

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

**Evaluation Report: Residential Energy
Star ® Lighting**

Presented to

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Section E. Executive Summary

This report presents a summary of the findings and results from the evaluation of ComEd's Residential Energy Star® Lighting program in Program Year 2010 (PY2)¹. The main goal of this residential lighting program is to increase the market penetration of energy efficient lighting within ComEd's service territory by offering incentives for bulbs purchased through various retail channels. The program also seeks to increase customer awareness and acceptance of energy efficient lighting technologies, as well as proper bulb disposal, through the distribution of educational materials.

E.1 Evaluation Objectives

The primary objectives of this evaluation are to quantify the gross and net energy impacts resulting from the Residential Energy Star Lighting program and to assess program participants' prior awareness of compact fluorescent lamps (CFLs) and satisfaction with the program.

E.2 Evaluation Methods

Table E-1 provides a summary of the data collection activities conducted as part of the PY2 Residential Energy Star Lighting Program evaluation. As this table shows, the data collection activities were quite extensive. The primary data collection activities included a series of in-depth interviews with program managers, program implementers and program trade allies (manufacturers and retailers); in-store intercept surveys with customers purchasing program and non-program bulbs; program and non-program shelf surveys; and computer-aided telephone interviews (CATI) conducted with random samples of program participants and non-participants. Data collected during these interviews and surveys were essential in evaluating the program from a process point of view and in estimating gross and net savings parameters.

¹ June 1, 2009 to May 31, 2010.

Table E-1. Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data	Program Participants (Upstream / Coupon)	Tracking Database	-	All	Ongoing
In-Depth Phone Interviews	ComEd Res Lighting Program Manager	Contact from ComEd	Residential Lighting Program Manager	1	February 2010
	ComEd Res Lighting Program Implementer	Contact from APT	APT Program Manager	1	February 2010
	Lighting Manufacturers	Tracking Database	Census of Program Manufacturers	10 Attempts 5 Completes	March – May 2010
	Corporate Retailers	Tracking Database	Census of Program Retailers	12 Attempts 5 Completes	March – April 2010
	Retail Store Managers	Tracking Database	Random Sample of Program Retailers	15 Attempts 11 Completes	June – July 2010
In-Store Intercept Surveys	Program and Non-Program Lighting Purchasers	Tracking Database	Random Sample of stores that would allow intercepts	381	January – February 2010
In-Store Shelf Surveys	Program and Non-Program Stores	Tracking and D&B Database	Random Sample of Program and Non-Program	34 Program 11 Non-Pgm	January – March 2010
CATI Phone Surveys	Residential Lighting Upstream Participants	Residential CIS	Random Sample. Survey questions used to identify Program Participants	201	May 2010
	ComEd Non-Participating Customers	Residential CIS	Random Sample. Survey questions used to identify Program Non-Participants	299	May 2010

Source: Navigant Evaluation Team

E.3 Key Findings

The goal of the Residential Energy Star Lighting program for PY2 was to sell 7.86 million discounted CFLs and CFL fixtures to residential customers within ComEd's service territory. Again in PY2, the program exceeded its goal. A total of 7,377,518 standard CFL bulbs, 834,618 specialty CFL bulbs and 72,240 fixtures were sold as part of the program for a grand total of 8,284,376 bulbs, which is 6 percent higher than the goal. Table E-2 below provides the program reported, TRM verified and evaluation estimated key gross and net savings parameter estimates (displaced watts, average daily hours of use, in-service rate, and net-to-gross ratio), as well as the first-year gross and net energy savings estimates. 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. Both the TRM verified and evaluation estimated numbers in this table are overall averages across all bulb types (standard, specialty and fixtures) and include the adjustment for the bulbs believed to have been installed in non-residential locations. Section 3.1 provides the evaluation estimates by bulb type and installation location (residential versus non-residential). Table E-2 below also provides the evaluation estimated savings estimates associated with the PY1 Late Installs (which are the savings resulting from 50% of the PY1 uninstalled (stored) bulbs believed to have been installed during PY2 based on the PY1 evaluation findings).

Table E-2. Ex-Post Program Savings

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		

Source: ComEd PY2 Goals Tracker, Tracking Database, and Navigant Evaluation Team Analysis

The PY2 net claimed ex ante energy savings for this program were 144,700 MWh,² while the evaluation net estimated ex post savings were 199,560 MWh³ resulting in a net energy saving realization rate of 138 percent (199,560/144,700). The net claimed peak demand savings for this program were 13.7 MW, while the evaluation estimated ex post savings were 23.8 MW, resulting in a net peak demand ex ante savings realization rate of 174 percent. The Gross energy

² Original goals for the PY2 Residential ES Lighting program were 126,349 MWh and 12.0 MW (coincident peak).

³ Excluding PY1 late CFLs installs.

and peak demand evaluation verified savings attainment rates (again without the additional savings from PY1 late installs) were both over 100 percent (165% and 208% respectively). The primary drivers for these rates include:

1. 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 types⁴, 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 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.)
2. 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.
3. The PY2 *Net-to-Gross Ratio* was found to be 58 percent based on the average of the two customer self-report NTGR results (the General Population survey and the intercept survey). This estimate is 83 percent of the estimate that was used for program planning (70 percent).

The overall annual gross and net program savings increase when the savings associated with the PY1 late installs are added. The final net realization rates with these additional savings are 147% (kWh) and 180% (peak kW).

Many of ComEd programs, including the Residential ES Lighting Program, revised their goals after the start of PY2 based on the overall portfolio performance and PY1 results. Table E-3 below compares the initial goals, the revised goals, the Ex Ante results (program reported), the TRM verified and the evaluation estimated results.

⁴ Installation rates by bulb type were found to be 73% for standard CFLs, 80% for specialty CFLs and 89% for CFL fixtures.

Table E-3. Comparison of Findings to Initial Program Goals

Savings Parameter	Initial PY2 Goal	Revised PY2 Goal	PY2 <i>Ex-Ante</i> Results	PY2 Ex Post Evaluation Estimated	PY2 TRM Verified
# of Bulbs	4,176,565	7,790,490	8,212,136	8,212,136	8,212,136
# of Fixtures	156,621	70,000	72,240	72,240	72,240
Net MWh Savings	126,349	127,011	144,700	199,560	202,557

Key Process Findings

- At the end of PY2, 79% of customers said they were aware of CFLs without being offered a description of the bulbs. Another 12% said they had heard of CFLs once they were read a short description. Awareness of CFLs among ComEd customers is high, but it did not increase between PY1 and PY2.
- Being aware of CFLs is not the same as having knowledge about their properties or experience with them. ComEd customers who were “aware” of CFLs were asked to rate their “familiarity” with CFLs on a four point scale that ranged from “not at all familiar” to “very familiar”. Familiarity with CFLs rose between PY1 and PY2 with 46% saying they were very familiar in PY2 compared to 34% in PY1.
- 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. However, customers who do have the bulbs installed have more of them, which suggests an increasing saturation rate (8.9 bulbs installed in PY1 compared to 13.3 in PY2).
- As in PY1, just over half of ComEd customers purchased CFLs during PY2 (52% in PY1, 55% in PY2). There was a large increase in the number of CFLs purchased though. ComEd customers, who purchased CFLs, bought an average of 10.8 CFLs in PY1 compared to 14.2 in PY2.
- The ComEd lighting program is reaching customers with relatively low CFL socket saturation prior to purchasing the program bulbs, as well as those who already had a lot of CFLs installed. Just over half (56%) had CFLs in less than 25% of their sockets prior to their purchase. Nearly one-third had no CFLs installed at all prior to their PY2 purchase. This suggests that the program is reaching newer CFL users. On the other hand, 24% of

program purchasers had CFLs in 75% or more of their sockets before their program purchase. 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.

- ComEd customers who have program discounted CFLs installed report high levels of satisfaction with them. Program purchasers who removed CFLs that they purchased in PY2 mainly did so because the CFLs burnt out or broke (79%) rather than being dissatisfied with the performance of the bulbs (17%).
- Price and unwillingness to replace working incandescent bulbs with CFLs remain barriers to CFL adoption. Despite ComEd's effort to get out the message to "Install Bulbs Now", many do not want to replace a light bulb that still works. Overcoming barriers will require a variety of messages. ComEd customers who have past experience with CFLs and still choose to purchase incandescent bulbs do not like the long warm up times of CFLs and still think they are too expensive. It is likely there is a segment of the population who will always buy the least expensive option so unless CFLs are the same price as incandescent bulbs, they will not purchase CFLs. Those who have not used CFLs admit they do not know much about them and just buy "regular" bulbs out of habit.
- The program is represented at a wide variety of retailer types and includes the major types of stores where ComEd customers purchase lighting. Therefore, lack of the presence of the program and lack of availability of discounted CFLs should not be barriers to participation or CFL adoption.
- 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 they are discounted. Even fewer (12%) know that ComEd is the sponsor of the discount.

ComEd emphasizes in-store marketing by providing participating retailers with considerable point of purchase materials. The out-of-store marketing consisted of two bill inserts. As expected, the in-store campaign appears to have had greater impact than the out-of-store marketing.

Section 1. Introduction to the Program

1.1 *Program Description*

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 of the CFL rebates were delivered via in-store coupons⁵ 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.

1.1.1 **Implementation Strategy**

Roles of the Implementation Contractor

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

⁵ 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.

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 that APT has utilized in about 90% of the programs they have implemented. Their primary role is processing incentive payments for the coupon and markdown program to industry partners. They collect all of the sales data and are responsible for paying retailers for their participation in the program. At the inception of each program, EFI takes all of the information from the MOU (participating stores, program SKUS, incentive levels, etc) and loads it into their system so that when retailers submit sales data and invoices for payment, EFI can verify that the sales occurring at participating retailers reflect program products, and the right incentive levels. EFI's goal is to make payments within three weeks of receiving sales data, and it has met that goal on nearly all records.

ComEd and APT have a very solid working relationship. They are in constant communication about the program and have not had any issues. The same is true for the relationship between APT and EFI. They have worked together on numerous lighting programs and have a very strong working relationship with clear channels of communication.

Program Timeline

The transition between PY1 and PY2 was a smooth one. All retailers but one were actively selling bulbs as of June 1, 2009. Due to some lingering legal issues, this retailer began selling bulbs later in June. By the end of June 2009, all new POP materials were in the stores.

Program Delivery Mechanisms and Marketing Strategy

In order to promote maximum retailer participation and allow a variety of retailers to participate, the Residential Lighting program offered retailers two rebate delivery mechanisms, upstream markdowns and in-store coupons.

Midstream Markdown

APT and ComEd prefer markdown partnerships because incentives are paid upon product sale, not upon product shipment, as is done with a buydown program. APT does not believe that an incentive should be paid upon shipment because there is no indication that the products are sold. With these partnerships, discounted bulbs are listed at lower retail prices on the shelves or are automatically marked down at the register. There are signs indicating the bulbs are discounted through ComEd, but customers may still be unaware that they are purchasing bulbs discounted through the program. They are also not asked to provide any contact information for follow up.

In order to participate in the markdown program, retailers are required to have a centralized automated data system that shows POS (Point-of-Sale) data at the individual store level for submission to APT/EFI for incentive payment. These types of systems are typically found in big box national chain stores. For stores involved in the markdown program, the MOU is signed at the corporate retailer level. For example, all of the stores of a particular retailer that are in ComEd's territory are required to participate in the program and are listed in the MOU. If the retailer has this data pull capability, all of their stores are included in the markdown program. Retailers that have the data pull capability in a majority of its stores, but not all are allowed to include the remaining stores in the coupon program.

In-Store Coupons

Customers purchasing bulbs at stores participating in the coupon program receive a \$1.25 discount on CFL single packs and \$3 off CFL multi-packs. Customers must fill out and redeem a coupon at the time of their purchase. The customer has to provide his or her name, address, and bulb information. Customers can purchase a maximum of 12 bulbs at a time (with a separate coupon required for each package). Coupon retailers then submit the completed coupons to EFI for reimbursement of rebate amounts.

Stores participating in the coupon program do not have POS capability, are typically smaller in nature, and tend to be individually-owned. These stores are the only ones that are eligible for the coupon program. For these retailers, the MOU is signed at the individual store level. This means that each individual store location decides whether or not to sign up for the program. The coupon portion accounts for a very small part of the entire program, less than 1% of program bulbs sold in PY2.

Retailer Recruitment

All PY1 retailers but one, Lowes, continued to participate in the program in PY2. Two new retailers, Wal-Mart and Meijer, joined the program for PY2.

Retailer Participation

In total, there were 12 retail chains that participated in the Residential ES Lighting Program in Program Year 2, which reflected 617 individual retail locations. Most of these retailers were recruited in Program Year 1 by responding to an RFP issued by ComEd, and continued their participation in Program Year 2. Two new retailers joined the program in Program Year 2 and one retailer from Program Year 1 stopped participating. Table 1-1 below lists the retailer categories that participated in the PY2 Residential ES Lighting Program, including the number and percentage of program bulbs and/or fixtures sold in each of the participating retailer categories, the number of storefronts within each of these categories, and the delivery method utilized by the category for program participation. As this table shows Big Box/DIY (Do It Yourself) stores were the largest category of participants accounting for 46% of the total

program bulb sales. Warehouse stores had nearly as large a share of program bulb sales (45%). Grocery stores, while having a relatively large number of participating storefronts, had the lowest overall program sales. This table also shows that overall more than 99% of the program bulbs were distributed through the markdown delivery channel.

Table 1-1. Retailer Participation

Retailer Category	Standard CFLs Sold	Specialty CFLs Sold	CFL Fixtures Sold	% of CFLs Sold	Store Fronts	Delivery Mechanism
Big Box/DIY	3,363,972	402,301	37,582	46%	246	Upstream
Warehouse ⁶	3,346,116	384,704	18,507	45%	34	Upstream
Grocery	274,412	13,392	1,765	3%	194	Upstream
Small Hardware	393,018	34,221	14,386	5%	143	Upstream/Coupon
Total Coupon	8,554	856	0	0.1%		Coupon
Total Upstream	7,368,964	833,762	72,240	99.9%		Upstream
Program Total	7,377,518	834,618	72,240	100%	617	Upstream/Coupon

Source: Evaluation team analysis of ComEd Tracking database

The Memoranda of Understanding (MOUs) that are negotiated with each of the program retailers set forth a specific number of bulbs that can be sold at the program discounted price. The program also encouraged a number of the retailers to begin selling bulbs and fixtures that were outside of their normal stocking mix.

Retailer Education and Outreach

Field representatives are at the heart of the ComEd Residential Lighting program and are trained to provide information about the program to the retailer partners. The training is usually one-on-one and is designed to educate the employee on ENERGY STAR, the features and benefits of CFL usage, how the bulbs work, what types are available for different applications, mercury content and how to distribute the information to the customers in the store. There are occasions where the field representative will be given the chance to present at all-store meetings, staff and store manager meetings.

Retailers are also given a manual with information about the program for reference. The field representative goes through this manual with the store manager and lighting employees to give

⁶ Warehouse stores include stores like Sam's Club and CostCo.

employees an understanding of the program and how they need to put the point of sale materials up.

1.1.2 Measures and Incentives/Marketing Strategy

Product Selection

APT and ComEd work to ensure that a wide variety of independently tested ENERGY STAR CFLs are available for the ComEd Residential Lighting program. APT has advised the program to provide discounts for both spirals and specialty bulbs across a wide mix of wattages. The program also includes pin-based fixtures. The program is intended to transform customers' lighting buying behavior, and part of that is exposing customers to different products that can be used in a variety of applications.

APT uses a number of criteria to determine whether a retailer/manufacturer partnership is a good fit for the program. APT examines the proposed product mix to ensure it includes a variety of bulb types and wattages. A focus on a single wattage or on spiral CFLs excludes customers who need other wattages or a specialty CFL. Because more people have become aware of CFLs in recent years due to other information campaigns and programs, an emphasis on spiral CFLs could make it difficult for the program to achieve its net savings goals as a greater number of participants might be more likely to buy spiral CFLs than specialty bulbs without the program incentive. APT is also concerned about the number of bulbs in the packages sold through the program. APT tries to match the package size to the retailer type. For example, smaller packages sell better at grocery stores, so APT does not allow grocery partnerships to sell packages containing more than four bulbs. Across all retailers, APT limits the number of SKUs sold that have large package sizes. Packages with 10 or more bulbs typically have low installation rates with a number of bulbs ending up in storage. The program has focused more on pack size in PY2 and is discounting more small packages than in PY1.

After reviewing the proposed products, APT provides its recommendation for each retailer to ComEd and obtains approval for the products that will be included in the program as well as the negotiated incentives.

Table 1-2 shows the distribution of program bulbs sold in PY2 across the three bulb types (Standard, Specialty and Fixtures) and the products (wattages for standard and bulb type for specialty). As this table shows 89% of the bulbs sold through the program were standard CFLs, 10% were Specialty CFLs and 1% were Fixtures. Within the Standard CFL group, the majority of bulbs sold were low-wattage CFLs (9-14 watts). The majority of the Specialty CFLs sold were Reflectors followed by A-Lamps.

Table 1-2. Distribution of PY2 Residential ES Lighting Program Sales across Bulb Types

Bulb Type	Product	Bulb Sales	%	Bulb Type Sales	%
Standard	40 Watt Replacement	461,302	6%	7,377,518	89%
	60 Watt Replacement	5,528,846	67%		
	75 Watt Replacement	495,674	6%		
	>=100 Watt Replacement	891,696	11%		
Specialty	Reflector	547,210	7%	834,618	10%
	A-bulb	145,583	2%		
	Globe	112,888	1%		
	Other Specialty	28,937	0%		
Fixture	Fixture	72,240	1%	72,240	1%
Residential ES Lighting Program		8,284,376	100%		

Source: Evaluation team analysis of ComEd Tracking data

1.2 Evaluation Questions

The evaluation sought to answer the following key researchable questions.

Impact Questions:

1. What is the level of gross annual energy (kWh) and peak demand (kW) savings induced by the program?
2. What are the net impacts from the program? What is the level of free ridership associated with the program, and how can it be reduced? What is the level of spillover associated with the program?
3. Did the program meet its energy and demand goals? If not, why not?

Process questions:

1. Has the program as implemented changed from the plan filed on November 15, 2007? If so, how, why and was this an advantageous change? Has the program changed since it was originally rolled out in PY1, and if so, why and how?
2. What are key barriers to participation for ComEd customers? How can they be addressed by the program?
3. How did customers become aware of the program? What marketing strategies could be used to boost program awareness and participation, if needed?
4. How efficiently is the program being administered? What methods could be implemented to improve the efficiency of program delivery?
5. What is the customer experience and satisfaction with the program and program bulbs?
6. What are the market effects induced by the program?

Section 2. Evaluation Methods

Numerous analytic methods and data collection activities have been, and will be utilized for the 3-year process and impact evaluations of the Residential ES Lighting Program. This section presents an overview of the analytic methods used during this second year of the 3-year evaluation. It also provides details on the extensive data collection activities implemented during PY2, including the data sources and sample designs used as a base for these data collection activities.

2.1 *Analytical Methods*

In PY2, the analytical methods used for the evaluation of the Residential ES Lighting Program were driven to a large extent by the data available for programs such as this that are delivered upstream at the retailer level. This delivery approach, while allowing for ease of program implementation and customer participation, increases the complexity of the program evaluation, since the program participants cannot be easily identified. The budget for PY2 was larger than the budget for PY1, which supported data collection in retail stores (via in-store intercepts and shelf surveys) and from lighting trade allies (via telephone interviews with manufacturers and retailers).

A secondary challenge encountered in the evaluation of the Residential ES Lighting Program stemmed from the many outside factors, such as global warming, the present economic conditions and the upcoming EISA regulatory changes, that are currently affecting CFL adoption in the U.S. These factors are very difficult to control for and thus can present measurement challenges within dynamic markets such as this. As a result, multiple analytical methods were applied to assess net program impacts. These allowed for triangulation of results across the various methods to provide an estimate of net program savings that is representative and robust for these dynamic and challenging market conditions.

2.1.1 **Impact Evaluation Methods**

Gross Program Savings

Gross energy and demand (coincident peak and overall) savings resulting from the PY2 Residential ES Lighting Program were calculated using the following algorithms:

Per Unit kWh Savings = Delta Watts * HOU * Realization Rate

Where:

HOU = Hours of Use

Delta Watts = Difference between Baseline Wattage (incandescent wattage) and CFL Wattage

Realization Rate = Installation Rate*Leakage Rate

Annual kWh Savings = Program bulbs * Per Unit kWh Savings

Per Unit kW Savings = Delta Watts/1000 * Realization Rate

Annual kW Savings = Program bulbs * Per Unit kW Savings

Per Unit Peak kW Savings = Per Unit kW Savings * Mean Load Coincidence Factor

Where Mean Load Coincidence Factor is calculated as the percentage of program bulbs turned on during peak hours (weekdays from 1 to 6 p.m.) throughout the summer.

Annual Peak kW Savings = Program bulbs * Per Unit Peak kW Savings

Table 2-1 below shows the data sources used to estimate the input parameters in the energy and demand savings algorithms for the Residential ES Lighting Program. Each of these parameters is described in further detail below.

Table 2-1. Gross Savings Parameter Data Sources

Gross Savings Input Parameters	Residential ES Lighting Program
Rebated Bulbs/Measures	PY1 and PY2 Program Tracking Data
Delta Watts	Program Tracking Data (DEER 2008 Measure Cost Data) / DEER Power Reduction Factor (DEER 2008 Deemed Savings Data) / Standard Equivalency Tables
Hours of Use	ANCOVA HOU Model ⁷ / Small Metering Study underway for PY3
Peak Load Coincidence Factor	ANCOVA CF Model ⁸ / Small Metering Study underway for PY3
Installation Rate	Telephone and In-store Intercept Surveys
Interactive Effects	Secondary Research
Leakage	In-store Intercept Surveys
Residential versus Non-Residential Installations	In-store Intercept Surveys / Secondary Research

Program Bulbs

The number of bulbs distributed through the program during PY2 is a key parameter in the calculation of total gross and net program savings and is derived from the Residential Lighting tracking databases (upstream and coupon) provided to the evaluation team by ComEd. PY2 bulb sales numbers include a small number of bulbs sold during PY1 (prior to May 31st 2009) that were invoiced after the PY1 sales cutoff date (and thus were not counted as PY1 sales in the Year 1 evaluation). PY2 bulbs sales numbers were also adjusted downward to correct for a small number of bulbs that were inadvertently double counted in the PY1 tracking data.

Delta Watts

The delta watts parameter is a measurement of the wattage displaced by the newly installed program CFLs. To estimate the number of watts displaced by program bulbs it is necessary to estimate the most probable incandescent wattage that the program bulb is likely to have

⁷ KEMA Inc. and The Cadmus Group, Inc., 2010. *Final Evaluation Report: Upstream Lighting Program*. Prepared for the California Public Utilities Commission, Energy Division. February 28, 2010.

⁸ Ibid.

replaced. Once this incandescent wattage has been estimated, the displaced watts (or delta watts) can be calculated as the difference between the wattage of the replaced incandescent bulb and the wattage of the new CFL. For this evaluation, delta watts was deemed at 49.6 watts based on ICC-adopted guidelines. Four additional methods were used to estimate the baseline incandescent wattage. The first used the incandescent equivalent base wattage included in the program tracking data (taken from the DEER Measure Cost Database⁹ for each program bulb), the second used the standard equivalency tables used in the PY1 evaluation, the third used the DEER 2008¹⁰ CFL Power Reduction Factor of 2.53, and the fourth used lumen equivalence between CFLs and the highest-selling incandescent bulbs by wattage group at General Electric and SYLVANIA.

Hours of Use (HOU)

In order to estimate the energy savings from a newly installed CFL, it is necessary to understand the number of hours the lamp is turned on each day (which can then be annualized by multiplying the daily value by 365 days). Assuming you have two bulbs that have displaced the same number of watts, the lamp that is turned on for a greater number of hours over the course of the year will yield a larger number of kilowatt hours saved. Based on results from last year's customer telephone survey and past lighting evaluations¹¹, both of which support the hypothesis that self-reported daily HOU for residential customers can be highly inaccurate, we did not ask customers to estimate their daily CFL bulb usage during the PY2 General Population telephone surveys. Instead we reviewed existing lighting logger studies that have directly measured residential hours of use, and we ran an HOU ANCOVA (Analysis of Covariance) model developed as part of a large California research study¹², with data collected during the ComEd General Population surveys, to estimate the PY2 average daily HOU. This ANCOVA model was developed within the California study using annualized logger data to calculate annual hours of use as a function of dwelling unit characteristics (such as number of bedrooms and bathrooms, whether children reside in the household, household CFL saturation, etc.), room type, lamp type, and service territory. A benefit of this type of model is that it can be easily be applied to other samples (as we have done here) to estimate the annual hours of use for each lamp within a given inventory. For the PY3, evaluation a small scale metering study is being conducted to estimate the HOU. The lighting loggers for this study are currently in the field and will collect data for a 6-month period ending in January or February 2011.

⁹http://www.deeresources.com/deer0911planning/downloads/DEER2008_Costs_ValuesAndDocumentation_080530Rev1.zip

¹⁰ 2008 DEER Update – Summary of Measure Energy Analysis Revisions, Version 2008.2.05 for 2009-2011 Planning/Reporting. December 2008. Page 15.

¹¹ KEMA, *CFL Metering Study*. Prepared for California's Investor-Owned Utilities (PG&E, SCE, SDG&E, and SoCalGas), February 2005.

¹² KEMA Inc. and The Cadmus Group, Inc., 2010. *Final Evaluation Report: Upstream Lighting Program*. Prepared for the California Public Utilities Commission, Energy Division. February 28, 2010.

Peak Load Coincidence Factor

The mean load coincidence factor (CF) allows for the estimation of the average demand savings that occur during ComEd's peak period (summer weekdays from 1 to 5 p.m.). Similar to the difficulties encountered when customers estimate their daily HOU, it is difficult for residential customers to correctly estimate the fraction of time their bulbs are turned on during the peak period. As a result a CF ANCOVA model that was developed as part of the same California research study mentioned above, was run with data collected during the ComEd General Population surveys to estimate the PY2 mean load coincidence factor. The CF ANCOVA model contains the same variables as for the HOU ANCOVA models, but with different parameter estimates that can be used to estimate the CF for each lamp in a given inventory. The light metering study currently underway will also be used to estimate this CF in PY3.

Installation Rate

In order for a program bulb to receive credit for energy savings in the Residential ES Lighting Program within a given program year, it must be installed within that program year. For PY2, we had two data sources from which to calculate the installation rate, the General Population survey and the In-store Intercept surveys. All customers surveyed as part of the PY2 General Population survey were asked whether or not they had installed (and not since removed) all or a portion of the CFLs they had purchased within the last year, and their responses were used to calculate an installation rate for the PY2 Residential ES Lighting Program. A second effort to calculate the PY2 installation rate relied on data collected during in-store intercept surveys with program bulb purchasers. Each of these respondents was asked how many of the CFLs they were purchasing they intended to install within the next six months. The installation rate was then calculated as the sum of this estimate of the CFLs installed divided by the sum of the number of CFLs purchased.

Energy Interactive Effects

CFLs use less energy than incandescent lamps to produce the same amount of useful light. As a result, CFLs produce less waste heat than incandescent lamps. During the cooling season, this reduction in heat produced by replacing incandescent bulbs with CFLs can provide the additional benefit of reducing cooling loads. Conversely, during the heating season, the reduced heat can result in net increases in heating requirements. These cooling benefits and heating penalties associated with CFL retrofits are referred to as "interactive effects".

Estimating the size of the interactive effects typically requires extensive building simulation modeling, preferably based on building prototypes developed to reflect the actual building stock and equipment holdings in a particular service territory. For this study, the available budget would not support conducting such building simulation modeling in order to derive robust estimates of interactive effects. However, these interactive effects have been estimated in other service territories, the results of which illustrate the relative magnitude of these

interactions across different end use loads. For example, comprehensive estimates of interactive effects for CFL retrofits in the residential and commercial sectors were developed and published as part of the recent update to the Database for Energy Efficient Resources (DEER) by the California Public Utilities Commission. The additional cooling energy savings from interactive effects were estimated to increase energy savings from CFLs by between 6.8% and 9.4% per lamp in the residential sector and between 4.0% and 18% per lamp in the commercial sector, depending on building type¹³. The recent DEER update also includes estimates of the heating penalties associated with CFL retrofits, which range from a 0.2% to 1.4% increase in the annual heating requirements of residential homes (per CFL retrofit). However, the true magnitude of these heating penalties has since been called into question based on a recent analysis of billing data for a sample of CFL program participants in San Diego Gas & Electric's service territory which showed actual heating penalties to be not statistically different from zero¹⁴.

So, although interactive effects do exist, we do not feel that the data exists to accurately estimate the magnitude of these effects for Residential buildings within ComEd service territory. The California results do provide estimates of the order of magnitude of these effects measured elsewhere in the country; however we do not feel they are robust proxies for the purposes of ex-post evaluation adjustments in Illinois. Determining the effects in Illinois would require extensive building simulation modeling that takes into account the characteristics of Illinois housing stock and weather patterns. This was not budgeted for as part of the PY2 evaluation, but could possibly be included in the PY3 evaluation.

Leakage

When program bulbs are sold through an upstream channel, as is done for the Residential ES Lighting Program it is possible for program bulbs to be purchased at program stores and then installed in areas outside of ComEd service territory (therefore negating any ComEd program bulb savings). This phenomenon is referred to as leakage. In the PY2 evaluation, we estimated the percentage of program bulbs being sold to non-ComEd customers by asking all in-store intercept survey respondents who were purchasing program bulbs if they received their electrical service from ComEd and then calculating the percentage of the program bulb sales that were leaving ComEd's service territory.

Residential versus Non-Residential Installation Locations

The Residential ES Lighting Program assumes that all program bulbs will be installed in residential locations. This assumption was tested as part of the PY2 evaluation via the in-store

¹³ California Public Utilities Commission (CPUC), 2009. Database for Energy Efficient Resources (version 2.05). Available online at: <http://deeresources.com/>

¹⁴ Brunner, E., S. Ford, M. McNulty, and M. Thayer, 2010. "Compact fluorescent lighting and residential natural gas consumption: Testing for interactive effects". Energy Policy 38(2010) 1288–1296. Elsevier Science, London.

intercept surveys during which all ComEd customers surveyed (who were purchasing program bulbs) were asked whether they intended to install the bulbs in their home, their workplace, or another location. This data was then used to estimate the percentage of program bulbs that are installed in residential versus non-residential locations and the gross impact parameters (HOU and CF) were adjusted to account for this split.

Net Program Savings

Net savings analyses seek to determine a program's net effect on customers' electricity usage. This requires estimating what would have happened in the absence of the program. Thus, after gross program impacts have been assessed, net program impacts are derived by estimating a net-to-gross (NTG) ratio that quantifies the percentage of the gross program impacts that can reliably be attributed to the program. The NTG ratio can be thought of as a metric of program influence.

For the PY2 Residential ES Lighting program evaluation a number of methods were used to estimate the net program savings. The results from these methods were then weighted (based on their perceived level of relevance/accuracy) to produce a final NTG estimate. These methods included:

1. Customer Self-Reported NTG (via a general population telephone survey and in-store intercept participant surveys)
2. Supplier Self-Reported NTG (via in-depth interviews with lighting manufacturers and retailers)
3. Revealed Preference Demand Model (based on data gathered during the in-store intercept customer surveys and the shelf stocking surveys)

Customer Self-Report Net-to-Gross

Estimating the NTG ratio using the self-report method requires the calculation of free ridership and spillover¹⁵ (both participant and non-participant). Once these three parameters have been estimated, the NTG ratio can be calculated as follows:

NTG Ratio = 1 – Free Ridership Rate + Spillover Rate (Participant and Non-Participant)

¹⁵ Spillover could only be calculated for the General Population survey self-reports. The in-store intercept surveys needed to be much shorter surveys to avoid customer fatigue and thus information on non-program bulb purchases was not collected.

Free Ridership

The calculation of free ridership using the customer self-report method relies on customer survey questions addressing the following two items:

1. The degree of influence the program had on the customer's decision to install CFLs (Program Influence Score); and
2. What actions the customer would have taken on their own in the absence of the program (No-Program Score).

The calculation of free ridership is a multi-step process that calculates a Program Influence score and a No-Program score for each customer and then combines those two scores to come up with a customer-level free ridership score. The Program Influence and No-Program scores can take values of zero to ten, where a lower score indicates a higher level of free ridership. Program-level free ridership is then determined by taking a program bulb-weighted average of the individual customer-level free ridership scores.

The Program Influence score was estimated based on the self-reported influence level the program had (on a scale of zero to ten, where zero equals not at all influential and ten equals very influential) on the customers' decision to install CFLs instead of standard efficiency bulbs. The No-Program score was based on a number of factors including:

1. Would the customer have purchased CFLs in the absence of the program?
2. Would they have purchased the CFLs at the same time?
3. Would they have purchased the same number of CFLs?
4. How likely is it (on a scale of zero to ten, where zero equals not at all likely and ten equals very likely) that they would have bought the same CFLs in the absence of the program?¹⁶

The algorithm used to calculate the No-Program score adjusts the score assigned to customers upward if they indicate that they would have purchased and installed the CFLs on their own in the absence of the program, but that the program either accelerated their CFL installation or led them to install a greater number of CFLs.

Once these two scores have been calculated, the customer-level free ridership is equal to:

$$\text{Customer-level Free Ridership} = 1 - (\text{Program Influence Score} + \text{No-Program Score})/20$$

¹⁶ This specific question was only asked as part of the General Population survey. However a combination of similar questions were used as a proxy for this question in the intercept survey.

Spillover

Two types of spillover were estimated for the General Population self-report method; participant and non-participant spillover. Spillover for both participants and non-participants includes all adoptions of energy efficient lighting measures that are influenced by the program, but are not done through the program (i.e., are not rebated). It is reasonable to expect that the program, by providing information on the benefits of energy efficient lighting and experience with such technologies, motivates customers to install energy efficient lighting without the program rebate.

The participant and non-participant surveys fielded as part of this evaluation gathered information on CFL lighting installations that were made by program participants and non-participants for which they did not receive a program rebate. The information collected included:

- a) The quantity and type of the efficient lighting equipment installed without a rebate;
- b) The degree of self-reported influence of the program on the decision to purchase the efficient lighting equipment; and
- c) Whether the customer received any rebates whatsoever for the installation or purchase of high efficiency lighting equipment (to confirm the measure was not rebated).

