

Section 1. Introduction to the Portfolio and Programs

ComEd's portfolio of programs includes five residential programs and four programs targeted at business customers[1] (Table 1.1). Details about each of these programs follows.

Table 1.1. Portfolio Year 2 Programs and Target Savings

	Sector	Revised Net PY2 Target	
		MW	MWh
Energy Efficiency			
Residential Energy Star Lighting	Residential	NA	127,011
Appliance Recycling	Residential	NA	23,628
All-Electric Efficiency Upgrade	Residential	NA	1,782
All-Electric Single Family Home Energy Performance Tune-Up	Residential	NA	399
Central Air Conditioning Efficiency Services	Residential	NA	3,893
Business Prescriptive	C&I	NA	152,100
Business Custom	C&I	NA	
C&I Retro-Commissioning	C&I	NA	5,780
Business New Construction	C&I	NA	630
Portfolio Total			**315,223**
Demand Response			
Central Air Conditioning Cycling	Residential	11.1	NA

1.1 Residential Energy Star Lighting

The Residential Energy Star (ES) Lighting Program provides incentives to increase the market share of Energy Star (ES) qualified compact fluorescent lamp (CFL) bulbs and fixtures sold through retail sales channels. It also seeks to distribute educational materials that will increase customer awareness and acceptance of energy-efficient lighting technology, as well as promote proper bulb disposal. The Residential ES Lighting Program accounts for more than one-third of the expected ex-ante MWh impacts of ComEd's 3-year energy efficiency portfolio and thus the program is very important to meeting ComEd's energy efficiency goals.

The majority of the Residential ES Lighting Program is delivered midstream (at the retailer level) which minimizes the burden on consumers, thus lowering barriers to participation, but making program participant identification (and thus evaluation) more difficult. A small portion

[1] The Small C&I CFL Intro Kit program was offered in PY1 but not in PY2 however carryover savings were estimated in this evaluation cycle.

of the CFL rebates were delivered via in-store coupons[2] that allowed for the capture of participant names and contact information. However due to the small proportion of the overall sales these coupons represent, as well as the limited retail categories where these coupons were distributed (restricted to small hardware stores), customers who participated via the coupon channel cannot be deemed representative of the entire participant population.

The Residential ES Lighting Program kicked-off in June 2008 and completed its second full year of operation at the end of May 2010. Program sales in Program Year 2010 (PY2) were nearly triple those of PY1, and in PY2, the program focused more of its efforts on fixtures, smaller pack sizes, and larger incentives on spirals at some retailers to encourage greater sales.

APT and EFI implement the ComEd Residential ES Lighting Program. APT serves in an advisory role to ComEd and is responsible for implementing the program in terms of the securing and maintaining the relationships with the retailer/manufacturer partners that are involved in the program. APT oversees the RFP process to recruit retailers and manufacturers to participate in the program, and its activities range from reviewing the submitted proposals to suggesting SKU mixes for stores to negotiating the incentive levels and signing the Memorandum of Understanding (MOU). APT sends trained field representatives into the stores to educate retailer employees as well as customers about the program, makes sure the required point of purchase (POP) materials are visible, and does special events to help promote the program. APT is very involved in the day-to-day operations of the residential lighting program. APT field representatives are the true face of the program because they are the ones that are interacting with the retail employees and customers on a frequent basis. EFI is a subcontractor to APT. Their primary role is processing incentive payments for the coupon and markdown program to industry partners.

1.2 Appliance Recycling

The Residential Appliance Recycling program was designed to achieve energy savings through the retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners. The primary objectives of the program are to:

- Decrease the retention of high energy-use refrigerators and freezers; and
- Deliver long-term energy savings.

A secondary objective is to dispose of these older refrigerators and freezers in an environmentally safe manner by offering comprehensive toxic material recycling and disposal

[2] Coupon sales account for less than 1% of program sales (traditional spiral bulbs only) and were the sole means of program participation at two of the eleven program retailers.

that conforms with applicable environmental laws and regulations and permitting requirements.

The Residential Appliance Recycling program began operation in June 2008. Program Year 2 (PY2) began on June 1, 2009 and ended on May 31, 2010. The program offers free pickup and recycling services for older, working refrigerators and freezers, and room air conditioners that households no longer want. Program savings are based on the accelerated removal, dismantling and recycling of these older, inefficient units.

The program is marketed through a combination of methods – bill inserts, radio and TV spots, newspaper and newsletter advertisements, online marketing, and word-of-mouth. ComEd also used a direct mail campaign that involved sending personalized letters and coupons to customers from specific demographic groups who had participated in the past and were seen as likely to participate in the future.

JACO continued to implement the Appliance Recycling Program in PY2. JACO is responsible for the following functions: appliance pickups and related scheduling; processing program enrollments; deconstructing and recycling program units; responding to customer questions and complaints; and program tracking and reporting.

In exchange for participating in the program, ComEd pays participants $25 each for up to two recycled refrigerators or freezers. Operational room air conditioner units are also eligible for pick up and recycling, but they can only be picked up from sites where the recycler, JACO, is already collecting a refrigerator and/or freezer (so the room AC unit can "ride for free"). Participants contributing these working room AC units also receive the $25 program incentive, in conjunction with the pickup of either a refrigerator or freezer. However the incentive is capped at 2 units per pickup.

1.3 All-Electric Efficiency Upgrade

ComEd's All-Electric Efficiency Upgrade Program targets multifamily buildings with both electric heat and hot water and provides site visits to improve the building's energy efficiency. These site visits consist of two major elements:

- Apartment Walkthrough Assessment – Energy specialists contracted by ComEd conduct a walkthrough assessment of each unit in the building and install high efficiency measures where possible. Replacement measures include compact fluorescent light (CFL) bulbs, low-flow showerheads, and faucet aerators. The energy specialist also provides the tenant with a write-up of the measures installed and information regarding energy efficiency.

- Common Area Assessment – Energy specialists also conduct an energy audit of the building's common areas to identify potential energy savings. The building manager or

property owner is then given a report of recommended improvements and information regarding possible rebates through ComEd's Business Custom or Prescriptive programs.

The All-Electric Efficiency Upgrade program launched in June 2008 and just completed PY2. The second program year runs from June 1, 2009 to May 31, 2010.

The multifamily buildings may be landlord-tenant apartment buildings or resident-owned condominiums in multi-unit buildings.

ComEd contracts with Honeywell Utility Solutions to implement the All-Electric Efficiency Upgrade Program.

1.4 All-Electric Single Family Home Energy Performance Tune-Up

The All-Electric Single Family Home Energy Performance Tune-Up Program is a residential direct install and educational program offering low cost energy saving measures as well as a home energy survey to the single-family all-electric home market. The home energy survey provides recommendations for cost effective energy saving equipment upgrades, as well as maintenance and other every-day practices. During the 2009-2010 program year the Program also ran an experimental pilot design with 92 customers participating. The pilot required a higher payment from participants in return for the additional services of blower door testing and air sealing measures.

Under the current program design the implementation contractor provides an energy assessment for a nominal fee of $25 (the remainder of the survey cost is subsidized by the program). Energy survey software is used to conduct onsite energy savings analysis and provide an instant summary report with recommendations for the customer. During the survey and with the customer's approval, the visiting energy specialist will install up to ten CFLs in specific areas, faucet aerators, low-flow showerheads, and hot water pipe insulation where needed. In addition, if a central air conditioner is present, the assessment includes identification of the age and size of the unit and the last service date. The report will be presented to the customer with recommendations for upgrades and information about available rebates.

ComEd has contracted Honeywell Utility Solutions to implement the Tune-Up program and deliver it to all-electric customers. Honeywell works on marketing jointly with the utility, but is directly responsible for communicating with customers, scheduling appointments with participants, assessing participant homes, installing measures, and providing participants with energy surveys that include recommendations for further energy savings actions.

1.5 Central Air Conditioning Efficiency Services

The residential Central Air Conditioning Efficiency Services (CACES) program consists of two distinct programs serving different markets though a common marketing and delivery

infrastructure. The first is the Diagnostics and Tune-Up program, which targets improved efficiency for existing residential air conditioning equipment. The second is the Quality Installation program that targets new and replacement air conditioning equipment. Both of these programs are co-marketed and branded as CACES and they have the same administrative staff at ComEd, Implementation Contractor (IC), and independent participating contractors who deliver the programs to consumers. Roughly 80% of the combined CACES originally planned savings and costs were to be attributed to the Quality Installation program.

ComEd selected Honeywell Utility Solutions to implement the CACES program. Together, ComEd and Honeywell recruited independent participating contractors to deliver the program through their normal business activities. Honeywell and their partner, Field Diagnostic Services, Inc. (FDSI), conducted Business and Technical training sessions and Honeywell is responsible for day-to-day program administration, including conducting quality control activities, maintaining consumer and participating contractor relations, and administering data flow during the program cycle using the FDSI databases and field data collection protocols.

The program contractors use diagnostic tools (the Service Assistant (SA) made by FDSI) to check refrigerant charge and airflow over AC system coils. The diagnostic process is based on an automated analysis of the manual and automated sensor inputs to the SA provided by the technician. The SA tool suggests changes to refrigerant charge, general service and/or airflow based on operating data, and the technician then makes the necessary modifications. Use of the diagnostic tool and the extra time adhering to the protocols are additional costs to the HVAC contractors, but the resulting diagnosis and repairs should provide better service for consumers. ComEd seeks to encourage improved service and offset the additional costs with incentives that are paid to the HVAC contractor on a per job basis. The contractors have the option of passing the incentive through to the consumer in the form of a lower fee for the service, or retaining the incentive, depending on their own marketing strategy.

The Quality Installation and Right-Sizing criteria for passing and earning an incentive include: using the SA to document a final efficiency index of greater than 90%; documented use of Manual J procedures and calculations to select the capacity of the equipment. An alternate path to incentives is also provided for equipment installed on deficient existing ductwork.

1.6 Business Prescriptive and Business Custom

The Commonwealth Edison Company (ComEd) Smart Ideas for Your Business program provides incentives for business customers who upgrade their facilities with energy efficient equipment. There were two specific program elements that were available to ComEd customers during program year 2: a Custom program and a Prescriptive program.

- Custom program incentives are available to customers for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects.