Lighting purchases were considered a spillover adoption if the following conditions were met:

- a) The lighting product was energy efficient.
- b) The degree of self-reported influence of the program on the purchase of the energy efficient lighting equipment was sufficiently high to reasonably conclude that the adoption would not have occurred in absence of the program. Additionally, for non-participants, this required that the customer was aware of the Smart Lighting Discounts program prior to making the purchase.
- c) The customer did not receive any rebates whatsoever for the efficient lighting purchase.

The participant spillover rate was calculated by summing the spillover adoptions over all program participants and then dividing it by the total number of purchases made through the program. The non-participant spillover rate was calculated in a similar manner as participant spillover except the spillover adoptions were divided by the number of surveyed customers. This value then was applied to the appropriate population of non-participating customers to estimate the number of spillover adoptions occurring in that population.

Supplier Self-Report Net-to-Gross

The supplier self-report approach relies on information collected from in-depth interviews with participating manufacturers and high level retail buyers to estimate free-ridership for various bulb categories. During the interviews, respondents were asked to estimate the percentage by which their sales of CF products would have been different in the absence of the ComEd

Residential ES Lighting Program. These self-reported estimates were cross-checked for consistency with other questions and analyzed in light of potential biases that might influence the estimates of different market actors. Distinct free-ridership estimates were requested for standard spiral bulbs, specialty bulbs, and CF fixtures.

For the impact evaluation, several types of information were sought in support of the net-to-gross (NTG) analysis. First were their estimates of the program's impacts on CFL awareness levels and overall bulb sales, both for program bulbs and for non-program bulbs. Second, were their perceptions of the most influential non-program factors affecting sales of CFL products. Third were the pricing strategies used by program participants and how the existence of the program may have influenced those strategies. For the Process evaluation, a key goal was to understand manufacturers' and high level retail buyers' opinions regarding the effectiveness of the program planning and implementation process.

To inform the net-to-gross ratio (NTGR) calculation for all CFL product categories, i.e., standard spiral bulbs, specialty bulbs and CFL Fixtures, respondents were asked whether they thought their program bulb sales would have been about the same, lower, or higher if they had not received the ComEd Residential ES Lighting program incentives and promotional materials. If they reported that they would have been lower, they were then asked to estimate the percentage by which they would have been lower.

Several elements of the survey design provided checks of internal consistency and served to enhance the accuracy of NTGR estimates. Respondents were asked to review a detailed summary of their company's program bulbs and fixtures based on ComEd tracking data and to fill in equivalent data for their non-program bulb and fixture sales prior to the interview. Respondents generally said that the number of program bulbs and fixtures based on the tracking data was accurate, though a few indicated the tracking data lagged their current sales figures. Respondents were also asked to fill out the table for non-program bulb sales. None did, despite a polite request and reminder prior to the interview date; several cited concerns over confidentiality of the data. Questions of a general nature about bulb sales were asked early in the survey to get respondents thinking about overall bulb sales and the different components of the Residential ES Lighting Program prior to asking them directly about the quantitative influence of the program on their sales of CFL products. These may have enhanced their ability to estimate the influence of the program on sales of each bulb type. Respondents were also asked about sales in regions outside ComEd service territory that were not receiving program discounts as further checks of internal consistency on changes in sales due to the existence of the program.

NTGR values were estimated both within and across categories of market actors for the same product type. Overall answers to survey questions provided a sense of whether the basic description of bulb sales trends and impacts was consistent across manufacturers and high level retail buyers for a given product.

NTGR values were also compared to those found in other studies. For example, KEMA's 2006-2008 evaluation report of California's Upstream Lighting Program derived NTGR values broken out by bulb type and sales channel. Net to gross ratio values ranged from 0.33-0.59 for big box and large home improvement stores, 0.27 to 0.75 for drug and small hardware stores, and 0.60 to 0.75 grocery and discount stores. Also, the 2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation estimated NTGRs of 0.25 to 0.34 for big box and large home improvement stores, 0.49 to 0.58 for drug and small hardware stores, and 0.84 to 0.97 for grocery and discount stores.¹⁷ Reasons for the differences in NTGRs observed in that study included differing price-sensitivity and shopping behavior at big box and home improvement stores compared to grocery stores, price caps at discount stores, and insensitivity to program discounts at some large chains due to their internal pricing strategies.

It is recognized that the supplier self-report approach to NTGR estimation has some threats to internal validity. Respondents may have motivations that introduce bias in their NTGR-related responses. One possible source of bias may be a tendency on the part of manufacturers and retail buyers, who have a vested interest in the continuation of the program, to overestimate its impacts. Conversely, retail buyers may tend to underestimate the impacts of the program based on a belief that they can sell CFL products based on their own merits, even in the absence of program discounts. Another threat to validity stems from the fact that the manufacturers and high level retail buyers are not the ultimate purchasing and installation decision makers for the bulbs sold through the program.

An advantage of the self-report approach to estimating free ridership is that by focusing on the manufacturers and high level retail buyers it covers the large majority of bulbs sold through all retail channels. Also, bulb manufacturers in particular have a strong motivation to know how much a lighting program such as the Residential ES Lighting Program affects their sales, since they end up paying an undiscounted price if their production falls above or below demand.

Revealed Preference Demand Modeling

The revealed preference demand modeling utilized data collected during the in-store intercept surveys and the lighting shelf surveys to model the probability of the CFL purchase and the influence of the program on these purchases. The influence of the Com Ed lighting program on the CFL purchase can occur through a direct price effect, stocking patterns at stores and the influence of the program marketing material on customer knowledge.

Data gathered during the store shelf surveys were used to develop measures describing CFL and equivalent incandescent price variables including minimum and mean prices and price

¹⁷ Itron, Inc. And KEMA Inc., 2007. *2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation*, CPUC-ID#:1115-04. Prepared for California's Investor-Owned Utilities. October, 2007

differentials for equivalent usage bulbs. The price variables were developed using pre-program prices and program discounted prices. The store shelf survey data were also employed to develop variables characterizing the display of CFL promotional material and the share of CFL shelf space. The in-store intercept survey data was used to determine the types of lighting consumers were purchasing and if the consumers were aware of the ComEd discount program.

The demand modeling used the revealed preference and shelf survey data in a logistic regression to estimate the probability of buying a CFL instead of an equivalent incandescent bulb. The model estimates the probability of buying a CFL as a function of lighting prices, CFL store displays, and customer knowledge of CFLs and ComEd's lighting program. The model was estimated separately for those consumers who had entered the store planning on making a lighting purchase and those who were making an unplanned lighting purchase. While the unit of observation for the model is the package purchased, the model results were weighted by the number of bulbs purchased.

To estimate the program NTGR, the estimated probability of purchasing a CFL was determined under the actual program conditions (P_p) and was simulated under non-program conditions (P_{np}). The NTGR is the increase in CFL purchase probability due to the program relative to the total probability of purchase.

$$NTGR = (P_p - P_{np})/P_p$$

The NTGR calculated from the revealed preference model has the advantage of relying on actual CFL and incandescent bulb purchases and real time customer recall of their intent to purchase lighting and their knowledge of ComEd's lighting program. The model also uses actual information on store level pre-program CFL, discount CFL, and incandescent prices. The revelation of preferences and the collection of observed pricing information should reduce possible errors in pricing variables and the possibility to mischaracterize lighting purchases.

Calculating the NTGR using shelf and intercept surveys, however, also has several limitations. The NTGR calculated using this approach is only applicable to stores and chains that permitted surveyors to undertake both shelf surveys and customer intercept surveys. Unfortunately, the ability to persuade stores to participate in both lighting shelf surveys and customer intercept surveys was a significant limiting factor in this analysis. In addition, only stores that stock discounted bulbs and incandescent bulbs could be included in the models. Regrettably, these two model and data limitations substantially reduced the data available to estimate the NTGR using the revealed preference model, limiting the applicability and reliability of the revealed preference NTGR estimates.

A final NTGR estimate was then derived from a careful review of both the resulting NTGR estimates from each of the methods and an assessment of the limitations and strengths of each of the methods.

2.1.2 Process Evaluation Methods

The process evaluation primarily makes use of quantitative analysis of surveys conducted with ComEd customers. Details on these surveys are provided below. Comparisons between PY1 and PY2, or between subgroups in PY2, are tested for statistical significance at the 0.10 level. Significant differences are noted in the results tables. In-depth interviews are subjected to both qualitative and, where possible, quantitative analysis.

2.2 *PY2 Data Collection Activities*

The data collected for the evaluation of the PY2 Residential ES Lighting Program was gathered during a number of activities including in-depth phone interviews with ComEd program staff, APT program implementers, and Supply-Side market actors (Lighting Manufacturers, Corporate Retailers and Retail Store Managers), Computer Assisted Telephone Interviews (CATI) conducted with Residential ES Lighting Program participants and nonparticipating ComEd residential customers, and ComEd tracking data analysis. Table 2-2 below provides a summary of these data collection activities including the targeted population, the sample frame, and timing in which the data collection occurred.

Table 2-2. Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data	Program Participants (Upstream / Coupon)	Tracking Database	-	All	Ongoing
In-Depth Phone Interviews	ComEd Res Lighting Program Manager	Contact from ComEd	Residential Lighting Program Manager	1	February 2010
	ComEd Res Lighting Program Implementer	Contact from APT	APT Program Manager	1	February 2010
	Lighting Manufacturers	Tracking Database	Census of Program Manufacturers	10 Attempts 5 Completes	March – May 2010
	Corporate Retailers	Tracking Database	Census of Program Retailers	12 Attempts 5 Completes	March – April 2010
	Retail Store Managers	Tracking Database	Random Sample of Program Retailers	15 Attempts 11 Completes	June – July 2010
In-Store Intercept Surveys	Program and Non-Program Lighting Purchasers	Tracking Database	Random Sample of stores that would allow intercepts	381	January–February 2010
In-Store Shelf Surveys	Program and Non-Program Stores	Tracking and D&B Database	Random Sample of Program and Non-Program	34 Program 11 Non-Pgm	January – March 2010
CATI Phone Surveys	Residential Lighting Upstream Participants	Residential CIS	Random Sample. Survey questions used to identify Program Participants	201	May 2010
	ComEd Non-Participating Customers	Residential CIS	Random Sample. Survey questions used to identify Program Non-Participants	299	May 2010

Source: Navigant Evaluation Team

2.3 Data Sources

2.3.1 Tracking Data

The tracking data delivered for this evaluation consisted of five databases, three corresponding to the upstream lighting sales, one for the coupon sales and one that included based wattages and incentive amounts for all program bulbs. These databases included the following:

- Residential Lighting Project Info Database - This database was the primary upstream lighting database and contained a record for all 164,773 retail program bulb sales invoices (by model number and store) that were sold during PY1 or PY2. The key variables in this database included the retailer store name and address, the MOU number, the bulb description and model number, the number of program bulbs sold, the rebates paid for these program bulbs, and the date of invoice.
- Residential Lighting Retailer Database - This database contained the names of all participation program retailers, the retailer id assigned to the retailer, and the number of stores the retailer had participating in the program.
- Residential Lighting Measure Lookup Database - This database contained a record for each CFL model sold through the upstream lighting program. Along with the model number and a description of the bulb, this database included the wattage of the CFL and the wattage of its incandescent equivalent (base watt), the bulb's rated life, the number of bulbs included in the pack, the bulb manufacturer, and the program year.
- Residential Lighting Coupon Database - This database contained a record for all 26,244 customers who purchased a program bulb using a ComEd coupon at one of three coupon retailers (small hardware stores). This database contained key information including the name, address and phone number of the coupon participant, the model and manufacture of the program bulbs purchased, the store where the program bulbs were purchased, the wattage grouping of the bulbs purchased, the date of the program purchase and the number of bulbs in the program package.
- Final PY2 Goals Tracker - This spreadsheet tracked cumulative weekly program bulbs sales compared to sales goals and allocated program dollars. Along with bulb sales, the record for each combination of model number and retailer included the suggested retail price per package and incentive requested from sponsor per package. Records also included manufacturer, product description, bulb type, CFL wattage, rated life, and the number of bulbs per package.

The final tracking databases for this program were quite thorough and easy to use. There were a few instances where the combination of model number and retailer in the Residential Lighting Project Info Database were not found in the other data sources.

Program and Implementer Staff Interviews

The evaluation team conducted two in-depth interviews with program staff as part of this evaluation. One of these interviews was conducted with the ComEd Residential Lighting Program Manager (Alicia Forrester) and one with the APT Implementation Manager (Erin Rasmussen). These interviews were completed over the phone in February 2010. Both interviews focused on changes to the program from PY1 to PY2, perceived effectiveness of the

program, and plans for PY3. The interview guides used for these interviews are included in Appendix Section 5.1.1.

Supply-side Market Actor Interviews

A series of supply-side market actor interviews was conducted with three types of firms: lighting manufacturers that currently supply product to one or more program retailers, corporate-level retail buyers at participating retailers, and participating retail store managers. The supply side market actor interviews served several purposes, in support of both the impact and process components of the evaluation.

Lighting Manufacturers

A total of 6 participating manufacturers were interviewed, all of which were able to provide data used in the calculation of the NTGR estimates. These manufacturers collectively represented 97% of total CFL shipments in program years 1 and 2.

Once contact was made with a prospective interviewee, they were sent an overview of the questions to be asked in the interview and a table showing their company's sales of bulbs and fixtures according to the most recent ComEd tracking data. The prospective interviewee was asked to look at the tracking data sales numbers to determine whether they were consistent with the interviewee's own estimates of sales. The interviewee was also asked to fill out equivalent sales figures for non-program bulbs and fixtures.

Corporate Retailers

Professional interviewers attempted to contact the 13 corporate retailers in the survey sample. This group of retailers included 12 active participants in PY2 as well as one big box participant from PY1 who did not participate in PY2. Of the 13 retailers in the sample, 6 agreed to participate in interviews. Four retailers firmly declined to participate in the interview, including 1 big box retailer, 1 warehouse retailer, and 2 grocery retailers. Two small hardware chains did not have a central person knowledgeable about the program for the whole chain, and one big box retailer agreed to participate by providing written answers to the questions but then did not provide them despite multiple follow-up requests. Of the 6 retailers who participated in the interview, 4 were willing to provide estimates of the percentage by which the program had influenced sales. These 4 corporate retailers collectively represent 34% of total CFL shipments in program year 2. Two big box retailers agreed to participate in the interviews but did not share data on sales impacts. Of these, one cited corporate confidentiality policy as the reason, and the other asked for time to find the requested data but then did not provide them despite multiple follow-up requests.

Retail Store Managers

A total of 11 store or lighting department managers of participating retail stores were interviewed. These 11 managers represented a range of program stores including big box/DIY, grocery, and small hardware. We attempted to complete 15 interviews. The sample of stores was randomly selected with one to two selected for each retailer. For the retailers selling a larger percentage of the program bulbs, we attempted to get more than one perspective by completing interviews with managers at more than one location of the retailer.

Professional interviewers conducted the interviews using a structured survey instrument. If an interview was unable to be completed because the manager refused to participate or was unable to be contacted after multiple attempts, another manager was substituted from a different location of the same retailer.

The interviews included questions about the store's participation in the ComEd program, their satisfaction with the program and an assessment of the impact of the program on CFL sales.

In-Store Intercept Surveys

The evaluation team conducted surveys in participating retail stores with customers purchasing lighting. Interviews were conducted with customers purchasing program CFLs, non-program CFLs and incandescent bulbs. The questionnaires contained questions for use in both the impact and process evaluations. For the impact evaluation, the survey contained questions designed to assess free-ridership and installation rates. For the process evaluation, the survey contained questions on reasons for purchasing different types of lighting, barriers to CFL use, and the awareness of ComEd marketing efforts. A copy of the survey instrument can be found in Section 5.1.3.

The evaluation team conducted interviews with customers at Home Depot, Costco and Ace Hardware. We could not gain permission to conduct interviews in any other retailers. Table 2-3 shows the number of retail locations at which we conducted interviews and the number of interviews completed at each retailer. Retail locations were selected on the basis of PY1 sales and location. We selected stores that had the most sales to ensure that the stores had good traffic to complete a large number of interviews. We also selected stores that were in the greater Chicagoland area. It was not cost effective to conduct intercept surveys in more rural areas.

Table 2-3. In-Store Intercept Retailers and Completed Surveys

Retailer	Stores	Completed Surveys
Home Depot	9	248
Costco	4	114
Ace Hardware	3	19
Totals	16	381

Source: Navigant Evaluation Team In-store Intercept Survey Analysis

The interviews took place between January 23, 2010 and February 27, 2010. For Costco, the surveys were required to be conducted while an APT field representative was also present in the store conducting a lighting demonstration. For comparison purposes, interviews were conducted at one Ace Hardware store and two Home Depots while a demonstration was taking place. In total, 157 of the 381 completed surveys were conducted during a store demonstration.

The field interviewers stationed themselves in the lighting aisle of the store and would approach customers only after they had made their product selections and were preparing to leave the aisle. Interviewers asked customers to complete a short survey in exchange for a \$5 gift card to that particular retailer. The customer would receive the gift card immediately after the interview and it could be used that day in the store.

After gaining consent to conduct the survey, the interviewer's first task was to record the products being purchased. This information was used to classify lighting customers into one of three categories: program participants purchasing CFLs that have been discounted through the ComEd program, non-program CFL purchasers purchasing CFLs that were not discounted through the ComEd program, and incandescent purchasers. The distribution of customers interviewed is in Table 2-4.

Table 2-4. In-Store Intercept Survey Respondent Types

Respondent Type	Completed Surveys
CFL Program Participants	269
Non-Program CFL Purchasers	38
Incandescent Purchasers	74
Total	381

Source: Navigant Evaluation Team In-store Intercept Survey Analysis

In-store Shelf Surveys

The in-store field work also included shelf surveys of lighting products. The evaluation team conducted these shelf surveys in at least one location for each program retailer.¹⁸ We also conducted shelf surveys at non-program stores. When possible, shelf surveys were conducted in conjunction with the in-store intercept surveys discussed in the previous section. To minimize costs, the other stores were selected based on their proximity to one another. This allowed the completion of several surveys in one day while keeping travel costs down.

Table 2-5 shows the retailers where shelf surveys were conducted and the number of surveys conducted for each retailer.

¹⁸ The evaluation team did not conduct a shelf survey at a Meijer store. This was an oversight due to their addition in PY2.

Table 2-5. Shelf Survey Retailers

Program Retailers	Surveys Completed
Costco	4
Ace Hardware	3
Home Depot	3
Wal-Mart	3
Sam's Club	3
Food4Less	3
Best Buy	3
Do It Best/Crafty Beaver Home Center	3
True Value	3
Menards	3
Jewel-Osco	3
Non-Program Retailers	Surveys Completed
Lowes	2
Target	2
Family Dollar	1
Walgreens	1
CVS	1
Dollar Tree	1
Dominick's	1
Whole Foods	1
Ikea	1

Source: Navigant Evaluation Team Analysis of Shelf Surveys

The shelf survey contained two parts. The first was an assessment of the lighting products and promotional materials in the store. The field worker noted the presence of different types of marketing and promotional materials, the presence and location of different types of lighting products, and the format for product pricing. The second part of the shelf survey was an

inventory of all CFL lighting and lighting products that could be used in place of CFLs. The inventory noted the product manufacturer, model number, type of bulb, wattage, SKU, location, quantity in pack, approximate number of packages on the shelf, original price and discounted price when available.

General Population Telephone Survey

Similar to PY1, the General Population survey was directed toward a random sample of ComEd residential customers. The survey quickly classified customers into one or more of a series of customer disposition or user groups (those unaware of CFLs, Aware non-purchasers, CFL user non-program purchasers, CFL program purchasers) that were then used to stratify the sample. Program purchasers were identified as customers who purchased one or more qualifying bulbs at a participating retailer between June 2009 and May 2010. These surveys obtained most of the parameters necessary to calculate gross and net energy and demand impacts and assess process-related issues for program participants. Additional data was collected from both program participants and nonparticipants on various topics to support the multi-state modeling effort that is part of the PY3 evaluation. This survey was fielded between May 20th and May 26th 2010. A total of 500 surveys were conducted which yielded the following:

- 201 completed surveys with ComEd residential customers whom the evaluation team believes to be program participants based on a CFL purchase (standard twistlers, specialty bulbs and/or CFL fixtures) they reported making at one of the 12 participating retailers' stores between June 2009 and May 2010.
- 72 completed surveys with ComEd residential customers who purchased a CFL between June 2009 and May 2010 that was not believed to be a program bulb.
- 227 completed surveys with ComEd residential customers who did not purchase any CFLs between June 2009 and May 2010.

For the process evaluation, the surveys contained questions on familiarity with and usage of CFLs, awareness of the ComEd Residential Lighting program, sources of program awareness, satisfaction with CFLs, barriers to purchasing CFLs, and overall lighting purchase behaviors. All CATI surveys were administered by Opinion Dynamics Corporation (ODC).

For the impact evaluation, the survey focused primarily on questions designed to estimate the self-reported net program impacts (which included estimating participant free ridership and participant and non-participant spillover). It also included questions which were used in conjunction with a pair of ANCOVA models developed during a large CA lighting evaluation to estimate room level hours of operation (HOU) and coincidence factor (CF) estimates based on customer demographical information (such as education level, presence of children in the home, number of bedrooms and bathrooms, etc.) and current CFL usage levels (number of CFLs present in the home and CFL socket saturation level). A battery of questions was also included

in this survey that will be used within the multi-state study currently underway for the PY3 evaluation. This battery is aimed at estimating the proportion of program bulb impacts that can justifiably be attributed to the program (and other programs around the country) by constructing an estimate of baseline sales within ComEd service territory based on data collected in other regions of the US with little or no program activity. Customers were also recruited during this survey to participate in a PY3 light metering study which involved agreeing to an in-home visit during which time lighting loggers could be installed to improve our HOU and CF estimate for the PY3 evaluation.

The evaluation team feels the two customer surveys conducted as part of the PY2 evaluation (the General Population survey and the in-store intercepts survey) complement each other nicely as they allow us to gather data for different net and gross parameter estimates. For example the in-store intercepts allowed us to estimate leakage and the percentage of program bulbs being installed in non-residential location, whereas the General Population survey allowed for the opportunity to collect much of the data needed for the HOU and CF ANCOVA models. Both surveys were used to estimate the program bulb installation rate and net-to-gross ratio.

Sampling

The sample used for the general population survey was pulled from the Residential CIS database provided to the evaluation team by ComEd during the PY1 evaluation. This database contained 2,987,066 records, one for each residential customer within ComEd service territory. All records with missing or invalid phone numbers or those surveyed during PY1 were removed from the sample (they were used in the calculations for the final impact results).

Survey Disposition

Table 2-6 below shows the final disposition of the nearly 11,000 ComEd residential customers selected for the PY2 General Population Lighting survey. As this figure shows, contact with all but 26% of the sample was attempted at least once and these contacts resulted in 500 survey completes. The survey center was unable to make contact with 32% of customers in the sample for a variety of reasons such as that: no one answered the phone, an answering machine picked up, or the phone line was busy. The phone numbers provided for 21% of the sample had problems such as being disconnected, blocked, an incorrect number, or a cell phone number¹⁹.

¹⁹ Some customers were reached on their cell phones and chose not to complete the survey.

Table 2-6. General Population Survey Call Disposition

Call Disposition	General Population Survey	%
Sample Pulled	10,853	100%
Completes	500	5%
Not Dialed	2,780	26%
Refusal	804	7%
Unable to Reach	3,415	32%
Language Barrier	159	2%
Phone Number Issue	2,202	21%
Appointment Scheduled	993	9%

Source: Navigant Evaluation Team Analysis of General Population Survey Data

Participant Identification

The General Population survey was created in such a way that each customer could be classified into one of five groups based on their responses to a number of the survey questions. Those groups are:

1. Customers who are Unaware of CFLs (Labeled “Unaware” in the tables below)
2. Customers who were aware of CFLs but had never purchased or been given CFLs (NonPurchasers)
3. Customers who have purchased or been given CFLs in the past but not since June 2009 (Prior Purchasers)
4. Customers who have purchased or been given CFLs since June 2009 but at a non-program store, a store outside of ComEd service territory or those who are unable to provide any information about these CFL purchases (Non-Program Purchasers)
5. Customers who have purchased CFLs since June 2009 (Likely Program Purchasers)

Only those in group 5 are classified as likely program participants. Table 2-7 below shows the initial classification of the General Population survey respondents across these five categories.

Table 2-7. Initial General Population Survey Customer Classification

Customer Classification	Customers	%
Unaware	44	9%
NonPurchasers	107	21%
Prior Purchasers	76	15%
Non-Program Purchasers	72	14%
Likely Program Purchasers	201	40%
All General Population Survey Respondents	500	100%

Source: General Population Survey

After the General Population survey was completed, the data were carefully reviewed and respondents who provided answers with major inconsistencies were removed from various analysis sections. Eleven customers reportedly bought CFLs at program retailers but were not classified as program participants since those retailers were located outside of Illinois.

Profile of Survey Respondents

As Table 2-8 below shows, 77% of those interviewed during the PY2 General Population survey indicated they owned their homes (which is very similar to PY1 where 75% reported owning their own home). If just General Population surveyed customers that were program participants are analyzed, 86% are homeowners (the same exact percentage found in PY1) indicating homeowners are more likely to purchase CFLs. Ninety-eight percent of those contacted as part of the PY2 General Population survey reported that they paid their own electric bill.

Table 2-8. Home Ownership Status of General Population Survey Respondents

Home Ownership Status	Percent of Respondents (n=500)
Own	77%
Rent	21%
Other/Refused/Don't Know	2%

Source: General Population Survey

Section 3. Program Level Results

3.1 *Impact Results*

This section presents both the Gross and Net impact results from the PY2 Residential ES Lighting Program evaluation.

3.1.1 **Verification and Due Diligence**

Given modest changes in the program design, this topic was not revisited. Refer to the year 1 report for more information.

3.1.2 **Tracking System Review**

The Residential Lighting Project Info Database that was received on July 5, 2010 included all sales records to date since the beginning of the first year of the program. A number of steps were taken to make sure bulb sales evaluated for Program Year 2 were complementary and non-overlapping with those from Program Year 1. Program Year 1 included bulbs sold between June 1, 2008 and May 31, 2009, while Program Year 2 included bulbs sold between June 1, 2009 and May 31, 2010.

Program Year 1 upstream sales were identified from the tracking data file that was provided at the end of Program Year 1 (defined as pj_sales_end before June 1 2009.) This yielded 2,979,531 bulbs, consistent with the PY1 report of upstream bulbs sold. Then total sales from PY1 combined with PY2 were calculated from the July 5, 2010 tracking data extract (defined as pj_sales_end before June 1 2010). Any records where the store state was not in Illinois or the pj_description was 'TCP Utility Support Fee' were dropped. This yielded 11,254,497 bulbs.

Records from the Program Year 1 tracking data file were then matched against the July 5, 2010 tracking data extract to allow any overlapping records to be dropped from the PY2 analysis. In this matching, 1,806 records were identified that were in the Program Year 1 tracking data file but were not in the July 5, 2010 tracking data extract. On closer inspection these records, which represented 57,723 bulbs, turned out to be predominantly duplicates of other records in the PY1 dataset, and were cleaned up prior to the creation of the PY2 tracking data. To correct for these duplicate PY1 records going forward these bulbs were subtracted from the PY2 dataset and thus the final PY2 dataset had 118,364 records, representing 8,274,966 program bulbs and fixtures.

3.1.3 **Gross Program Impact Results**

As mentioned above there are eight key parameters necessary to calculate gross energy and demand savings estimates for the Residential ES Lighting Program. These include:

1. Number of discounted bulbs (Rebated bulbs) sold through the program (both via the Coupon and Markdown program delivery methods),
2. Average Displaced Watts (Delta Watts) across all installed program bulbs,
3. Average Hours of Use (HOU) per Day across all installed program bulbs,
4. Installation Rate (Install Rate) across all program bulbs sold,
5. Mean Load Coincidence Factor,
6. Interactive Effects,
7. ComEd Service territory Leakage, and
8. Residential versus Non-Residential Program Bulb Installations.

These parameter estimates were used to calculate gross energy and demand (coincident peak and overall) savings using the following savings algorithms:

$$\text{Annual kWh Savings} = \text{Program bulbs} * \text{Delta Watts}/1,000 * \text{Annual HOU} * \text{Realization Rate}^{20}$$

$$\text{Annual kW Savings} = \text{Program bulbs} * \text{Delta Watts}/1,000 * \text{Realization Rate}$$

$$\text{Annual Coincident Peak kW Savings} = \text{Annual kW Savings} * \text{Mean Load Coincidence Factor}$$

It was necessary to calculate energy (kWh) and demand (kW) saving separately for the residential and non-residential installations (since their HOU and CF differ) and then sum them up to get the total program savings. In PY2 the interactive effects were assumed to be 1.0 and thus, are not included in the algorithms above. The calculations used to estimate each of these parameter estimates are described in detail below.

Program Bulb Distribution

The number of bulbs distributed through the program is a key parameter in the calculation of gross and net program impacts and is used to extrapolate the per-bulb savings estimates to the program level.

Because the savings analysis for this evaluation is completed by delivery mechanism (in-store coupon and upstream markdown), program bulb sales have been delineated by these two

²⁰ Realization rate is equal to the installation rate times the leakage rate.

delivery mechanisms. Table 3-1 below provides the total number of CFLs (including standard and specialty CFLs and CFL fixtures) by retailer category and delivery mechanism. It also provides the average number of bulbs sold at each of the retailer categories. These data are based on the coupon and upstream tracking databases provided to the evaluation team by ComEd.

Table 3-1. Rebated Bulbs Sold by Retailer Category and Delivery Mechanism

Retailer Category	Standard CFLs Sold	Specialty CFLs Sold	CFL Fixtures Sold	% of CFLs Sold	Store fronts	Delivery Mechanism
Big Box/DIY	3,363,972	402,301	37,582	46%	246	Upstream
Warehouse	3,346,116	384,704	18,507	45%	34	Upstream
Grocery	274,412	13,392	1,765	3%	194	Upstream
Small Hardware	393,018	34,221	14,386	5%	143	Upstream/Coupon
Total Coupon	8,554	856	0	0.1%		Coupon
Total Upstream	7,368,964	833,762	72,240	99.9%		Upstream
Program Total	7,377,518	834,618	72,240	100%	617	Upstream/Coupon

Source: Evaluation team analysis of ComEd Tracking database

As the table above shows, the majority of the program is distributed via the upstream markdown approach (99.9%) and the Big Box/DIY stores and Warehouse stores together are responsible for more than 90% of all program sales.

Table 3-2 and Table 3-3 below provide the total number of CFLs sold (standard and specialty respectively) through the program by bulb wattage. More than 80% of the standard bulbs sold through the program were low-wattage bulbs (17 watts or less), and more than 85% of the specialty bulbs sold through the program were low-wattage bulbs. The single largest-selling wattage for standard CFLs was 13 watts, which constituted 46% of total standard bulb sales.

Table 3-2. Distribution of Standard Program Bulbs by Wattage Group

Program Bulb Wattage Group	Standard Bulbs Sold	% of Program Sales
12 Watts or less	461,302	6%
13 Watt	3,379,474	46%
14-17 Watt	2,155,119	29%
18-21 Watt	488,495	7%
22-27 Watt	883,066	12%
28-42 Watt	10,062	0%
Total	7,377,518	100%

Source: Residential Lighting Tracking Data

Table 3-3. Distribution of Specialty Program Bulbs by Wattage Group

Program Bulb Wattage Group	Standard Bulbs Sold	% of Program Sales
12 Watts or less	146,058	17%
13-17 Watt	577,501	69%
18-23 Watt	81,233	10%
24-28 Watt	24,755	3%
29-42 Watt	5,071	1%
Total	834,618	100%

Source: Residential Lighting Tracking Data

Table 3-4 below provides the distribution of program bulbs by bulb type. Around 90% of the program bulbs sold were standard twister bulbs. Within the specialty bulb group, reflectors comprised 67% of bulb sales.

Table 3-4. Distribution of Program Bulbs by Bulb Type

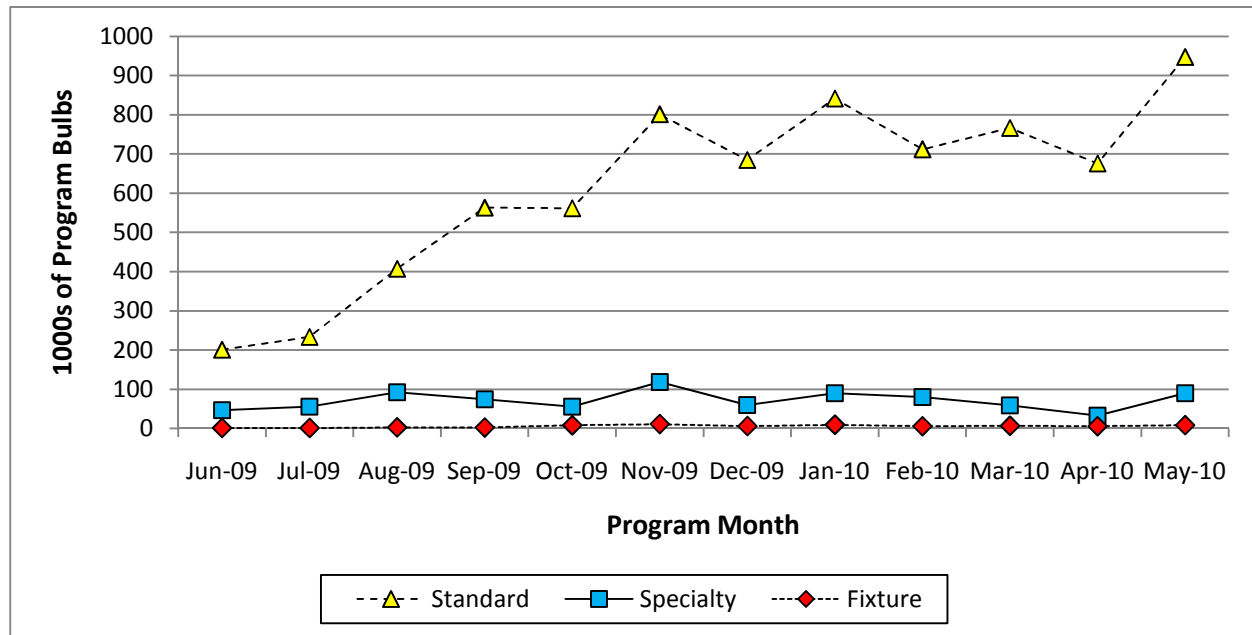
CFL Bulb Type	Bulbs Sold	% of Program Sales
Standard	7,377,518	89%
Dimmable Twist	14,381	0%
3-way	8,029	0%
A-bulb	145,583	2%
Globe	112,888	1%
Post	1,619	0%
Dimmable Reflector	4,908	0%
Reflector	547,210	7%
Fixture	72,240	1%
Total	8,284,376	100%

Source: Residential Lighting Tracking Data

Figure 3-1 below presents the distribution of program bulbs sales by month and bulb type (Standard, Specialty and Fixtures). Sales of standard bulbs increased significantly over the course of PY2 with peak sales months in November 2009, January 2010, and May 2010. Specialty bulb sales did not show a distinct upward or downward trend over PY2; peak sales months included August 2009, November 2009, January 2010, and May 2010. CFL fixture sales rose significantly in October 2009, from an average of 2,100 fixtures per month before that point to an average of 7,800 fixtures per month thereafter. Peak sales of a little over 11,000 CFL fixtures occurred in November 2009.

A comparison with sales trends by bulb type in PY1 reveals a few salient observations. In PY1 sales of standard and specialty bulbs peaked in February 2009. Following that peak there was a sharp dip in sales of standard and specialty bulbs to approximately 20% and 35% of their peak values, respectively, for two months before climbing back toward their February peak. Month to month bulb sales in PY2 were smoother. This may reflect natural differences between the first year of a program when efforts are focused on getting the program up and running versus the second year when the program a program is being maintained. This, in turn, may have prevented the need that arose for some retailers in PY1 to temporarily shut down the program when month to month sales were exceeding program bulb allocations.

Figure 3-1. Program Bulb Sales by Month and Bulb Type



Source: Residential Lighting Tracking Data

Installation Rate

The evaluation estimate of installation rates for CFLs purchased as part of the PY2 Residential ES Lighting program were calculated based on data gathered during the General Population telephone surveys and the in-store intercept surveys. The questions asked of respondents during the General Population surveys included:

- How many of the CFLs that you purchased in the last year have you installed in your home?
- Where are the discounted CFLs that you did not install?
- How many are in storage?

Similarly, in-store intercept participants were asked “In the next six months how many of the CFLs that you are purchasing today to you plan on installing in your home?”

Based on the responses to these questions the installation rate was calculated as the number of bulbs installed (or planned to be installed) divided by the total number of bulbs sold. Table 3-5 below shows the installation rate calculated based on the general population and in-store intercept surveys. As this figure shows, the estimated installation rate based on the in-store intercept survey was 10% lower than for the General Population survey (which is statistically

significant at the 90% level). The 90 percent confidence bounds on these estimates are 75.0% to 84.5% and 65.3% to 74.9%, respectively.

Table 3-5. Current Status of Program Bulbs

Program Bulb Status	General Population		In-Store Intercepts	
	Bulbs	%	Bulbs	%
Installed	1,916	80%	1,472	70%
In Storage	420	17%	627	30%
Other/Don't Know	67	3%	-	-
All	2,403	100%	2,099	100%

Source: PY2 General Population Surveys and In-store Intercept Surveys

Table 3-6 below provides the self-reported future plans for the program bulbs currently in storage from the General Population survey. As this exhibit shows, an equal number of respondents reported that they planned to install a stored CFL when an incandescent bulb burned out and when a CFL burned out (56%). This figure has remained fairly constant since PY1 for incandescent bulbs (PY1 = 54%) but has increased fairly drastically for CFLs (PY1 = 17%). This may be an indication that more program participants feel they are reaching their personal saturation point for the sockets in which they feel “comfortable” at this time installing CFLs. The continued high rate of the respondents indicating they will install one of their new CFLs when an incandescent burns out shows there is still more work to be done to educate customers on the savings resulting from changing out incandescent bulbs prior to burn out.

Table 3-6. Future Plans for Bulbs in Storage

Plan to Install CFL when...	%
... an incandescent bulb burns out	56%
... a CFL bulb out	56%
... any light bulb burns out	3%
Not planning to use them	7%
Undecided	3%

Source: PY2 General Population Participant Surveys

For the PY2 General Population survey, a follow up question was added for all respondents who indicated that planned to install one or more of their stored bulbs when another bulb burned out. The follow up question asked them to estimate how many of their stored bulbs they expected to install within the next year. On average these respondents estimated that they expected half of their stored bulbs to be installed within the next year. This finding supports the recommendation the evaluation team made to ComEd in April of 2010²¹ concerning the attribution of savings from uninstalled program bulb to future program years. Hence, the PY2 impacts include the savings resulting from 50% of the PY1 uninstalled bulbs (or 15% the overall PY1 bulbs).

Delta Watts

In order to estimate the watts displaced by installing program bulbs, it is necessary to know the wattage of the program bulb as well as the wattage of bulb that was installed prior to the program bulb (the base watts). Because it is nearly impossible to know the exact wattage of the bulb installed prior to the program bulb, this base wattage value is estimated based on the wattage of the newly installed program bulb. For this evaluation, delta watts was deemed at 49.6 watts based on ICC-adopted guidelines. The PY2 evaluation calculated bulb-level delta watts estimates in four additional ways, first using the ex ante DEER incandescent equivalents (which were included in the program tracking data), secondly using the standard equivalency tables used in PY1, thirdly using a Power Reduction Factor method that is used to estimate program savings in the 2008 DEER Deemed Savings Database, and finally using lumen equivalence between CFLs and the highest-selling incandescent bulbs by wattage group at General Electric and Sylvania.

DEER Incandescent Equivalents from Tracking Data

Delta watts were first estimated using the incandescent equivalents provided in the program tracking data. According to the program manager of the Residential ES Lighting Program, these tracking data estimates came from DEER 2008 2.05. The evaluation team researched this source and found they were the estimates used within the DEER 2008 Measure Cost Database. This method resulted in an average program-level delta watts estimate of 41.7 watts.

Standard Equivalency Table Method

Delta watts were also estimated using a lookup table of program bulb wattages to the typical incandescent wattage equivalents used as base wattage values in PY1. This method resulted in an average program-level delta watts estimate of 49.8 watts.

²¹ 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 and the remaining 50% should be attributed to the 2nd subsequent program year.

Table 3-7. Estimation of Delta Watts based on PY1 Typical Bulb Equivalencies²²

Program Bulb Wattage Group	Incandescent Equivalent	Bulbs Sold	Delta Watts
7 Watt	25 Watt	37,820	18.0
9-11 Watt	40 Watt	570,975	30.6
13-16 Watt	60 Watt	6,113,281	46.5
18-20 Watt	75 Watt	526,758	56.1
22-27 Watt	100 Watt	1,000,409	76.0
29+ Watt	150 Watt	25,723	112.7
Total		8,274,966	49.8

Source: ComEd PY1 Tracking Data

Power Reduction Factor Method

Another method of estimating bulb-level delta watts was to apply a Power Reduction Factor of 3.53 to the program CFL wattage to calculate a base watts estimate (or 2.53 to calculating delta watts). This Power Reduction Factor estimate was taken from a 2008 DEER update and was used within the DEER 2008 Deemed Savings Database. This “factor” was derived from an RLW 2005 CLASS study which included 850 onsite audits.²³ It is thought to be the most robust delta watts estimate to date. This method resulted in an average program-level delta watts estimate of 37.9 watts.

Lumen Equivalence Method

The fourth method of estimating bulb-level delta watts was to map CFLs to incandescent equivalent wattage based on lumen equivalence. Lumens for each model in the tracking data were provided by ComEd. Lumens by incandescent wattage were taken as the average of three values for highest-selling incandescent bulbs as supplied by technical representatives at General Electric and Sylvania: two values for soft white bulbs and one value for clear bulbs for each incandescent wattage. CFLs were assigned to the incandescent equivalent wattage of the nearest average lumens value. Delta lumens due to the mapping were then calculated as the

²² Coupon bulbs were excluded from this table since the type of bulb and wattage were not provided on the in-store coupon.

²³ RLW Analytics, 2005. 2005 California Statewide Residential Lighting and Appliance Efficiency Saturation Study. Prepared for San Diego Gas & Electric, Southern California Gas Company, Southern California Edison, Pacific Gas & Electric. August 2005.

difference between CFL lumens in the tracking data and the lumens of the assigned incandescent equivalent wattage. The weighted average delta lumens due to the mapping is low, at -4.9 (CFL lumens minus mapped incandescent lumens), showing there was no systematic upward or downward bias in the mapping. Overall evaluation-based DW was then calculated as the weighted average difference between CFL wattage and the assigned incandescent wattage for each bulb in the tracking data. This method resulted in an average program-level delta watts estimate of 49.2 watts.

Table 3-8 below compares the overall delta watts estimates resulting from the application of the five methods. The PY2 ex-post savings estimates are calculated using the deemed DW value. This table also shows the percentage by which the other methods differ from the deemed value.

Table 3-8. Estimated Delta Watts based on the Various Methods

Result	Delta Watts Calculation Method	Delta Watts Estimate	Difference from Deemed Value
1	PY2 Deemed Value	49.6	-
2	2008 DEER Update Power Reduction Factor (2.53) ²⁴	37.9	-24%
3	Program Tracking Data (PY2 Ex Ante)	41.7	-16%
4	PY1 Ex Ante Standard Equivalency Tables	49.8	0%
5	Lumen Equivalence	49.2	-1%

Source: Navigant Consulting Team Analysis

As shown in Table 3-9 below, delta watts were lower for standard and specialty bulbs than for fixtures by all calculation methodologies. Based on the deemed delta watts value used to calculate the final ex post savings estimates, average delta watts was approximately 50 watts for standard bulbs and 45 watts for specialty bulbs and 62 watts for fixtures.

²⁴ 2008 DEER Update – Summary of Measure Energy Analysis Revisions, Version 2008.2.05 for 2009-2011 Planning/Reporting. December 2008. Page 15.

Table 3-9. Estimated Delta Watts based on Various Methods by Bulb Type

Bulb Type	Deemed	Power Reduction Factor	Program Tracking Data (PY2 Ex Ante)	PY1 Ex Ante Standard Equivalency Tables	Lumen Equivalence
Standard	50.0	37.6	41.4	50.0	49.9
Specialty	45.2	38.4	42.7	46.1	41.8
Fixture	61.9	57.6	65.3	70.1	60.6

Source: Navigant Consulting Team Analysis

Table 3-10 below shows that the majority of program bulbs (87%) were reported to replace all or mostly incandescent bulbs, and 10% were reported to replace all or mostly CFLs. The remaining bulbs replaced an unknown bulb type (2% of participants could not remember the previous bulb type or stated 'other' but did not specify what it was). In the PY1 evaluation, the final delta watts estimate was discounted to account for CFLs that replaced CFLs. This approach was not taken in PY2 since we now believe that the NTG ratio should account for CFL to CFL change out (as each time a bulb is replaced the customer has the option to install an incandescent regardless of the previously installed bulb).

Table 3-10. Distribution of Prior Bulb Type

Prior Bulb Type	Bulbs	%
All Incandescent	1,940	75%
Mostly Incandescent	313	12%
All CFL	139	5%
Mostly CFL	128	5%
Other	42	2%
Don't Know	32	1%
Total	2,594	

Source: PY2 General Population Surveys

Hours of Use

Average daily HOU is a key parameter in the estimation of both gross and net program impacts. Past comparison studies between lighting loggers and verbal estimates by building occupants indicate that relying on program participants' estimates for the number of hours their

program CFLs are turned on leads to highly inaccurate²⁵ HOU estimates. Given this uncertainty and because the budget for this evaluation did not allow for a lighting logger study of program bulbs in PY2, the evaluation team estimated the annual average hours of use per day for ComEd customers by conducting a review of existing lighting logger studies and by using an analysis of covariance (ANCOVA) model adapted from the California Upstream Lighting Program to fit the usage profile of ComEd customers.²⁶

ANCOVA Model

Based on the most extensive lighting logger studies to-date of residential lighting use, the ANCOVA model accounts for the impacts that physical and demographic characteristics have on the number of hours lights are used. The model provides the incremental effect of each dimension on annual hours of use. It was developed based on the fit to collected data in the Upstream Lighting Program for those characteristics that have a statistically significant impact on hours of use. Physical characteristics adapted from the model include number of bedrooms and bathrooms in the home, room types in which bulbs are installed, and the number of bulbs installed. Demographic characteristics include the presence or absence of children in the home and the education level of the head of household. Factors that were evaluated in the development of the model and found not to have a significant impact on hours of use include dwelling unit type, fixture type, heating system type, cooling system type, bulb type (e.g., spiral, globe, or reflector), and whether or not a bulb was bought at a discount.

The HOU ANCOVA model was applied to each program bulb in the ComEd general population survey sample to produce projected annual hours of use for all bulbs. Inputs to the model were based on survey responses with two exceptions: The average number of light sockets in a home is 66.8 based on onsite data from the multi-state modeling effort that is part of the PY3 evaluation. Also, the coefficient in the model for the utility providing electric service was taken as the simple average of the coefficients for the 3 California IOUs at 0.235.

The 66.8 sockets per home is the mean value based on onsite lighting inventories of 100 homes in ComEd service territory as part of the multi-state modeling effort. The sample includes the 66 respondents to the gen pop survey who are participating in the lighting logger study and an additional 34 gen pop survey respondents who are not participating in the lighting logger study. The sample consists of respondents who pay their own utility bills and reflect the range of single family, multi family, and mobile homes in the gen pop sample.

²⁵ KEMA, *CFL Metering Study*. Prepared for California's Investor-Owned Utilities (PG&E, SCE, SDG&E, and SoCalGas), February 2005.

²⁶ KEMA Inc. and The Cadmus Group, Inc., 2010. *Final Evaluation Report: Upstream Lighting Program*. Prepared for California Public Utilities Commission, Energy Division. February 28, 2010.

A brief review of other studies regarding average sockets per home was undertaken to provide context to the 66.8 sockets per home figure. The results suggest that the 66.8 value is consistent with an upward trend in sockets per home observed in recent years. A 2007 study by RLW Analytics found an average of 37 fixtures and 62 lamps per home among 487 homes sampled across 11 utilities in the Pacific Northwest.²⁷ The 2005 CLASS study yielded an average of 40.6 sockets per home. This was an increase from 34 installed lamps per home found in the 2000 CLASS study and cited within the 2005 CLASS study.

Based on this analysis, the estimated average daily hours of use for the randomly selected population of ComEd residential customers surveyed on an annualized basis was 2.06 hours per day (shown in Table 3-11).

This table also shows that the highest hours of use are observed for bulbs in exterior locations, as well as for bulbs in the kitchen and living room. The lowest hours of use are observed for bulbs located in bathrooms, hallways, bedrooms, and offices.

Table 3-11. ANCOVA Derived Average Annual Hours of Use by Room Type

Room Type	Average Annual Hours of Use
Outside	3.77
Kitchen	2.70
Living Room	2.34
Dining Room	1.99
Garage	1.91
Other Room	1.75
Office	1.66
Bedroom	1.57
Hallway	1.51
Bathroom	1.48
Overall	2.06

Source: ANCOVA Model and General Population Survey

²⁷ RLW Analytics, 2007. *Single-Family Residential Existing Construction Stock Assessment*. REPORT #E07-179. Prepared for Northwest Energy Efficiency Alliance. <http://www.neea.org/research/reports/E07179.pdf>. August 2007.

Methods Review of Existing Lighting Logger Studies

The evaluation team conducted a review of the methodology of recent lighting logger studies to inform the evaluation-based value for hours of use. In general, collecting lighting logger data and expanding the collected data to the population of interest studies is a challenging undertaking, with multiple, overlapping sources of uncertainty. The following is an incomplete list intended to highlight the challenges of the task. High variance in a complex population makes it difficult to generate samples of residential CFL users that can be accurately expanded to the entire population. Some degree of measurement error is inevitable, as there is always the potential for lighting loggers to malfunction or for other data collection errors to take place. There is also the problem of response bias where, for example, the population of people who are at home during the hours when recruiting calls are made for a logger study may show some kind of systematic bias with respect to the population as a whole. Fully addressing these and other issues in a lighting logger study can be challenging.

The three lighting logger studies that were considered most relevant to the current analysis were the California Upstream Lighting Program (CA ULP) evaluation report mentioned above, the Residential Lighting Markdown Impact Evaluation submitted to markdown and buydown sponsors of the program in Connecticut, Massachusetts, Rhode Island, and Vermont (NE RLMIE)²⁸, and the 2005 CFL Metering Study prepared by KEMA for the California investor-owned utilities (2005 KEMA).²⁹

These studies arrived at significantly different calculations of average residential hours of use per day, with the CA ULP study finding 1.9 hours of use, the NE RLMIE study finding 2.8 hours of use, and the 2005 KEMA study finding 2.34 hours of use. A brief review of the methods of the three studies, as well as qualitative comments on their applicability to ComEd, are warranted to inform their relative value in arriving at an HOU figure for Illinois.

All three studies used lighting loggers placed in people's homes to directly measure hours of use. The studies differ in terms of number of homes and bulbs logged, sampling methodology for homes to install loggers, and expansion of measured results to draw conclusions about hours of use for the populations under consideration.

The HOU calculation in the NE RLMIE study was based on data from 657 loggers that recorded data in 157 homes between December 2007 – October 2008. Some loggers recorded data for

²⁸ Nexus Market Research, Inc., RLW Analytics, Inc., and GDS Associates, 2009. *Residential Lighting Markdown Impact Evaluation*. Prepared for Markdown and Buydown Program Sponsors in Connecticut, Massachusetts, Rhode Island, and Vermont. January 20, 2009.

²⁹ KEMA, *CFL Metering Study*. Prepared for California's Investor-Owned Utilities (PG&E, SCE, SDG&E, and SoCalGas), February 2005.

multiple bulbs. A total of 1,103 bulbs were logged, yielding an average of 7.0 bulbs per home. Loggers were in place for periods ranging from 2 weeks to 8 months. Loggers used in the summer measurement panel were kept in place for a minimum of 3 months, and those used in the winter measurement panel were kept in place for a minimum of 2 weeks. There were few loggers in place during the months of October and November; 4 in October and 12 in November. Hours of use for these months were calculated based on the proportionate monthly hours of use from another study.³⁰ The combination of these factors yielded precision at 80% confidence of +/- 10% for average daily hours of use. The total number of bulbs logged by room type ranged from 69 to 273.

The expansion of the logger results to the population of homes in the NE RLMIE study sponsors' service territories is constrained by several factors. The selection of homes for the random digit dial (RDD) survey that yielded recruits for the logger study was a stratified random sample by utility service territory and geography. However, only respondents who said they had purchased and installed program bulbs were selected for onsite visits. According to the report, the study "was not designed to provide a representative sample of households—or even all markdown purchases—in the region, nor was it meant to provide detailed information on all factors that may affect lighting in the home." In particular, "the recruited participants are committed CFL users, and their responses may not be entirely representative of the population of markdown purchasers." The method by which bulbs were selected for logger measurement within a given home is not detailed in the report.

The 2005 KEMA CFL Metering Study prepared for the California investor-owned utilities utilized logger data from 983 CFLs in 369 California homes and found an average of 2.34 hours of use. Each logger was in place for 6-12 months, collectively covering the period from July 2003 through October 2004. In the study, 7 clusters, or geographic areas were identified that represented the urban/rural continuum and other demographic factors throughout California according to the 2000 Census. Within these 7 clusters, participants in the lighting program were randomly selected and recruited for the placement of loggers in their homes. Participants were given a \$50 incentive, and this was raised to \$75 if they agreed to extend to 12 months. Within the homes of those who agreed to participate, all fixtures containing CFLs were logged. The total number of bulbs logged per room type varied from 21 to 204. Outdoor lighting was not directly measured; the hours of use for exterior lighting was derived based on self-reported values, adjusted based on a prior study that compared self-reported to directly measured hours of use by room type, including exterior lighting.³¹

³⁰ Xenergy (1994) *Residential Lighting Study*, New England Electric Systems.

³¹ Heschong Mahone Group, 1999. *Lighting Efficiency Technology Report. Volume 1: California Baseline*. Prepared for the California Energy Commission. September 1999.

The HOU calculation in the CA ULP study was based on logger data collected July 2008 through December 2009. In this study, 7,299 bulbs were tracked in 1,123 homes, yielding an average of 6.5 tracked bulbs per home. Loggers were in place for 6-9 months in a series of 3 overlapping waves over the 18 month period. This sample size yielded precision at 90% confidence of +/- 7% for average daily hours of use. The achieved precision using direct estimation for hours of use was +/- 3% for the state as a whole, and +/- 8% or better for each of the 3 IOUs in the study.

The sample of homes within the CA ULP study was a stratified random sample based on IOU service territory and bulb purchase status, including program bulb purchasers over the past 3 months, program bulb purchasers over the 2006-2008 duration of program, and non-purchasers. In addition, the final sample by IOU was post-stratified to align with distributions of demographic characteristics of California homes including education, own/rent status, dwelling unit type, number of bathrooms (as a strong proxy for dwelling unit size) and income. Incentives (\$100) and multiple contact attempts at different times of day were used to minimize non-response bias errors.

Within each home, a goal of 4 CFL fixture groups and 3 non-CFL fixture groups were targeted for loggers (where a fixture group is all the bulbs controlled by a single on/off switch). The selection of CFL and non-CFL fixture groups within the home was randomized. While the process of selecting bulbs is made clear in the report, the resulting total number of tracked bulbs by room type is not shown.

The analysis in the CA ULP study included a direct expansion approach and a leveraged expansion approach. The direct expansion approach consisted of directly weighting the results for each bulb based on their representativeness of bulbs within the population according to the sample selection criteria. The leveraged approach modeled the relationship of each bulb to all measured household characteristics and then aggregated these data to model these relationships at the population level.

In addition to the three studies reviewed above, the methodology for four more existing lighting logger studies is briefly reviewed below.

A widely-cited 1999 lighting efficiency technology report by the Heschong Mahone Group³² determined average residential hours of use to be 2.34, the exact same value reached independently in the 2005 KEMA study 6 years later. The 1999 HMG study involved a review of data from pre-existing lighting hours of use studies at the time. Having evaluated the quality of the constituent studies, the authors based their meta-analysis principally on a study from

³² Heschong Mahone Group, 1999. *Lighting Efficiency Technology Report. Volume 1: California Baseline*. Prepared for the California Energy Commission. September 1999.

Southern California Edison that featured one logged fixture per household from 359 homes and on a study from Tacoma, Washington with 2641 monitored fixtures. However, the Southern California Edison study involved expressly monitoring a single high-use fixture in each use, and therefore does not provide adequate data for calculating overall household hours of use. The Tacoma study, which monitored a large proportion of the fixtures in each home, did not involve a representative sampling of the population.

KEMA produced an impact evaluation in 2004 for the residential lighting programs of Massachusetts, Rhode Island and Vermont that yielded an average HOU of 2.6.³³ The CFL portion of this study included lighting loggers placed in 59 homes during May and June of 2003, with each logger in place for a minimum of 2 weeks. A total of 258 CFLs were logged, with a range of 0 to 19 total bulbs per room type. Average hours of use were calculated by expanding the logger data to a whole-year calculation based on the proportionate monthly hours of use found in a prior, 1994 NEES study.³⁴ Participants in the study received a \$75 incentive, and all program-purchased lighting products were logged in homes that were selected for lighting loggers.

NMR and RLW completed a lighting logger study in 2007 for Efficiency Maine that yielded an average HOU of 3.2 for CFL bulbs overall, comprised of 2.4 hours per day for interior fixtures and 6.4 hours per day for exterior fixtures.³⁵ The lighting logger portion of this study comprised 153 loggers installed in 25 homes, with each logger installed for a minimum of 2 weeks between December 2006 and January 2007. Logger data collected prior to January 3, 2007 was not used in the analysis of hours of operation on the assumption that lighting use during the holiday season would not be representative of normal lighting use. Participants were initially offered a \$50 incentive; this was increased to \$75 to recruit additional participants who had initially refused. Logged hours of use were expanded to an estimation of yearly hours of use based on proportionate monthly hours of use from a long term metering study performed in Massachusetts in 2004 and 2005, also by NMR and RLW. The sample of homes for loggers was recruited from telephone survey respondents who had purchased program bulbs through the 2005-2006 coupon program.

³³ Nexus Market Research, Inc. and RLW Analytics, Inc. 2004. *Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs*. Prepared for The Cape Light Compact, State of Vermont Public Service Department for Efficiency Vermont, National Grid, Northeast Utilities, NSTAR Electric, Unitil Energy Systems, Inc. October 2004.

³⁴ Xenergy (1994) *Residential Lighting Study*, New England Electric Systems.

³⁵ Nexus Market Research, Inc. and RLW Analytics, Inc. 2007. *Process and Impact Evaluation of the Efficiency Maine Lighting Program*. Prepared for Efficiency Maine. April 2007.

A KEMA study in 2008 evaluated lighting for New Jersey's Clean Energy Program Residential CFL Impact Evaluation and Protocol Review and reported an average HOU of 2.4.³⁶ This study did not involve using lighting loggers to directly measure hours of use in New Jersey homes. The study used hours of use data developed in the 2005 KEMA study cited above, adjusted to New Jersey based on the number of lamps found installed in each room type in the onsite visits for the New Jersey study.

Recommended HOU

Hours of use for calculating program impacts are deemed at 2.34 hours per day based on testimony from Mr. Val Jensen adopted by the Illinois Commerce Commission.

The comparison of methods from existing lighting logger studies and the application of the CA ULP ANCOVA model with inputs from ComEd service territory provide additional data about whether a future, updated value for HOU will be lower, higher, or about the same as the current deemed value.

Of all of the studies reviewed, the CA ULP stands out as having the most carefully selected sample for representativeness of the target population and the largest random sample of logged bulbs in the logged homes. Because of the CA ULP study's greater precision and the opportunity to enter local population parameters into its ANCOVA model, it represents a more robust means of deriving HOU for ComEd service territory than the NE RLMIE study and the other reviewed studies.

However, none of the reviewed studies expressly measured hours of use in ComEd service territory. Looking at all of the reviewed studies together, several of the studies have higher hours of use than 2.34 and several have about the same value. Though the CA ULP appears most reliable and useful, the preponderance of evidence presents a range within which the deemed value falls, and there is not strong enough evidence at this time to recommend a change. Until more data is available, our recommended HOU value is coincident with the deemed value at 2.34 hours per day.

In Program Year 2010, results from the multi-state study will be used to inform program savings parameters, including hours of use.

³⁶ KEMA, Inc. 2008. *New Jersey's Clean Energy Program Residential CFL Impact Evaluation and Protocol Review*. Energy Star Products Program – Lighting. September 2008.

Mean Load Coincidence Factor

Coincidence factor (CF) represents the average percent of a given load that is operated during the peak period. For residential CFLs it can also be characterized as the likelihood that a bulb in a given room will be in use at the peak period. The California Upstream Lighting Program developed an ANCOVA model for coincidence factor based on the same lighting logger research used to develop the average annual hours of use ANCOVA model. Similar to the HOU model, logger data were regressed against physical and demographic characteristics of households to determine which characteristics had a statistically significant impact on coincidence factor. These were then used to develop coefficients for modeling coincidence factors based on the identified household characteristics.

Similar to the HOU model, physical factors found to be significant in determining coincidence factors include number of bedrooms and bathrooms in the home, room types in which bulbs are installed, and the number of bulbs installed. Demographic characteristics found to be significant included the presence or absence of children in the home and the education level of the head of household. Factors that were evaluated in the development of the model and found not to have a significant impact on coincidence factor included dwelling unit type, fixture type, heating system type, cooling system type, bulb type (e.g., spiral, globe, or reflector), and whether or not a bulb was bought at a discount.

The CF ANCOVA model was applied to each program bulb in the ComEd general population survey sample to produce a projected CF for each bulb. Based on this analysis, the overall estimated average coincidence factor for the randomly selected population of ComEd residential customers surveyed was 0.054, or 5% (shown in Table 3-12). This table also shows that the highest coincidence factors are observed for bulbs in exterior locations, as well as for bulbs in the garage, kitchen and bathroom(s). The lowest coincidence factors are observed for bulbs located in offices, bedrooms, and hallways.

Table 3-12. ANCOVA Derived Mean Load Coincidence Factor by Room Type

Room Type	Mean Load Coincidence Factor
Outside	0.139
Kitchen	0.064
Living Room	0.044
Dining Room	0.050
Garage	0.103
Other Room	0.046

Office	0.021
Bedroom	0.033
Hallway	0.039
Bathroom	0.063
Overall	0.054

Source: ANCOVA Model and General Population Survey

Leakage

Based on the in-store intercept interviews conducted for the PY2 evaluation, leakage does not appear to be a significant problem. More than 99% of those who purchased program bulbs indicated that ComEd was the electrical service provider for the location (home or office) where they intended to install the program bulbs they were purchasing. When weighted by bulbs sold, this represented 99.6% of all program bulbs. This leakage adjustment factor was included in the realization rate applied to estimate the PY2 ex post gross impacts.

Residential versus Non-Residential Installation Location

To estimate the ex-ante savings resulting from the Residential ES Lighting Program, ComEd assumed all program bulbs would be installed in residential locations and thus applied all Residential HOU and CF parameter estimates in their calculations of program savings. During the PY2 evaluation, this assumption was tested using data collected during the in-store intercept surveys that were conducted. During these surveys, all respondents were asked where they planned to install (home, business or other location) the program CFLs they were purchasing on the day the intercept survey was completed. Table 3-13 below shows the self-reported installation location by retailer category from the intercept surveys. As this table shows, the percentage of respondents reporting that they planned to install the program bulbs in a business location varied significantly by retailer category. Nearly a third of those who purchased program bulbs at a DIY store reported they either planned to install all of the bulbs in their business or in a combination of their business and their home. Virtually none of the respondents who purchased program bulbs in either a warehouse or small hardware store reported that they planned to install the bulbs anywhere but in a residential location. In order to come up with an overall program total, the installation location distributions were weighted by the percentage of total program bulbs sold through each of the retailer channels³⁷. This

³⁷ For the purpose of this analysis we grouped grocery stores in with small hardware stores since we believe the behavior in these two types of stores would likely be comparable. Similarly, Big Box stores and a few DIY stores that we believe are less frequented by contractors or other individuals shopping for a business location were grouped with Warehouse stores as we believe they would also behave in a like fashion.

weighting resulted in an estimate of approximately 89% of the program bulbs being installed in customers' homes and 10% being installed in customers' businesses.

Table 3-13. Self-Reported Installation Location by Retailer Category

Install Location	Retailer Category			
	DIY	Warehouse	Small Hardware	Weighted Total
Home	66%	99%	100%	87%
Business	22%	0%	0%	8%
Both	10%	1%	0%	4%
Other	2%	0%	0%	1%
Total	100%	100%	100%	100%
% of Program Bulbs Sold	37%	55%	8%	

Source: In-store Intercept Surveys

With respect to estimating the residential versus non-residential split for calculating PY2 impacts, the evaluation team believes that this analysis verifies that there are a significant number of program bulbs being installed in non-residential locations. A review of a report on a similar program in California also found a significant residential versus non-residential split of CFLs sold through an upstream channel³⁸. The evaluation team does recommend applying this 90/10 residential/non-residential split to estimate ex-post impacts as it is the best data currently available to estimate the percentage of program bulbs being installed in non-residential locations. However, we strongly believe this split should be reevaluated during the PY3 evaluation to ensure this initial finding continues to hold.

Calculating the PY2 gross ex-post impacts to reflect this residential versus non-residential split requires estimating the non-residential HOU and CF parameters and then applying these estimates to the percentage of bulbs estimated to have been installed in non-residential locations. For this ex-post evaluation the non-residential HOU and CF parameter estimates were taken from the ex-post findings from the PY1 Small C&I Intro kit final report (HOU = 10.0 per day and CF = 0.86). While the evaluation team believes these HOU and CF estimates are currently the best estimates available³⁹, we do recommend collecting additional data during in-

³⁸ The 2006-2008 ULP evaluation found a Residential versus Non-Residential Split of 94%/6%.

³⁹ The HOU estimate is significantly higher than the average Small C&I HOU estimates that came out of the 06-08 California Small C&I evaluation. This evaluation found HOU for this segment of customers ranged from a minimum of 6 hours/day (for SDG&E customers) to 7.4 hours/day (for PG&E customers).

store intercept surveys planned as part of the PY3 evaluation to refine these non-residential HOU and CF estimates. Non-residential HOU and CF estimates are highly correlated with the type of business where the program bulbs are installed (retail, grocery, restaurant, etc.) and thus collecting business type information from respondents who indicate they plan on installing their program bulb purchases in a business location will allow us to increase the accuracy of our non-residential HOU and CF estimates.

Ex-Post Gross Impact Results

Based on the gross impact parameter estimates described in the previous section, estimates of the gross program impacts resulting from PY2 Residential ES Lighting program were developed. The results are provided in Table 3-14 below.

Table 3-14. Ex-Post Gross Parameter and Savings Estimates

Gross Parameter and Savings Estimates	Residential Installation			Non-Residential Installation		
	Standard	Specialty	Fixture	Standard	Specialty	Fixture
CFLs Distributed through the Program	6,620,305	748,955	72,240	757,213	85,663	0
Average Displaced Watts (Delta Watts)	49.9	41.8	60.6	49.9	41.8	60.6
Average Daily Hours of Use	2.34			10.0		
Gross kWh Impact per unit	42.6	35.7	51.8	182.4	152.8	221.5
Gross kW Impact per unit	0.05	0.04	0.06	0.05	0.04	0.06
Realization Rate	73%	80%	89%	73%	80%	89%
Peak-Load Coincidence Factor	0.054			0.86		
Total First-Year Gross MWh Savings	205,489	21,489	3,316	100,585	10,519	0
	341,398					
Total First-Year Gross MW Savings	242	25.3	3.9	27.6	2.9	0
	301					
Total First-Year Gross Peak MW Savings	14.6		26.1			
	40.7					

Source: Evaluation Team Analysis

3.1.4 Net Program Impact Results

Customer Self-Report Method

As mentioned above, after gross program impacts have been estimated, net program impacts are calculated by multiplying the gross impact estimate by the Program Net-to-Gross (NTG) ratio. The PY2 Residential ES Lighting program assumed a NTG ratio of 0.7. In PY2, four primary methods were used to estimate the NTG ratio:

1. Customer self-report approach based on the General Population Surveys
2. Customer self-report approach based on the In-Store Intercept Surveys
3. Supplier self-reports based on in-depth interviews with program trade allies
4. Revealed Preference Demand Modeling

Customer Self-Report Methods (based General Population and In-store Intercept Surveys)

The customer self-report methods relied on responses provided by program participants during the General Population CATI telephone survey and the in-store intercept surveys to determine the fraction of CFL installations that would have occurred by participants in the absence of the program (free-ridership). The incremental non-program CFL installations influenced by the program (spillover) could only be calculated from the General Population survey. Once these parameters have been estimated, the PY2 NTGR can be calculated as:

$$\text{NTGR} = 1 - \text{Free-ridership} + \text{Spillover (Participant and Nonparticipant)}$$

Free-ridership

Calculating free-ridership using the customer self-report method requires using collected survey data to assign the following two scores:

- 1) *Program Influence Score* - The degree of influence the program had on the customers' decision to install CFLs, and
- 2) *No-Program Score* - What actions the customer would have taken on their own if the program did not exist.