- The Prescriptive program provides an expedited application approach for nonresidential customers interested in purchasing efficient technologies. The program targets discrete retrofit and replacement opportunities in lighting, HVAC, motor, and refrigeration systems. A streamlined incentive application and quality control process is intended to facilitate ease of participation. Relationships with trade allies are a key strategy for promoting prescriptive incentive availability to customers.

ComEd retained KEMA Services Inc. as its program administrator responsible for day-to-day operations. 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 Prescriptive incentive cap for PY2 ending May 31, 2010 was $100,000 per facility, the Custom incentive cap was $200,000 per facility, and the combined cap was $300,000 per facility.

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

Pre-approval Application Submittal: Pre-approval is required for some Prescriptive projects, depending on the measures installed. Measures that require pre-approval include permanent lamp removal and T8/T5 new fluorescent fixtures with electronic ballasts.

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

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

Reservation: The program reserves the project funds once the pre-inspection report and/or initial project review is approved. Prescriptive lighting projects placed on a waiting list from December 2009 through February 2010 were offered in March 2010 the opportunity to participate in PY2 or PY3. In the event that a project is not completed within 90 days of the reservation and an extension has not been requested and granted, then the project is cancelled.

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

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

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

1.7 C&I Retro-Commissioning

The *Smart Ideas* Retro-Commissioning (RCx) Program provides a platform to assist commercial and industrial customers to improve performance and reduce energy consumption through the systematic evaluation of existing building and industrial systems. Low- and no-cost measures are targeted and implemented to improve system operation, reduce energy use and demand, and, in many cases, improve occupant comfort. The Smart Ideas Retro-Commissioning Program aims to streamline the typical retro-commissioning process in order to facilitate timely turnaround projects.

Unlike Prescriptive or Custom Programs that focus on new efficient equipment, the Retro-Commissioning Program focuses on using existing equipment more efficiently to save energy while still delivering the required services to support the building occupants. Day-to-day administration of the Retro-commissioning Program is performed by a third-party program administrator (PA), Nexant, Inc. The PA is responsible for all aspects of the program including participant coordination, technical resources, Retro-Commissioning Service Provider (RSP) recruitment and training, logistical support, and technical review at each phase of the program.

The program is delivered in four main phases: application, planning, implementation and verification.

Application Phase. The facility owner or representative completes the application material and submits paperwork to the Program Administrator (PA). Based on the application material and some follow-up with the site, the PA selects sites that have the highest likely savings

opportunities. After accepting a project for the Program, an RSP is assigned, if necessary.[3,4] Projects that are screened out are given detailed reasons for non-acceptance. If other Smart Ideas programs are more appropriate, the customer is directed to applicable programs.

Planning Phase. The project planning phase commences after the customer and RSP complete the application. Activities include a kick-off meeting with the PA, ComEd representatives, and the RSP with the customer team during which expectations are described and roles and responsibilities are defined. A site assessment and data acquisition plan is also completed by the RSP during this phase. The findings of this plan are used to generate the Retro-Commissioning Plan for the project and assess potential measures and project economics.

The Retro-Commissioning Plan establishes the framework and direction for the Implementation Phase. Upon completion of the retro-commissioning plan, another meeting is held with the owner representative and engineering staff to review the scope of the plan and the impacts and economics of the identified potential measures. At the completion of the Planning Phase, the facility owner enters into the formal Program Agreement.

The Program Agreement includes several components that define the roles and responsibilities of each party. The primary goal is gaining the customer's spending commitment - $10,000 or $20,000, depending on the magnitude of the retro-commissioning study – for agreed-upon retro-commissioning measures that result in a bundled estimated simple payback of 1.5 years or less.

These measures must be installed within the program year the project is started. For projects that are not completed within one calendar year, the customer will be expected to refund the cost of the retro-commissioning study. Additionally, the agreement acts as a decision point at which the customer selects measures from the Planning report that they wish to pursue for further investigation in the next phase.

Implementation Phase. This work takes the consensus decisions from the Planning Phase and builds on them. Additional field data is gathered to better define, augment, add to, or discard measures presented in the Plan. The RSP and customer's team members work together to implement the measures in the Plan. This may involve coordination of multiple contractors to ensure that the Plan measures are executed to save energy.

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[3] In most cases, the RSP generated the lead: and therefore, is the default RSP. Assignment only occurs when the customer is not yet working with an RSP.

[4] Retro-Commissioning Service Providers are qualified through the Program by ComEd staff and the Program Administrator. RSP training conducted by the PA and ComEd must be completed prior to participation with the program.

Verification Phase. After measures are implemented, the RSP evaluates data from the facility to determine that measures are operating as intended to save energy. These data might be observations of installed and/or repaired equipment, trend data from an automation system, or data from dataloggers installed after the measure was implemented. The RSP prepares a report describing the status of implementation and revised savings estimates based on observations and measurements.

The program is marketed primarily through one-on-one marketing to candidate facilities by the Program's qualified RSPs. A total of nine RSPs were recruited for PY2. ComEd program staff and the PA, as well as ComEd Account Managers also contribute to program promotion. The PA and ComEd collaborated to produce marketing materials, and the PA conducts marketing training with ComEd support.

1.8 C&I New Construction

The C&I New Construction program began in the second program year (PY2) of the ComEd portfolio of energy efficiency programs. It is designed to capture immediate and long-term energy efficiency opportunities that are available during the design and construction of new buildings, additions, and renovations in the non-residential market. The program provides incentives to improve the efficiency of building systems (e.g., lighting and/or HVAC) in new construction (system track) as well as through integrated whole building design (comprehensive track). Early in the program year, a small business track was added with incentives for buildings less than 20,000 square feet. This track attempted to move lighting/daylighting systems beyond the systems track level of efficiency. Projects were expected to come from a mix of system, small business, and comprehensive tracks.

Through market preparation activities, this program has also attempted to achieve beneficial impacts that extend beyond the life and scope of the program. Market preparation entails moving the awareness and knowledge gained by designers and architects through program participation into their standard construction practice through an integrated education and training effort.

The program is a turn-key approach provided by the Energy Center of Wisconsin (ECW).

1.9 Small C&I CFL Intro Kit

The Small C&I Intro Kit lighting program provided a point-of-entry to ComEd's Smart Ideas for Your Business program and increased the market penetration of energy-efficient lighting by offering free CFL bulbs to hard-to-reach (HTR) small business customers. The Small C&I Intro Kit lighting program was implemented in the first program year and was not repeated in the second year. However, some of the measures distributed in the first year were installed in the second and are addressed in the current evaluation report.

1.10 Central Air Conditioning Cycling

Central Air Conditioning Cycling is a residential direct load control program that ComEd has been running since 1996. The program allows ComEd to cycle off and on a participant's home central air conditioner condenser so it uses less electricity on the hottest days of the year. The air conditioner's fan remains powered to circulate air to help the participant's home stay comfortable.

Customers can select either a 50% cycling option or a 100% load shed option. They receive an annual incentive of $20 for cycling or $40 for load shed. Approximately 60% of participants are on the 100% load shed option.

At the end of 2007, there were approximately 50,000 participants in the program. The evaluation covered only the participants who joined the program since 6/1/2008 and not those who were already in the program. Impact evaluation of this program is regularly performed by GoodCents Solutions, the installation contractor, based on a sample of approximately 250 customers that have whole house interval meters installed. Estimated program impacts are reported annually to PJM ISO as demand response resources.

Control events were called fifteen times between 1996 and 2006. New guidelines from PJM now require that an annual system test be run at least once each year.

Section 2. Evaluation Methods

The ComEd EM&V team developed an evaluation work plan for each program in the portfolio. Methods employed consisted of a combination of surveys, secondary research, on-site data collection, modeling, engineering review, program database and other information reviews, and staff interviews. Table 2.1 summarizes the main evaluation tasks for each program.

Table 2.1. Summary of Evaluation Tasks

Program	Action	Impact	Process	Details
All Programs	Manager interview	✓	✓	Program procedures, impact assumptions
	Review Tracking Database	✓	✓	Quality control, meet the needs of the program
	QAQC	✓	✓	Quality control, meet the needs of the program
	In-depth Interviews with Program Implementers		✓	Process-related strengths and weaknesses
Residential Energy Star Lighting	Phone Survey of Upstream Markdown Participants and Nonparticipants	✓	✓	Installation rate, free rider, spillover and process issues
	In-depth interviews with lighting manufacturers	✓	✓	Process issues, free rider
	In-depth interviews with corporate retailers and retail store managers	✓	✓	Process issues, free rider
	In-store intercept surveys	✓	✓	Installation rate, free rider, spillover and process issues
	In-store shelf survey	✓	✓	Installation rate, free rider, spillover and process issues
	Engineering calculation of gross savings	✓		Impact realization rate
	Net program savings using customer self-report, supplier self-report, and revealed preference	✓		Impact realization rate

Program	Action	Impact	Process	Details
	demand modeling			
Appliance Recycling	Regression modeling of Unit Energy Consumption for Refrigerators and Freezers	✓		Based on secondary data for 1600 metered units applied to characteristics of collected units
	Phone Survey of Participants	✓	✓	Part-use factor, free rider, and process evaluation
	Phone survey of nonparticipants	✓	✓	Part-use factor, free rider, and process evaluation
All-Electric Efficiency Upgrade	Engineering review of energy savings	✓		Impact estimates
	Phone survey of participants	✓	✓	Installation rate, free rider, spillover and process issues
	Phone survey of building owners/managers	✓	✓	Installation rate, free rider, spillover and process issues
All-Electric Single Family Home Energy Performance Tune-Up	Engineering review of energy savings	✓		Impact estimates
	Phone survey of participants	✓	✓	Installation rate, free rider, spillover and process issues
Central Air Conditioning Efficiency Services	Field verification of Tune-Up parameters	✓		
	Engineering review of energy savings	✓		
	Billing analysis for Quality Install	✓		
	In-depth interviews with contractors, ComEd staff, and implementation contractor	✓	✓	Data tracking and process issues
Business Prescriptive	Phone Survey of Participants	✓	✓	Installation rate, free rider, spillover and process issues

Program	Action	Impact	Process	Details
	Project File Engineering Review	✓		Impact realization rate
	On-Site Visits	✓		Impact realization rate
	In-depth interviews with Participating and Non-Participating Market Actors	✓	✓	Free rider, spillover and process issues
Business Custom	Same as Business Prescriptive			
C&I Retro-Commissioning	Engineering Review of Savings	✓		
	In-depth interview with participants	✓	✓	Installation rate, free rider, spillover and process issues
	In-depth interview with Retro-commissioning service providers (RSP)	✓	✓	Installation rate, free rider, spillover and process issues
C&I New Construction	In-depth interview with participants	✓	✓	Installation rate, free rider, spillover and process issues
	Engineering Review of Savings	✓		
Central Air Conditioning Cycling	Phone survey of participants	✓	✓	Response to event, program awareness, process issues
	Content Review of Marketing Materials		✓	Process issues
	Comparison of new participant characteristics to existing participants	✓		Verify applicability of existing impact estimates from metered sample

Section 3. Portfolio Level Results and Recommendations

This section will present an overview at the portfolio level of the results and recommendations from the impact and process evaluations.