Once these two scores have been calculated, customer-level free-ridership is equal to:

$$\text{Customer-level Free-Ridership} = 1 - (\text{Program Influence Score} + \text{No-Program Score})/20$$

Using the NTG scoring algorithm, customers fall into one of three free-ridership levels: Full, Partial, or Non Free-rider. A customer was classified as a *Full Free-rider*⁴⁰ if they reported that the program was not a critical factor in their decision to install CFLs as opposed to standard efficiency bulbs and that they would have purchased CFLs at the same time to install in their residence even if the program did not exist. Conversely, a customer was defined as a *Non Free-rider*⁴¹ if they reported that the program was a critical factor in their decision to install CFLs and that it would have been highly unlikely that they would have purchased the same CFLs on their own without the program. Between these two extremes, customers were classified as Partial Free-riders⁴² and a free-ridership score between 0% and 100% was assigned to them to reflect their reported influence of the program and what they would have done in its absence.

Table 3-15 below shows the distribution of surveyed customers across these three free-rider levels for the two customer survey efforts. It also shows that the free-ridership for those surveyed through the General Population telephone survey and those surveyed during the in-store intercept surveys had very similar free-ridership estimates (0.48 and 0.46, respectively). In PY1 free-ridership was estimated to be 0.38 using this same customer self-report method.

Table 3-15. Free-Rider Distribution

Free-Ridership Level	General Population Survey			In-Store Intercept Surveys		
	Bulbs	%	Avg FR Score	Bulbs	%	Avg FR Score

⁴⁰ Full Free-rider: Free-ridership score of 1.0 and NTG score of 0.

⁴¹ Non Free-rider: Free-ridership score of 0.0 and NTG score of 1.

⁴² Partial Free-rider: Free-riders score > 0 and < 1, NTG score > 0 and < 1.

Full Free-rider	33	2%	1	102	5%	1
Partial Free-rider	1265	91%	0.50	1,951	89%	0.49
Non Free-rider	73	5%	0	132	6%	0
Missing	19	1%	-			
Total	1,390		0.48	2,185		0.46

Source: PY2 General Population and In-Store Intercept Surveys

One question that was asked of both General Population and In-store Intercept survey respondents was, “If the CFLs had been \$1.00 more per bulb would you still have purchased the CFLs or would you have purchased incandescent light bulbs?” This question was one of the questions factored into the calculation of the non-program score described above but it is also interesting to look directly at the responses to this question. In the general population survey, 70 percent respondents identified as program participants reported that they still would have bought the bulbs if they were \$1.00 more a bulb, 20% reported they would not have purchased them and 10% were unsure if they would have still purchased them. Fifty-three percent of in-store intercept respondents indicated they would have purchased the same number of CFLs even if they were \$1 more. The \$1 increase in price was selected based on the program tracking data which indicated the average incentive per program bulb was exactly \$1.00, however the shelf survey data indicated that the average incentive was higher (closer to \$1.20), and for some retail chains significantly higher (up to nearly \$4). For stores where the average incentive amount for a program bulb was close to \$1, this question provides an indication of the level of free-ridership that exists amongst program participants.

Participant Spillover

As mentioned previously, participant spillover could only be calculated based on the General Population survey and not the In-store Intercept surveys. It was estimated by asking General Population survey respondents about efficient lighting products they had purchased in the time since their program purchase was made that were not rebated, but were highly influenced by their participation in ComEd’s Residential ES Lighting program. These spillover purchases were then summed and extrapolated to estimate the number of spillover purchases across all program participants. This figure was then divided by the total number of program bulbs to estimate the total participant spillover rate. Spillover purchases were only counted for customers that were not free-riders.

The General Population Survey participant spillover battery was asked of the 102 customers who were identified as “likely” program purchasers and who recalled that the bulbs they

purchased since June 2009 were discounted⁴³. Thirteen responded that they had purchased and installed an efficient lighting product at a regular retail price in the time since they purchased their “program” bulbs. Table 3-16 below shows the participant spillover rate for the PY2 Residential ES Lighting program based on the General Population survey is estimated to be roughly 5% of program savings.

Table 3-16. Participant Spillover Assessment

Participant Spillover	General Population Survey		
	n	Bulbs per Purchase	Extrapolated Bulbs
Spillover Purchases	13	8.8	114
Program Purchases	194	12.6	2,451
Participant Spillover Rate			0.05

Source: PY2 General Population Participant Surveys

In PY1, participant spillover was estimated to be 0.036 using this same customer self-report method.

NonParticipant Spillover

Nonparticipant spillover is calculated in much the same manner as participant spillover except the number of spillover adoptions was divided by the number of surveyed customers and then applied to the estimated population of nonparticipating customers within ComEd service territory to estimate the number of spillover adoptions occurring in the population. Table 3-17 below shows that of the 299 nonparticipants surveyed as part of the General Population survey, only 1 customer reported purchasing an efficient lighting product that they did not receive a rebate for and that was influenced by the Residential ES Lighting Program. This customer reported purchasing globe CFLs but did not state how many (so the average number of bulbs per purchase from the participant spillover was used as a proxy for the nonparticipant spillover). They stated they purchased them without a rebate and indicated that ComEd’s Lighting Program was very influential to their decision to purchase these bulbs. To extrapolate this across the nonparticipating customer population the 9 spillover bulbs were multiplied by the estimated number of nonparticipating ComEd residential customers (~2.5 M) and divided

⁴³ Participant spillover can only be asked of survey respondents who could recall they had purchased CFLs that were discounted as part of a promotion, since respondents who didn’t recall the discount could not be asked about the influence the promotion had on their decision to purchase the additional non-program bulbs. Within the general population survey 51% of those believed to be program participants recalled the bulbs they purchased were discounted (this is up from 34% in PY1).

by the total number of nonparticipants surveyed (299). This resulted in an estimated nonparticipant spillover rate of 1%.

Table 3-17. NonParticipant Spillover Estimation

NonParticipant Spillover	General Population Survey		
	n	Bulb/ Purchase	Total Bulbs
NP Spillover Purchases	1	9	9
Population Extrapolated NP Spillover Purchases	7,766	9	68,103
Program Bulbs			8,284,376
NonParticipant Spillover Rate			0.01

Source: PY2 General Population Survey

In PY1, Nonparticipant spillover was estimated to be 0.038 using this same customer self-report method. While this is a substantial reduction in NP spillover from PY1 to PY2, rather than focusing on participant or non-participant spillover individually what is more important is looking at the total estimated spillover present in the market place. The PY1 evaluation estimated it to be approximately 7% and the PY2 evaluation estimated it to be roughly 6% which indicates overall spillover has remained relatively stable across the two program years.

Self-Reported Net-to-Gross Ratio

Based on the estimates of Free-ridership and Spillover (participant and nonparticipant) provided above, the program-level NTGR for the PY2 Residential ES Lighting Program is calculated as:

NTGR = 1 – Free-ridership + Participant Spillover + NonParticipant Spillover

$$= 1 - (0.46 \text{ to } 0.48) + .05 + .01 = \text{a range of } 0.57 \text{ to } 0.60$$

Supplier Self-Report Method

This section provides the Net-to-Gross ratio (NTGR) values based on the supplier self-report method for Spiral bulbs, Specialty bulbs, and Fixtures in the Residential Lighting Program.

The final estimation of the NTGR for each CFL product category is the shipment-weighted average of the component NTGR values for each market actor.

For standard CFL spiral bulbs, the overall supplier self report NTGR is 0.39. This reflects a weighting of NTGR values that range from 0.27 for big box and large home improvement stores to 0.82 for grocery stores. NTGR values for warehouse stores and small hardware stores are between 0.40 and 0.50. The relatively high NTGR for grocery stores indicates that the program has a large influence on CFL product sales in these stores, most likely because consumers do not normally associate CFL products with grocery stores. The relatively low NTGR for big box and large home improvement stores suggests that consumers already associate these stores with CFL products and may not be motivated to change their purchasing behavior in response to incentives at the same level that they do for grocery stores.

Table 3-18. Sales-Weighted Net-To-Gross Ratios for Standard Bulbs by Store Type

Retailer Channel	% CFLs	Type of Market Actor	# of Market Actors Interviewed	# of Program CFLs Sold	Unweighted NTGR	Sales Weighted Evaluation NTGR
Big Box/DIY	46%	Manufacturer	2	476,078	0.43	0.27
				2,566,209	0.23	
		Retailer	1	33,081	1.00	
Warehouse	45%	Manufacturer	2	896,764	0.80	0.47
				2,449,352	0.26	
		Retailer	1	2,449,352	0.56	
Grocery/Misc	4%	Manufacturer	2	36,668	0.97	0.82
				179,102	0.70	
		Retailer	1	179,102	0.90	
Small Hardware	5%	Manufacturer	3	388,131	0.43	0.43
				349	0.80	
				25	0.43	
		Retailer	1	3,249	0.40	
Total	100%					0.39

Source: Evaluation team interviews of CFL lighting manufacturers and high level retail buyers, March 2010-June 2010

For Specialty CFL bulbs, the overall supplier self report NTGR value is 0.53. Similar to standard bulbs, the highest NTGR estimate by retail channel is for grocery stores, at 0.82, while the lowest is for big box and large home improvement stores at 0.41. NTGR values for warehouse stores and small hardware stores are in the 0.65 to 0.75 range. The higher NTGR values in all retail

channels for Specialty bulbs confirm that the program has had a comparatively larger influence on Specialty bulb purchases than on standard bulb purchases. This may be due to the fact that Specialty bulbs cost significantly more than standard CFL spirals, even with the program discount, and that there is a large proportion of people who were motivated to buy specialty CFLs that hadn't tried them before.

Table 3-19. Sales-Weighted Net-To-Gross Ratios for Specialty Bulbs by Store Type

Retailer Channel	% CFLs	Type of Market Actor	# of Market Actors Interviewed	# of Program CFLs Sold	Unweighted NTGR	Sales Weighted Evaluation NTGR
Big Box/DIY	48%	Manufacturer	4	12,675	0.93	0.41
				49,746	0.50	
				100,492	0.65	
				201,270	0.23	
		Retailer	1	1,455	1.00	
Warehouse	46%	Manufacturer	2	228,764	0.93	0.63
				155,940	0.35	
		Retailer	1	155,940	0.56	
Grocery/Misc	2%	Manufacturer	1	13,064	0.65	0.82
		Retailer	1	13,064	0.98	
Small Hardware	4%	Manufacturer	3	33,867	0.75	0.75
				90	0.93	
				16	0.65	
Total	100%					0.53

Source: Evaluation team interviews of CFL lighting manufacturers and high level retail buyers, March 2010-June 2010

The overall supplier self report NTGR value for CFL Fixtures is the highest of all bulb types, at 0.77. Grocery stores and hardware stores' NTGR values are 1.00, revealing they would not have sold CFL fixtures at all in the absence of the program. The fixture NTGR value for Warehouse stores is high, at 0.87, and is somewhat lower for Big Box and Home Improvement stores at 0.62. The \$10 incentive per CFL fixture through the program represented the largest discount percentage of all CFL product types. The higher NTGR values for CFL Specialty bulbs and Fixtures reveal the program's heavy influence on product sales in these categories. This finding is consistent with expectations, given that these product categories had the highest product

costs, the least market penetration prior to the program and the largest average incentives per unit through the program.

Table 3-20. Sales-Weighted Net-To-Gross Ratios for CFL Fixtures by Store Type

Retailer Channel	% CFLs	Type of Market Actor	# of Market Actors Interviewed	# of Program Fixtures Sold	Unweighted NTGR	Sales Weighted Evaluation NTGR
Big Box/DIY	52%	Manufacturer	2	944	1.00	0.62
				6,092	0.50	
		Retailer	1	944	1.00	
Warehouse	26%	Manufacturer	2	4,125	0.50	0.87
				11,565	1.00	
Grocery/Misc	2%	Manufacturer	1	1,765	1.00	1.00
Small Hardware	20%	Manufacturer	1	7,560	1.00	1.00
Total	100%					0.77

Source: Evaluation team interviews of CFL lighting manufacturers and high level retail buyers, March 2010-June 2010

Across all bulb types, NTGR values range from 0.27 to 0.62 for big box and large home improvement stores, 0.43 to 0.75 for small hardware stores, and 0.81 to 1.00 for grocery stores. These results are in general agreement with those of the other studies discussed above.

Revealed Preference Demand Modeled NTGR

This section describes the data, methods, and results for the revealed preference demand model's estimate of the NTGR.

Data

The revealed preference model utilized data collected during in-store customer intercept surveys and in-store shelf surveys. These data were used to model the probability of CFL purchase as a function of price, store characteristics, and customer characteristics. The estimated model parameters, and the data, were used to estimate the probability of purchasing a CFL with the program and to simulate the probability of purchasing a CFL under non-program conditions. The NTGR was then calculated using the program and non-program predicted probabilities.

The revealed preference model relies on an intricate mix of the in-store shelf survey and revealed preference data. Developing these data to be used in the model was a multistep

process. Using ComEd's equivalent wattage categories, the shelf survey data for CFLs and the incandescent bulbs were grouped into the corresponding wattage and style categories. Based on these wattage and style categories, minimum, average, and maximum pricing variables were then developed at the chain, store, and package level. The pricing variables were developed using shelf survey information on both the pre-program price of the CFLs and the program-discounted CFL price. The shelf survey data was also used to develop chain and store level promotional and display variables. Promotional variables described the different types and quantity of ComEd promotional material observable in the store. Display variables described the share of lighting shelf space occupied by CFLs.

The shelf survey data was collected for 45 stores and 20 chains. The intercept surveys, however, were undertaken at 16 stores, representing 3 chains of stores. One limitation on the data used was that the in-store intercept and shelf survey data did not have substantial overlap. Ensuring that each in-store intercept was matched to a shelf survey stores would have allowed the development of store level pricing and display variables for each intercept survey. Due to restrictions placed on the team by participating retailers and budget limitations, it was not possible to match each intercept survey with a store level shelf survey. In an attempt to preserve data, the intercept data from stores that were associated with major chains was also used even if the particular store was not associated with a shelf survey. For stores with intercept and shelf surveys, the pricing and display variables are store level variables. For stores with intercept surveys but no shelf surveys, the pricing and display variables are chain level variables.⁴⁴

Additional data limitations resulted in further elimination of data in the analysis. Ultimately, the analysis included intercept survey data from 9 stores and one chain. One such limitation was caused by the lack of incandescent and non-program CFLs at one chain retailer which was discovered following the review of the shelf survey data. Specifically, 4 of the stores associated with that chain sold only program CFLs. When the store intercept surveys were scheduled, it was not known that this chain of stores sold no incandescent or non-program CFLs. To estimate the demand for CFLs and the program's influence on CFL demand, it is necessary that consumers have the option to buy both program and non-program lighting. It was also necessary to eliminate data from 3 stores associated with a hardware store chain due to the small number of intercept surveys and the stores' significantly different pricing structure when compared to the remaining chain of stores.⁴⁵

⁴⁴ The small number of intercept surveys associated with individual store data did not allow the model to be estimated separately for this subset of data.

⁴⁵ Including the data point associated with the hardware chain does not substantially change the conclusions of the revealed preference model.

Logistic Model

Due to data limitations, the logistic revealed preference demand model was estimated only for one chain of Home Improvement stores. It was estimated using the lighting package as the unit of observation and was estimated separately for planned and unplanned lighting purchases. The model included variables representing store or chain characteristics such as the price of CFLs and incandescents and the prominence of CFLs in the store or chain. It also included variables representing the customer's intent to purchase CFLs and the current use of CFLs in the customer's home or business.

Table 3-21 below lists the variables included in the revealed preference model, the model parameters, and the p-values. The table also lists the mean values and standard deviations for each variable included in the model under the program and non-program scenarios. The program scenario represents the actual characteristics under which the model was estimated. The non-program scenario probability was simulated using the model parameters and the individual non-program values for the independent variables.

Table 3-21. Revealed Preference Model for Planned Purchases

Model Parameter	Coeff.	P-Value	With Program		Non-Program	
			Mean	S.D.	Mean	S.D.
Intercept	-1.52	0.0126				
Min Comparable CFL Price/Min Comparable Inc Price	-0.07	0.4385	3.18	3.47	3.97	4.85
# Comparable CFL Models/# Comparable Inc Models	-0.38	0.0028	2.80	2.50	2.80	2.50
Intent to Purchase CFL	3.85	<.0001	0.61	1.10	0.61	1.10
Knew Discounts Available	3.31	<.0001	0.32	1.06	0.00	0.00
Had Experiences Using CFL	0.54	0.1160	0.83	0.86	0.83	0.86
A Demo Store	1.55	0.0009	0.15	0.81	0.00	0.00

Source: Revealed Preference Demand Modeling

The estimated probability of purchasing a CFL with the program was 67%. The simulated probability of purchasing a CFL under the non-program scenario was 53%. The calculated NTGR for CFLs given these predicted probabilities is 0.21. The NTGR for the planned purchase model is low and should be viewed with caution. The estimated probabilities and resulting NTGR was only estimated using data from one chain of Home Improvement stores. Applying this NTGR across the program is likely to misrepresent the program NTGR. In addition, for many packages within the model, the independent variables represent chain wide averages, not

store level prices or number of packages. The use of chain level variables limits the variability of the independent variables and introduces possible errors in variables that may bias the coefficient estimates. Therefore, it is recommended that this value not be considered when estimating the program level NTGR for PY2. Additional data collection efforts in PY3, as described below, will hopefully eliminate many of the data problems encountered in PY2, and lead to a more robust model specification and resulting NTGR estimates than were generated in this PY2 evaluation.

The model coefficients, predicted probabilities, and NTGR for unplanned purchases are also not presented due to the unstable nature of the model. The coefficients in the model were highly sensitive to the addition or deletion of additional variables into the model. The unstable nature of the estimated probabilities for unplanned purchases implies that a NTGR calculated from these results would be unreliable.

While the data collected from the revealed preference and shelf surveys have provided ComEd with substantial information on pricing, customer preferences, and helped provide an additional calculation of self-reported NTGR, these data were of marginal quality for the revealed preference demand model. Additional data will be gathered in the PY3 evaluation to support estimating the NTGR using the revealed preference model based on in-store intercept and shelf survey data. The current model was estimated using data from 9 stores from a single chain. The restricted nature of the data that was available limited the quality and applicability of the results. Future data collection efforts will also focus on ensuring that the revealed preference surveys are matched with shelf survey data, eliminating the need to use chain level averages, since the use of chain level averages may bias the results, further limiting their value.

Comparison of Net Impact Results across Methods

Table 3-22 presents range of estimated NTGR resulting from the four methods used as part of the PY2 evaluation.

Table 3-22. NTGR Estimates by Evaluation Method

Evaluation Method	Data Source	NTGR Estimate
Customer Self-Report	General Population Survey	0.57
	In-store Intercept Survey	0.60
Supplier Self-Report	Trade Ally In-depth Interviews	0.44
Revealed Preference Purchase Model	In-store Intercepts and Shelf Surveys	0.21
Recommended PY2 Ex Post NTGR Estimate		0.58

The evaluation team thoroughly reviewed the PY2 Residential Lighting Program NTGR results from the four NTGR methods employed and has concluded the PY2 Ex-Post NTGR should be calculated as the average of the NTGR results coming from the two Customer Self-Report methods. Although there is much promise for the revealed preference purchase model, the current model is too unstable based on the data issues and constraints as discussed above.

The supplier self-report NTGR estimate is also not recommended since the findings from such a limited sample size can easily be influenced by responses from one or two supplier-respondents. While neither of these approaches is recommended for the final result, they do provide strong evidence that high free ridership may exist in the market. This conclusion is also supported by the large percent of customers who claimed they would have purchased the same number of CFLs even if the price was increased by \$1 (the average discount amount).

The recommended NTGR is based on the two customer self-report methods which are the most valid for setting the program NTGR. The in-store intercept NTGR method is a strong method since it is based on perceptions at the time of purchase while the purchase experience is still fresh. It is complemented by the general population-based NTGR which also has the advantage of being able to investigate participant and nonparticipant spillover (a limitation of the intercept surveys). In addition, the CATI telephone format for that approach allows for the real-time identification of response inconsistencies that can then be more clearly explained by a respondent in their own words. Such inconsistencies are much harder to identify and dig into during face to face pen and paper in-store intercept surveys. Due to the strength of these two customer self-report methods, it is recommended that the two values be averaged to yield a final NTGR estimate of 0.58.

It is important to understand that the estimation of a NTGR for an upstream program such as this, where the market is very dynamic and the product being purchased is very low cost is challenging. This means that the most appropriate course of action is to investigate free ridership and spillover through multiple approaches and then use the most robust approaches to develop the final estimate. Such a result is likely to be more robust than if it were developed based on a narrower investigation involving a single method and set of market actors.

Final Ex-Post Net Impact Results

The final net program impacts were derived by multiplying the ex-post gross program savings estimates by the ex-post NTGR. Table 3-23 below provides the program-level evaluation-adjusted net impact results for the PY2 Residential Lighting program. As this figure shows, the ex-post program-level first-year net energy saving estimate resulting from this evaluation are 146,044 MWh and the net demand savings estimates are 136 MW and 21.6 MW during peak. The net attainment rate on program reported net energy savings is 101% (146,044/144,700).

Table 3-23. PY2 Net Parameter and Savings Estimates

Net Parameter and Savings Estimates	Program Reported	Evaluation Verified
Total First-Year Gross MWh Savings	206,715	341,398
Total First-Year Gross MW Savings	242	301
Total First-Year Gross Peak MW Savings	19.6	40.7
Net-to-Gross Ratio (1-FR+SO)	70%	58%
Total First-Year Net MWh Savings	144,700	199,560
Total First-Year Net MW Savings	169	176
Total First-Year Net Peak MW Savings	13.7	23.8

Source: Evaluation Team Analysis

3.2 *Process Evaluation Results*

The process evaluation component of the PY2 Residential Lighting Evaluation focused on familiarity with and usage of CFLs, overall lighting purchase behaviors, satisfaction with CFLs and program CFLs in particular, barriers to purchasing CFLs, awareness of the ComEd Residential Lighting program, and effectiveness of program marketing.

Data sources for the process evaluation include the General Population (Purchaser and Non-Purchaser) Telephone Survey (n=500), the in-store customer intercept survey (n=81), in-store lighting shelf stocking survey, and in-depth interviews with participating store managers or lighting department specialists. Comparisons between PY1 and PY2, or between subgroups in PY2, are tested for statistical significance at the .10 level. Significant differences are indicated by the presence of superscripts next to the value in the table. For example, if a value in column A has a superscript "B" next to it, the value in A is significantly different from the value in B at the .10 level.

3.2.1 *Awareness and Use of CFLs*

CFL Awareness

Most ComEd customers are aware of CFLs. In Program Year 2, 79% said they knew what CFLs were without any prompting, and an additional 12% remembered having heard of CFLs when read a brief description of the bulb type, bringing overall awareness of the CFLs to 91%. This level of awareness is largely on par with PY1, where overall awareness of CFLs, aided and unaided combined, was at 95%. It should be noted, however, that unaided awareness is significantly lower in PY2 as compared to PY1.

The evaluation team explored whether this decrease could be due to inconsistencies in survey design and data collection strategies between the two studies. It was found that both studies had similar distributions of respondents across major demographic characteristics indicating that we reached similar customers. In addition, the unaided awareness question and its position in the survey instrument remained unchanged. The PY1 survey was conducted in September 2009 whereas the PY2 survey was conducted in May 2010. Conducting the survey in the spring versus the fall could impact the results if there was a much larger marketing campaign undertaken in September 2009 compared to May 2010. However, the September 2009 campaign would have to have been considerably larger to account for this decline in awareness. In addition, the rest of the survey results do not show similar differences between PY1 and PY2. As a result, it is concluded that this difference in awareness between PY1 and PY2 is due to the vagaries of random survey sampling. Surveys sometimes produce a result that falls outside the margin of error that cannot be explained.

Table 3-24. Awareness of CFLs by Program Year*

	PY1 Total (n=231) A	PY2 Total (n=499) B
Yes – Unaided	86% ^B	79%
Yes – Aided	10%	12%
No	5%	9% ^A

Source: ComEd General Population Surveys (PY1 and PY2)

*Does not sum to 100% due to rounding

Home-owners as well as those who live in larger residences are more likely than renters and residents of smaller size properties to be aware of CFLs.

Customers who were aware of CFLs were asked how familiar they are with the light bulbs. Though awareness of CFLs remained largely unchanged from PY1, ComEd customers tend to be more familiar with CFLs in PY2 than they were in PY1. While in PY1, a third of customers aware of CFLs claimed to be very familiar with them, in PY2, this number increased to 46%.

Table 3-25. Familiarity with CFLs by Program Year

	PY1 Total (n=220) A	PY2 Total (n=456) B
Very familiar	34%	46% ^A
Somewhat familiar	36%	38%
Not too familiar	22% ^B	10%
Not at all familiar	8% ^B	5%
Don't know	0%	1%

Source: ComEd General Population Surveys (PY1 and PY2)

Program purchasers specifically were asked about their familiarity with CFLs before they purchased them. As seen in Table 3-26, familiarity with CFL technology increased from PY1 to PY2. Eighty-three percent of PY2 program participants (up from 56% in PY1) were at least somewhat familiar with CFLs before they purchased them.

Table 3-26. Familiarity with CFLs before Purchase of Bulbs*

	PY1 Total (n=55) A	PY2 Total (n=201) B
Very familiar	27%	39%
Somewhat familiar	29%	44% ^A
Not too familiar	35% ^A	10%
Not at all familiar	9%	6%
Don't know	0%	1%

Source: ComEd General Population Surveys (PY1 and PY2)

**The definition of program purchasers is slightly different in PY2 than it was in PY1*

While general knowledge of CFL technology is fairly widespread, familiarity with specialty CFLs lags behind. Familiarity ranges from over one-third who are very or somewhat familiar with A-Shaped CFLs (35%) to just under half (48%) who are familiar with dimmable or 3-way CFLs.

Table 3-27. Familiarity with Various Types of CFLs

	CFLs in General (n=456) A	Dimmable or 3-Way (n=456) B	Flood or Recessed CFLs (n=456) C	Globe CFLs (n=456) D	A-Shaped CFLs (n=456) E
Very familiar	46% ^{BCDE}	22% ^E	24% ^E	23% ^E	16%
Somewhat familiar	38% ^{BCDE}	27% ^E	22%	23%	19%
Not too familiar	10%	12%	13%	14%	15% ^A
Not at all familiar	5%	37% ^A	38% ^A	38% ^A	46% ^{ABCD}
Don't know	1%	3% ^A	2%	2%	4% ^{ACD}

Source: ComEd General Population Survey (PY2) *Does not sum to 100% due to rounding

Not surprisingly, ComEd customers who have purchased CFLs are more familiar with them than those who have not. This is true of CFLs in general as well as specialty CFLs. Table 3-28 shows the percentage of customers who are very or somewhat familiar with CFLs in general and with specialty CFLs across four distinct customer segments. It is important to note that combined familiarity with various types of specialty CFLs is higher than familiarity with each individual specialty CFL type.

Table 3-28. Familiarity with CFLs by Customer Segment

% Very/ Somewhat Familiar	PY2 Total (n=456) A	Program Purchasers (n=201) B	Non- Program Purchasers (n=72) C	Purchased Prior to June 2009 (n=76) D	Never Purchased CFLs (n=107) E
Familiar with CFLs in general	84%	90% ^D	100% ^{ACD}	83% ^D	63%
	(n=456)	(n=201)	(n=72)	(n=76)	(n=107)
Familiar with specialty CFLs*	71%	77% ^D	86% ^{CD}	70% ^D	52%

Source: ComEd General Population Survey (PY2)

*Respondents were classified as familiar with specialty CFLs if they said they were very or somewhat familiar with at least one specialty CFL type.

CFL Usage and Purchases

Penetration of CFLs in ComEd territory remained the same between PY1 and PY2. At the end of both program years, two of three ComEd customers had at least one CFL installed in their homes. This means that one-third of ComEd customers still do not have any CFLs installed. Compared to CFL users, these CFL non-users have less education, lower incomes, are more likely to rent their homes, which also tend to be smaller. These customers are also more likely than CFL users to live by themselves. In essence, they tend to be from traditional “hard to reach” populations. Reaching these customers is typically more difficult and usually requires targeted marketing and educational outreach efforts.

Among ComEd customers with CFLs installed, however, there has been a significant shift in the number of CFLs customers are using in their homes. The average number of CFLs present in homes in PY2 is 13, a significant increase compared to an average of nine CFLs in PY1. At the same time the number of “incandescent-free” homes increased by 6% in PY2 compared to PY1. These changes suggest that while the overall share of CFL-using customers remains largely the same, these customers are increasingly replacing their incandescent bulbs with CFLs.

Table 3-29. Change in CFL and Incandescent Usage

	CFLs		Incandescents	
	PY1 Total (n=231)	PY2 Total (n=499)	PY1 Total (n=231)	PY2 Total (n=500)
	A	B	C	D
Have at least one bulb installed in home	64%	62%	76% ^{BA}	70% ^B
	(n=147)	(n=308)	N/A	N/A
Average number of bulbs installed at home	8.9	13.3 ^A	N/A	N/A

Source: ComEd General Population Surveys (PY1 and PY2)

Seven in ten ComEd customers have, at some point, purchased a CFL for use in their home. This number is essentially unchanged from PY1. A majority of ComEd customers bought CFLs in PY2 (55%), which is statistically unchanged from PY1.

Table 3-30. Past CFL Purchases by Program Year

	PY1 Total (n=231) A	PY2 Total (n=499) B
Purchased CFLs at some point in the past	72%	70%
Purchased any CFLs in Program Year	52%	55%

Source: ComEd General Population Surveys (PY1 and PY2)

When all the lighting ComEd Customers purchased is examined, 31% bought *only* CFLs in PY2 while 24% bought CFLs as well as incandescent bulbs. One in five bought only incandescent bulbs (19%) A quarter of ComEd customers did not buy either bulb type in PY2. As seen in Table 3-31, there has been no significant shift in the bulb mix from PY1 to PY2.

Table 3-31. Lighting Purchases by Program Year

	PY1 Total (n=231) A	PY2 Total (n=498) B
CFLs only	32%	31%
Incandescent only	24%	19%
Both CFL and incandescent	19%	24%
Neither CFL nor incandescent	24%	26%

Source: ComEd General Population Surveys (PY1 and PY2)

Although there has been no change in the number of customers purchasing CFLs, there has been an increase in the number of bulbs customers are buying. ComEd customers who purchased CFLs in PY2 reported purchasing an average of 14 bulbs, a significant increase from PY1's 11 bulbs. Incandescent bulb purchases stayed the same over the two Program Years with an average of 10 bulbs purchased each year.

Table 3-32. Change in Purchases of Various Bulb Types

	CFLs		Incandescents	
	PY1 Total (n=231)	PY2 Total (n=499)	PY1 Total (n=231)	PY2 Total (n=500)
	A	B	C	D
Purchased at least one bulb	52% ^{CD}	55% ^{CD}	44%	43%
	(n=107)	(n=246)	(n=94)	(n=180)
Average number of bulbs purchased	10.8	14.2 ^{ACD}	9.9	9.9

Source: ComEd General Population Surveys (PY1 and PY2)

Nearly every ComEd customer who purchased CFLs in PY2 (94%) was at least slightly familiar with CFLs prior to purchasing them, with 39% being very familiar and 44% somewhat familiar. Program purchasers familiar with CFLs prior to their PY2 purchase were asked about prior saturation of their sockets with CFLs. As seen in Table 3-33, over half of program participants in PY2 (56%) reported that less than a quarter of their sockets contained CFLs, while 12% had CFLs in all of the sockets prior to their PY2 purchase. This could indicate that the program is reaching customers with low prior usage of CFLs. However, a sizable number of ComEd customers who have CFLs in a large number of their sockets also purchased program bulbs. Just over one in ten (12%) have CFLs in all of their light sockets while 13% had them in more than 75% but not all of their sockets. The program appears to be reaching the two extremes – CFL non-users and heavy CFL users. More targeted marketing may be required to reach more of the former group and less of the latter.

Table 3-33. CFL Saturation Prior to PY2 Purchase*

	PY2 Total (n=190)
All of sockets	12%
More than 75% but not all of the sockets	13%
More than 50% but less than 75% of the sockets	9%
More than 25% but less than 50% of the sockets	9%
More than 5% but less than 25% of the sockets	15%
Less than 5% of the sockets	10%
None of the sockets	31%
Don't know	2%

Source: ComEd General Population Survey (PY2)

*Does not sum to 100% due to rounding

PY2 program participants and non participating PY2 purchasers have more CFLs installed than those who purchased CFL bulbs prior to Program Year 2. A small number of ComEd customers reported they have never purchased a CFL and yet they also report that they have an average of 5 CFLs installed in their homes. These customers might have been given CFLs or might have moved to a residence where CFLs were already installed.

Table 3-34. Mean Number of CFLs Purchased and Installed by Respondent Type

	PY2 Total (n=246)	Program Purchasers (n=201)	Non- Program Purchasers (n=45)	Purchased Prior to June 2009 (n=76)	Never Purchased CFLs (n=107)
		A	B	C	D
Average number of bulbs purchased	14.2	14.7	12.0	--	--
	(n=308)	(n=184)	(n=55)	(n=52)	(n=17)
Average number of bulbs installed at home	13.3	14.9 ^{CD}	13.9 ^{CD}	9.8 ^D	4.7

Source: ComEd General Population Survey (PY2)

One-quarter of customers who purchased ComEd program CFLs in PY2 and installed them have removed at least some them (24%). The most common reason given for why they were removed is that the bulbs burned out, stopped working, or they broke (79%). The remaining reasons concerned the performance of the CFLs (see Table 3-35). Not surprisingly, the customers who removed their CFLs are less satisfied with them than those in kept them in place.⁴⁶ ComEd should further investigate these quality issues. Those who experienced these problems may not purchase CFLs in the future as a result.

⁴⁶ For full results on satisfaction with CFLs, please refer to the *Barriers* section of this report.

Table 3-35. Reasons Why Customers Remove CFLs*

Reason for Removing CFL	Removed CFLs (n=47)
Burned out/stopped working/broke	79%
Not bright enough	9%
Didn't like the way it looked	4%
Moved	4%
Did not like the color	2%
Took too long to start up	2%
Didn't fit in the fixture	2%

Source: ComEd PY2 General Population Lighting Survey

*Multiple response question

ComEd customers who still purchase incandescent bulbs appear to be buying them more for specialty fixtures and less for regular fixtures. The number of customers who purchased incandescent bulbs for a regular fixture decreased from 65% in PY1 to 56% in PY2, while the number of customers buying incandescent bulbs for a specialty fixture increased from 17% in PY1 to 26% in PY2. This shift could indicate that while customers are increasingly using CFLs in their regular fixtures, there are still barriers to CFL use in specialty fixtures.

The in-store customer intercept survey that was conducted as part of this evaluation provides additional support. Customers purchasing non-CFL bulbs were asked why they were buying a non-CFL. One of the most common responses given was a need for a bulb that would work in a specialty fixture such as dimmable bulb or three-way bulb.⁴⁷ This result, paired with somewhat low familiarity with specialty CFLs suggests a need for increased education about the variety of CFL types available and their applications.

⁴⁷ For detailed results, please refer to the *Barriers* section of this report.

Table 3-36. Usage of Incandescent Bulbs

	PY1 Total (n=101) A	PY2 Total (n=217) B
Regular fixture	65%	56%
Dimmer or specialty fixture	17%	26% ^A
Both	15%	15%
Don't know	3%	3%

Source: ComEd General Population Surveys (PY1 and PY2)

3.2.2 Attitudes Regarding CFLs

Why Use CFLs

ComEd customers who had CFLs installed in their homes at the time of the general population survey were asked why they chose to use CFLs in their homes. ComEd customers' top reason was to save energy, followed closely by saving money. There is little difference between those purchasing program versus non-program CFLs during PY2. Two out of five program purchasers and non-program purchasers were motivated to save energy; just over one-third of each of these groups uses them to save money. Those who purchased prior to June 2009 are less likely to be motivated to save energy. This group is also more likely to say they didn't know why they decided to use CFLs. This may indicate that as time passes, CFL users could use a reminder of the energy and financial benefits of CFL use.

Table 3-37. Reasons Why Customers Use CFLs (single response)

Reasons for Using CFLs	PY2 Total (n=291) A	Program Purchasers (n=184) A	Non-Program Purchasers (n=55) B	Purchased prior to June 2009 (n=52) C
I want to save energy	39%	41% ^C	44% ^C	27%
I want to save money	36%	36%	33%	37%
I want to help the environment	19%	20%	16%	15%
I want to reduce dependence on foreign oil, coal, or gas	2%	1%	4%	4%
Don't know	4%	2%	2%	14% ^{AB}

Source: ComEd General Population Survey (PY2)

Satisfaction with CFLs

Nearly eight in ten ComEd customers who purchased CFLs last year are satisfied with their purchase (78%). In fact, 52% of PY2 CFL purchasers gave a rating of 9 or 10 on a satisfaction scale that ranged from 0 to 10 where 0 means “not at all satisfied” and 10 means “very satisfied”. Only 4% of CFL users are dissatisfied with the light bulbs. Some of the reasons customers gave for being dissatisfied include problems with quality of the light, longevity, delay when the light turns on, brightness, and fitting in light sockets.

Table 3-38. Satisfaction with CFLs Purchased

Satisfaction with CFLs Purchased	PY1 Total (n=107) A	PY2 Total (n=241) B	Program Purchasers (n=199) C	Non- Program Purchasers (n=42) D
Satisfied (7-10)	79%	78%	78%	81%
Neither Satisfied Nor Dissatisfied (4-6)	13%	16%	16%	17%
Dissatisfied (0-3)	7%	4%	5%	2%
Don't know	1%	1%	1%	0%
Mean	8.04	8.13	8.11	8.21

Source: ComEd General Population Survey (PY1 and PY2)

In the previous section, it was reported that one-quarter of customers who purchased ComEd discounted CFLs since June 2009 had removed some of the ones they had installed. As Table 3-39 shows, these customers are less satisfied with their purchases than those who have kept all of their CFLs installed.

Table 3-39. Satisfaction with CFLs Purchased by Removal of CFLs

Satisfaction with CFLs by CFL Removal Status	Kept all CFLs Installed (n=149) A	Removed Some/All CFLs (n=47) B
Satisfied (7-10)	84% ^B	66%
Neither Satisfied Nor Dissatisfied (4-6)	12%	26% ^A
Dissatisfied (0-3)	3%	9% ^A
Don't know	1%	0%
Mean	8.46 ^B	7.36

Future CFL Purchasing Intentions

Overall, there appears to be a shift towards more CFL usage between PY1 and PY2 customers. PY2 respondents are significantly more likely to replace existing burned out incandescent bulbs with CFLs and less likely to replace them with incandescent bulbs compared to PY1 respondents. PY1 and PY2 customers are consistent in their intent to replace existing CFLs with other CFLs.

Table 3-40. Actions Planned For Next Time Incandescent Burns Out

Planned Action	PY1 (n=176) A	PY2 (n=348) B
Replace it with another incandescent	58% ^B	45%
Replace it with a CFL	30%	39% ^A
Depends on fixtures/sockets/location	6%	3%
Depends on price	0%	1%
Other	0%	2% ^A
Don't know	6%	10%

Source: ComEd General Population Survey (PY1 and PY2)

Table 3-41. Actions Planned For Next Time CFL Burns Out

Planned Action	PY1 (n=75)	PY2 (n=309)
	A	B
Replace it with another CFL	85%	83%
Replace it with an incandescent	9%	10%
Depends on fixtures/sockets/location	1%	0%
Depends on price	0%	1%
Replace with both CFL and Incandescent	0%	1%
Replace with LED	0%	1%
Other	0%	1%
Don't know	4%	4%

Source: ComEd General Population Survey, ComEd General Population Survey (PY1 and PY2)

Across the board, customers are more likely than not to replace an existing CFL with another CFL when the current one burns out. Those who purchased their CFLs prior to June 2009 are more likely to replace their CFL with an incandescent or are not sure what type of bulb they will use.

Table 3-42. Actions Planned For Next Time CFL Burns Out

Planned Action	PY2 Total (n=309)	Program Purchasers (n=184) A	Non- Program Purchasers (n=56) B	Purchased Prior to June 2009 (n=52) C	Never Purchased CFLs (n=17) D
Replace it with a CFL	83%	85% ^C	88% ^C	67%	82%
Replace it with an incandescent	10%	10%	7%	17%	6%
Depends on price	1%	1%	0%	0%	6% ^{BC}
Replace with both CFL and incandescent	1%	1%	0%	4%	0%
Replace with LED	1%	1%	0%	0%	0%
Other	1%	1%	0%	0%	0%
Don't know	4%	1%	5% ^A	12% ^{AB}	6%

Source: ComEd General Population Survey (PY2)

There is a stark difference in intent between recent CFL purchasers (program and non-program purchasers) and those who purchased before June 2009 or have never purchased CFLs when it comes to replacing existing incandescent bulbs. Those who purchased their CFLs before June 2009 (61%) or have never purchased (68%) are more likely to replace a burned out incandescent with another incandescent. Half of recent purchasers, however, plan on replacing burned out incandescent bulbs with CFLs. While recent CFL purchasers are more likely than earlier purchasers to replace existing incandescent bulbs with CFL bulbs, this number is still low considering the high levels of satisfaction indicated previously. This suggests that reasons other than satisfaction with CFLs may be at work, such as a fixture requiring a specialty bulb that current CFL users think may not be suitable for a CFL. A small number of respondents who have never purchased CFLs but have them installed overwhelmingly say they will replace those CFLs with another CFL.

Table 3-43. Actions Planned For Next Time Incandescent Burns Out

Planned Action	PY2 Total (n=348)	Program Purchasers (n=151) A	Non-Program Purchasers (n=52) B	Purchased Prior to June 2009 (n=56) C	Never Purchased (n=65) D
Replace it with another incandescent	45%	32%	29%	61% ^{AB}	68% ^{AB}
Replace it with a CFL	39%	50% ^{CDE}	50% ^{CDE}	25%	25%
Depends on fixtures, sockets, location	3%	5% ^C	2%	0%	0%
Depends on price	1%	1%	0%	2%	0%
Other	2%	4%	2%	0%	0%
Don't know	10%	8%	15%	13%	8%

Source: ComEd General Population Survey (PY2)

Green Preferences

The general population survey of ComEd customers contained a number of questions designed to gauge customers' level of environmental awareness and concern. Overall, ComEd customers are more likely to say that protecting the environment should take precedence over economic growth (Table 3-44). When it comes to concern over use of fossil fuels, more are concerned with dependence on foreign oil than global warming or running out of these fuels (Table 3-45).

Program purchasers are particularly concerned about dependence on foreign oil. Non-program CFL purchasers are equally concerned about global warming and dependence on foreign oil. Those who have never purchased a CFL or are unaware of them are less concerned with all of these issues related to use of fossil fuels.

Table 3-44. Environment versus Economy

With which one of these statements do you most agree?	PY2 Total (n=500)	Program Purchasers (n=201)	Non-Program Purchasers (n=72)	Purchased Prior to June 2009 (n=76)	Never Purchased (n=107)	Unaware (n=44)
		A	B	C	D	E
Protection of the environment should be given priority, even at the risk of curbing economic growth	53%	54% ^E	54%	54%	50%	48%
Economic growth should be given priority, even if the environment suffers to some extent	32%	33%	32%	28%	35%	32%
Don't know	14%	11%	14%	16% ^A	16% ^A	20% ^A

Source: ComEd General Population Survey (PY2)

Table 3-45. Global Warming and Resource Concerns*

How much do you personally worry about... (Top 2)	PY2 Total (n=500)	Program Purchasers (n=201)	Non-Program Purchasers (n=72)	Purchased Prior to June 2009 (n=76)	Never Purchased (n=107)	Unaware (n=44)
		A	B	C	D	E
Global warming	52%	56% ^{CDE}	64% ^{ACDE}	51% ^D	40%	45%
Running out of fossil fuels such as coal, oil, and natural gas	46%	50% ^{CDE}	54% ^{ACDE}	39%	42%	41%
Dependence on other countries for oil	61%	70% ^{BCDE}	64% ^{CDE}	54% ^E	53% ^E	43%

Source: ComEd General Population Survey (PY2)

*Respondents were asked their level of concern on a four point scale, where 1 was "not at all", 2 "only a little", 3 "a fair amount" and 4 "a great deal". The top two categories are reported in this table.

The majority of all ComEd customers expect to reduce energy consumption over the next few months, with three quarters of program purchasers, non-program purchasers, and those unaware of CFLs predicting they will. However, a large percentage of each group also believes that they cannot do much more to reduce the amount of energy their households are currently using. Those who have never purchased or are unaware of the existence of CFLs are more likely to think that it is too expensive to reduce energy use. In addition, those who have never purchased CFLs and those who purchased before 2009 are less likely than program purchasers to think that their actions influence climate change.

Table 3-46. Energy Usage

(Top 2 Agree)	PY2 Total (n=500)	Program Purchasers (n=201)	Non- Program Purchasers (n=72)	Purchased Prior to June 2009 (n=76)	Never Purchased (n=107)	Unaware (n=44)
		A	B	C	D	E
Over the next few months I expect to take measures to reduce how much energy my household uses.	72%	78% ^{BCD}	74%	68%	63%	73%
I can't do much more than I'm already doing to reduce the amount of energy my household uses.	61%	58%	57%	64%	67%	66%
It is too expensive for me to reduce my household energy use.	33%	27%	26%	34%	42% ^{AB}	48% ^{AB}
I believe my actions have an influence on global warming and climate change.	66%	72% ^{CD}	69%	59%	57%	64%

Source: ComEd General Population Survey (PY2)

The link between environmental concerns and CFL usage becomes even more apparent when looking at the reasons behind the use of CFLs. Earlier it was reported that more people were using CFLs to save money than to help the environment. However, those who are motivated by saving money are more likely to say they can't do much more and less likely to think they have a direct influence on global warming and climate change. It may take different messaging to encourage these customers to use greater numbers of CFLs or take other energy saving actions through ComEd's CFL discounts and other programs.

Table 3-47. Energy Usage

(Top 2 Agree)	Use CFLs to save money (n=104) A	Use CFLs to help the environment (n=54) B
Over the next few months I expect to take measures to reduce how much energy my household uses.	76%	85%
I can't do much more than I'm already doing to reduce the amount of energy my household uses.	62% ^B	43%
It is too expensive for me to reduce my household energy use.	33%	22%
I believe my actions have an influence on global warming and climate change.	60%	83% ^A

Source: ComEd General Population Survey (PY2)

3.2.3 Barriers to CFL Use

In the general population survey, the top reasons cited by customers as to why they have not purchased CFLs are that they are too expensive (15%) and they are waiting for their current bulbs to burn out (13%). The results between PY1 and PY2 are fairly consistent, except opinions about the appearance of CFLs have improved significantly since last year. One out of five customers who have never purchased CFLs do not know why they haven't done so. These non-purchasers may simply be unaware of the benefits of CFLs, representing an opportunity for conversion through proper marketing and incentives.

Table 3-48. Reasons Why Customers Do Not Purchase CFLs

	Never Purchased CFLs	
	PY1 (n=53)	PY2 (n=152)
	A	B
Too expensive	17%	15%
Waiting for current bulbs to burn out	17%	13%
Do not like the appearance	11% ^B	3%
Unsure of quality	6%	7%
Dangerous/mercury concerns	6%	4%
Haven't thought about it	6%	3%
Have some that were free/given to me	6%	2%
Have not seen in stores	4%	5%
Do not like the light	4%	4%
Don't fit/don't work with certain applications	4%	2%
Do not like CFLs in general	4%	0%
Do not save that much energy	4%	0%
Don't know enough about them	4%	1%
Takes too long to light up	2%	0%
Don't need them/Have lights in storage	0%	5%
Waiting for discount/sale/coupon	0%	4%
Not my responsibility to buy light bulbs	0%	3%
Satisfied with light bulbs I use	0%	2%
Haven't had time	0%	1%
Other	0%	8%
Don't know	13%	22%

Source: ComEd General Population Surveys (PY1 and PY2)

The in-store intercept survey asked customers who did not purchase CFLs why they were buying another type of light bulb. Responses are broken down between those who considered purchasing CFLs but didn't and those who did not even consider CFLs. Table 3-49 below provides results combined across these two customer groups, as well as the results for each group separately.

As seen in this table, multiple barriers still exist in the marketplace that can hinder wider adoption of CFL technology. As with the general population survey, price is the top barrier to CFL adoption. Awareness also plays a big role in customers choosing incandescent bulbs instead of CFLs. Thirty-eight percent of non-CFL purchasers believe that CFLs are too expensive, while 32% say they are either unaware of have little knowledge about them. In addition, 22% cite a need for specialty CFLs, 14% believe that CFLs burn out too quickly, and 21% say that CFLs take too long to reach full brightness.

Table 3-49. Reasons for Purchasing Incandescents Instead of CFLs

	PY2 Total (n=72)	Considered but did not Purchase CFLs (n=16) A	Did not Consider or Purchase CFLs (n=56) B
CFLs are too expensive	38%	31%	39%
Accustomed to incandescent bulbs	25%	13%	29%
CFLs take too long to reach full brightness	21%	13%	23%
Dislike the light quality/color of CFLs	18%	0%	23% ^A
Don't know enough about CFLs	17%	19%	16%
Not aware of CFLs before today	15%	13%	16%
CFLs burn out too quickly	14%	6%	16%
Need three-way bulbs	10%	19%	7%
Need dimmable bulbs	10%	13%	9%
Don't like the way CFLs fit in fixtures	6%	0%	7%
CFLs flicker	4%	6%	4%
Don't like the way CFLs look in fixtures	3%	0%	4%
Need other specialty type	3%	0%	4%
Prior experience with this incandescent	3%	0%	4%
Prefer this brand/manufacturer	1%	0%	2%
Other	26%	38%	23%

Source: ComEd Customer Store Intercept Survey

*Multiple response question

Non-CFL purchasers who have had experience either purchasing or using CFLs prior to their store visit are more likely than those who have not had any prior experience with CFLs to mention cost (48% vs. 21%), the fact that CFLs burn out too quickly (20% vs. 4%) and that they take too long to reach full brightness (34% vs. 0%) as the reasons for not purchasing or considering CFLs. Customers who did not have prior experience with CFLs are more likely to cite lack of awareness as the major reason (71% vs. 7%).

Table 3-50. Reasons for Purchasing Incandescents Instead of CFLs

	PY2 Total (n=72)	Prior Experience with CFLs (n=44) A	No Prior Experience with CFLs (n=28) B
CFLs are too expensive	38%	48% ^B	21%
Accustomed to incandescent bulbs	25%	23%	29%
CFLs take too long to reach full brightness	21%	34% ^B	0%
Dislike the light quality/color of CFLs	18%	23%	11%
Don't know enough about CFLs	17%	7%	32% ^A
Not aware of CFLs before today	15%	0%	39% ^A
CFLs burn out too quickly	14%	20% ^B	4%
Need three-way bulbs	10%	11%	7%
Need dimmable bulbs	10%	11%	7%
Don't like the way CFLs fit in fixtures	6%	9%	0%
CFLs flicker	4%	7%	0%
Don't like the way CFLs look in fixtures	3%	5%	0%
Need other specialty type	3%	5%	0%
Prior experience with this incandescent model	3%	2%	4%
Prefer this brand/manufacturer	1%	0%	4%
Other	26%	25%	29%

Source: ComEd Customer Store Intercept Survey

*Multiple response question

Intercept survey participants purchasing CFLs and non-CFLs were also asked about reasons behind their decision to purchase a mix of lighting technologies. Most participants (68%) name, among other reasons, usage of different light bulb types in different rooms. Fifty-three percent mentioned a need for specialty bulbs, while 5% mentioned that they dislike how CFLs look in fixtures among their reasons for purchasing both CFL and non-CFL bulbs. While the sample size is too small when subdivided to support definitive conclusions, it appears that intercept survey respondents purchasing non-CFLs along with CFLs do not mention the barriers that non-CFL purchasers mention. This might be a result of greater familiarity with CFL bulbs, their pricing and advances in CFL technology that eliminated some of the negative preconceptions about CFLs that non-purchasers have.

Table 3-51. Reasons for Purchasing CFLs and Non-CFLs*

	PY2 Total (n=19)
Use in different rooms	68%
Need dimmable bulbs	32%
Need three-way bulbs	21%
Use in different fixture types	11%
Dislike CFL look in fixtures	5%
Other	5%

Source: ComEd Customer Store Intercept Survey

*Multiple response question

General population survey results provide additional support for the idea that barriers to CFL adoption stem largely from misconception rather than actual dissatisfaction with CFL technology. Eight in ten customers who purchased CFLs in the last year are satisfied with the CFLs they purchased.⁴⁸

Disposal of CFLs

The number of ComEd customers who have disposed of CFLs increased between PY1 and PY2. In PY2, 41% of the customers who purchased a CFL report disposing of their CFL(s) at some point in the past (up from 30% in PY1). Customers who disposed of their CFLs were asked about their disposal practices. In PY2, over a half (58%), report throwing their CFLs in trash,

⁴⁸ For detailed results please refer to the *Attitudes Regarding CFLs* section of this report.

while a third (36%) report recycling their CFLs by either dropping them at hazardous waste center or dropping them off at a retail store. Though not statistically significant, there appears to be a slight increase in the number of customers who are recycling their CFLs, which might indicate a shift toward higher awareness of proper CFL disposal practices. ComEd did produce marketing materials promoting CFL recycling and the recycling programs at Ace Hardware and Home Depot, which might have helped increase awareness of the importance of CFL recycling and the options available.

Table 3-52. CFL Disposal Practices*

	PY1 Total (n=166) A	PY2 Total (n=289) B
Disposed of CFLs	30%	41% ^A
Ways of disposing of CFLs*	(n=50)	(n=116)
Threw away in trash	64%	58%
Recycled/dropped off at hazardous waste center	16%	22%
Recycled/dropped off at retail store	12%	14%
Have stored till we can dispose	--	2%
Other	2%	4%
Don't know	8%	3%

Source: ComEd General Population Surveys (PY1 and PY2)

*Multiple response question

Lighting Purchase Behaviors

Customers name a variety of stores as likely places for their lighting purchases. Home improvement stores, such as Home Depot or Lowe's, however, are preferred places for lighting purchases: 41% of ComEd customers are most likely to buy their incandescent bulbs there, and 48% of customers who purchased CFLs in the past are most likely to buy CFLs bulbs at this type of stores. A variety of store types that currently stock and sell ComEd discounted CFLs match customers' preferences, indicating that ComEd discounted lighting products are readily available to most customers.

Table 3-53. Where Customers Purchase Lighting Products*

	Most Likely to Buy Incandescents (n=500)	Most Likely to Buy CFLs (n=349)
Home improvement Store (e.g., Home Depot)	41%	48%
Hardware store (e.g., True Value)	19%	17%
Mass merchandize store (e.g., Wal-Mart)	15%	16%
Grocery store or supermarket	11%	10%
Warehouse/club store (e.g., Sam's Club)	9%	13%
Don't know	6%	1%
Refused	1%	<1%

Source: ComEd General Population Survey (PY2)

*Multiple response question. Responses with less than 5% are not shown

3.2.4 Effectiveness of Program Marketing

Awareness of Marketing Activities

This assessment of ComEd's Residential Lighting program's PY2 marketing and outreach activities draws from a variety of evaluation research activities: the survey of the general ComEd customer population, the store intercept survey with lighting customers, the lighting product shelf survey and the survey of retail store managers. Findings from each of these evaluation tasks will be included where relevant.

According to the survey of ComEd customers, awareness of ComEd's "Smart Ideas" program is essentially unchanged from PY1. At the end of PY2, 19% of ComEd customers said they were aware of the program, which is statistically unchanged from 22% in PY1.

Table 3-54. Awareness of ComEd's "Smart Ideas"

	PY1 Total (n=220) A	PY2 Total (n=450) B
Aware	22%	19%
Unaware	78%	81%

Source: ComEd General Population Surveys (PY1 and PY2)

ComEd customers who purchased ComEd discounted bulbs are not more likely to be aware of the Smart Ideas program. Only 16% are aware of the program. In fact, program participants are as likely to be aware of the program as non-participants (19%). A large majority of customers purchased ComEd discounted CFLs without realizing it. Almost a quarter of customers (22%) who have never purchased CFLs are aware of the program's existence. These differences are not statistically significant because of the smaller size of these subgroups.

Table 3-55. Awareness of ComEd's Smart Ideas Program by Customer Segment

	PY2 Total (n=450)	Program Purchasers (n=201) A	Non-Program Purchasers (n=72) B	Purchased Prior to June 2009 (n=76) C	Never Purchased CFLs (n=101) D
Aware	19%	16%	19%	25%	22%
Unaware	81%	84% ^c	81%	75%	78%

Source: ComEd General Population Survey (PY2)

Over half of program purchasers (61%) are aware that some or all of the CFLs they purchased were discounted. However, only 12% name ComEd as the sponsor of the discount, while over half (60%) believe it was the retail store that sponsored the discount.

Table 3-56. Knowledge of ComEd Discount

Awareness of Discount	PY2 Total (n=197)
Aware	61%
Perceived Discount Sponsor*	PY2 Total (n=103)
ComEd	12%
Retail store	60%
Manufacturer	7%
Don't know	39%

Source: ComEd General Population Survey (PY2)

*Multiple response question

The few program participants who identified ComEd as the sponsor named a variety of information sources through which they first learned about ComEd's price discounts on CFLs.

These sources range from mass media advertising to bill inserts and mailings and in-store marketing materials. However, the sample is too small (n=12) to identify the core information source.

The in-store customer intercept survey also asked participants who were planning to purchase lighting prior to entering the store and knew about the ComEd discount to identify how they learned about the ComEd discounts. These participants gave similar answers as the general population survey participants, however, bill inserts tend to dominate as the primary information source for the in-store participants.

Program participants who knew they had purchased discounted CFLs, were asked if they had seen pamphlets or brochures from ComEd explaining the energy saving benefits of CFLs. Over half of program participants (56%) remember seeing or receiving these types of materials. Participants named a mix of sources where they saw ComEd's marketing materials, among them bill inserts (26%) and other mailings (14%), flyers included in a bag with the purchase (16%) and shelf collateral (14%). A third of these participants strongly agree⁴⁹ that the collateral played a significant role in their decision to purchase CFLs.

Table 3-57. Recall of ComEd's Marketing Materials

	PY1 Total (n=77) A	PY2 Total (n=102) B
Recall seeing ComEd's collateral	40%	56% ^A
Sources of collateral*	(n=31)	(n=57)
Bill insert	29%	26%
Flyer included with purchase	19%	16%
On shelf collateral	3%	14%
Mailing	10%	14%
On display in aisle	0%	5%
Newspaper	16%	9%
Store employee made aware	16%	5%

Source: ComEd General Population Surveys (PY1 and PY2)

*Multiple response question. Not all responses are shown.

⁴⁹ A rating of 9 through 10 on a 0 to 10 point scale where 0 means strongly disagree and 10 means strongly agree.

Slightly over half of the in-store intercept survey participants were planning on buying light bulbs when they walked into the store. Nearly two-thirds (65%) were set on buying solely CFLs while another 6% planned to buy a combination of CFL and non-CFL bulbs. One in four (24%) planned to buy bulbs that were not CFLs. Most ended up buying what they intended though those who didn't tended to buy CFLs when that was not their plan.

Table 3-58. CFL Purchase Intentions and Actual Purchases

	Intercept Participants
Planned on purchasing light bulbs prior to entering the store (n=381)	57%
Of them, planned on purchasing... (n=218)	
CFLs only	65%
CFLs and another type of bulb	6%
Bulbs other than CFLs	24%
Don't know	5%
Ended up purchasing... (n=218)	
CFLs Only	70%
CFLs and another type of bulb	8%
Bulbs other than CFLs	23%

Source: ComEd In-Store Intercept Survey

Few customers who came to the store with the intent of purchasing CFLs did so specifically to purchase ComEd discounted CFLs. Only 16% came to the store because they wanted to buy CFLs that were discounted by ComEd.

Customers do not need to have planned to purchase lighting to know that ComEd has a program that discounts CFLs. Still, only 7% of those making unplanned lighting purchases knew that ComEd was offering discounts on CFLs before they entered the store. These results suggest that ComEd's out-of-store marketing materials are not reaching many customers.

However, results from the in-store intercept survey show that, while the recall of ComEd's out-of-store marketing materials is low, the in-store material is having a greater effect. Those who do recall it are influenced by it. As part of the intercept surveys, CFL purchasers were asked

how much influence ComEd's collateral materials had on their purchasing decision. While 62% do not recall seeing any pamphlets or brochures from ComEd about the benefits of CFLs, 37% of those who recall seeing the materials agree⁵⁰ that the materials influenced their decision to purchase CFLs. The remaining respondents say that the influence of ComEd's collateral materials was either moderate (30%) or low (33%).⁵¹

Furthermore, slightly more than a third of CFL purchasers (36%) admitted they would not have purchased CFLs during their visit if it had not been for the in-store advertising and 32% said they would not have purchased CFLs if there the CFL signage were not present in the store.

Overall, ComEd's in-store marketing campaign appears to have had greater impact than the out-of-store materials. Given the considerable point of purchase materials that ComEd supplies to participating retailers it is not surprising that the in-store materials appear to influence purchase behavior more than the out-store efforts, which consisted of two bill inserts.

Assessment of In-Store Marketing and Outreach Activities

In addition to the general population survey and in-store intercept survey, the evaluation team conducted interviews with participating retailers and shelf surveys of lighting products. APT continued to do an excellent job administering the ComEd program. Data tracking procedures are good and are followed as planned. The field representatives also do good work. They receive high marks from the store managers we contacted as part of the in-store survey effort as well as through the retail store manager survey effort.

The shelf surveys the team conducted at program and non-program stores confirm the retail manager survey results.⁵² The field representatives do a good job of monitoring the display and placement of the program POP displays. Shelf survey findings show that in-store marketing materials are present and highly visible. Shelf and wall signage, along with brochures, tend to be most widely used ComEd sponsored in-store materials. Twenty six of 28 program stores for which data was recorded had some sort of shelf or wall signage, and 14 stores had ComEd promotional brochures.

Retailers frequently supplemented ComEd promotional materials with additional CFL promotional materials in the program stores. Sixteen program stores had non-ComEd shelf or

⁵⁰ A rating of 7 through 10 on a 0 to 10 point scale with 0 being strongly disagree and 10 being strongly agree.

⁵¹ Moderate influence includes a rating of 4 through 6, and low influence includes a rating of 0 through 3 on a 0 to 10 point scale with 0 being strongly disagree and 10 being strongly agree.

⁵² Please note that while shelf surveys were conducted in all program stores at which in-store intercept surveys were conducted as well as some additional stores, some data is missing for certain stores. Therefore, the bases do not add up to 34 program stores in every case.

wall signage, six stores featured promotional brochures and two stores had floor stickers or clings. Five of nine non-program stores also promoted CFLs through shelf or wall signage, ceiling signs or brochures.

In addition to the ComEd discounts and materials and additional promotional materials, 13 of 34 program stores offer other promotions. These include basic sales and discounts as well as manufacturer promotional material.

Table 3-59. Presence of In-Store Promotional Materials

	Program Stores	Non-Program Stores
ComEd promotional materials		
Brochures	14 (n=27)	
Floor sticker/clings	4 (n=26)	
Shelf/wall signage	26 (n=28)	
Sign hung from ceiling	1 (n=26)	
Retailer promotional materials		
Brochures	6 (n=31)	1 (n=9)
Floor sticker/clings	2 (n=31)	0 (n=9)
Shelf/wall signage	16 (n=32)	5 (n=9)
Sign hung from ceiling	0 (n=30)	2 (n=9)

Source: Shelf Survey

Overall, the evaluation team rated the visibility of the ComEd's point-of-purchase (POP) materials as "medium" or "high".⁵³ Of 27 program stores for which the data was collected, the visibility of program materials was high in 18 stores and moderate in an additional seven stores. Only one store did not carry any POP materials and one had these materials hidden.

⁵³ High visibility means that POP materials could be easily located and/or seen right away, while low visibility means that shelf survey administrators had to search for POP materials.

Despite having promotional materials, half of the program stores did not note the discount on or near the price tag and only showed the final discounted price.

Table 3-60. Display of Discounted Prices

	Program Stores (n=26)
Only discounted price displayed	13
Original price and discounted price are displayed	7
Sometimes only discounted price is displayed, sometimes original and discounted prices are displayed	3
ComEd coupon discount is offered	3
Price tag missing for discounted bulbs	0

Source: Shelf Survey

Findings from the interviews with retail store managers are consistent with the shelf survey findings – retail managers are utilizing a variety of tactics to promote ComEd discounted CFLs in their stores. Specifically, 10 out of 11 retail managers say they place program CFLs in more prominent places in their stores or display signage that promotes ComEd sponsored price reductions. Seven use ComEd signage to promote the discounted CFLs, and five use additional signage that is either provided by the corporate office or printed in-house. Four retail store managers, however, were unaware that ComEd provides free signage for its discounted CFLs.

Table 3-61. Marketing Actions Taken by Retail Store Managers

	Retail Store Managers (n=11)
Place ComEd discounted CFLs in a more prominent place	10
Display signage promoting price reduction from the ComEd discount	10
Use signage provided by ComEd	7
Use other signage to promote ComEd discounted CFLs	5

Source: Retail Store Manager Survey

As for CFLs themselves, shelf survey results indicate that every program store sold CFLs, which should be the case. However, the percentage of the lighting inventory that was CFLs compared to other types of lighting varies across the program stores. CFLs make up a quarter or less of the

light bulb inventory in 5 of 34 stores. CFLs comprise over half the inventory at 22 of 34 stores. Eight stores only carried and sold CFLs.

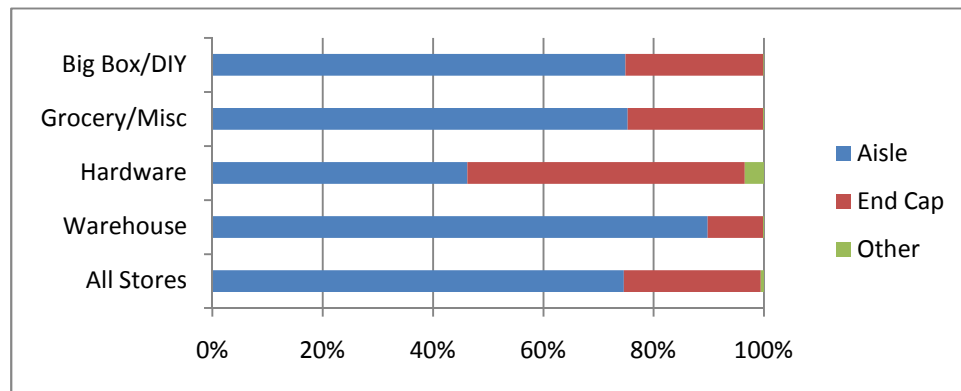
Table 3-62. Percentage of CFLs Displayed on Shelves

% of all light bulbs displayed that are CFLs	Program Store (n=34)	Non-Program Stores (n=11)
None	0	1
1%-25%	5	4
26%-50%	7	3
51%-75%	11	2
76%-99%	3	0
All	8	1
% of all CFLs displayed that are Energy Star CFLs	(n=34)	(n=11)
None	0	2
1%-25%	1	0
26%-50%	0	1
51%-75%	2	0
76%-99%	5	1
All	26	7
% of all ComEd discounted CFLs displayed	(n=27)	
None	1	
1%-25%	9	
26%-50%	4	
51%-75%	2	
76%-99%	7	
All	4	

Source: Shelf Survey

In 13 of 27 program stores, over a half of the CFL shelf inventory is allocated to ComEd discounted CFLs. Of those, four stores carry only ComEd discounted CFLs. One program store did not display any ComEd discounted CFLs on its shelves (although this particular retailer had only two program SKUs, one spiral CFL and one desk lamp, neither of which were present). This is the same store that had no in-store promotional materials. Using results of the shelf stocking survey, Figure 3-2 below shows where standard program CFLs are located overall and by retailer type. As this figure shows across all stores about 75% of program bulbs are being displayed in the aisles and a quarter are displayed in the end caps. Small hardware stores were more likely to display the program bulbs in end caps and warehouse stores were less likely to do so.