3.1 Portfolio Level Impact Results

The ComEd program tracking systems reported 604,981 MWh of savings at the portfolio level for PY2 (Table 3.1). Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 113% of those estimated gross savings had been realized. Additional evaluation work to estimate free riders and spillover effects resulted in an overall net-to-gross ratio of 0.67. The results of all the individual program reviews was an ex-post estimate of 456,151 MWh of verified net savings at the portfolio level (not counting PY1 carryover). The statutory requirements for PY2 were 312,339 MWh. During PY2, the ComEd program tracking systems portfolio achieved 146% of the statutory requirements.

Table 3.1. Portfolio Level Program Year 2 Results

	Ex-Ante Gross (MWh)	Realization Rate	Ex-Post Gross (MWh)	Net-to-Gross Ratio	Ex-Post Net (MWh)
Residential Energy Star Lighting	295,307	117%	346,526	0.58	202,557
Appliance Recycling	50,147	87%	43,788	0.75	32,624
All-Electric Efficiency Upgrade	3,094	68%	2,090	0.80	1,840
All-Electric Single Family Home Energy Performance Tune-Up	672	107%	721	0.88	638
Central Air Conditioning Efficiency Services	5,972	33%	1,964	1.00	1,964
Business Prescriptive	213,522	121%	259,093	0.74	191,896
Business Custom	26,805	85%	22,697	0.76	17,255
C&I Retro-Commissioning	7,847	91%	7,174	0.92	6,574
C&I New Construction	1,615	85%	1,368	0.59	803
ComEd Total	**604,981**	**113%**	**685,421**	**0.67**	**456,151**
PY1 CFL Carryover					
Residential Lighting	18,761	100%	18,761	0.69	12,973
Small C&I CFL Intro Kit	5,371	100%	5,371	0.56	3,008
Total PY1 Carryover	**24,132**		**24,132**		**15,981**
Portfolio Total with Carryover	**629,113**		**709,553**		**472,132**
Statutory Requirements					**312,339**
Comparison to Statutory Requirements					**159,793**

Definitions

- Ex-Ante Gross MWh are the expected total savings based on installed measures under the program. This information comes from ComEd's data tracking system.
- The realization rate represents the % of Gross MWh accepted after verification by evaluators.
- Ex-Post Gross MWh are the accepted savings from program after verification by evaluators.

- Net-to-Gross (NTG) is the ratio of accepted program savings due to program influence over accepted program savings.
- Ex-Post Net MWh are the accepted savings due to program influence.

3.2 Portfolio Level Process Results

The primary objective of the process evaluation effort is to gather market intelligence to help program designers and managers structure their programs to achieve cost-effective savings while maintaining high levels of customer satisfaction. Specific process evaluation methods and objectives vary based on each individual program's needs and stage of development, and detailed process findings are reported separately for each program in the individual evaluation reports. However, customer satisfaction is a key component of each process evaluation and a comparison of customer satisfaction scores across programs is presented in Table 3.2. While there are slight differences in how each score is assessed, it can be seen that all scores indicate high levels of customer satisfaction.

Table 3.2. Summary of Customer Satisfaction Scores

	Sector	Customer Satisfaction	
Energy Efficiency		Score	Details
Residential Energy Star Lighting	Residential	78%	*Satisfaction with bulbs purchased*
Appliance Recycling	Residential	94%	*Score of 7 to 10 on a 10-point scale* *Convenience of home pick-up is biggest reported benefit*
All-Electric Efficiency Upgrade	Residential	95%	*Average Score of 9.3 for residents* *Average score of 8.5 for building owners and managers*
All-Electric Single Family Home Energy Performance Tune-Up	Residential	92%	*Score of 7 to 10 on a 10-point scale* *Program staff received high praises*
Central Air Conditioning Efficiency Services	Residential	NA	*Contractors generally satisfied with program administration*
Business Prescriptive	C&I	97%	*Customer satisfaction is high.* *Contractors are satisfied with the program.*
Business Custom	C&I	98%	*Customers, contractors are satisfied.* *Small sample size.*
C&I New Construction	C&I	NA	*Participants are satisfied with the program. Small sample size.*
C&I Retro-Commissioning	C&I	NA	*Participant and RSP satisfaction with the program is very high.* *Small sample size.*
Small C&I CFL Intro kit	C&I	NA	*Process evaluation not conducted in PY2.*
Demand Response			
Central Air Conditioning Cycling	Residential	78%	*Customers report highest satisfaction with monthly bill credit.*

3.3 Portfolio Level Cost Effectiveness

Cost effectiveness was determined for individual programs and for the portfolio of programs as a whole. It 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."*[5]

ComEd uses DSMore™ software for the calculation of the TRC test.[6] 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 PJM Northern Illinois region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact on electric prices that comes from extreme weather conditions. Extreme weather creates extreme peaks which create extreme prices. These extreme prices generally occur as price spikes and they create a skewed price distribution. High prices are going to be much higher than the average price while low prices are going to be only moderately lower than the average. DSMore is able to quantify the weighted benefits of avoiding energy use across years which have this skewed price distribution.

Table 3.3 shows that all of the individual ComEd programs, except the All-Electric Single Family Home Energy Performance Tune-Up, Central Air Conditioning Efficiency Services, and C&I New Construction,[7] are cost effective, with TRC values greater than one which means that total benefits are greater than total costs. The programs with TRC values under one were first-year programs in PY2. A modified TRC calculation is being used for Illinois, which includes an environmental benefit for CO2 reductions valued at $.013875/kWh. The Illinois TRC for ComEd's portfolio is 2.84.

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[5] Illinois Power Agency Act SB1592, pages 7-8.
[6] Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.
[7] The Single Family and C&I New Construction programs were in their first year in PY2. It is expected that the TRC will be greater than one in PY3 since administrative costs will moderate and participation will increase.

Table 3.3. Cost Effectiveness of ComEd Portfolio

Program	Ex-Post Net (MWh)	Illinois Total Resource Cost Test
Residential Energy Star Lighting	202,557	5.84
Appliance Recycling	32,624	3.97
All-Electric Efficiency Upgrade	1,840	2.50
All-Electric Single Family Home Energy Performance Tune-Up	638	0.95
Central Air Conditioning Efficiency Services	1,964	0.33
Business Prescriptive	191,896	2.67
Business Custom	17,255	1.82
C&I Retro-Commissioning	6,574	1.41
C&I New Construction	803	0.87
Central Air Conditioning Cycling	NA	3.73
ComEd TOTAL	**456,151**	2.84

Note: The Central Air Conditioning Cycling program saves 13.6 MW of demand, but no energy.

Additional costs are included in the determination of the TRC ratio at the portfolio level. These are costs related to the overall delivery of energy efficiency and demand response programs that cannot be assigned to any of the individual evaluated programs, like evaluation, measurement and verification costs, portfolio-level administration costs, research and development costs, educational outreach costs and Energy Insight Online (EIO) costs.

3.4 Portfolio Level Conclusions and Recommendations

Customer Information

From last year to this year, several programs improved their processes to collect accurate customer information. However, some programs failed to collect important customer contact information. The impact of missing customer information affects the efficiency level of reaching program participants and resulting process evaluation findings.

Program Tracking Data

The program tracking systems continue to be generally well designed and populated with the information needed for program evaluation purposes. The evaluation team found that many programs provided timely, complete and accurate program documentation. The evaluation team would like to commend the Business Prescriptive program, in particular, for its complete and accurate program documentation.

However, the evaluation team found that customer information was incomplete or missing for several programs, including the All-Efficiency Energy Efficiency Upgrade, Appliance Recycling, Business Custom, Business Retro-Commissioning programs. The impact of missing program tracking information affects the evaluation team's ability to calculate accurate impact savings. For example, the value for estimated peak demand savings is populated with zeros in more than 50% of the projects in the Business Custom program tracking database.

Therefore, the evaluation team continues to recommend that program tracking data across all programs receive periodic reviews for data quality and completeness.

Gross Savings Estimates

The gross savings realization rates were greater than 1.0 for three programs (Residential Energy Star Lighting, All Electric Home Energy Performance Tune-Up, and Business Prescriptive) and were less than one the remainder. ComEd should consider revising its tracking system estimates for some key parameters for the programs for which the realization rates were found to be significantly different than 1.0.

Net-to-Gross Ratios

The NTG ratio improved from PY1 for Business Prescriptive and Custom and worsened for Residential Lighting. Across the portfolio it dropped modestly from 0.68 to 0.67. The estimated net-to-gross (NTG) ratios for several programs continued to be well below ComEd's program planning assumptions, which were generally 80% NTG.

Customer Satisfaction

Customer satisfaction rates continued to be quite high, with several programs with satisfaction rates above 90%. This indicates that the programs are being well run, and no major changes are needed to address program process issues.

Energy and demand calculations

ComEd program managers examined the EM&V recommendations from the PY1 reports and in some cases made adjustments to assumptions and algorithms used to calculate savings for PY2 projects. In part because of this effort, four programs saw their gross realization rates move closer to 1.0 (Residential Lighting, Appliance Recycling, Business Prescriptive, Custom, and RCx). In PY2 the evaluation team continued to examine impact assumptions and algorithms, provide feedback to ComEd, and identified a number of further updates that could be addressed through an iterative process between the evaluation team, ComEd, and the program implementer in PY3. The evaluation team recommends that this collaborative process continue and that the program implementers continue to improve systems for ensuring that the calculations and procedures proceed as planned.

Adjustments and refinements were made to default savings of many programs during the PY2 evaluation. The evaluation team found that in the Business Prescriptive program, ComEd is to be commended for improving default estimates of HVAC full load hours from PY1 to PY2. The Residential Energy Star lighting program adjusted the gross realization rate, hours of use, peak load coincidence, net to gross ratio and installation rate and location of installs, storage.

The C&I Retro-Commissioning program has developed guidelines for its service providers to use to estimate energy savings from complex projects associated with the program. However, the service provider spreadsheets were not consistent during PY2. Using standard templates will greatly increase the program's accountability and reliability, which ComEd indicates will be available for PY4 projects.

Increase technical and marketing training and resources to trade ally network and contractors

Contractors were found to be very important drivers to several programs. Contractors participate in some programs without registering as trade allies. For example, only 31% of contractors who implemented a Business Prescriptive project in PY2 were registered trade allies. Targeted trade ally recruitment and marketing should be increased for the appropriate trades for specific programs. For example, in PY2 only 28% of contractors involved in a custom project also completed a prescriptive project. Therefore, marketing, training, and recruitment efforts for particular programs should specifically target contractors capable of implementing the appropriate projects.

According to program reports, almost all of the interviewed contractors who are registered trade allies have attended some kind of training. Overall, contractors found training events to be useful in explaining the program requirements. ComEd and program implementers may consider opportunities to provide additional training for contractors and trade allies, including creating or increasing incentives for registering as a trade ally, attending training events and bringing customers to ComEd programs. In addition, training sessions help increase communication between the program implementer and participating contractors and trade allies, and can potentially reduce the number of mistakes in program applications or paperwork and minimize dissatisfaction among customers.

However, registering as a trade ally may not, *per se*, be enough to prompt a contractor to participate in a program. For example, there are over 300 registered trade allies on the ComEd website. Even so, approximately two-thirds of registered trade allies completed no projects or only one project in PY2. Contractors report barriers to participation such as administrative burden related to customer applications, perceived bureaucracy of program implementation, lack of steady program funding (especially for the Business program) and first-costs to customers, especially given the state of the current economic environment. When asked how the program could be improved, contractors recommended that the program utilize online tracking of application milestones. Contractors recommended additional resources to help overcome

barriers to participation including offering financing mechanisms for contractors, assigning a unique contractor ID and a unique project ID to be tracked in program tracking database(s).

Continue to improve communication among stakeholders, including account managers

The evaluation team found that several programs made significant improvements in communication among stakeholders. For example, stakeholders reported that the Business Prescriptive program engaged in proactive communication with trade allies and the addition of a "fund-o-meter" on the program's website was helpful in keeping all parties informed of the program's funding status. Nearly all interviewed lighting contractors were aware of the waitlist and believe it was communicated effectively by program staff. In addition, the C&I Retro-Commissioning program was reported as successfully implementing a strong communication and feedback process.

Effective communication could still be enhanced in several programs, according to stakeholders. For example, customers reported a lack of understanding about the progress of their project once accepted into the C&I New Construction program. In addition, although program staff reports that Account Managers have become more active in the Smart Ideas for Your Business Program during PY2, additional opportunities for Account Managers to help increase participation in the program appear to exist.

Consider strategic opportunities to increase customer awareness through public events, online and social media avenues, billing inserts and other opportunities.

Customer and contractor awareness of ComEd programs remains a barrier to participation. For example, according to the findings of the Residential Energy Star Lighting survey, only one in five ComEd customers is aware of ComEd's "Smart Ideas" program. Approximately half of the customers who purchased CFLs discounted through the ComEd program were *unaware* that the CFLs were discounted. According to the Appliance Recycling survey, when asked why they did not participate, 24% of respondents replied that they had only learned of the program *after* they had already gotten rid of their appliance through other means. In the All-Electric Home Energy Performance Tune-Up Program, 29% of respondents did not recall receiving a report with recommendations from the program. The Business Prescriptive survey found that a lack of program awareness remains the largest cited barrier (55%) followed by financial reasons (33%) for participants and contractors alike.

To the extent feasible, ComEd should consider strategic opportunities to increase customer awareness about energy efficiency programs through public events, online and social media avenues, billing inserts and other opportunities.

Several programs demonstrated flexibility to adapt to external circumstances.

Several programs reported that the economic environment was a barrier to participation for many stakeholders. Despite the difficult economic circumstances, several programs demonstrated flexibility to adapt to external circumstances and improve their likelihood of success. For example, the Business Prescriptive program expanded its communication with stakeholders and proactively decided to place only lighting projects on a waitlist. The program reported that it was able to accommodate all projects by the end of the program year.

The All-Electric Home Energy Performance Tune-Up Program implementer also adapted implementation practices as needed to improve program delivery. For example, the implementer switched from setting exact appointment times to providing windows of time in which the contractor would arrive and complete the program services. This allowed implementers to increase the number of homes visited from three to five per day. The implementer also started scheduling appointments geographically to save time spent driving in between participant homes. The program also used an adaptable incentive strategy that was altered as needed to reach the program's goals for participation and energy savings.

An additional external circumstance for some programs included unanticipated levels of customer participation. For example, the All-Electric Efficiency program changed its eligibility requirements to include buildings with gas space heating as long as there is an electric water heater. The program worked more closely with municipalities and housing authorities to gather information on qualified buildings. In addition, in PY1 the resident had to be home for the energy specialist to enter the home and make the upgrades. This changed in PY2 so that building maintenance staff can let the program staff into the homes when the resident is not present. Partly for this reason, in PY2 second visits to buildings were less common than in PY1.

3.5 Summary of DCEO ComEd Programs

Energy efficiency resources are also delivered to ComEd customers through programs administered by the Illinois Department of Commerce and Economic Opportunity (DCEO). DCEO programs focused on low income customers in the residential sector, and on public facilities (like schools and government buildings) in the business sector.

The results from the DCEO programs will be included as an addendum at a later date.

Section 4. Program Level Results and Recommendations

4.1 Residential Energy Star Lighting

The goal of the Residential Energy Star Lighting program for PY2 was to sell 7,860,000 discounted CFLs and CFL fixtures to residential customers within ComEd's service territory. The program sold a total of 7,377,518 standard CFL bulbs, 834,618 specialty CFL bulbs and 72,240 fixtures during PY2 for a total of 8,284,376 units.

4.1.1 Key Impact Findings

The energy goals for the program were 127,011 MWh and 12.0 MW. The PY2 ex-ante gross energy savings for this program (excluding PY1 late installs) were 295,307 MWh (before adjusting for installation and leakage), while the ex-post gross evaluation TRM verified savings were 346,526 MWh, resulting in a realization rate of 117 percent. The ex-post evaluation TRM verified net energy savings were 202,557 MWh, resulting in a net-to-gross ratio of 0.58. The TRM verified estimates reflect deemed values for average displaced watts (delta watts), hours of use, and peak load coincidence factor, adjusted for the additional impact of program bulbs that were installed in commercial locations. The evaluation verified savings estimates, by contrast, are derived from independent values for these same parameters, developed using data collected in the current evaluation and from reviews of other studies.

The ex-ante gross peak demand savings for this program (excluding PY1 late installs) were 19.6 MW, while the ex-post evaluation TRM verified savings were 48.6 MW. The ex-post evaluation TRM verified net peak demand savings were 28.4 MW. The net-to-gross ratio was 0.58.

The PY1 late installs gross energy savings were attributed at 18,761 MWh and PY1 late installs net energy savings were attributed at 12,973 MWh. PY1 late installs gross peak demand savings were attributed at 1.2 MW and PY1 late installs net peak demand savings were attributed at 0.8 MW. The net-to-gross ratio for PY1 late installs was determined to be 0.69.

Table 4.1 below provides the program reported and evaluation verified gross and net savings parameter estimates and gross and net energy and demand savings estimates. The table also includes evaluation verified PY1 late installs.

Table 4.1. PY2 Gross and Net Parameter and Savings Estimates

Gross and Net Parameter and Savings Estimates	Program Reported	Evaluation Verified		Evaluation TRM Verified
		PY2 Sales	PY1 Late Installs	
CFLs Distributed through the Program	8,343,233	8,284,376	442,870	8,284,376
Average Displaced Watts (Delta Watts)	41.4	49.2	49.6	49.6
Average Daily Hours of Use	2.34	3.12	2.34	3.12
Gross kWh Impact per unit	35.4	56	42.4	56.5
Gross kW Impact per unit	0.04	0.05	0.05	0.05
Total First-Year Gross MWh Savings	**295,307**	**463,834**	**18,761**	**468,060**
Total First-Year Gross MW Savings	**346**	**408**	**22**	**411**
Installation Rate*Leakage Rate	70%	74%	100%	74%
Peak-Load Coincidence Factor	0.081	0.136	0.054	0.16
Total Installed First-Year Gross MWh Savings	**206,715**	**341,398**	**18,761**	**346,526**
		360,159		
Total Installed First-Year Gross MW Savings	**242**	**301**	**22**	**304**
		323		
Total Installed First-Year Gross Peak MW Savings	**19.6**	**40.7**	**1.2**	**48.6**
		41.9		
Net-to-Gross Ratio (1-FR)	70%	58%	69%	58%
Total First-Year Net MWh Savings	**144,700**	**199,560**	**12,973**	**202,557**
		212,532		
Total First-Year Net MW Savings	**169**	**176**	**15.2**	**178**
		191		
Total First-Year Net Peak MW Savings	**13.7**	**23.8**	**0.8**	**28.4**
		24.6		

The primary drivers for these rates include:

The *Gross Realization Rate* was based on customer self-reported installation rates (from both the general population and in-store intercept surveys) and was estimated to be 74 percent across all bulb types[8], which is four percentage points higher than program reported (70 percent). The majority of the uninstalled bulbs were reportedly put into storage and will be

[8] Installation rates by bulb type were found to be 73% for standard CFLs, 80% for specialty CFLs and 89% for CFL fixtures.

installed when another bulb burns out. Fifty percent of the savings from these uninstalled PY2 bulbs will be attributed to PY3 savings and the other 50 percent will be attributed to PY4. Similarly, savings from 50 percent of the PY1 uninstalled bulbs are being attributed to PY2 (and are shown in the table above as PY1 Late Installs.)