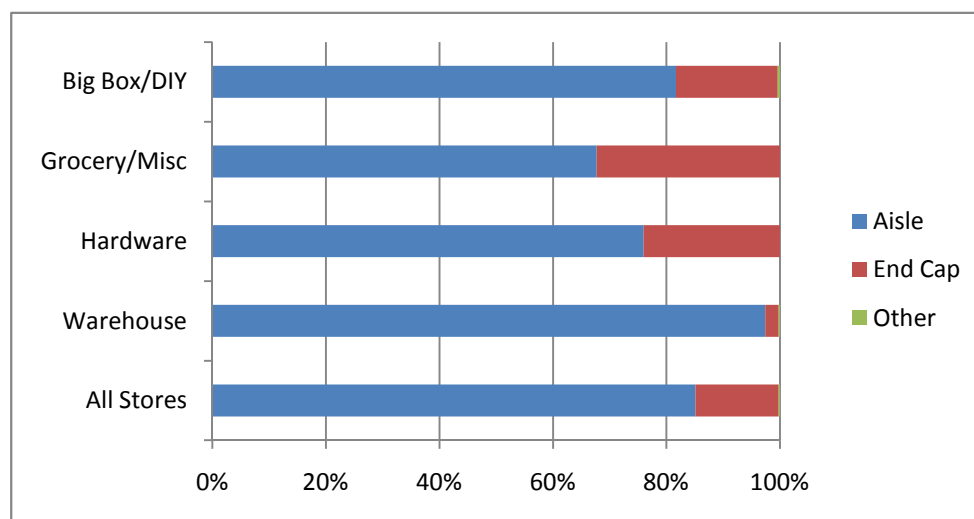
Figure 3-2. Distribution of Shelf Stocking Locations for Standard Bulbs



Source: Evaluation team analysis of Shelf Survey Data

Figure 3-3 below shows that specialty bulbs were even less likely to be located in end cap displays (less than 15% were located there). On average just over 2% of specialty bulbs sold in warehouse stores were included in end cap displays.

Figure 3-3. Distribution of Shelf Stocking Locations for Specialty Bulbs



Source: Evaluation team analysis of Shelf Survey Data

3.2.5 Shelf Stocking Practices and Program Incentives

Shelf Stocking Practices

The data collected during the shelf stocking surveys was very informative for a number of reasons. It allowed us to gather data by retailer on the percentage of shelf space dedicated to various bulb types, typical shelf stocking locations for program bulb and actual retail and incentive prices seen by customers within the retail environment. Table 3-63 and Table 3-64 below show the percentage of shelf space dedicated to program versus non-program CFLs and CFLs versus other bulb types (incandescents, halogens, etc.) in program stores.

As Table 3-63 shows, of the four major retailer types in the program, warehouse stores and big box stores had the largest proportion of shelf space devoted to program CFLs compared with non-program CFLs, both for standard bulbs and specialty bulbs. Warehouse stores and big box stores averaged approximately 90% program bulbs in shelf space dedicated to standard CFLs and approximately 80% program bulbs in shelf space dedicated to specialty CFLs. Grocery stores and small hardware stores averaged approximately 15% program bulbs in shelf space dedicated to standard CFLs and approximately 20%-25% program bulbs in shelf space dedicated to specialty CFLs.

Table 3-63. Shelf Space Dedicated to Program versus NonProgram CFLs

Retailer Type	Standard		Specialty	
	Program CFLs	NonProgram CFLs	Program CFLs	NonProgram CFLs
Big Box/DIY	77%	23%	68%	32%
Grocery/Misc	16%	84%	19%	81%
Small Hardware	13%	87%	26%	74%
Warehouse	100%	0%	100%	0%
All Stores	53%	47%	62%	38%

Source: Evaluation team analysis of Shelf Survey Data

Looking at the proportion of shelf space devoted to CFLs compared with other bulb types, retailers generally devoted a greater proportion of shelf space to CFLs among standard bulbs than among specialty bulbs. At 44%, the average percentage of shelf space dedicated to CFLs among standard bulbs across all store types was more than twice that for specialty bulbs, at 18%. Warehouse stores made a complete commitment and devoted 100% of standard and specialty bulb shelf space to CFLs. Among the other store types, the percentage of shelf space dedicated to CFLs ranged from 17%-62% for standard bulbs and 7%-20% for specialty bulbs.

Table 3-64. Shelf Space Dedicated to CFLs versus Other Bulb Types

Retailer Type	Standard		Specialty	
	CFLs	NonCFLs	CFLs	NonCFLs
Big Box/DIY	57%	43%	19%	81%
Grocery/Misc	62%	38%	20%	80%
Small Hardware	17%	83%	7%	93%
Warehouse	100%	0%	100%	0%
All Stores	44%	56%	18%	82%

Source: Evaluation team analysis of Shelf Survey Data

Program Incentives

Table 3-65 below provides the average retail price, incentive, discounted price and resulting discount percentage across five bulb types based on program tracking data⁵⁴. As this exhibit shows discounts for standard CFLs averaged around \$1 per bulb, while discounts on specialty bulbs averaged around \$1.30 per bulb and those on fixtures were all \$10 per fixture. The average discount across all bulbs was around 50% off retail prices, while on fixtures it was 60% off retail prices.

Table 3-65. Average Pre and Post Incentive Prices by Bulb Type from Program Tracking Data^{55,56}

Bulb Type Category	Average Retail Price	Average Incentive	Average Discounted Price	% Discount
High Wattage ⁵⁷	\$ 2.35	\$ 1.14	\$ 1.21	49%
Low Wattage	\$ 1.62	\$ 0.93	\$ 0.69	57%
Reflector	\$ 4.68	\$ 1.39	\$ 3.30	30%
Other Specialty	\$ 4.49	\$ 1.31	\$ 3.18	29%
Fixtures	\$ 16.75	\$ 10.00	\$ 6.74	60%
All Bulbs	\$ 2.13	\$ 1.07	\$ 1.05	51%

Source: Evaluation team analysis of ComEd Goals Tracking spreadsheet

In PY2 we also conducted shelf surveys at program and non-program stores which allowed us to capture actual program bulb prices in the retail environment. Similar to Table 3-65, Table 3-66 below provides the average retail price, incentive, discounted price and resulting discount percentage across the four bulb types (for the most part the shelf surveys excluded fixtures) based on the shelf survey data collected on program bulbs. As this table shows both incentives

⁵⁴ Program tracking data reflects the APT negotiated MOU agreements from which the program incentive must remain constant although the original retail price and the discounted retail price can fluctuate either direction.

⁵⁵ Excludes coupon bulbs

⁵⁶ 406 upstream markdown bulbs were dropped from pricing analysis as their retail prices were not included in our tracking data.

⁵⁷ The high wattage bulb category contained all standard spiral bulb CFLs with wattages greater than or equal to 23 watts.

and average discounted prices in the retail environment for both standard and specialty CFLs were higher than estimated based on the program tracking data⁵⁸.

Table 3-66. Average Pre and Post Incentive Prices by Bulb Type from Shelf Survey Data

Bulb Type Category	Average Retail Price	Average Incentive	Average Discounted Price	% Discount
High Wattage	\$ 3.88	\$ 1.29	\$ 2.59	33%
Low Wattage	\$ 2.64	\$ 1.12	\$ 1.52	42%
Reflector	\$ 7.07	\$ 1.89	\$ 5.18	27%
Other Specialty	\$ 6.42	\$ 2.29	\$ 4.13	36%

Source: Evaluation team analysis of Shelf Survey Data

Table 3-67 is based on program tracking data (similar to Table 3-65 above) but is broken down by store type rather than bulb type. This table is focused solely on bulbs (standard and specialty) and thus excludes fixtures. As this table shows, discounts as a percentage of the original retail price were lowest at grocery stores and were highest among warehouse stores. The average incentive across all standard and specialty program bulbs was \$1.02 which was on average about a 50% reduction in price over the average non-discounted retail price.

Table 3-67. Average Pre and Post Incentive Prices by Store Type⁵⁹

Retailer Category	Average Retail Price per bulb	Average Incentive per bulb	Average Discounted Price per bulb	% Discount
Big Box/DIY	\$2.16	\$0.97	\$1.19	45%
Grocery	\$3.48	\$1.05	\$2.44	30%
Small Hardware	\$2.73	\$1.35	\$1.38	49%
Warehouse	\$1.67	\$0.98	\$0.69	59%
Program Total	\$2.00	\$1.00	\$1.01	50%

Source: Evaluation team analysis of ComEd's "Goals Tracking" spreadsheet

⁵⁸ While this data has been weighted by program retailer to most accurately represent the program as a whole it is important to remember that it is based on a random sample of stores where shelf surveys were conducted.

⁵⁹ Excludes Fixtures

According to the shelf survey data, average pre-incentive retail prices for standard CFLs ranged from approximately \$1.50 to \$5.50 per bulb, while those for specialty bulbs ranged from approximately \$5 to \$12 per bulb (as shown below in Table 3-68). Small hardware stores had the highest average retail prices for both standard and specialty CFLs by a significant margin, with standard CFLs priced 83% higher and specialty CFLs priced 62% higher on average than the next highest priced store type. Small hardware stores also had the largest incentives, such that their discount prices were on par with the other store types for both standard and specialty CFLs. Average retail prices in Grocery Stores were found to be substantially lower than expected as was the average incentive per bulb. Big Box/DIY and Warehouse stores seemed to be setting their retail prices very close to the suggested retail prices that were in the goals tracking data.

Table 3-68. Average Pre and Post Incentive Prices per Bulb by Store Type⁶⁰

Retailer Category	Standard Bulbs				Specialty Bulbs			
	Average Retail Price	Average Incentive	Average Discounted Price	% Discount	Average Retail Price	Average Incentive	Average Discounted Price	% Discount
Big Box/DIY	\$3.09	\$1.13	\$1.97	36%	\$6.92	\$1.75	\$5.17	25%
Grocery	\$2.67	\$1.22	\$1.45	46%	\$7.32	\$2.20	\$5.12	30%
Small Hardware	\$5.67	\$3.80	\$1.87	67%	\$11.88	\$6.17	\$5.71	52%
Warehouse	\$1.66	\$0.90	\$0.75	55%	\$4.96	\$1.83	\$3.13	37%
Program Total	\$2.89	\$1.16	\$1.74	40%	\$6.74	\$2.09	\$4.65	31%

Source: Evaluation team analysis of Shelf Survey data

Table 3-69 below shows program bulb discount prices and percentage discounts as a function of both bulb type and store type. Within standard CFLs, average discounted price per bulb varies from \$0.49 at warehouse stores to \$1.96 at grocery stores. This reflects a range in average discount percentages from 66% at warehouse stores to 34% at grocery stores. A similar pattern is seen with specialty CFLs, with average discount prices ranging from \$2.48 at warehouse stores to \$7.99 at grocery stores and the corresponding discount percentages ranging from 33% to 20%. CFL fixtures exhibit the opposite pattern, where the lowest average post-incentive prices for fixtures are found at grocery stores, while the highest are found at warehouse stores. Because the discount for fixtures was set at \$10 per fixture for all channels, this result illustrates

⁶⁰ Excludes Fixtures

that grocery stores were selling fixtures with lower average retail prices to begin with, so the \$10 incentive per fixture represented a deeper discount from the average regular retail price.

Table 3-69. Average Discount Price per Bulb by Store and Bulb Type⁶¹

Retailer Category	Standard CFLs		Specialty CFLs		CFL Fixtures		All Bulbs
	Discount Price/bulb	% Discount	Discount Price/bulb	% Discount	Discount Price/bulb	% Discount	% Discount
Big Box/DIY	\$0.89	51%	\$3.63	28%	\$5.84	63%	45%
Grocery	\$1.96	34%	\$7.99	20%	\$3.99	71%	32%
Small Hardware	\$0.99	57%	\$5.93	24%	\$4.47	69%	49%
Warehouse	\$0.49	66%	\$2.48	33%	\$10.45	49%	58%
Program Total	\$0.75	56%	\$3.26	30%	\$6.75	60%	50%

Source: Evaluation team analysis of ComEd's "Goals Tracking" spreadsheet

Table 3-70 shows the average incentive per bulb by store and bulb type. Average incentives for standard bulbs are close to \$1 at all store types except small hardware stores, where they average \$1.30. Average incentives for specialty bulbs are between \$1 and \$2 per bulb at all store types. Although grocery stores have the highest average incentive per specialty CFL at \$2, this represents the smallest percent discount because of higher regular retail prices for specialty CFLs at grocery stores. As mentioned previously, incentives for CFL fixtures were \$10 at all store types.

Table 3-70. Average Incentive per Bulb by Store and Bulb Type

Retailer Category	Standard Bulbs		Specialty Bulbs		Fixtures		All Bulbs
	Incentive per bulb	% Discount	Incentive per bulb	% Discount	Incentive per bulb	% Discount	% Discount
Big Box/DIY	\$0.91	51%	\$1.44	28%	\$10.00	63%	45%
Grocery	\$1.00	34%	\$2.00	20%	\$10.00	71%	32%
Small Hardware	\$1.30	57%	\$1.88	24%	\$10.00	69%	49%
Warehouse	\$0.95	66%	\$1.22	33%	\$10.00	49%	58%
Program Total	\$0.96	56%	\$1.36	30%	\$10.00	60%	50%

Source: Evaluation team analysis of ComEd's "Goals Tracking" spreadsheet

⁶¹ This excludes coupon bulb sales for which we have no retail price data.

On a per bulb basis, average discounts also varied depending on whether bulbs were sold in single packs or multi packs. For all bulb types average retail price per bulb was lower in multi packs than single packs, as shown in Table 3-71 below. Also average incentive per bulb was lower for bulbs in multi packs than in single packs. However, on a percentage basis, average discounts were 5-7% higher for bulbs in multi packs than in single packs for both standard and specialty bulbs.

Table 3-71. Average Pre and Post Incentive Prices for Bulbs Sold In Single and Multi Packs

Bulb Type	Single Packs				Multi Packs			
	Retail Price/ Bulb	Incentive Per Bulb	Discount Price/ Bulb	% Discount	Retail Price/ Bulb	Incentive Per Bulb	Discount Price/ Bulb	% Discount
Standard Bulbs	\$ 2.40	\$ 1.24	\$ 1.16	52%	\$ 1.60	\$ 0.91	\$ 0.69	57%
Specialty Bulbs	\$ 7.09	\$ 1.73	\$ 5.36	24%	\$ 4.14	\$ 1.29	\$ 2.85	31%
Std & Spec Bulbs	\$ 2.98	\$ 1.30	\$ 1.68	44%	\$ 1.85	\$ 0.95	\$ 0.90	51%

Source: Evaluation team analysis of ComEd's "Goals Tracking" spreadsheet

The ComEd lighting program did not just discount pre-stocked lighting products. It was also responsible for bringing new products into the retail stores. Overall approximately 11% of bulbs sold through the program were SKUs new to the retailer and 65% of the fixtures sold were new SKUs as well.

Using the shelf survey data, the average program and non-program retail prices (after all incentives and discounts) in various retail channels was also examined. As Table 3-72 below shows, standard program CFLs on average across all retail categories were priced more than \$3 lower than non-program CFLs. The difference in program versus non-program bulbs was greatest at small hardware stores where we found the original retail prices for program bulbs were often significantly higher than what was estimated in the goals tracker data, but the final discounted price was often the same which required the retailer to provide an additional markdown on top of what ComEd was paying for as part of the residential lighting program. Specialty program bulbs were on average \$2.20 less than non-program CFLs. Again the largest differences were seen between program and non-program CFLs at small hardware stores. Overall the pricing data gathered from the shelf surveys found that the program is having a significant impact on bring down the price of CFLs (by often more than the ComEd incentive amount) across all retailer categories.

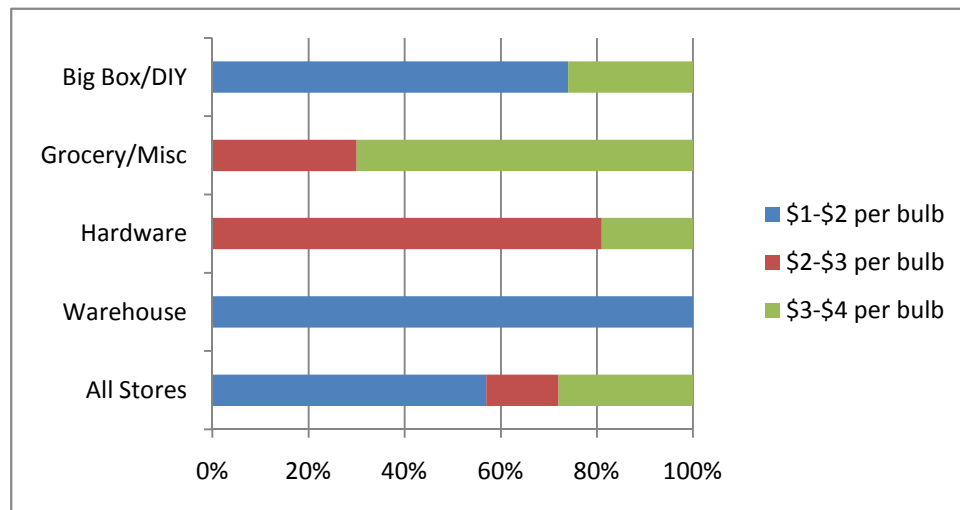
Table 3-72. Average Prices for Standard and Specialty CFLs by Program Bulb Status

Retailer Category	Standard Bulbs		Specialty Bulbs	
	Program Bulb	Non-Program Bulb	Program Bulb	Non-Program Bulb
Big Box/DIY	\$1.97	\$5.01	\$5.17	\$6.92
Grocery	\$1.45	\$3.62	\$5.12	\$6.09
Small Hardware	\$1.87	\$6.03	\$5.71	\$8.51
Warehouse	\$0.75	-	\$3.13	-
Program Total	\$1.74	\$4.92	\$4.65	\$6.87

Source: Evaluation team analysis of Shelf Survey data

Figure 3-4 below shows the percentage of standard CFL program bulbs that were sold within various price ranges based on the data collected during the shelf surveys. As this figure shows across all program retailers, nearly 60% of standard program CFLs were priced between \$1 and \$2, 100% of those sold at warehouse stores were priced in this range and none of the bulbs sold at Grocery or Small Hardware stores were priced in this range. Grocery stores had the highest percentage of bulbs sold in the \$3 to \$4 range (70%).

Figure 3-4. Distribution of Average Discounted Price per Standard CFL across Store Types



Source: Evaluation team analysis of Shelf Survey data

3.2.6 Program Theory

Given modest changes in the program design this topic was not revisited. Please refer to the year 1 report.

3.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the Residential Energy Star ® Lighting program. Cost effectiveness is assessed through the use of the Total Resource Cost (TRC) test. The TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

“ ‘Total resource cost test’ or ‘TRC test’ means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.”⁶²

ComEd uses DSMore™ software for the calculation of the TRC test.⁶³ The DSMore model accepts information on program parameters, such as number of participants, gross savings, free ridership and program costs, and calculates a TRC which fits the requirements of the Illinois legislation. Environmental benefits have been quantified for CO₂ reductions, using a value of \$0.013875 per kWh.

One important feature of the DSMore model is that it performs a probabilistic estimation of future avoided energy costs. It looks at the historical relationship between weather, electric use and prices in the MISO region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact on electric prices that comes from extreme weather conditions. Extreme weather creates extreme peaks which create extreme prices. These extreme prices generally

⁶² Illinois Power Agency Act SB1592, pages 7-8.

⁶³ Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

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 3-73 summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the Residential Energy Star® Lighting program in PY2. Most of the unique inputs come directly from the evaluation results presented previously in this report. Measure life estimates and program costs come directly from ComEd. All other inputs to the model, such as avoided costs, come from ComEd and are the same for this program and all programs in the ComEd portfolio.

Table 3-73. Inputs to DSMore Model for Residential Energy Star® Lighting Program

Item	Value Used
Measure Life	9 years
Participants	8,727,246
Annual Gross Energy Savings	360,159 MWh
Gross Coincident Peak Savings	323 MW
Net-to-Gross Ratio	58%
Utility Administration and Implementation Costs	\$ 207,844
Utility Incentive Costs	\$ 9,074,820
Participant Contribution to Incremental Measure Costs	\$2.40

Based on these inputs, the Illinois societal TRC for this program is 5.84 and the program passes the TRC test. The standard TRC calculation produced by DSMore is 4.45.

Section 4. Conclusions and Recommendations

This section highlights the findings and recommendations from the evaluation of ComEd's PY2 Residential ES Lighting Program. The primary objectives of this evaluation are to quantify the gross and net energy impacts resulting from this lighting program and to assess program participants' prior awareness of CFLs and satisfaction with the program. Below are the key conclusions and recommendations.

4.1 Conclusions

4.1.1 Program Gross and Net Impacts

PY2 gross ex post energy and peak demand savings both surpassed gross ex ante savings estimates (attainment rates of 165% and 208% respectively). These high gross savings rates were driven by two primary factors: high gross realization rates and a portion of the program bulbs being installed in non-residential locations (which have significantly higher HOU and CF estimates associated with them).

Gross Realization Rates

The *Gross Realization Rate* is primarily based on the customer self-reported installation rates⁶⁴ (from both the general population and in-store intercept surveys) and is estimated to be 74 percent across all bulb types, which is four percentage points higher than the estimate used by ComEd for program reported savings (70 percent). Customers reported that they had placed the majority of the uninstalled bulbs in storage and planned on installing them when another bulb (CFL or incandescent) burns out. While savings from these uninstalled bulbs will not be counted towards PY2 program savings, 50 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 have been attributed to PY2, although have not been included in the high gross savings attainment rates. When they are included in the PY2 gross attainment rates they become 174% and 218%, respectively.

Hours of Use and Peak Coincidence Factors

The overall PY2 ex-post *Hours-of-Use* 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%

⁶⁴ The gross realization rates also include a small adjustment to account for the leakage of program bulbs outside of ComEd service territory. Based on in-store intercept surveys the rate of program bulb leakage which was found to be very minimal (less than 0.5%).

Non-Residential. To estimate program impacts, the program currently 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, 10% non-residential assumption has a major effect on gross impacts.

Due to these non-residential installations both PY2 ex post net energy (kWh) and net peak demand savings surpassed the PY2 program ex ante savings estimates (by 38% and 73%, respectively) despite being driven down by the PY2 ex-post NTG ratio which was estimated to be 0.58. This was based on the average of the two customer self-report NTGR results (from the General Population survey and the intercept survey). This NTGR estimate is 83% of the estimate that was used for program planning (70%).

The overall annual gross and net program savings increase when the savings associated with the PY1 late installs are included. The final net realization rates with these additional savings are 147% (kWh) and 179% (kW).

4.1.2 Program Processes

At the end of PY2, 79% of customers said they were aware of CFLs without being offered a description of the bulbs. Another 12% said they had heard of CFLs once they were read a short description. Awareness of CFLs among ComEd customers is high, but it did not increase between PY1 and PY2.

Being aware of CFLs is not the same as having knowledge about their properties or experience with them. ComEd customers who were “aware” of CFLs were asked to rate their “familiarity” with CFLs on a four point scale that ranged from “not at all familiar” to “very familiar”. Familiarity with CFLs rose between PY1 and PY2 with 46% saying they were very familiar in PY2 compared to 34% in PY1.

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. However, customers who do have the bulbs installed have more of them, which suggests an increasing saturation rate (8.9 bulbs installed in PY1 compared to 13.3 in PY2).

As in PY1, just over half of ComEd customers purchased CFLs during PY2 (52% in PY1, 55% in PY2). There was a large increase in the number of CFLs purchased through the program. ComEd customers who purchased CFLs, bought an average of 10.8 CFLs in PY1 compared to 14.2 in PY2.

The ComEd lighting program is reaching customers with relatively low CFL socket saturation prior to purchasing the program bulbs, as well as those who already had a lot of CFLs installed. Just over half (56%) had CFLs in less than 25% of their sockets prior to their purchase. Nearly one-third had no CFLs installed at all prior to their PY2 purchase. This suggests that the

program is reaching newer CFL users. On the other hand, 24% of program purchasers had CFLs in 75% or more of their sockets before their program purchase. 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.

ComEd customers who have ComEd discounted CFLs installed report high levels of satisfaction with them. Program purchasers who removed CFLs that they purchased in PY2 mainly did so because the CFLs burnt out or broke (79%) rather than dissatisfaction with the performance of the bulbs (17%).

Barriers to CFL adoption remain price and unwillingness to replace working incandescent bulbs with CFLs. Despite ComEd's effort to get out the message to "Install Bulbs Now", many do not want to replace a light bulb that still works. Overcoming barriers will require a variety of messages. ComEd customers who have past experience with CFLs and still choose to purchase incandescent bulbs do not like the long warm up times of CFLs and still think they are too expensive. It is possible there is a segment of the population who will always buy the least expensive option so unless CFLs are the same price as incandescents, they will not purchase CFLs. Those who have not used CFLs admit they do not know much about them and just buy "regular" bulbs out of habit.

The program is represented at a wide variety of retailer types and includes the major types of stores where ComEd customers purchase lighting. Presence of the program and availability of discounted CFLs should not be a barrier to participation or CFL adoption.

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 they are discounted. Even fewer (12%) know that ComEd is the sponsor of the discount. Interviews with program implementers indicate that ComEd is under pressure from stakeholders to reduce the amount of credit they claim for providing the discount in PY3. The results of this evaluation suggest that this change may be unnecessary as the PY2 marketing did not cause ComEd customers in general, or program bulb purchasers specially, to associate discounted CFLs with ComEd.

ComEd's in-store marketing campaign appears to be more effective than the out-of-store marketing. ComEd produces a large number of point-of-purchase materials so the success of these materials is not surprising. It is not clear why the out-of-store materials have not increased the awareness of the program or CFL discounts.

4.2 *Recommendations*

The program was successful in PY2 in meeting its goals in terms of number of bulbs sold, just as it was in PY1. The general population survey indicates that approximately 30% of program

purchasers did not have any CFLs installed prior to their program purchase. Another 10% had CFLs in less than 5% of their sockets. However, the program is also selling bulbs to a sizable number of customers who already have CFLs in most of their sockets. This may account for the lower than planned net-to-gross ratio found in the impact analysis. One-third of ComEd customers still do not have any CFLs installed. These customers tend to be from traditionally hard-to-reach or disadvantaged populations.

Although the general population survey results indicate that the program is operating in stores where ComEd customers tend to buy the bulk of their lighting, ComEd should consider a pilot program in some discount stores to reach people who do not have any CFLs installed. POP materials in these stores should emphasize lifecycle cost savings since a significant barrier to CFL adoption among this group is the higher costs of CFL products.

It is understood that ComEd has not taken the program to discount stores such as Dollar Stores or Big Lots as DCEO covers the low income programs. Given that the low income population still lags behind in CFL adoption, there may be gaps in the targeting of low income customers between the DCEO and ComEd programs. Greater coordination between the two programs is encouraged to better serve this low-income population.

The messaging of ComEd's PY2 marketing materials addressed the existing barriers to CFL adoption, price and reluctance to replace working non-CFLs. ComEd may want to conduct additional out-of-store marketing to raise awareness of CFL discounts.

Section 5. Appendices

5.1 *Data Collection Instruments*

The data collection instruments used in this evaluation consisted of in-depth interview guides for the ComEd program manager, the APT and EFI program implementers, Lighting Manufacturers, Corporate Retailers and Retail Store Managers. Survey instruments were also developed for the In-store intercept surveys, the shelf surveys and the CATI general population telephone survey.

5.1.1 **In-Depth Interview Guides for ComEd Staff and APT Program Implementers**

ComEd PY2 Residential Lighting Interview Guide – ComEd and APT

February 18, 2010

PY2 Changes

1. I'd like to first start by talking about the changes that were made to the Residential Lighting program for PY2. Generally, how has the program changed from its planning stages to now?
 - a. How has the allocation of program bulbs changed in PY2? (Overall quantity sold and mix of discounted products)
 - b. Has the mix of bulbs being sold through the coupon channel versus the markdown channel changed for PY2?
 - c. What has been the impact of bring new retailers such as Wal-mart, Sam's Club and Meijer into the program in PY2? Why is Lowe's not participating in PY2? Do you have any indications that they are maintaining program level pricing despite their lack of participation?
 - d. It is our understanding that most of the ex ante performance metrics are not changing for PY2 (Hours of Use, Coincidence Factors, NTG). Is this correct? If not, how have they changed? For PY2 we understand Delta Watts will be estimated slightly differently. Can you explain the change in method? Also can please explain the parameter you refer to as "Realization Rate". How does this differ from an Installation Rate?

- e. Has the marketing of the program been changed at all in PY2? Do you know if APT is conducting the same number of in-store events as in PY1?
- f. Have you made any changes to your program data tracking system including sales and payment data?
- g. Have you made any changes the quality control procedures used to monitor the APT field representatives' works?

PY2 Implementation

- 2. Can you please give me an idea of the timeline for the implementation of PY2? Was it a seamless transition from PY1 to PY2?
- 3. In your opinion, how effective has the second year of the Residential Lighting Program been thus far? What elements of the program are working best? What elements need improvement?
- 4. Is the program on track to meet its goals for Program Year 2? Has participation in the program been greater than or less than expected?
- 5. In PY1 we received feedback that although Wal-mart did not participate in PY1 they discounted their bulbs to stay competitive with program retailers. Wal-mart is now a program participant, but are there any other non-program retailers that you are aware of that are taking similar actions in PY2?
- 6. We also received feedback that Best Buy was only selling CFLs because of the program. Do you know if they have expanded the selection of CFLs they sell due to their program participation in PY1?
- 7. Do you know of any other PY2 implementation issues that we should be aware of?

PY3 Changes

- 8. Besides Target and Lowe's, do you have plans to expand the program to other retailers in PY3? Is there a reason why you haven't included retailers such as Walgreens or Dollar stores? What is keeping Target from participating in PY2?
- 9. Are you currently planning any changes to the program for next year (PY3)? Please detail these anticipated change.

Miscellaneous Items

Are there any key process-related issues you would like to see explored in this year's evaluation?

10. Is there anything else relevant to the program or program's progress that we have not discussed that we should know about?

11. FOR APT - We are currently getting ready begin our Manufacturer and Corporate Retailer/Buyer Interviews – Could you please provide us with a list of the appropriate contacts for these interviews? We are looking for the manufacturers and corporate retailers that are the most knowledgeable about their organizations participation in ComEd's Residential Lighting program.

Thank you very much for taking the time in assisting us with this evaluation. Your contribution is a very important part of the process.

5.1.2 In-Depth Interview Guides for Lighting Manufacturers, Corporate Retailers and Retail Store Managers

Net-to-Gross, Process and Spillover Interview Guide for Manufacturers Participating in the 2009-2011 ComEd Residential Lighting Program (Sample. N.B.: The interview guides for corporate retailers and retail store managers are similar in structure and content to this attached sample)

Definitions

Spiral CFL Bulbs - CFL bulbs that DO NOT have special functions such as reflectors/floods, dimmability or 3-way light levels.

Specialty CFL Bulbs - CFL bulbs that HAVE special functions such as reflectors/floods, dimmability or 3-way light levels.

CFL Fixtures - Energy Star-qualified integrated CFL bulbs/fixtures.

Introduction

Hello. I'm calling from Itron on behalf of Commonwealth Edison as part of the evaluation of its Residential Lighting Program. For the remainder of this survey, I'm going to refer to Commonwealth Edison as "ComEd".

The purpose of the interview is to learn about your company's participation in ComEd's program, to understand your past promotion, sales and pricing of CFLs prior to the start of the program, and to learn how the program has affected your company's sales, pricing and

promotion of CFLs. The interview will take approximately 60 minutes and any information that is provided will remain strictly confidential. We will not identify or attribute any of your comments or organization information.

N1. First of all, what are your job title and major responsibilities?

N2. How long have you been performing that job?

N3. What is your role with respect to ComEd's program?

N4. I emailed you a table that showed the quantity of CFL bulbs and fixtures sold by your organization through the ComEd Residential Lighting program along with some spaces for non-program sales that we were hoping you could fill in. [REPEAT ASSURANCES OF CONFIDENTIALITY.] Were you able to complete that table?

N5. Does the table I sent to you seem correct in terms of the types and volume of CFL bulbs and fixtures that you sold through the ComEd Residential Lighting Program? If not, why not?

Reasons for Participation

P1. According to our records your company has been receiving lighting incentives from the ComEd Residential Lighting Program from START MONTH/YEAR through MOST RECENT MONTH/YEAR. Is that correct? If not, what are the correct dates of your participation?

P2. What were your primary reasons for getting involved with the ComEd Residential Lighting program?

P3. Was your company selling Energy Star CFLs or fixtures in ComEd's service territory before getting involved with the Residential Lighting Program?

P4. Before participating in this program, was your company involved in any other Illinois programs that provided incentives for energy-efficient lighting products? {IF NEEDED: Such as the MEEA Change-A-Light program]

IF Yes:

- What programs?
- When did this involvement begin/end?

PREFERENCE FOR ENERGY STAR PRODUCTS

Now I'd like to ask you a few questions regarding your firm's attitudes towards Energy Star certified CFL products.

ES1. What is your opinion of the Energy Star program, and specifically, the CFL products that are Energy Star certified?

ES2. Does your firm sell any CFL products that are not Energy Star Certified?