The ex-post *Hours-of-Use* (HOU) and *Peak Coincidence Factor* estimates are higher than the ex-ante assumptions based on findings from the PY2 evaluation regarding the installation of program bulbs in non-residential locations. The PY2 recommended bulb split for residential versus non-residential installations based on the evaluation findings is 90 Residential/10 Non-Residential. Currently from an impact estimation perspective the program assumes all program bulbs are installed in residential locations. Bulbs installed in Non-Residential locations have much higher HOU (more than 4 times higher) and Peak Coincidence Factors (more than 10 times higher) and thus this 10% non-residential assumption had a major effect on gross impacts.

The PY2 *Net-to-Gross Ratio* was found to be 0.58 based on the average of the two customer self-report NTGR results (the General Population survey and the intercept survey). This estimate is lower than the 0.70 estimate used for program planning.

4.1.2 Key Process Findings

ComEd customers who have program discounted CFLs installed report high levels of satisfaction with them. Awareness of CFLs among ComEd customers is high, but it did not increase between PY1 and PY2. Penetration of CFLs also remained the same between PY1 and PY2. At the end of both years, two of three ComEd customers had at least one CFL installed in their homes.

Approximately 55% of ComEd customers purchased a CFL in PY2 (up from 52% in PY1) and the average number of bulbs purchased in PY2 was 14.2 (up from 10.8 in PY1).

The ComEd lighting program is reaching customers with relatively low CFL socket saturation prior to purchasing the program bulbs. Nearly one-third (33%) of purchasers report that they had no CFLs installed at all prior to their PY2 purchase. This suggests that the program is reaching newer CFL users.

However, a significant portion of program bulbs are being purchased by people who might have purchased the bulbs without the program or may end up putting these additional bulbs in storage. According to program surveys, 24% of program purchasers had CFLs in 75% or more of their sockets before their PY2 program purchase.

Only one in five ComEd customers is aware of ComEd's "Smart Ideas" program, which is essentially unchanged from PY1. Approximately half of customers who purchase CFLs that are

discounted through the ComEd program are unaware that they are discounted. Even fewer (12%) know that ComEd is the sponsor of the discount.

The in-store marketing campaign appears to have had greater impact than the out-of-store marketing, consisting of two bill inserts.

Price and unwillingness to replace working incandescent bulbs with CFLs remain barriers to CFL adoption.

4.2 *Appliance Recycling*

The Appliance Recycling program collected 25,735 units during PY2, approximately 80% of which were refrigerators.

4.2.1 Key Impact Findings

The revised PY2 goal for the Appliance Recycling program was 23,628 MWh. The program reported ex-ante gross energy savings of 36,671 MWh. The ex-post gross savings were 43,788 MWh, resulting in a gross realization rate of 119%. The ex-post net energy savings were 32,624 MWh, resulting in a net-to-gross ratio of 0.75. Table 4.2 below illustrates the program's gross and net savings estimates for each measure and for the overall program.

Table 4.2. Appliance Recycling PY2 Gross and Net Impact Parameter and Savings Estimates (MWh)

Gross and Net Impact Parameter and Savings Estimates	Program Tracking System Savings				Verified Program Savings			
	Refrigerators	Freezers	Room AC	Total Program	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	20,065	4,946	724	25,735	20,065	4,946	724	25,735
Annual kWh Savings Impacts								
Annual Gross kWh savings per unit (full-load operating hours)	2,021	1,928	80	---	2,021	1,928		---
Part-Use Factor	73%	73%	73%	---	87%	89%		---
Annual Gross kWh savings per unit adjusted for part-use	1,478	1,410	59	--	1,757	1,715	80	--
Program Gross MWh	29,655	6,973	42	36,671	35,248	8,482	58	43,788
Net-to-Gross Ratio (1-Free Rider %)	0.71	0.71	0.71		0.73	0.82	0.72	
Total PY2 Net MWh Savings	**21,023**	**4,944**	**30**	**25,997**	**25,663**	**6,919**	**42**	**32,624**

The Gross savings per unit (without adjustment for the part-use factor) are identical for the ex-ante and ex-post program-verified savings estimates. The differences in realization rates were the result of different assumptions used to calculate part-use factor and net-to-gross ratios. In its ex-ante estimates, ComEd assumed a part-use factor of 0.73, while the program verified part-use factors are 0.87 for refrigerators and 0.89 for freezers, respectively. As a result, ComEd assumed a net-to-gross ratio of 0.71, whereas the evaluation team calculated program-verified net-to-gross ratios of 0.73 for refrigerators and 0.82 for freezers, for an overall program net-to-gross ratio average of 0.75.

Total PY2 Gross demand savings were 7,334 kW and PY2 Net demand savings were 5,453 kW. The average program demand Net-to-Gross Ratio was 0.74. Table 4.3 below indicates gross and net demand savings estimates for each measure and for the overall program.

Table 4.3. Appliance Recycling PY2 Gross and Net Impact Parameter and Savings Estimates (kW)

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	20,065	4,946	724	25,735
Verified Annual kW Savings Impacts				
Annual Gross kW savings per unit (full-load operating hours)	0.30	0.26	0.04	---
Program Gross kW	6,020	1,286	29	7,334
Net-to-Gross Ratio (1-Free Rider %)	0.73	0.82	0.72	0.74
Total PY2 Net kW Savings	**4,383**	**1,049**	**21**	**5,453**

The per-unit demand savings assumptions for Refrigerators, Freezers and Room AC units were based on ComEd's ex-ante planning estimates. No adjustments were made to the gross demand savings reported by the program.

4.2.2 Key Process Findings

The vast majority of participants (94%) are satisfied with the program.

The convenience of the home pick-up, the $25 incentive and environmental benefits are the main reasons for participation and satisfaction cited by respondents.

Bill inserts are an effective method for increasing awareness of the program, as roughly 70% of participants and nonparticipant survey respondents learned of the program through bill inserts.

An additional means of learning about the program and participating was through ABT Electronics. Nearly 10% of the units collected in PY2 were obtained from this retailer.

The program's direct mail promotion yielded a response rate estimated at 1.2%.

4.3 *All-Electric Efficiency Upgrade*

The All-Electric Efficiency Upgrade program installed at least one efficiency measure in 4,219 tenant spaces.

4.3.1 Key Impact Findings

The All-Electric Efficiency Upgrade program's energy savings goal for PY2 was 1,782 MWh. The program achieved ex-ante gross energy savings of 3,094 MWh as recorded in the program tracking database. The evaluation team used a revised ex-ante gross energy savings estimate of 2,698 MWh, based on a memorandum (dated January 20, 2010) recommending default values for program measures to be used during this program year. The evaluation team found ex-post gross energy savings of 2,090 MWh resulting in a gross realization rate of 77%. The evaluation team found ex-post net energy savings of 1,840 MWh. The average net-to-gross ratio across all program measures was 0.88. Table 4.4 below provides the program's first-year gross and net energy savings by measure.

Table 4.4. PY2 All-Electric Efficiency Upgrade Gross and Net Energy Savings

Measure	Ex Ante Gross kWh	Ex Post Gross kWh	Realization Rate	Ex Post Net kWh	Net-to-Gross Ratio
13W CFL	52,021	49,940	96%	40,452	0.81
15W CFL	128,371	123,236	96%	99,821	0.81
20W CFL	762,011	731,531	96%	592,540	0.81
CFL (unspec.)	4,089	3,925	96%	3,180	0.81
Showerhead	1,015,146	710,602	70%	660,860	0.93
Kitchen aerator	410,319	262,604	64%	246,848	0.94
Bath aerator	325,952	208,609	64%	196,093	0.94
Total	2,697,909	2,090,448	77%	1,839,793	0.88

The PY2 All-Electric Efficiency Upgrade program achieved ex-ante gross demand savings of 223 kW and ex-post gross demand savings of 173 kW for a realization rate of 78%. The evaluation team found ex-post net demand savings of 151 kW, resulting in an average net-to-gross ratio across all measures of 0.87. **Error! Reference source not found.** below describes the gross and

net coincident demand savings from the PY2 All-Electric Efficiency Upgrade program by individual measure.

Table 4.5 PY2 All-Electric Efficiency Upgrade Gross and Net Demand Savings

Measure	Ex Ante Gross kW	Ex Post Gross kW	Realization Rate	Ex Post Net kW	Net-to-Gross Ratio
13W CFL	5	5	96%	4	0.81
15W CFL	12	11	96%	9	0.81
20W CFL	68	65	96%	53	0.81
CFL (unspec.)	0	0	96%	0	0.81
Showerhead	51	36	70%	33	0.93
Kitchen aerator	42	27	64%	25	0.94
Bath aerator	44	28	64%	26	0.94
Total	223	173	78%	151	0.87

A minor adjustment to reduce energy and demand impacts was made to CFL measure net-to-gross ratios based on analysis of participant survey questions that addressed removal of installed CFLs, program CFLs that were not actually installed and program CFLs that were placed into storage instead of installed.

Three adjustments were made to water savings measures that resulted in a significant reduction to ex post gross impacts. The first adjustment was due to recommended changes to the default per unit impact assumptions and algorithms as outlined in a memorandum from Navigant dated January 20, 2010. A second adjustment accounted for survey-based adjustments for removal, non-installation, and storage of water savings measures. Finally, the participant survey found significantly lower occupancy in residential units than assumed in the ex ante default assumptions. The participant survey resulted in the evaluation team calculating an ex post occupancy rate of 1.66 occupants per dwelling unit, compared with the default ex-ante occupancy rate of 2.35 occupants per dwelling unit.

The evaluation team recommends conducting periodic data quality review and assessment for the program tracking data and that data entry include checks for values outside of program limits. Data exported for the evaluation team should also be checked for anomalies. The evaluation team recommends that the implementer collect occupancy information in PY3, and that ComEd adjust the PY3 default per unit values for water savings measures.

4.3.2 Key Process Findings

Satisfaction with all elements of the program is very high for both residents and building owners and managers.

The direct installation of energy savings measures is effective. Nearly all participating residents have all of the measures installed. The installation rate ranged from 87% for low flow showerheads to 98% for CFLs.

The program's common area assessment is less effective at capturing potential energy savings from participating buildings, as the building owner must take the initiative to seek out installation assistance. Three building owners indicated they installed common area measures as a result of the common area assessment, but did not indicate applying for a Business Prescriptive rebate. The energy savings for these non-rebated common area measures are potentially significant additions to the program's energy impacts.

4.4 All-Electric Single Family Home Energy Performance Tune-Up

The All-Electric Single Family Home Energy Performance Tune-Up Program included 760 participants. The Program also ran an experimental pilot with 92 participating customers. The energy savings associated with this pilot program are excluded from the program's impact evaluation, based on ComEd's decision not to take credit for pilot program savings at this time.

4.4.1 Key Impact Findings

The All-Electric Single Family Home Energy Performance Tune-Up Program had a gross energy savings goal of 671 MWh. The program achieved ex-ante gross energy savings of 605 MWh and ex-post gross energy savings of 721 MWh for a gross realization rate of 119%. The program produced ex-post net energy savings of 638 MWh resulting in a net-to-gross ratio of 0.88. The program produced ex-ante gross peak demand of 60.3 kW and ex-post gross peak demand of 64.1 kW for a realization rate of 106%. The program produced 56.9 kW of ex-post net peak demand impact, resulting in a peak demand net-to-gross ratio of 0.89. Table 4.5 below indicates the PY2 program goals, evaluation impact results and corresponding realization rates and net-to-gross ratios.

Table 4.5. All Electric PY2 Home Energy Performance Tune-Up Program Impacts

	PY2 Goal	*Ex Ante* Impact	Ex-Post Result	Performance	
				Realization Rate	Net-to-Gross
Participants (#customers)	-	760	760	-	-
Gross Energy Impact (MWh)	671	605	721	119%	-
Gross Demand Impact (kW)	-	60.3	64.1	106%	-
Net Energy Impact (MWh)	399	514	638	-	0.88
Net Demand Impact (kW)	-	51.2	56.9	-	0.89

The program's realization rates were based on slight differences in the default values for installed measures between the evaluator-recommended values and the program planning assumptions. The high realization rate for energy impact is driven largely by the absence of ex-ante impact estimates related to energy survey recommendations, which are estimated to have generated 100 MWh during PY2. The direct install measures make up 84% of the ex-post gross kWh impact, and 96% of the ex-post gross kW impact. The impact study incorporated participant telephone survey data to refine gross impact estimates relating to the gross impact of the direct install measures, including measure installation rate, first year measure persistence, home occupancy and partial retrofit adjustments for water savings measures. A customer self-report method was used to estimate the NTG ratio for this evaluation, using data gathered during participant phone surveys.

4.4.2 Key Process Findings

Overall, this evaluation found that the program succeeded in delivering low-cost energy efficiency measures to high-use electric customers. The program evaluation found highly satisfied program participants, 92% of whom rated the program at a 7 or higher on a 10-point scale. Although customers indicate that they were highly satisfied with direct install measures, only 29% of respondents that participated in the program could recall receiving a home energy report as part of their home energy audit.

The program staff received extremely positive feedback from program participants and program staff. The program stakeholders indicate that the program staff was able to respond to external circumstances, thereby helping the program meet its energy goals for the year. For example, the implementer switched from setting exact appointment times to providing windows of time in which the contractor would arrive and complete the program services. This allowed implementers to increase the number of homes visited from three to five per day. The implementer also started scheduling appointments geographically to save time spent driving in

between participant homes. The program also used varied marketing channels and incentives, from an informational approach through mailings, to telemarketing, to offering incentives such as waiving the $25 fee and giving away $50 restaurant vouchers.

4.5 *Central Air Conditioning Efficiency Services*

The residential Central Air Conditioning Efficiency Services (CACES) program consists of two distinct programs (Diagnostics and Tune-Up program and Quality Installation program) serving different markets though a common marketing and delivery infrastructure. Both of these programs are co-marketed and branded as CACES and they have the same administrative staff at ComEd, Implementation Contractor (IC), and independent participating contractors who deliver the programs to consumers and are therefore reported together. Additional details about the performance of each individual program is included in the program report.

4.5.1 Key Impact Findings

The CACES program goals for PY2 were energy savings of 9,029 MWh and peak demand savings of 12.2 MW. The CACES program reported ex-ante gross energy savings of 5,972 MWh and the evaluation team found ex-post gross energy savings of 1,964 MWh for a gross realization rate of 33%. The CACES program reported ex-ante gross demand savings of 9.74 MW and the evaluation team found ex-post gross demand savings of 3.82 MW for a gross realization rate of 39.3%. The net-to-gross ratio for this program was determined to be 1.0, resulting in no changes between the ex-post gross savings estimates and the ex-post net savings estimates. Table 4.6 compares ComEd's original program planning savings estimate for the program to the final program achievement evaluated savings estimate.

Table 4.6 CACES PY2 Gross and Net Energy and Demand Savings Estimates

	Ex Ante Gross	Ex-Post Gross	Realization Rate	Ex-Post Net*	Net-to-Gross Ratio
Participants (#customers)	17,164	17,164	100%	17,164	1.0
Energy Savings (MWh)	5,972	1,964	32.9%	1,964	1.0
Demand Savings (MW)	9.74	3.82	39.3%	3.82	1.0

The CACES program more than doubled its participation goals, but the ex-post gross energy savings were much lower than ex ante gross energy savings reported because of two factors – lower hours of operation (both *monitored* runtimes and estimations of runtime using load research data which were subsequently weather normalized) and baseline equipment efficiency conditions that were better than anticipated.

The qualitative assessment of the net-to-gross ratio was based on in-depth interviews with contractors and determined to be 1.0. A quantitative assessment was not possible with the survey methods deployed in PY2.

It is important to realize that these results represent the first year of operation for this program. The program is innovative in its use of generally small vendors to market and deliver the program. Outreach to participating contractors and consumers continues with high-level goals to grow the program and change the way HVAC service is delivered in the ComEd service territory. Furthermore, the impacts of a poor economy are very difficult to determine.

4.5.2 Key Process Findings

Contractors seemed to be generally satisfied with overall program administration.

Contractors were less satisfied with the payment of incentives, though most attributed delays to the program start-up and noted that more recent payments had been more prompt. Several contractors noted that it was odd to receive dozens of $100 (for example) checks instead of one large check. Some contractors also noted that it was hard to keep track of open and closed rebates and that a tracking report would help greatly. Contractors also reported that they would like to see increased marketing efforts by the program.

One early concern with the program was the requirement for nameplate data to enter rated efficiency and capacity into the Service Assistant (SA) tool. The Service Assistant tool is a key part of the program's process. Much of both the technical and business trainings focus on incorporating the tool into standard practice. Although the use of the tool in the field is integral to the program, the administrative changes required to support the tool are substantial. Many contractors reported issues with the data entry process when first joining the program. Most of these contractors claim that their issues were resolved after using the tool and portal for a period of time. Larger contractors with dedicated administrative staff and multiple tools appear to have the most ease with the data entry process. Smaller firms without dedicated administrative staff were more likely to struggle with the process.

Contractors felt that both the technical and the administrative training sessions were useful and well-run. There were sufficient training opportunities such that scheduling training was not a burden.

Recommendations to improve the program's processes include implementing more quality control for acquiring complete data for each installation and linking that information with the program database. In addition, the evaluation team recommends that customer program participation be indicated by measure implementation dates rather than administrative dates (such as when checks are written) to reduce the impact of administrative lag time in the program's reporting requirements.

4.6 *Business Prescriptive*

The Smart Ideas for Your Business Prescriptive program (Business Prescriptive) included participation from 958 unique companies completing a total of 3,967 Prescriptive measures across 1,739 projects. The Business Prescriptive program is administered in conjunction with the Business Custom program, which allows considerable flexibility to adjust program funding as needed between the Custom and Prescriptive programs. Lighting measures comprised approximately 85% of the projects, approximately the same amount as PY1 and resulted in 94% of the ex-ante gross energy savings and 96% of the ex-ante gross demand savings.

4.6.1 Key Impact Findings

The PY2 energy savings goal was 86,510 MWh. The PY2 Business Prescriptive program reported ex-ante gross savings of 213,522 MWh and ex-post gross savings of 259,093 MWh, resulting in a realization rate of 121%. The evaluation team applied a net-to-gross ratio of 0.74 to yield net energy savings of 191,896 MWh. Table 4.7 below indicates the Business Prescriptive program's evaluation-adjusted gross and net energy savings for PY2.

Table 4.7. Business Prescriptive PY2 Gross and Net Energy Savings

Segment	Ex Ante Gross MWh	Ex Post Gross MWh	Realization Rate	Ex Post Net MWh	Net-to-Gross Ratio
Total	213,522	259,093	121%	191,896	0.74

The realization rate for energy savings was 1.21. The primary reason for this being greater than one is that verified annual hours of use were higher than default values for many projects. Annual hours of use were verified through a CATI survey with program participants or through on-site M&V. The hours of use adjustments increased and decreased impacts, depending on the project, but similar to PY1, there were a substantial number of industrial and warehouse business types with verified hours that exceeded default values.

The PY2 Business Prescriptive program achieved ex-ante gross demand savings of 45,641 kW and ex-post gross demand savings of 45,106 kW for a realization rate of 99%. The evaluation team applied a net-to-gross ratio of 0.74 to yield net demand savings of 33.4 MW. Table 4.8 below describes the gross and net coincident demand savings from the PY2 Business Prescriptive program.

Table 4.8. Business Prescriptive PY2 Gross and Net Demand Savings

Segment	Ex Ante Gross kW	Ex Post Gross kW	Realization Rate	Ex Post Net kW	Net-to-Gross Ratio
Total	45,641	45,106	99%	33,409	0.74

The high realization rate for demand savings reflects ComEd's rigorous quality control and verification procedures for the Business Prescriptive program. ComEd is to be commended for improving estimates of HVAC full load hours from PY1 to PY2. The PY2 default savings review identifies additional potential updates in PY3.

The mean NTG ratio increased significantly from PY1 (0.68) to PY2 (0.74). The primary driver in this increase was substantially lower free-ridership in the large project group. For large projects, the mean NTG ratio increased from 0.59 in PY1 to 0.77 in PY2. The increase was due to much higher component scores for factors that indicate the program had a higher influence on the decision to implement a project and to implement that project sooner than would have occurred without the program. The NTG ratio estimate for PY2 included a more complex "standard rigor" level of analysis conducted on larger projects, defined as those with incentives greater than $50,000 for a single project or multiple projects under a single contact name.