If Yes:

- Which products? (Spirals, Specialty, Fixtures)
- Approximately what percent of your total CFL product sales do the non Energy Star CFL products account for? (Record by product type: Spirals, Specialty, Fixtures)
- How do prices compare between the Energy Star CFL products and the non Energy Star CFL products?
- Why does your firm sell products that are not Energy Star certified?

PY1/PY2 CFL Product Sales and ComEd Residential Lighting Program Trends

My next questions concern the types and quantities of CFL bulbs or fixtures you sell in ComEd's service territory. Are you the correct person to talk to about this? [IF NOT, WHO?]

***SPIRAL CFLS* [IF THEY SELL SPIRAL CFL BULBS]**

I'd like to start by asking you some questions about your sales of Spiral CFL bulbs in ComEd's service territory. [IF NEEDED: By Spiral CFL bulbs I mean CFL bulbs that DO NOT have special functions such as reflectors/floods, dimmability or 3-way light levels.]

The table I emailed you earlier shows you a record of the types of spiral CFL bulbs that we have records of you selling through ComEd's Lighting program along with some spaces for non-program sales - Have you had a chance to check over the data and fill it in the non-program fields? Can you email it to me now? [REPEAT ASSURANCES OF CONFIDENTIALITY]

[IF TABLE COMPLETED]

PS1. Does the table I sent to you seem correct in terms of the types and volume of spiral CFLs you sold through the ComEd Residential Lighting Program? If not, why not?

PS2. Why did you choose to sell these particular products and packages through the ComEd Program?

[IF TABLE INDICATES *SPIRAL ES CFLs* SOLD IN COMED'S SERVICE TERRITORY FROM JUNE 1, 2008 TO CURRENT DATE BUT NOT THROUGH COMED'S PROGRAM ASK PS3]

PS3. I noticed that when you filled out the table you indicated that between START MONTH/YEAR and MOST RECENT MONTH/YEAR you sold spiral Energy Star CFLs in ComEd's service territory that were not rebated by the ComEd Residential Lighting Program. Why didn't you sell these CFL bulbs through the program? Were there advantages or disadvantages to selling the bulbs through the program?

[IF TABLE NOT COMPLETED]

PS5. From June 1, 2008 to CURRENT DATE did you sell spiral CFL bulbs in ComEd's service territory that **did not** receive discounts from the Residential Lighting Program?

IF Yes:

- Are the bulb types and packages different from those you sell through the ComEd Program? If Yes, How so?
- Why didn't you sell these bulbs through the ComEd Program?

PS7. When discounts from the Residential Lighting Program **were not** available, due to product allocations for discounted CFLs running out, did you sell spiral Energy Star CFL bulbs in ComEd's service territory?

IF Yes:

- Were the bulb types and packages different from those you sell through the ComEd Program? If Yes, How so?

PS8. Please provide your best estimate of the percentage breakdown of your spiral CFL bulb sales in ComEd's service territory From June 1, 2008 to CURRENT DATE by the following 3 categories:

- a. Percentage of ES units sold that were discounted by the ComEd Residential Lighting Program ____%
- b. Percentage of ES units sold that were not discounted by the program ____%
- c. Percentage of units sold that were not ES ____%

[THESE MUST TOTAL 100 PERCENT]

PS10. ComEd has sales data for the CFL products that your company sold through the ComEd Residential Lighting Program. However, they are also very interested in learning about prices and sales volumes for CFL products that were **not** sold through the ComEd Residential Lighting Program. If we provided assurances to protect the confidentiality of these sales data, would you be willing to share these data? If yes, how could we get this data?

SPECIALTY CFLS [IF THEY SELL SPECIALTY CFL BULBS]

Now I'd like to ask you some similar questions about your sales of specialty CFL bulbs (reflectors/flood, dimmability, three-way lights)

[IF TABLE COMPLETED]

PS11. Does the table I sent to you seem correct in terms of the types and volume of Specialty CFLs you sold through the ComEd Residential Lighting Program? If not, why not?

PS12. Why did you choose to sell these particular products and packages through the ComEd Residential Lighting Program?

[IF TABLE INDICATES SPECIALTY ES CFLs SOLD IN COMED'S SERVICE TERRITORY FROM JUNE 1, 2008 TO CURRENT DATE BUT NOT THROUGH COMED'S PROGRAM, THEN ASK PS13]

PS13. I noticed that when you filled out the table you indicated that between START MONTH/YEAR and MOST RECENT MONTH/YEAR you sold Specialty Energy Star CFLs in ComEd's service territory that were not rebated by the ComEd Residential Lighting Program. Why didn't you sell these CFL bulbs through the program? Were there advantages or disadvantages to selling the bulbs through the program?

[IF TABLE NOT COMPLETED]

PS15. From June 1, 2008 to CURRENT DATE did you sell Specialty CFL bulbs in ComEd's service territory that **did not** receive discounts from the Residential Lighting Program?

IF Yes:

- Are the bulb types and packages different from those you sell through the ComEd Program? If Yes, How so?
- Why didn't you sell these bulbs through the ComEd Program?

PS17. [ASK ALL] When discounts from the Residential Lighting Program **were not** available, due to product allocations for discounted CFLs running out, did you sell Specialty Energy Star CFL bulbs in ComEd's service territory?

IF Yes:

- Were the bulb types and packages different from those you sell through the ComEd Program? If Yes, How so?

PS18. Please provide your best estimate of the percentage breakdown of your Specialty CFL bulb sales in ComEd's service territory from June 1, 2008 to CURRENT DATE by the following 3 categories:

- a. Percentage of Specialty ES units sold that were discounted by the ComEd Residential Lighting Program ____%
- b. Percentage of Specialty ES units sold that were not discounted by the program ____%
- c. Percentage of Specialty units sold that were not ES ____%

[THESE MUST TOTAL 100 PERCENT.]

CFL FIXTURES [IF THEY SELL CFL FIXTURES]

Next I'm going to ask you some similar questions but this time about your sales of Energy Star-qualified CFL fixtures.

PS11. Does the table I sent to you seem correct in terms of the types and volume of CFL fixtures you sold through the ComEd Residential Lighting Program? If not, why not?

PS12. Why did you choose to sell these particular CFL fixtures through the ComEd Residential Lighting Program?

[IF TABLE INDICATES ES CFL FIXTURES SOLD IN COMED'S SERVICE TERRITORY FROM JUNE 1, 2008 TO CURRENT DATE BUT NOT THROUGH COMED'S PROGRAM, THEN ASK, ELSE SKIP TO PS13]

PS13. I noticed that when you filled out the table you indicated that between START MONTH/YEAR and MOST RECENT MONTH/YEAR you sold Energy Star CFL fixtures in ComEd's service territory that were **not** rebated by the ComEd Residential Lighting Program. Why didn't you sell these CFL fixtures through the program? Were there advantages/disadvantages to selling the bulbs through the program?

[IF TABLE NOT COMPLETED]

PS15. From June 1, 2008 to CURRENT DATE did you sell *Energy Star* CFL fixtures in ComEd's service territory that **did not** receive discounts from the Residential Lighting Program?

IF Yes:

- Are the CFL fixtures different from those you sell through the ComEd Program? If Yes, How so?
- Why didn't you sell these CFL Fixtures through the ComEd Program?

PS17. When discounts from the Residential Lighting Program **were not** available, due to product allocations for discounted CFL fixtures running out, did you sell Energy Star CFL fixtures in ComEd's service territory?

IF Yes:

- Were the CFL fixtures different from those you sell through the ComEd Program? If Yes, How so?

PS18. Please provide your best estimate of the percentage breakdown of your CFL fixtures in ComEd's service territory from June 1, 2008 to CURRENT DATE by the following 3 categories:

- a. Percentage of ES fixtures sold that were discounted by the ComEd Residential Lighting Program ____%
- b. Percentage of ES fixtures sold that were not discounted by the program ____%
- c. Percentage of fixtures sold that were not ES ____%

[THESE MUST TOTAL 100 PERCENT.]

Free Ridership and In-State Spillover for PY1/PY2 Residential Lighting Program

My next questions are about the impact that the ComEd Residential Lighting Program may have had on your CFL products sales within ComEd's service territory.

FR1. Do you think your company would have been selling any CFL products from June 1, 2008 to CURRENT DATE if the discounts averaging 99 cents per bulb from the program had not been available? Why do you say that?

Free Ridership

Instructions to interviewers: *The goal is to ask this question sequence for each significant retailer category (home improvement, food/drug, dollar store, etc.) addressed by the program, with a maximum of 3 categories for the interview. Start with the largest category, then ask for the second largest category. If they sold to more than 2 categories, ask about the remaining categories as a combined group.*

Spiral CFL bulbs [ASK ONLY IF THEY SELL SPIRAL CFL BULBS]

FR2. According to our records, from June 1, 2008 to CURRENT DATE you received ComEd Residential Lighting Program program discounts for the sale of the following types of spiral CFL bulbs [NAME TYPES] through [RETAILER CATEGORY] such as [NAME RETAILER EXAMPLE]. The program also provided promotional materials such as signage. If these discounts and program promotional materials had not been available during this June 1, 2008 to CURRENT DATE period, do you think your sales of these types of spiral *Energy Star* CFL bulbs through [RETAILER CATEGORY] stores in the ComEd service territory would have been about the same, lower, or higher?

- 1 Same
- 2 Higher - Why do you say this?
- 3 Lower- By what % do you estimate your sales of spiral ES CFL bulbs through [RETAILER CATEGORY] stores would be lower during this period if the program incentives and promotional materials had not been available? **RECORD PERCENTAGE DECREASE: ____%**

FR3. I want to make sure I understand you correctly. You estimate that your sales through [RETAILER CATEGORY] stores would have been [PERCENTAGE FROM QUESTION FR2.] %

lower without the program discounts. So if you actually sold 100 spiral CFLs in a given week, you think you'd have sold only about $[100 - (\text{PERCENTAGE FROM QUESTION FR2} * 100)]$ in that period if the program discounts hadn't been available? [IF RESPONSE IS \neq YES THEN CLARIFY ESTIMATED SALES VOLUME DECREASE]

FR4. When the ComEd Residential Lighting Program was providing discounts for spiral bulbs sold through the [RETAILER CATEGORY] retail channel, did your company ever provide any of its own price discounts in addition to those provided by the Residential Lighting Program?

IF No, why not?

IF Yes:

- What were your reasons for providing these additional price discounts?
- What was the typical range of these additional discounts on a \$ per bulb basis?
- Were there particular types of bulbs that you offered these additional discounts on?
- What types of bulbs were these?
- Using a scale of 0 to 10 where 10 equals "very likely" and 0 equals "not likely at all," how likely were you to offer these additional price discounts if the program discounts had not also been available?

Specialty CFL bulbs [ASK ONLY IF THEY SELL SPECIALTY CFL BULBS]

FR5. According to our records, from June 1, 2008 to CURRENT DATE you received ComEd Residential Lighting Program program discounts for the sale of the following types of Specialty CFL bulbs [NAME TYPES] through [RETAILER CATEGORY] such as [NAME RETAILER EXAMPLE]. The program also provided promotional materials such as signage. If these discounts and program promotional materials had not been available during this June 1, 2008 to CURRENT DATE period, do you think your sales of these types of Specialty *Energy Star* CFL bulbs through [RETAILER CATEGORY] stores in the ComEd service territory would have been about the same, lower, or higher?

1 Same [FR6]

2 Higher - Why do you say this?

3 Lower- By what % do you estimate your sales of Specialty ES CFL bulbs through [RETAILER CATEGORY] stores would be lower during this period if the program discounts and promotional materials had not been available? **RECORD**

PERCENTAGE DECREASE: __%

FR6. I want to make sure I understand you correctly. You estimate that your sales through [RETAILER CATEGORY] stores would have been [PERCENTAGE FROM QUESTION FR2.] % lower without the program discounts. So if you actually sold 100 Specialty CFLs in a given week, you think you'd have sold only about $[100 - (\text{PERCENTAGE FROM QUESTION FR2} * 100)]$ in that period if the program discounts hadn't been available? [IF RESPONSE IS \neq YES THEN CLARIFY ESTIMATED SALES VOLUME DECREASE]

FR7. When the ComEd Residential Lighting Program was providing program discounts for Specialty bulbs sold through the [RETAIL CATEGORY] retail channel, did your company ever provide any of its own price discounts in addition to those provided by the Residential Lighting Program?

IF No, why not?

IF Yes:

- What were your reasons for providing these additional price discounts?
- What was the typical range of these additional discounts on a \$ per bulb basis?
- Were there particular types of bulbs that you offered these additional discounts on?
- What types of bulbs were these?
- Using a scale of 0 to 10 where 10 equals "very likely" and 0 equals "not likely at all," how likely were you to offer these additional price discounts if the program discounts had not also been available?

CFL fixtures [ASK ONLY IF SOLD SPECIALTY CFL FIXTURES]

FR8. According to our records, from June 1, 2008 to CURRENT DATE you received a ComEd Residential Lighting Program program discounts for the sale of the following types of CFL fixtures [NAME TYPES] through [RETAILER CATEGORY] such as [NAME RETAILER EXAMPLE]. The program also provided promotional materials such as signage. If these program discounts and program promotional materials had not been available during this June 1, 2008 to CURRENT DATE period, do you think your sales of these types of *Energy Star* CFL fixtures through [RETAILER CATEGORY] stores in the ComEd service territory would have been about the same, lower, or higher?

1 Same [FR3]

2 Higher - Why do you say this?

3 Lower- By what % do you estimate your sales of ES CFL fixtures through [RETAILER CATEGORY] stores would be lower during this period if the program discounts and promotional materials had not been available? **RECORD**

PERCENTAGE DECREASE: __%

FR3. I want to make sure I understand you correctly. You estimate that your sales through [RETAILER CATEGORY] stores would have been [PERCENTAGE FROM QUESTION FR2.] % lower without the program discounts. So if you actually sold 100 *Energy Star* CFL fixtures in a given week, you think you'd have sold only about [100 – (PERCENTAGE FROM QUESTION FR2 * 100)] in that period if the program discounts hadn't been available? [IF RESPONSE IS ≠ YES THEN CLARIFY ESTIMATED SALES VOLUME DECREASE]

FR4. When the ComEd Residential Lighting Program was providing program discounts for *Energy Star* CFL fixtures sold through the [RETAIL CATEGORY] retail channel, did your

company ever provide any of its own price discounts in addition to those provided by the Residential Lighting Program?

IF No, why not?

IF Yes:

- What were your reasons for providing these additional price discounts?
- What was the typical range of these additional discounts on a \$ per fixture basis?
- Was there a particular type of fixture that you offered additional discounts on?
- What types of fixtures were these?
- Using a scale of 0 to 10 where 10 equals "very likely" and 0 equals "not likely at all," how likely were you to offer these additional price discounts if the program discounts had not also been available?

FR5. State or utility incentive programs are only some of the factors that may be encouraging sales of CFL bulbs and fixtures. How important are each of the following in affecting your company's sales of CFLs in ComEd's service territory? For each one please tell me how important it is for influencing your company's CFL product sales between June 1, 2008 and CURRENT DATE. Please use a 0 to 10 scale, where 0 is not at all significant and 10 is extremely significant.

FR5a. State or utility rebate and discount programs? Why?

FR5b. The Energy Star program including its Change-a-Light campaign? Why?

FR5c. CFL promotion campaigns by some large retailers that are being done independently of any state or utility energy efficiency programs? Why?

FR5d. Media stories promoting the use of CFLs? Why?

FR5e. Reductions in CFL production costs and price points due to lower-cost overseas manufacturing and increases in CFL production capacity? Why?

FR5f. Growing consumer awareness about global warming? Why?

FR5g. Higher energy costs? Why?

Program Effects on Non-discounted CFLs Sold in ComEd Service Territory [IF THEY SOLD CFL BULBS AND FIXTURES IN COMED'S SERVICE TERRITORY FROM JUNE 1, 2008 TO CURRENT DATE OUTSIDE OF COMED'S PROGRAM, THEN ASK, ELSE SKIP TO SAT1]

PE1. You said earlier that you also sold CFL bulbs or fixtures in ComEd's service territory from June 1, 2008 to CURRENT DATE that did not receive discounts from the ComEd Residential Lighting Program. What effects, if any, do the program discounted CFL bulbs or fixtures have on your sales levels and prices of these non-program-discounted CFL bulbs or fixtures? [IF MECHANISM FOR THESE EFFECTS IS NOT EXPLAINED, PROBE FOR MECHANISM]

PE1a. Do these effects vary depending on the type of CFL product? [IF YES] How so?

PE1b. Have these effects changed at all over this time period? [IF YES] How so and about what time period did these effects change?

PE2. Do the retailers that you supply ever sell program-discounted CFL bulbs or fixtures and non-program-discounted CFL bulbs or fixtures at the same time?

IF Yes:

- Would you say this happens always, very often, sometimes, or not very often?
- Do you promote these non-program-discounted CFL bulbs or fixtures differently than you do the program-discounted CFL bulbs or fixtures?
- How are your promotional efforts different?
- Do you think increased shopper foot traffic due to program-discounted CFL bulbs and fixtures has any impact on the sales of non-program discounted CFL bulbs or fixtures that are being sold at the same time? Why do you say this?

PE3. What effects do you think program-discounted CFL bulbs or fixtures have on consumer expectations regarding prices of non-discounted CFL bulbs or fixtures?

PE5. [IF THEY SOLD BOTH SPECIALTY AND SPIRAL CFLS] You said earlier that from June 1, 2008 to CURRENT DATE, you sold both spiral and specialty CFL bulbs through the ComEd Residential Lighting Program. What effects, if any, do the program-discounted spiral CFL bulbs have on your sales levels of program-discounted specialty CFL bulbs, such as dimmable bulbs, bulbs with reflectors, 3-way bulbs, and flood lights? [IF MECHANISM FOR THESE EFFECTS IS NOT EXPLAINED, PROBE FOR MECHANISM]

PE6. Earlier you said that your company was **not** selling CFL products in ComEd's service territory before getting involved with the ComEd Residential Lighting Program. How significant was the existence of the ComEd Residential Lighting Program and rebate in your company's decision to enter the ComEd lighting market? Please use a 0 to 10 scale, where 0 is not at all significant and 10 is extremely significant.

PE7. Earlier you said that your company sold CFL products in ComEd's service territory before getting involved with any of these ComEd lighting rebate or discount programs. Do you have ComEd service territory CFL product sales data for this period before you became involved with the ComEd lighting rebate or discount programs?

- If we provided assurances to protect the confidentiality of these sales data, would you be willing to share these data? If yes, how could we get this data?

PE8. Does your company sell CFL bulbs or fixtures in states other than Illinois?

[IF YES] Does your company sell CFL bulbs or fixtures in any states that **do not** have utility or state energy efficiency programs that offer manufacturer program discounts or point of sale rebates for these kind of lighting products?

[IF YES] Are you familiar with your company's CFL bulb or fixture sales activities in these states?

[IF YES] In these states without utility or state energy efficiency program rebates, do you promote your CFL products differently than you do in ComEd's service territory?

[IF YES] How is this promotion different?

[IF YES] On a per-bulb basis, on average, how much lower are the prices of the Illinois program-discounted CFLs than the CFL bulbs that you sell in states that do not offer rebates or discounts from utilities or state energy efficiency programs?

[IF YES] If we provided assurances to protect the confidentiality of your data, would you be willing to share recent CFL product sales data for states other than Illinois?

[IF YES] What would be the next step for getting these data?

PE9. Have you seen any evidence that that some lighting products receiving discounts from the ComEd Residential Lighting Program are being sold out-of-state or through out-of-state buyers through the Internet? What evidence have you seen?

PE10. What do you think should be done to minimize the occurrence of out-of-state sales of lighting products receiving discounts from the ComEd Residential Lighting Program?

Pricing

P1. [IF THEY SELL NON-PROGRAM-DISCOUNTED CFLS ALSO] You said earlier that you also sell CFL products in ComEd's service territory that do not receive program discounts from the ComEd Residential Lighting Program. Are the program-discounted CFL products typically sold at a lower retail price, a higher retail price, or at the same retail prices as the non-program-discounted bulbs?

On a per-bulb basis, on average, how much [LOWER/HIGHER] are the prices of the program-discounted CFL bulbs than the other CFL bulbs that you sell?

On a per-fixture basis, on average, how much [LOWER/HIGHER] is the price on the program-discounted CFL fixtures than the other CFL fixtures that you sell?

Are your pricing strategies for the products with ComEd Residential Lighting Program discounts handled differently than non-program products? How are these different?

Market Characterization

MC1. How can you tell whether the CFLs you are manufacturing are quality products?

MC2. What actions is your company taking to assure the quality of CFL products it sells?

MC3. Are there any CFLs you have stopped manufacturing due to retailer complaints related to quality? If yes, which types and brands?

MC4. Do you have standard recommendations you give to customers about how to recycle their CFLs?

MC5. What actions has your own company taken to encourage environmentally safe recycling and disposal of CFL products?

Program Satisfaction

Finally I would like to find out your level of satisfaction with various elements of the ComEd Residential Lighting Program. For these questions we will be using a scale of 0 to 10 where 10 = very satisfied and 0 = very dissatisfied. Using this 0 to 10 scale...

Rebate Reservation, Program Verification Process

SAT1. How satisfied have you been with the enrollment process – that is, the process of discussing the program with the program implementer and agreeing to participate?

SAT2. How satisfied have you been with the incentive fund reservation process – that is, the process used by the program implementer to allocate a set amount of incentive dollars to participating stores?

SAT3. How satisfied have you been with the program tracking and verification process – that is, the process used by the utility to insure that the CFL products that they are providing discounts for are being sold by retailers and are properly labeled and promoted?

IF ANY RATING = 0 to 5 ASK: Why do you say that?

Incentive Levels and Coverage

CFL bulbs

SAT4. Using this same satisfaction scale, how satisfied have you been with the level of program discounts for CFL *bulbs*?

[IF RATING = 0 to 5] Why do you say that? For which bulb types are you unsatisfied with the incentive levels?

SAT5. If the program, due to fund constraints, had to eliminate a program discount for one type of CFL bulb, which one should they choose? Why do say that?

CFL fixtures

SAT6. Using this same satisfaction scale, how satisfied have you been with the levels of program discounts for CFL *fixtures*?

[IF RATING = 0 to 5] Why do you say that? For which fixture types are you unsatisfied with the incentive levels?

SAT7. Are there specific types of CFL fixtures that you think that the program should be offering program discounts for, that are not currently addressed by the program?

[IF YES] For what CFL products?

SAT8. The Residential Lighting Incentive program offers both manufacturer program discounts and discounted coupons. Do you have a preference for one method or another in terms of helping to sell CFL products? Why do you say that? What are the advantages and disadvantages of the two rebate types?

Marketing and Coordination with Retailers

SAT9. Using the same scale of 0 to 10, how satisfied have you been with the ComEd Residential Lighting Program's efforts to mass-market CFL products?

[IF RATING = 0 to 5] Why do you say that?

SAT10. Using the same satisfaction scale, how satisfied have you been with the program's efforts to coordinate with retailers on in-store product placement and promotions?

[IF RATING = 0 to 5] Why do you say that?

SAT11. What effects, if any, does the inclusion of the utility logos have on the sales of your CFL products?

Satisfaction with Program Staff and Program As a Whole

SAT12. Using the same satisfaction scale, how satisfied have you been with the program managers and other staff involved in the ComEd Residential Lighting Program? [IF RATING IN 0-5] Why do you say that?

SAT13. Using the same scale, how would you rate your level of satisfaction with the program in general? [IF RATING = 0 to 5] Why do you say that?

SAT14. In what way could the program be improved?

SAT15. Are you planning to participate in the program going forward? Why?

SAT16. Do you have any final suggestions for ComEd program staff to help them improve the program they offer and encourage greater sales of CFL bulbs?

Other Information

And finally, I have a couple of miscellaneous questions that I am hoping you can answer.
SAT17. Can you estimate what percentage of the CFL products you sold through the ComEd Residential Lighting Program during 2009 were installed in residential vs. nonresidential fixtures?

SAT18. If the people shopping in the retail stores that you supply could not purchase CFL bulbs there, for whatever reason, do you think they would buy incandescent bulbs instead or would they wait to buy their CFL bulbs from other retailers?

[IF THEY INDICATE THE CUSTOMERS WOULD WAIT TO BUY CFL BULBS FROM OTHER RETAILERS] What other retailers do you think these customers would be buying their CFLs from?

That concludes the survey. On behalf of ComEd, thank you very much for your time, and for the information you provided.

5.1.3 In-store Intercept Survey Instrument

1. Were you planning to purchase light bulbs when you entered the store today?

Yes / No / DK

2. What type (or types) of bulbs were you planning to buy?

1 CFLs only / 2 CFLs and other / 3 Incandescent / 4 Halogen / 5 Other nonCFL / 6 Don't Know

3. May I look at the types of bulbs you are purchasing today?

CFLs & nonCFLs / CFLs Only / Only nonCFLs

4. Why are you buying both CFLs and nonCFLs?
(Do Not Read - Accept Multiple)

1 Use in different rooms / 2 Use in different fixture types / 3 Dislike CFL fit in fixtures / 4 Dislike CFL look in fixtures / 5 Need dimmable bulbs / 6 Need 3-way bulbs / 7 Other

5. Did you know you are purchasing CFLs that have been discounted by ComEd?

Yes / No - Didn't know ComEd discount / No - Didn't know they were discounted

5x. Did you know they were discounted?

YES / NO

6. How did you first find out about ComEd's discounts on CFLs?

1. Saw marketing materials in the store / 2. Read about it in my bill / 3. Discount was advertised in newspaper/tv/radio / 4. Store employee made me aware of the discounted bulbs / 5. Saw a retail lighting demonstration / 6. Other (specify): / 7. Don't Know

7. Did you come into the store today specifically to buy CFLs discounted by ComEd?

Yes / No/Don't Know

8. Why did you choose these CFLs instead of the ones discounted by ComEd?

1. Prefer this brand/manufacturer / 2. Prior experience with this model / 3. No discounted CFLs in this wattage / 4. Didn't want to buy a multi-pack / 5. Full-price CFLs are higher quality / 6. Didn't know about ComEd discounted CFLs / 7. Didn't know about any discounted CFLs / 8. Other

9. Before entering the store today did you know ComEd was offering discounts on CFLs?

Yes / No/DK

10. Did you know you could find CFLs here that were discounted by ComEd?

1. Yes / 2. No / 3. Don't Know

11. Did you know you could find CFLs here that were discounted?

1. Yes / 2. No / 3. Don't Know

ComEd In-Store Intercept Survey

Store Name	
Store City	
Date	
Time	
Researcher	

Customer Lighting Purchases

Pkg #	CFL or Incand.	Watts	Bulbs in	Price per	IOU discount?	# of Packs
1					Yes No	
2					Yes No	
3					Yes No	
4					Yes No	

IF PURCHASING ANY CFLs --> GO TO BLUE PAGE (CFL Purchasers) -- Page 2

IF NOT PURCHASING CFLs --> GO TO YELLOW PAGE (Incandescent Purchasers) -- Page 3

BLUE PAGE -- CFL PURCHASERS -- PAGE 2

[COLUMN A]	Reason [DO NOT READ LIST]	A -- Check if Mentioned	B Rank
1a. What influenced your decision to purchase these particular CFLs today?	1. CFL price is low / affordable		
[DO NOT READ LIST.]	2. To save money		
ACCEPT MULTIPLE RESPONSES.]	3. To save energy (CIRCLE: \$\$ / environment)		
Anything else? [RECORD OTHER INFLUENCES]	4. Saw signs or displays in store		
	5. Environmental reasons		
	6. Recommended by friends/family		
[COLUMN B -- FOR ALL ID'd IN COLUMN A]	7. Saw advertisement outside store		
2a. Which of these factors was the most influential on your decision?	8. CFLs work better / higher quality than incandes		
Second most?	9. Prior experience with CFLs		
Third most?	10. CFL location in store		
	11. Other (specify):		

On a 0 to 10 scale, with 0 being strongly disagree and 10 being strongly agree, how much do you agree with the following two statements:

3a. There may have been several reasons for my purchase decision. But the price was a critical factor in my decision to purchase the CFLs. ____

4a. The pamphlets and brochures explaining the benefits of CFLs played a significant role in my decision to purchase the CFLs. ____
(Check if they did not see the materials: ____)

5a. How many would you have purchased if each bulb cost \$1 more?

1. none
2. fewer
3. the same number
4. more CFLs
5. Don't know

6a. How many would you have purchased if each bulb cost \$1 less?

1. none
2. fewer
3. the same number
4. more CFLs
5. Don't know

Would you still have purchased CFLs today if..

[ENTER "N/A" IF NOT APPLICABLE, DK = "Don't Know"]

Question	Circle one
7a ...you hadn't seen advertising in the store?	Yes No DK N/A
8a ...you had no prior experiences with CFLs?	Yes No DK N/A
9a ...there were no CFL signs/displays in the store?	Yes No DK N/A
10a ...the CFLs were located with the rest of the lighting products?	Yes No DK N/A
11a ...ComEd had not been discounting the bulbs?	Yes No DK N/A

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12a. When would you have purchased them if ComEd had not been discounting them?

1. At the same time
2. Within a few months
3. Within a year
4. More than a year later
5. Would not have purchased

13a. Are you planning to install the CFLs you are purchasing today in your home, a business, or both?

1 Home
2 Business
3 Both
4 Other: ____
5 Don't Know

14a. In the next six months, how many of the CFLs that you are purchasing today do you plan on installing in your...

1 home? ____
2 business? ____
3 other: ____

15a. Have you ever purchased or been given any CFLs before today?

Yes No/DK

16a. Do you have any CFLs installed right now in your home/business?

Home	Business
1. Yes	1. Yes
2. No	2. No
3. DK	3. DK

17a. Do you have any CFLs in storage in your home/business?

Home	Business
1. Yes	1. Yes
2. No	2. No
3. DK	3. DK

18a. Does ComEd provide electricity to your home? [If RELEVANT] Business?

Yes No / DK

____ Home
____ Business

Thank you for your time today. May I have your contact information for our records?

Name: _____ Zip: _____

Phone: _____

Would you be interested in participating in lighting study ComEd will be conducting in a few months? Customers who participate in this phase of the study will be compensated for their participation.

[GIVE GIFT CARD]

1b. Did you consider purchasing CFLs today? [ASSUME RESPONSE OF "YES" IF RESPONDENT SAID THEY WERE INITIALLY PLANNING ON PURCHASING CFLs (SEE PAGE 1)]		
<input type="button" value="Yes"/>	<input type="button" value="DK"/>	<input type="button" value="No"/>

2b. Why did you purchase incandescent bulbs over CFLs? [ACCEPT MULTIPLE RESPONSES.]

1. Not aware of CFLs before today
2. CFLs are too expensive
3. Don't know enough about CFLs
4. Don't like the way CFLs fit in fixtures
5. Don't like the way CFLs look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color of CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulb - type?
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs
14. Prefer this brand/manufacturer to CFL brands/manu
15. Prior experience with this incandescent model
16. CFLs only in multi-packs
17. Other

3b. Why not?
 [ACCEPT MULTIPLE RESPONSES.]

1. Not aware of CFLs before today
2. CFLs are too expensive
3. Don't know enough about CFLs
4. Don't like the way CFLs fit in fixtures
5. Don't like the way CFLs look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color of CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulb - type?
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs
14. Prefer this brand/manufacturer to CFL brands/manu
15. Prior experience with this incandescent model
16. CFLs only in multi-packs
17. Other

4b. Would you have purchased CFLs today if they cost \$1 less per bulb?

1. Yes
2. No
3. Don't know

5b. Have you ever purchased or been given any CFLs before today?

6b. Do you have any CFLs installed right now in your home/business?

Home	Business
1. Yes 2. No 3. Don't know	1. Yes 2. No 3. Don't know

8b. Does ComEd provide electricity to your home (or business)?

7b. Do you have any CFLs in storage in your home/business?

Home	Business
1. Yes 2. No 3. Don't know	1. Yes 2. No 3. Don't know

Thank you for your time today. May I have your contact information for our records?

Name:	Zip:
Phone:	

[GIVE GIFT CARD]

5.1.4 In-store Shelf Survey Instrument

COMED SHELF SURVEY – NON-PROGRAM STORES (SAMPLE)

(Fielded in Stores Visited for PY2 ComEd Residential Lighting Evaluation)

Field Staff Name:	
Store name:	Date:
Store address:	Store city:
Store type (e.g, Big Box, grocery, etc.):	Store zip code:

GSS1. Is the retailer currently running any CFL promotions involving discounted CFLs? If so, describe promotion:

GSS2. What types of materials are present, if any, that promote CFLs? [CHECK ALL THAT APPLY.]

Retailer signage that promotes CFLs	
Brochures	<input type="checkbox"/> Yes <input type="checkbox"/> No
Floor sticker/cling	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sign on shelf/wall	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sign hung from	<input type="checkbox"/> Yes <input type="checkbox"/> No

ceiling	
Other (such as display with working CFLs) – Describe: <hr/>	
<input type="checkbox"/> No Retailer materials present	

GSS3. Approximately what percentage of all light bulbs displayed on the shelves are CFLs?

0% ____ 1-25% ____ 26-50% ____ 51-75% ____ 76-99% ____ 100% ____

GSS4. Approximately what percentage of all CFLs displayed on the shelves are ENERGY STAR CFLs?

0% ____ 1-25% ____ 26-50% ____ 51-75% ____ 76-99% ____ 100% ____

[IF STORE SELLS CFLs AND OTHER TYPES OF LIGHT BULBS]

GSS5. Are the CFLs located in the same aisle/location in the store as the rest of the light bulbs? [CIRCLE ONE]

- 1 CFLs always located with other types of bulbs near them
- 2 Some of the CFLs are located near other bulbs, and some CFLs are located on their own
- 3 All of the CFLs are located on their own with no other bulbs near them
- 4 Store sells no other types of light bulbs (store sells only CFLs)

GSS6. Does one particular CFL model (such as a 4-pack of GE Spiral bulbs) or a couple of CFL models

dominate inventory (i.e. make up more than 50% of total inventory)?

- 1 Yes
- 2 No

If yes, provide manufacturer, style and wattage:

Manufacturer _____ Style _____ EStar? _____ #Bulbs _____ Watts _____

Manufacturer _____ Style _____ EStar? _____ #Bulbs _____ Watts _____

Also describe degree of dominance (e.g., 100+ packages of this model, 4 or 5 packages of each other model):

GSS7. What styles of CFLs are available? [CIRCLE YES OR NO FOR EACH TYPE.]