There was stronger evidence for spillover in PY1 than in PY2. An effort to quantify spillover savings, limited to the on-site M&V sample, found 885 MWh (0.5% of ex-post net energy savings) and 0.1 peak MW (0.3% of ex-post net demand savings) that were added to ComEd's net PY2 Prescriptive savings. The PY2 evaluation interviews with market actors provided evidence for program influence on vendors, and provide some evidence of the potential for non-participant spillover.

4.6.2 Key Process Findings

Participation in the Business Prescriptive program substantially increased in PY2, with participation by more national retailers, particularly in the retail/service sector, contributing to the increase. No Custom or Prescriptive applicants with non-lighting measures were wait-listed in PY2 based on available funding. Prescriptive lighting projects were wait-listed beginning in December 2009, but by March 2010 wait-listing ended and lighting projects were allowed again for PY2. Lighting projects placed on the PY2 wait list were offered the opportunity to participate in PY2 or in PY3. According to program staff, all waitlisted projects were able to participate before the end of the program year. Additional details about PY2 oversubscription and communication of the waitlist are included in the program report.

Customer satisfaction with the Business Prescriptive program remains very high. Notably, 97% of participants are satisfied with the Business Prescriptive program overall. Very few participants encountered problems while participating, and about three-quarters (74%) plan on participating again. Overall, participants are very satisfied with their contractor, and 96% would recommend their contractor to others.

Contractors continue to play an integral role in the Business Prescriptive program in both promotion and implementation of projects. According to participants, contractors remain the most important source of program information. While the Business Prescriptive program hasn't

influenced the business models of lighting contractors, many of whom were already recommending energy efficient equipment; many non-lighting contractors reported that they were more frequently recommending energy efficient equipment as a result of the Business Prescriptive program. Contractors expressed satisfaction with the Business Prescriptive program measures offered and found the incentives to be reasonable and fair. While nearly all interviewed lighting contractors were aware of the waitlist, they believe it was communicated more effectively by program staff this year than last year. However, the oversubscription still presented a problem for many contractors, as the availability of program incentives affected their business volume.

Only 31% of contractors who implemented a project in PY2 are registered trade allies. Almost all of the interviewed contractors who are registered trade allies have attended training. Overall, the contractors found the training events to be useful in explaining the program requirements.

Although program staff report that ComEd Account Managers have become more active in the Smart Ideas for Your Business Program in PY2, additional opportunities for Account Managers to help increase participation in the program appear to exist. In general, program staff would still like to see increased involvement by Account Managers.

4.7 Business Custom

The Smart Ideas for Your Business Custom program (Business Custom) included participation from 110 unique companies completing 340 projects. The Business Custom program is administered in conjunction with the Business Prescriptive program, which allows considerable flexibility to adjust program funding as needed between the Custom and Prescriptive programs. The Business Custom program continued recruitment of all custom projects throughout the program year. The adverse effects of oversubscription seen last year were thwarted through increased communication efforts with trade allies and customers. As indicated above, no Custom or Prescriptive applicants with non-lighting measures were wait-listed in PY2 based on available funding. Prescriptive lighting projects were wait-listed beginning in December 2009, but by March 2010 wait-listing ended and lighting projects were allowed again for PY2. Lighting projects placed on the PY2 wait list were offered the opportunity to participate in PY2 or in PY3. As a result, less than 5% of customers interviewed noted that the waitlist impacted their participation in the Business Custom program.

4.7.1 Key Impact Findings

The PY2 net energy savings goal for the program was 74,475 MWh and net demand savings was 13.7 MW. The Business Custom program reported ex ante gross energy savings of 26,805 MWh and ex post gross energy savings of 22,697 MWh for a realization rate of 85%. The verified net-to-gross ratio, 0.76, was slightly lower than ComEd's planning value of 0.80, but higher than the

net-to-gross ratio from the previous year. Table 4.9 indicates the PY2 Business Custom program gross and net energy savings.

Table 4.9. Business Custom PY2 Program Gross and Net Energy Savings

Segment	Ex Ante Gross MWh	Ex Post Gross MWh	Realization Rate	Ex Post Net MWh	Net-to-Gross Ratio
Total	26,805	22,697	85%	17,255	0.76

The Business Custom program reported ex ante gross demand savings of 2,910 kW and ex post gross demand savings of 2,890 kW for a realization rate of 99%. The evaluation team applied a net-to-gross ratio of 0.76 to result in ex post net demand savings of 2,197 kW. Table 4.10 indicates the PY2 Business Custom program gross and net demand savings.

Table 4.10. Business Custom PY2 Program Gross and Net Demand Savings

Segment	Ex Ante Gross kW	Ex Post Gross kW	Realization Rate	Ex Post Net kW	Net-to-Gross Ratio
Total	2,910	2,890	99%	2,197	0.76

Overall, the high realization rate is to be attributed to ComEd's quality control and verification procedures for the Custom Program. In particular, the program is strongest in the area of project screening and access to project documentation in electronic format. In the M&V sample, all measures were verified to be installed and operational, though not always operating in a fashion that is consistent with the ex ante documentation provided.

From a technical perspective, ex ante savings estimates were reasonably accurate, although some equations were not well supported or sourced. For example, the value for estimated peak demand savings is populated with zeros in more than 50% of the projects in the program tracking database, indicating that accurate estimation of peak demand appears to be given a lower priority than estimating energy savings.

4.7.2 Key Process Findings

Satisfaction with the Custom Program across various program processes and components remains very high. Notably, 98% of participants are satisfied with their participation in the Custom Program overall, a rating of 7 or higher on a scale of 0 to 10.

As in the Business Prescriptive program, contractors and trade allies continue to play an integral role in the Business Custom program in both promotion and implementation of projects. However, contractors implementing custom projects are clearly different from contractors implementing prescriptive projects: Only 28% of contractors involved in a custom

project in PY2 also completed a prescriptive project. Therefore, marketing, training, and recruitment efforts should specifically target contractors capable of implementing custom projects.

As in PY1, heavy industry accounted for the largest share of program savings. The grocery sector and retail/service sectors were two segments where the program participation significantly increased.

According to participants, contractors remain the most important source of program information. Overall, participants are very satisfied with their contractor and 94% would recommend their contractor to others. However, in general, customers reported that they did not believe that it is important that their contractor is affiliated with the Business Custom program.

Although program staff report that ComEd Account Managers have become more active in the Smart Ideas for Your Business Program in PY2, additional opportunities for Account Managers to help increase participation in the program appear to exist. In general, program staff report that they would still like to see increased involvement by Account Managers.

4.8 C&I Retro-Commissioning

The Smart Ideas for Your Business Retro-Commissioning program (C&I Retro-Commissioning) was implemented at full scale for the first time during PY2. A total of 14 sites comprising 15 buildings participated in the program, and more than 100 measures were implemented among those sites. One of these sites dropped out of the program prior to completion of its obligations, but did receive some incentive from ComEd and did implement several retro-commissioning measures. Participating facilities included five office buildings, two hospitals, two industrial facilities, a large retail facility, an education facility, a museum, and a hotel.

4.8.1 Key Impact Findings

The C&I Retro-Commissioning program had a goal of 6,456 MWh for PY2. The program reported total ex ante gross energy savings of 7,847 MWh. The average ex-ante energy savings per project was 560 MWh per year, with individual projects ranging from 95 MWh to 1,220 MWh. The ex-post gross energy savings were 7,174 MWh, for a realization rate of 91%. The PY2 ex-ante gross demand savings were 9.3 MW and the ex-post gross demand savings were 11.1 MW for a realization rate of 121%. The net-to-gross ratio was determined to be 0.92 for energy and demand savings, resulting in ex-post net energy savings of 6,574 MWh and ex-post net demand savings of 10.3 MW.

Table 4.11. C&I Retro-Commissioning PY2 Program Gross and Net Savings

Gross and Net Parameter and Savings Estimates	Ex-ante savings	Ex-Post savings	Realization Rate
Participants	14	14	100%
Gross MWh Savings	7,846.6	7,174.1	91%
Gross MW Savings	9.3	11.1	121%
Net-to-Gross Ratio (1-FR)	NA	0.92	
Net MWh Savings	NA	6,574.1	
Net MW Savings	NA	10.3	111%

The low realization rate for energy savings was due to two projects (one project with a 50% realization rate and another with a 32% realization rate). Based on review of all of the 14 participating projects, the evaluation team found that these projects were isolated errors in engineering calculations and inaccurate assumptions that affected the energy savings estimates. More details about these two projects are included in the program report.

The evaluation team applied installation-specific net-to-gross ratios where research found free-rider influence. The evaluation team attempted interviews with a census of program participants. Participant interviews also probed for evidences of spill-over. More information about net-to-gross and spillover calculations are included in the program report.

Free-Ridership is very low with this program as a whole. All surveyed participants either scored the program incentives as a very important influence on their decision to implement retro-commissioning, or they cited the influence of their retro-commissioning service provider in their decision to implement retro-commissioning measures.

4.8.2 Key Process Findings

Customers' satisfaction with the retro-commissioning program is high for the various program phases and the program overall. The program selected nine retro-commissioning service providers (RSPs) for PY2. Retro-commissioning service providers play a major role in the program and are responsible for much of the program's outreach and customer interface. RSPs are required to attend training and found the trainings to be helpful. All interviewed RSPs were generally very satisfied with the program and noted that the program has had an effect on their business practices, including recommending retro-commissioning services more often and adding new staff.

Customers are generally very satisfied with their RSPs and would work with them again or refer them to others. Satisfaction is similar for customers with or without a prior working relationship with the RSP. Consistent application of methods and assumptions will enhance the repeatability, consistency, and veracity of savings estimates as the program expands the number of RSPs as the primary delivery and savings estimation entities.

The program has implemented a strong communication and feedback process. This has enabled the program to quickly address and clarify issues and make any needed mid-course adjustments. While RSPs and customers find that participation processes are generally clearly explained, some RSPs expressed frustration with certain parts of the application and review processes, including not accounting for complex projects and access to facilities in program timelines.

4.9 C&I New Construction

The C&I New Construction program completed 16 projects in PY2, all of which were from the systems track. The program maintains three 'tracks' for projects. The systems track allows for less involvement by the implementer to cost effectively garner savings from lighting and HVAC systems.

4.9.1 Key Impact Findings

The C&I New Construction program's PY2 energy savings goal was 596 MWh. The program reported ex-ante gross energy savings of 1,615 MWh. The evaluation team found ex-post gross savings of 1,368 MWh for a realization rate of 85%. The program reported ex-ante gross peak demand savings of 309 kW. The evaluation team found ex-post gross peak demand savings of 296 kW for a realization rate of 96%. Table 4.12 indicates the program's gross and net savings.

Table 4.12. C&I New Construction PY2 Gross and Net Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Realization Rate	Ex-Post Net Savings	Net-to-Gross Ratio
Energy Savings	1,615 MWh	1,368 MWh	85%	803 MWh	0.59
Peak Demand Savings	309 kW	296 kW	96%	284 kW	0.59

The gross savings impact evaluation consisted of two aspects. The first, at program level, entailed an engineering review and evaluation of the overall program assumptions and algorithms used for calculating default measure gross savings estimates. The second portion, at measure level, focused on verification of individual project measure quantities and

characteristics that are used to calculate gross savings estimates for each project. The adjusted program assumptions and algorithms and the verified inputs were used to calculate the final ex post gross savings estimates for each project.

Where it was deemed appropriate during the evaluation, program level adjustments were made to the implementer assumptions primarily to improve consistency and accuracy of program verified savings. These included algorithm for calculating energy and demand savings for HVAC units and the use of lighting energy interactive effects when determining the energy savings for lighting projects. The engineering file review used the documentation available within each project file to verify the specific inputs into the savings algorithms. Where appropriate, adjustments were made to baseline and measure quantities, wattages, efficiencies, hours of use, etc, based on the information within each project file.

Our net-to-gross interviews reached participants representing 14 projects and 76% of the gross impacts. The net-to-gross ratio was 0.59 for the program (compared to the program tracking assumption of 0.85). This somewhat low value is due to three customers who represent 30% of the expected savings indicated that the program had no influence on the energy efficiency choices made within their building.

4.9.2 Key Process Findings

Participants are generally satisfied or very satisfied with the program and find it valuable, both for the available financial incentives and the information about energy efficient measures and design. While most were familiar enough with program processes to judge them positively, few knew about the technical assistance phase by name or were aware of training opportunities provided by the program's outreach activities. Customers reported a lack of understanding about the progress of their project once accepted into the program.

4.10 Small C&I CFL Intro Kit

The evaluation objectives of the PY2 Small C&I Intro Kit program were altered due to the extremely low customer response to the PY1 mini-catalog mailing. As a result, the primary objective of the PY2 evaluation was to quantify the gross and net energy impacts resulting from the free CFLs that were distributed, but not installed, during PY1 and are believed to be installed during PY2 (referred to as PY1 Late Installs).

The Small C&I Intro Kit distributed a total of 104,160 free CFLs during the first year of the program. The PY1 evaluation found that only 32% of all of the bulbs distributed were installed by the end of the program year, leaving 68% of the bulbs to be installed in future program years. In a memo to ComEd dated April 8th 2010, the evaluation team recommended, based on an extensive secondary literature review, that 50% of uninstalled bulb savings should be attributed to the following program year (PY2) and the remaining 50% should be attributed to the 2nd subsequent program year (PY3). Hence, the PY2 impacts include the savings resulting

from 50% of the PY1 uninstalled bulbs (which in the case of the Small C&I Intro Kit program equates to 34% of the overall PY1 bulbs). The balance of savings from the remaining 50% of uninstalled bulbs will be credited to the program in Year 3.

The PY1 evaluation also found that a large percentage of the program bulbs (nearly one-third) were installed in residences rather than businesses, and thus the savings from the PY1 bulbs were estimated using both residential and non-residential HOU and CF parameters. HOU and CF's are much lower for bulbs installed in residential locations than they are for bulbs installed in business locations. As part of the PY2 Residential Energy Star Lighting program evaluation, the CF estimate was reevaluated and updated accordingly. The new residential estimate was also applied to the fraction of PY1 Small C&I Intro Kit bulbs assumed to have been installed during PY2 in residential locations.

Based on this assumption, the PY2 evaluation gross energy and peak demand savings were estimated to be 5,371 MWh and 1.3 MW, respectively. The net energy and peak demand savings were estimated to be 3,008 MWh and 0.7 MW, respectively. The evaluation team applied a net-to-gross ratio of 0.56 to this program. Table 4.13 includes details about the program's gross and net parameters and savings.

Table 4.13. Small C& I CFL Intro Program PY2 Gross and Net Parameter and Savings

Gross and Net Parameter and Savings Estimates	PY1 Late Installs	
	Small Business	Residential
CFLs Distributed through the Program	25,068	10,412
Average Displaced Watts (Delta Watts)	48.3	48.3
Average Daily Hours of Use	10.1	2.34
Gross kWh Impact per unit	176.4	41.2
Gross kW Impact per unit	0.05	0.05
Gross Realization Rate	100%	100%
Energy Interactive Effects	1.12	1.00
Demand Interactive Effects	1.19	1.00
Peak-Load Coincidence Factor	0.86	0.062
Total First-Year Gross MWh Savings	**4,941**	**430**
	5,371	
Total First-Year Gross MW Savings	**1.4**	**0.5**
	1.9	
Total First-Year Gross Peak MW Savings	**1.23**	**0.03**
	1.26	
Net-to-Gross Ratio (1-FR)	56%	56%
Total First-Year Net MWh Savings	**2,768**	**240**
	3,008	
Total First-Year Net Connected MW Savings	**0.8**	**0.3**
	1.1	
Total First-Year Net Peak MW Savings	**0.69**	**0.02**
	0.71	

Source: ComEd PY1 Small C&I Final Report and PY2 Residential Lighting Report

These savings estimates are based on the following assumptions:

- A total of *35,480 program bulbs* were installed during PY2 (34% of all PY1 bulbs). Two-thirds of these (25,068) are believed to have been installed in small business locations and the remaining third (10,412 bulbs) are believed to have been installed in residential locations.
- The estimated *Displaced Watts* resulting from installing a program CFL was not changed from the PY1 evaluation estimate (48.3 Watts).
- The *Peak Coincidence Factor* (CF) parameter estimates for the bulbs installed in Non-Residential locations during PY2 are the same as those used in the PY1 evaluation. However, the Residential CF parameter estimates have been updated based upon findings from the PY2 Draft Residential ES Lighting program evaluation.

- The *Gross Realization Rate* was set equal to 100%, since program bulb installation rates were accounted for in the PY2 program bulb estimate (#1 above).

- The *Net-to-Gross Ratio* used to estimate net program savings for these PY1 Late Installs was set equal to 56% based on the PY1 Small C&I Intro Kit final evaluation report. No additional data was collected during this evaluation that would allow the evaluation team to update this parameter estimate.

4.11 Central Air Conditioning Cycling

ComEd's original target for the Central Air Conditioning Cycling program was 11.1 MW of summer peak savings from 7,695 new participants in PY2. The final PY2 report of claimed savings shows 13.55 MW of savings from 9,418 customers. At the end of Program Year 2, there were approximately 65,000 total participants in the program. Since this is a demand response program, there are no associated energy savings goals. The demand reduction achieved from these additional participants is expected to meet the statutory Demand Response goal, which is to reduce peak demand by 0.1% over the prior year for eligible customers.

4.11.1 Key Impact Findings

Verification and Due Diligence

All indications are that the GoodCents Solutions records of installations and removals are accurate and in good order.

Tracking System Review

The evaluation team found the tracking system data to be consistent, clean and in good order. We did not find any serious issues in the tracking system data for this program.

Comparison of Old and New Customers

Characteristics that were examined for similarities were geographic location, energy use, presence of multiple central AC units in the home, and selection of cycling level. The evaluation team did not find any significant differences in these characteristics between old and new customers from PY1 to PY2.

Verified Gross and Net Savings

ComEd's original target for the Central Air Conditioning Cycling program was 11.1 MW of summer peak savings from 7,695 new participants in PY2. The final PY2 report of claimed savings shows 13.55 MW of savings from 9,418 customers.

Table 4.14 compares ComEd's original program planning savings estimate for the program to the final program achievement evaluated savings estimate.

Table 4.14. Central Air Conditioning Cycling Program PY2 Planning and Program Achievement Gross Savings Calculations

Program Planning					Ex Post Evaluation Adjusted Achievement		
Participant Group	kW/ Cust	Customers	Share	MW	Customers	Share	MW
50% Cycling	0.909	3,147	40.9%	2.7	3,936	41.8%	2.97 MW
100% Cycling	1.818	4,548	59.1%	8.3	5,482	58.2%	10.58 MW
All Participants		**7,695**		**11.0**	**9,418**		**13.55 MW**

The biggest difference between program planning and program achievement comes from the increase in the number of customers that joined the program compared to the PY2 program participation goal. A smaller difference comes from the fact that the 100% cycling option was chosen by 58.2% of new customers, compared to the original estimate of 59.1%. There is no free ridership or spillover expected in a direct load control program, so the Net-to-Gross ratio for this program is one and the net savings equal the gross savings.

4.11.2 Key Process Findings

ComEd's implementation efforts are effective. Nearly all surveyed participants (95%) expressed satisfaction with the program in PY2. ComEd's marketing efforts for the program are very successful at generating program awareness and participation. Participants found the modalities of signing up for the program (e.g., mail, telephone, web site) easy to use.

The single residential control event examined by the evaluation was implemented effectively as nearly three quarters of participants who were home did not notice a change in the temperature in their home. Very few participants (n=4 out of 141 surveyed) experienced any technical difficulty with their air conditioner after the event.

Overall, program satisfaction is relatively high at 78%, while program retention is higher, as 87% of participants are unlikely to cancel their participation in the program. The program incentives and monthly savings are the primary drivers of program participation and satisfaction, especially among customers with the 100% option.

Section 5. Appendices

The program-specific reports will be attached as separate appendices.

A. Residential Energy Star Lighting

B. Appliance Recycling

C. All-Electric Efficiency Upgrade

D. All-Electric Single Family Home Energy Performance Tune-Up

E. Central Air Conditioning Efficiency Services

F. Business Prescriptive

G. Business Custom

H. C&I Retro-Commissioning

I. C&I New Construction

J. Small C&I CFL Intro Kit

K. Central Air Conditioning Cycling