Style	Any 3-way?	Any dimmable?	Bulb type not sold at store	STYLE CODES (for bulb inventory)
1. Spiral/twister	Y or N	Y or N	☉	SP
2. Globe (e.g., for bathroom vanity fixtures)	Y or N	Y or N	☉	GL
3. A-lamp (shaped like standard incandescent)	Y or N	Y or N	☉	AL

4. Post lamp bulbs	Y or N	Y or N	☉	PO
5. Reflector/floodlight	Y or N	Y or N	☉	RE
6. Ceiling Fixtures	Y or N	Y or N	☉	CF
7. Desk Lamp	Y or N	Y or N	☉	DL
8. Other (describe in box at right)				

GSS8. Are the following types of products sold? [CHECK YES OR NO FOR EACH]

Energy Star CFLs	<i>Spiral:</i> Yes <input type="checkbox"/> No <input type="checkbox"/>	Specialty: Yes <input type="checkbox"/> No <input type="checkbox"/>
Non-Energy Star CFLs	<i>Spiral:</i> Yes <input type="checkbox"/> No <input type="checkbox"/>	Specialty: Yes <input type="checkbox"/> No <input type="checkbox"/>
Incandescent Bulbs	<i>Standard (A-lamp):</i> Yes <input type="checkbox"/> No <input type="checkbox"/>	<i>Specialty (Other):</i> Yes <input type="checkbox"/> No <input type="checkbox"/>
Halogen Bulbs	<i>Any Halogen bulb:</i> Yes <input type="checkbox"/> No <input type="checkbox"/>	
LED bulbs	<i>Any LED bulb:</i> Yes <input type="checkbox"/> No <input type="checkbox"/>	

Bulb Inventories:

CFL Inventory

- **Spiral Bulbs** – Please inventory all standard spiral CFLs
- **Globe Bulbs** – Please inventory all globe CFLs sold in the store
- **A-Lamp Bulbs** – Please inventory all a-lamp CFLs sold in the store
- **Post Lamp Bulbs** – Please inventory all post lamp CFLs sold in the store
- **Reflectors/Floodlights** – Please inventory all CFL reflectors or floodlights sold in the store
- **Ceiling Fixtures and Desk Lamps** – It is NOT necessary to inventory any CFL ceiling fixtures or desk lamps

Incandescent Inventory

- **Standard Incandescent Bulbs** – Please inventory all 40,60, 75, 100 and 150 watt incandescent bulbs
- **Globe Bulbs** – Please inventory all incandescent globe bulbs sold in the store
- **A-Lamp Bulbs** – Incandescent equivalents to A-lamps are the same as for Spiral bulbs above
- **Post Lamp Bulbs** – Please inventory all incandescent post lamp bulbs sold in the store
- **Reflectors/Floodlights** – Please inventory all reflectors or floodlights sold in the store
- **Ceiling Fixtures and Desk Lamps** – It is NOT necessary to inventory any incandescent ceiling fixtures or desk lamps

Halogen Bulb Inventory

- **Halogen Bulbs** – Please inventory all Halogen bulbs that are equivalents to the standard incandescent or reflector bulbs

Inventory 1a: CFL Inventory (sample)

Inventory all Spiral (SP) CFLs sold

[illegible]

5.1.5 General Population Survey Instrument

Screeners Section

INTRO 1:

Hello, this is [SURVEYOR NAME] from Opinion Dynamics calling on behalf of Commonwealth Edison. We are not selling anything. We're conducting a study of households to better understand how residential customers like you choose light bulbs and fixtures to buy for your home.



May I speak with [CONTACT] or the person in your household that is most knowledgeable about your household lighting purchases? [EXPLAIN IF THERE IS MORE THAN ONE DECISION-MAKER WE ONLY NEED TO TALK TO ONE PERSON. ARRANGE CALL BACK IF RESPONDENT NOT AVAILABLE]

This call may be recorded or monitored for quality assurance purposes.

C1 According to our records ComEd is your electrical service provider, is this still correct?

- 1 Yes, ComEd
- 2 No, Someone Else [TERMINATE]
- 98. (Don't know) [TERMINATE]
- 99. (Refused) [TERMINATE]

S1 I'd like to start by asking you a few questions about your awareness of different types of light bulbs. Before this call today, had you ever heard of compact fluorescent bulbs, or CFLs?

- 1 Yes (SKIP TO S3)
- 2 No
- 8. (Don't know)
- 9. (Refused)

S2 Compact fluorescent light bulbs – also known as CFLs – usually do not look like regular incandescent light bulbs. The most common type of CFL is made with a glass tube bent into a spiral, resembling soft-serve ice cream, and it fits in a regular light bulb socket. Before today, were you familiar with CFLs?

- 1 Yes
- 2 No (SKIP TO OT1)
- 8. (Don't know) (SKIP TO OT1)
- 9. (Refused) (SKIP TO OT1)

S3 How familiar are you with CFLs? Would you say that you are ...

- 1 Very familiar
- 2 Somewhat familiar
- 3 Not too familiar
- 4 Not at all familiar (SKIP TO QS4)
- 8. (Don't know) (SKIP TO OT1)
- 9. (Refused) (SKIP TO OT1)

S3a-f (S4). While most CFLs are spiral shaped, CFLs also come in other shapes and some have special features. How familiar are you with the following types of CFLs? Would you say that you are...with [RANDOMIZE AND READ, RECORD RESPONSE FOR EACH TYPE]?

- 1 Very familiar
 - 2 Somewhat familiar
 - 3 Not too familiar
 - 4 Not at all familiar
 - 8 (Don't know)
 - 9 (Refused)
- a. Dimmable or 3-way CFLs. These CFLs can be used with a dimmer switch to adjust the level of brightness or to shine at 3 different light levels
 - c. Flood or recessed lighting CFLs
 - e. Globe CFLs. This refers to a CFL that has a round shape and might be used in a fixture, such as a vanity light
 - f. A-shaped CFLs. This refers to a covered CFL that is made to look and feel like a traditional incandescent or regular light bulb.

S4 Have you heard of the “Smart Ideas” Program offered by ComEd, which provides discounts for installing energy efficiency lighting in your home?

- 1 Yes
- 2 No
- 8. (Don't know)
- 9. (Refused)

Q1 Have you ever purchased any CFLs to use in your home?

- 1 Yes (SKIP TO Q1yr)
- 2 No
- 8 (Don't know)
- 9 (Refused)

Q1aa Has anyone else in your household ever purchased any CFLs to use in your home?

- 1 Yes, (ASK TO SPEAK TO THAT PERSON & REPEAT INTRO, If they are not available schedule a call-back)
- 2 No (SKIP TO USE1)
- 8 (Don't know) (SKIP TO USE1)
- 9 (Refused) (SKIP TO USE1)

Q1yr Since June 2009, have you purchased any CFLs to use in your home?

- 1 Yes
- 2 No
- 8 (Don't know)
- 9 (Refused)

[If Q1yr = 1 then ASK Q6]

Q6 Approximately, how many CFLs have you purchased since June 2009 to use in your home, including both spiral shaped CFLs and specialty CFLs? If a package contained multiple CFLs, please count

each CFL bulb separately. [IF NEEDED READ: “Specialty CFLs are bulbs such as flood lights, reflectors, globe bulbs (typically used in bathroom vanities) that are typically used in non-standard lamp applications”] [ASK THEM TO GIVE THEIR BEST GUESS EVEN IF NUMBER ISN’T PERFECT]

— Enter #

0 None (SKIP to USE1)

998 (Don’t know) (IF NONE GIVEN, SKIP TO USE1)

999 (Refused) (IF NONE GIVEN, SKIP TO USE1)

Participant Screener – 1 YR Bulb Purchases

[If PY2 = 1 Then Go Through This Participant Screener Section; Otherwise Skip to USE1]

Store. Thinking back about your CFL purchases since June 2009, at what store were these bulbs purchased? (ACCEPT MULTIPLE)

- 1 Lowes
- 2 Home Depot
- 3 Sam’s Club
- 4 Ace Hardware
- 5 CostCo
- 6 Menards
- 7 Jewel-Osco
- 8 Food4Less
- 9 Best Buy
- 10 DoItBest (Also known as Crafty Beaver)
- 11 TrueValue Hardware
- 12 Target
- 13 Walgreens
- 14 Wal-Mart
- 15 7-Eleven
- 16 Dominick’s
- 17 CVS Pharmacy
- 18 Dollar Store
- 19 Family Dollar
- 20 Meijer
- 21 IKEA
97. Other [SPECIFY] _____
98. (Don’t know)
99. (Refused)

State. Were any of these stores located outside of Illinois?

- 1 Yes – some were located outside Illinois
- 2 Yes – All were located outside Illinois (SKIP to USE1)
- 3 No
98. (Don’t know)
99. (Refused)

[IF State = 1 then READ: For the following questions please consider only the bulbs purchased within Illinois]

TYPE What type of CFLs have you purchased since June 2009? [ACCEPT MULTIPLE]

- 1 Traditional Spiral CFLs
- 2 Reflector CFLs – typically used in indoor/outdoor flood light applications
- 3 Globe CFLs – typically used in bathroom vanity mirrors
- 4 CFL Flood Lights – used in recessed and track lighting and flood lamp applications
- 5 A-lamp CFLs – these have a dome cover designed to look like a traditional bulb
- 6 Dimmable CFLs – these can be used in lamps with dimmer settings
- 7 3-way CFLs – used in lamps with 3 light output settings
- 8 Post CFLs – for driveway and post lights
- 9 CFL Fixture – flush mounted ceiling fixture, desk lamp, outdoor wall light, bathroom vanity
- 00 Other _____
- 98 (Don't know)
- 99 (Refused)

[T=Type and takes values from 1 to 9 based on responses to Type above – ASK ABOUT UP TO THREE TYPES]

BP1_T Approximately how many <TYPE – i.e. “Spiral CFLs”> you have purchased since June 2009?

- 00 Enter number of bulbs purchased
- 98 (Don't know)
- 99 (Refused)

BP2_T Were these <TYPE> discounted or on sale? There might have been a sign on the shelf or display in the store.

- 1 Yes – they were discounted
- 2 No – they were not discounted (SKIP TO BP4_T)
- 3 Some were discounted
- 8 (Don't know) (SKIP TO BP4_T)
- 9 (Refused) (SKIP TO BP4_T)

BP3_T Do you know who sponsored this discount?

- 1 ComEd
- 2 Retail Store
- 3 Manufacturer
 - 00 OTHER, Specify
- 98 (Don't Know)
- 99 (Refused)

[IF TYPE = 9 OR BP1_T =1 SKIP BP4_T]

BP4_T Did the <TYPE> come in single or multi-packs?

- 1 Single
- 2 Multi-Pack
- 3 Some Single and some multi-packs
- 8 (Don't know)

9 (Refused)

[SKIP TO P1 IF TOTAL_BULBS = Q6 or TOTAL_BULBS = missing OR TYPES>3 OR TYPE=00]

[ASK IF Total_bulbs > Q6]

Q6CH1 We just discussed a total of *[TOTAL_BULBS]* CFLs that you purchased at various stores since June 2009. Earlier you said that you purchased a total of *[Q6]* CFLs during this time period. Which do you think would be the better estimate for the number of bulbs you have purchased since June 2009?

- 1 [Q6] bulbs – the original estimate
- 2 [Total_Bulbs] The itemized total
- 3 Other Number of Bulbs
 - 8 (Don't know)
 - 9 (Refused)

[ASK IF Q6CH1=3]

Q6C1A What is a better estimate of the number of bulbs you have purchased since June 2009?

- 00 Enter number of bulbs purchased
- 998 (Don't know)
- 999 (Refused)

[ASK IF if Q6 > Total_bulbs]

Q6CH2 We just discussed a total of *[TOTAL_BULBS]* CFLs that you purchased at various stores since June 2009. Earlier you said that you purchased a total of *[Q6]* CFLs during this time period. Which do you think would be the better estimate for the number of bulbs you have purchased since June 2009?

- 1 [Q6] bulbs – the original estimate
- 2 [Total_Bulbs] The itemized total
- 3 Other Number of Bulbs
 - 8 (Don't know)
 - 9 (Refused)

[ASK IF Q6CH2=00]

Q6C2A What is a better estimate of the number of bulbs you have purchased since June 2009?

- 00 Enter number of bulbs purchased
- 998 (Don't know)
- 999 (Refused)

[IF TOTAL_BULBS > Q6 AND Q6CH1 = 1 THEN B_1YR =Q6

IF TOTAL_BULBS > Q6 AND Q6CH1 = 2 THEN B_1YR =TOTAL_BULBS

IF Q6 > TOTAL_BULBS AND Q6CH2 = 1 THEN B_1YR =Q6

IF Q6 > TOTAL_BULBS AND Q6CH2 = 2 THEN B_1YR =TOTAL_BULBS

IF Q6CH1 = 00 then B_1YR = Other Bulbs recorded into Q6CH1 (00)

IF Q6CH2 = 00 then B_1YR = Other Bulbs recorded into Q6CH2 (00)

OTHERWISE B_1YR=Q6]

YR2 Install Rate Battery for Install Rate
--

[IF PY2 = 1 and State <2 then ask YR2 Install Rate Battery – this includes all who purchased bulbs during PY2 and those who purchased them in Illinois Stores]

For the next set of questions I'd like you to think about these <b_1yr> CFLs that you purchased since June 2009.

P1. Prior to purchasing these < b_1yr > CFLs, were you ... (READ LIST)

1. Very familiar
2. Somewhat familiar
3. Not too familiar or
4. Not at all familiar with CFLs
8. (Don't know)
9. (Refused)

[IF P1=4 SKIP P2]

P2. Prior to purchasing these < b_1yr > bulbs, approximately how many of the screw-in lighting sockets in your home contained CFLs?

1. None of the sockets
2. Less than 5% of the sockets
3. More than 5% but less than 25% of the sockets
4. More than 25% but less than 50% of the sockets
5. More than 50% but less than 75% of the sockets
6. More than 75% of the sockets, but not all of the sockets
7. All of the sockets
8. (Don't know)
9. (Refused)

G1. Of the <b_1yr> CFLs purchased since June 2009, have you installed ...

1. All of these.
2. Some of these,
3. None of these inside or outside your home?
0. (Other Specify)
98. (Don't know)
99. (Refused)

[SKIP IF G1 = 1 or 3]

G2. How many of these <b_1yr> CFLs have you installed in or around your home? (Should be equal to or less than <b_1yr>.)

00. [NUMERIC OPEN END]

998. (Don't know)

999. (Refused)

[IF G1 in 2 or 3 ASK G2a]

G2a. Where are the CFLs that you did not install in your home? (DO NOT READ) [ACCEPT UP TO 4 RESPONSES]

1. (In Storage)
2. (Gave Away)
3. (Lost)
4. (Broken)
5. (Installed in another home)
6. (Installed at work)
7. (Returned to store)
8. (Installed but later removed)
00. (Other, Specify)
98. (Don't know)
99. (Refused)

[ASK IF G2A = 1 OTHERWISE SKIP TO G3]

G2b. How many are in storage?

[NUMERIC OPEN END]

98. (Don't know)

99. (Refused)

G2c. What are you planning to do with the CFLs you have in storage? (DO NOT READ) [ALLOW MULTIPLE RESPONSES]

1. (Waiting until an incandescent bulb burns out before replacing it)
2. (Waiting until a CFL burns out before replacing it)
3. (Waiting until a bulb (NO TYPE SPECIFIED) burns out before replacing it)
4. (Not planning to use them)
5. (Haven't decided)
00. (Other, Specify)
98. (Don't know)
99. (Refused)

[IF G2c in (1,2,3) THEN ASK QG2D]

QG2D. How many of the bulbs in storage do you expect to install within the next year ...

1. All
2. Half, or
3. None of the stored bulbs
98. (Don't know)
99. (Refused)

[IF G2C=4 THEN ASK G2CC]

G2cc. Why are you not planning on using the CFLs?

00. [OPEN END]

98. (Don't know)

99. (Refused)

YR2 Purchase Battery for Impact and NTG Estimation

[IF PY2 = 1 and Store is 2-11,14,20 then ask YR2 Purchase Battery – this excludes those who purchased bulbs during PY2 but only at merchants not included in ComEd's program; OTHERWISE SKIP TO NS1]

[SKIP TO FR1 IF G1 NOT = 1 or 2]

G3. In what rooms in your home did you install the <QG2> CFLs you purchased in the last year? (DO NOT READ) [ACCEPT MULTIPLES] (PROBE: DID YOU INSTALL THE CFLS IN ANY OTHER ROOMS?)

1. (Bedroom)
2. (Bathroom)
3. (Family room / den)
4. (Garage)
5. (Hallway, staircase, foyer or entry)
6. (Kitchen)
7. (Living Room)
8. (Laundry room)
9. (Attic)
10. (Basement)
11. (Dining room)
12. (Office)
13. (Outside)
14. (Spare room)
15. (Closet)
00. (Other, Specify)
98. (Don't know)
99. (Refused)

[FOR QUESTION G4a-p, READ FOR EACH AREA WHERE CFLS ARE INSTALLED FROM QUESTION G3]

G4a-p. How many of the <QG2> CFLs did you install in the [LOCATION NAME]?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8

- 9. 9
- 10. 10
- 11. 11
- 12. 12 or more
- 98. (Don't know)
- 99. (Refused)

G5. In the majority of instances, what type of bulbs did the new CFL(s) replace, incandescent or CFLs?
Would you say...

- 1. All Incandescents
- 2. Mostly Incandescents
- 3. All CFLs
- 4. Mostly CFLs
- 5. Half Incandescents and Half CFLs
- 6. Halogens
- 7. Mixture of bulbs
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

G8. Are all of the CFLs you installed since June 2009 still in place or have you removed some?

- 1. All still in place
- 2. Removed some
- 3. Removed all
- 8. (Don't know)
- 9. (Refused)

[IF G8 =2 Ask G9]

G9. How many have been removed?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8
- 9. 9
- 10. 10 or more
- 98. (Don't know)
- 99. (Refused)

[IF G8 =2 or 3 Ask G10 and G12, ELSE SKIP TO FR1]

G10. Why did you remove the CFL(s)? (DO NOT READ)(ACCEPT MULTIPLE)

- 1. (Burned out/stopped working/broke)
- 2. (Did not like the color)
- 3. (Took too long to start up)

- 4. (Not bright enough)
- 5. (Didn't like the way it looked)
- 6. (Didn't fit in the fixture)
- 7. (Moved)
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

G12. What did you do with the CFL bulb(s) that were removed? (DO NOT READ) [ACCEPT MULTIPLE]

- 1. (Moved it to a different location)
- 2. (Gave it away)
- 3. (Threw it away)
- 4. (Recycled it)
- 5. (Saved it for future use)
- 6. (Returned it to the store for a refund)
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

FREE-RIDERSHIP

IF PY2 = 1 and DISCOUNT = 1 AND STORE IS 2-11,14,20 THEN ASK FREE-RIDERSHIP QUESTIONS; OTHERWISE SKIP TO NS1

IF ComED = 1 ASK FR1

FR1. How did you first find out about ComEd's price discounts on Compact Fluorescent Light bulbs? (DO NOT READ) (IF "SAW MARKETING MATERIAL IN STORE" PROBE FOR WHERE IN STORE)

- 1. (Saw coupon/marketing materials on shelf with bulbs)
- 2. (Saw coupon/marketing materials on display in aisle)
- 3. (Discount was advertised in mailing)
- 4. (Discount was advertised on radio)
- 5. (Discount was advertised in newspaper)
- 6. (A store employee made me aware of the discounted bulbs)
- 7. (Saw a retail lighting demonstration)
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

FR1a. In the past year have you come across any pamphlets or brochures from ComEd explaining the energy saving benefits of Compact Fluorescent Light bulbs?

- 1. Yes
- 2. No
- 8. (Don't know)
- 9. (Refused)

[Ask FR1b if FR1a = 1, Else SKIP to FR2]

FR1b. Where did you first see this material? (DO NOT READ) (IF “SAW MATERIALS IN STORE”
PROBE FOR WHERE IN STORE)

1. (On shelf with bulbs)
2. (On display in aisle)
3. (APT Booth in aisle)
4. (On flyer they included in the bag with my purchase)
5. (In newspaper)
6. (A store employee made me aware of the energy savings benefits of CFLs)
7. (Bill insert)
8. (Mailing – non-specific)
9. (Brochure)
97. (Other, Specify)
98. (Don’t know)
99. (Refused)

[ASK IF DISCOUNT=1 OR FR1A=1]

FR2. At the time that you learned about the [IF FR1A = 1 READ “energy savings benefits of CFLs”,
EVERYONE ELSE READ “price discounted CFLs”] were you already planning on purchasing light
bulbs?

1. Yes
2. No
8. (Don’t know)
9. (Refused)

[ASK IF FR2=1]

FR2A. Had you already decided to purchase CFLs or were you considering purchasing a different type of
bulb?

1. Already decided to buy CFLs
2. Considering purchasing different type of bulb
3. (Other)
8. (Don’t know)
9. (Refused)

FR3. If the CFLs had been \$1.00 more per bulb would you still have purchased the CFLs or would you
have purchased incandescent light bulbs?

1. Yes – Still CFLs
2. No - Incandescents
8. (Don’t know)
9. (Refused)

[If FR3 = 1 THEN ASK FR6-FR11, ELSE SKIP TO FR12]

FR6. Would you have purchased them ...

1. At the same time,
2. Within a few months,
3. Within a year, or
4. More than a year later.

- 8. (Don't know)
- 9. (Refused)

FR9. Would you have purchased...

- 1. The same number of CFLs or
- 2. Fewer CFLs
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

[ASK FR10 IF FR9=2]

FR10. How many do you think you would have purchased?

____ [NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

FR12. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have bought the same CFLs if they were \$1 more per bulb?

- 0. -0- Not at all likely
- 1. -1-
- 2. -2-
- 3. -3-
- 4. -4-
- 5. -5-
- 6. -6-
- 7. -7-
- 8. -8-
- 9. -9-
- 10. -10- Very likely
- 98. (Don't know)
- 99. (Refused)

On a 0 to 10 scale, with 0 being strongly disagree and 10 being strongly agree, how much do you agree with the following statements?

FR14. There may have been several reasons for my purchase decision. But the price was a critical factor in my decision to purchase the compact fluorescent light bulbs.

- 0. -0- Strongly disagree
- 1. -1-
- 2. -2-
- 3. -3-
- 4. -4-
- 5. -5-
- 6. -6-
- 7. -7-
- 8. -8-
- 9. -9-
- 10. -10- Strongly agree

98. (Don't know)

99. (Refused)

[If FR1a = 1 then ASK FR15]

FR15. The pamphlets and brochures explaining the benefits of CFLs played a significant role in my decision to purchase the compact fluorescent light bulbs.

0. -0- Strongly disagree

1. -1-

2. -2-

3. -3-

4. -4-

5. -5-

6. -6-

7. -7-

8. -8-

9. -9-

10. -10- Strongly agree

98. (Don't know)

99. (Refused)

CONSISTENCY CHECK

INC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY1], but that differs from some of your other responses. Please tell me in your own words what influence, if any, the price of the bulb had on your decision to purchase the CFLs at the time you did?

00. [OPEN END]

98. (Don't know)

99. (Refused)

PARTICIPANT SPILLOVER

[IF PY2 = 1 and DISCOUNT = 1 AND STORE IS 2-11,14,20 THEN ASK PARTICIPANT SPILLOVER QUESTIONS]

SO1. In the time since you purchased the (if ComEd = 1 READ: "ComEd") discounted CFLs have you purchased and installed any efficient lighting products on your own at regular retail price, without any discounts (this includes both coupons and instant rebates)?

1. Yes

2. No

8. (Don't know)

9. (Refused)

[ASK If SO1 = 1; ELSE SKIP TO P4]

SO1a. What type of efficient lighting products have you purchased?

1 Traditional Spiral Bulbs

2 Reflector Bulbs

3 Globes

4 Flood Lights

5 A-lamps

- 6 Dimmables
- 7 3-way bulbs
- 8 Post Bulbs
- 9 CFL Fixture
- 10 Candelabra
- 11 U-Shaped
- 0 Other (Record Verbatim)
- 98. (Don't know)
- 99. (Refused)

[ASK SO2a IF SO1a=1, ELSE SO2d]

SO2a. How many Spiral CFLs did you purchase and install on your own?
[NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK SO5 IF SO1a = 1]

SO5. How much did you pay per bulb for the CFLs that you purchased at regular retail price?
[RECORD AMOUNT]

- 98. (Don't know)
- 99. (Refused)

[IF SO5 = 98, ASK SO5a]

SO5a. Would you guess you paid ...

- 1. Less than \$1 more per bulb than the discounted bulbs,
- 2. \$1 to \$2 more per bulb than with the discount bulbs, or
- 3. More than \$2 more per bulb than what you paid with the discount.
- 98. (Don't know)
- 99. (Refused)

[ASK SO2d IF SO1a in 2-8, ELSE SO2g]

SO2d. How many Specialty CFLs did you purchase and install on your own?
[NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK SO2g IF SO1a =9]

SO2g. How many CFL Fixtures did you purchase and install on your own?
[NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK SO3 and SO4 IF SO1 = 1]

On a scale from 0-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

SO3. My experience with the CFLs purchased at a discounted price influenced my decision to install more efficient lighting products on my own.

- 0. -0- Strongly disagree

1. -1-
2. -2-
3. -3-
4. -4-
5. -5-
6. -6-
7. -7-
8. -8-
9. -9-
10. -10- Strongly agree
98. (Don't know)
99. (Refused)

SO4. Why did you purchase these lighting products at regular retail price and not at the discounted price? (DO NOT READ) [ACCEPT MULTIPLE]

1. (The price discounts had ended, so I purchased the same lights at regular retail price)
2. (Although there were discounted CFLs available, the additional CFLs I purchased were not discounted)
3. (The price difference wasn't great enough)
4. (I bought the lighting at a store that did not have the price discounted bulbs)
5. (The price discounted CFLs had sold out)
6. (Needed/wanted them)
7. (Energy efficient/would save money on bill)
8. (Good value)
0. (Other, Specify)
98. (Don't know)
99. (Refused)

NONPARTICIPANT SPILLOVER

[ASK IF PY2 = 1 AND S4 = 1 AND DISCOUNT = 0; OTHERWISE SKIP TO P4]

NS1. In the time since you first heard about the "Smart Ideas" Program offered by ComEd have you purchased and installed any efficient lighting products for your home at regular retail price?

1. Yes
2. No
98. (Don't know)
99. (Refused)

[If NS1 = 1 ASK NS1a]

NS1a. What type of efficient lighting products have you purchased?

- 1 Traditional Spiral Bulbs
- 2 Reflector Bulbs
- 3 Globes
- 4 Flood Lights
- 5 A-lamps
- 6 Dimmables
- 7 3-way bulbs

- 8 Post Bulbs
- 9 CFL Fixture
- 0 Other (Record Verbatim)
- 98. (Don't know)
- 99. (Refused)

[ASK NS2a IF NS1a=1, ELSE NS2d]

NS2a. How many Spiral CFLs did you purchase?

[NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK NS5 IF NS1a = 1]

NS5. How much did you pay per bulb for the spiral CFLs that you purchased at regular retail price?

[RECORD AMOUNT]

- 98. (Don't know)
- 99. (Refused)

[IF NS5 = 98, ASK NS5a]

NS5a. Would you guess you paid ...

- 1. Less than \$1 a bulb,
- 2. \$1 to \$2 a bulb,
- 3. \$2 to \$3 a bulb,
- 4. \$3 to \$4 a bulb, or
- 5. More than \$4 more a bulb.
- 8. (Don't know)
- 9. (Refused)

[ASK NS2d IF NS1a in 2-8, ELSE NS2g]

NS2d. How many Specialty CFLs did you purchase?

00. [NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK NS2g IF NS1a =9, ELSE NS2i]

NS2g. How many CFL Fixtures did you purchase?

00. [NUMERIC OPEN END]

- 98. (Don't know)
- 99. (Refused)

[ASK NS3 and NS4 IF NS1 = 1]

On a scale from 0-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

NS3. ComEd's "Smart Ideas" Program influenced my decision to install energy efficient lighting products in my home.

- 0. -0- Strongly disagree
- 1. -1-

- 2. -2-
- 3. -3-
- 4. -4-
- 5. -5-
- 6. -6-
- 7. -7-
- 8. -8-
- 9. -9-
- 10. -10- Strongly agree
- 98. (Don't know)
- 99. (Refused)

NS4. Why did you purchase these lighting products at regular retail price and not at the discounted rate? (DO NOT READ) [ACCEPT MULTIPLE]

- 1. (The price discounts had ended, so I purchased the same lights at regular retail price)
- 2. (Although there were discounted CFLs available, the additional CFLs I purchased were not discounted)
- 3. (The price difference wasn't great enough)
- 4. (I bought the lighting at a store that did not have the price discounted bulbs)
- 5. (The price discounted CFLs had sold out)
- 6. (Needed them)
- 7. (Longevity)
- 0. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

PROCESS

[ASK IF PY2 = 1]

P4. On a scale of 0 to 10 where 0 means you were "not at all satisfied" and 10 means "very satisfied", how satisfied are you with the compact fluorescent light bulbs you bought since June 2009?

- 0. -0- Not at all satisfied
- 1. -1-
- 2. -2-
- 3. -3-
- 4. -4-
- 5. -5-
- 6. -6-
- 7. -7-
- 8. -8-
- 9. -9-
- 10. -10- Very satisfied
- 98. (Don't know)
- 99. (Refused)

[SKIP IF P4 >= 5]

P5. Why aren't you satisfied?

- 1. Delay when the lights turn on
- 2. Had to replace because it burnt out

- 3. Do not like light
- 4. Dim/not bright enough
- 5. Do not last long
- 6. Do not fit socket
- 00. (Other – specify)
- 98. (Don't know)
- 99. (Refused)

CFL User Section

[ASK USE1 if P2 not in 2-7 AND G1 not in 1,2]

USE1. Have you EVER USED a CFL, in the interior or exterior of your home?

- 1 YES
- 2 NO (SKIP TO OT1)
- 98 DON'T KNOW (SKIP TO OT1)
- 99 REFUSED (SKIP TO OT1)

Q2 (USE2) How many CFLs would you estimate are currently installed inside or outside your home?

- 0 None (SKIP TO Q3)
- __ (Enter # of CFLs)
- 998 (Don't know) (SKIP TO Q3)
- 999 (Refused) (SKIP TO Q3)

[If Q2 ne 0 and P2 = . then ASK P2_Now]

P2_Now. Approximately what percentage of the screw-in lighting sockets in your home currently contain CFLs?

- 1. None of the sockets
- 2. Less than 5% of the sockets
- 3. More than 5% but less than 25% of the sockets
- 4. More than 25% but less than 50% of the sockets
- 5. More than 50% but less than 75% of the sockets
- 6. More than 75% of the sockets, but not all of the sockets
- 7. All of the sockets
- 8. (Don't know)
- 9. (Refused)

[If USE1 = 1 OR P2 in 2-7 OR G1 in 1,2]then ASK USE3, Else SKIP to Q3]

USE3 (Q1a). Approximately how long ago did you FIRST USE a CFL in your home?
 [RECORD NUMBER OF YEARS OR MONTHS, NOT A RANGE..
 IF “DON’T KNOW,” PROBE: Is it less than or more than five years ago? WORK FROM
 THERE TO GET AN ESTIMATE.]

- 1 MONTHS _____
- 2 YEARS _____
- 98 DON’T KNOW
- 99 REFUSED

[IF G2b = . ASK Q3]

Q3 Are you currently storing any CFLs at your home? This could be in your closet, your pantry, your garage, or anywhere at your home.

- 1 Yes
- 2 No (SKIP TO SAT1)
- 8 (Don’t know) (SKIP TO SAT1)
- 9 (Refused) (SKIP TO SAT1)

[ASK IF Q3=1; ELSE SKIP TO USE5] – CURRENTLY Q3 IS BEING ASKED IF S2=1 OR G2B=0 OR MISSING OR USE1=1 OR MISSING.

Q3a In total, about how many CFLs are you storing at your home?

- _____ (Enter # of CFLs)
- 98 (Don’t know) (SKIP TO Q4)
- 99 (Refused) (SKIP TO Q4)

[IF Q3 = 1 and G2c = . then ASK Q4]

Q4 Why are you currently storing CFLs? (DO NOT READ - ACCEPT MULTIPLE)

- 1 (So that I have them on hand if a bulb burns out)
- 2 (Purchased more CFLs than I needed / in bulk / on sale)
- 3 (Bought them in bulk)
- 4 (Bought them on sale)
- 5 (Can’t use them in certain rooms)
- 6 (Can’t use them in certain applications (e.g. dimmer switch))
- 7 (Didn’t like having them installed)
- 8 (Need different wattage)
- 00 (Other (SPECIFY))
- 98 (Don’t know)
- 99 (Refused)

USE5 (SAT1). How satisfied are you with the CFLs currently in your home or, if you have no CFLs installed right now, the ones you have used in the past? Would you say....?

- 1 Very satisfied
- 2 Somewhat satisfied
- 3 Neither satisfied nor dissatisfied
- 4 Somewhat dissatisfied
- 5 Very dissatisfied
- 8 (Don’t know)
- 9 (Refused)

[IF USE5 = 4 or 5 THEN ASK USE6]

USE6. Why are you not satisfied?

- 1 Don't like the light
- 2 Dim/not bright enough
- 3 Do not last long
- 4 Delay when the light turns on
- 5 Health risks/poisonous
- 6 Don't dim properly
 - 97 Other
 - 98 (Don't know)
 - 99 (Refused)

[SKIP IF Q1<=1 OR G10=1]

CD3. Have you ever disposed of any CFLs that have broken, burned out, or are no longer useful?

- 1. Yes
- 2. No
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

[IF CD3=1 THEN ASK CD4]

CD4. How did you dispose of these CFLs? (DO NOT READ - ALLOW MULTIPLE RESPONSE)

- 1. (Threw away in trash)
- 2. (Recycled / dropped off at hazardous waste center)
- 3. (Recycled / dropped off at Retail Store (such as Home Depot or Ace Hardware))
- 4. (Have stored till we can dispose)
- 00. (Other, Specify)
- 98. (Don't know)
- 99. (Refused)

All Respondents Section

[ASK THIS SECTION OF ALL SURVEYED]

OT1. Have you purchased any incandescent light bulbs at retail stores for use in a home in the last year?

[IF NEEDED READ: An incandescent light bulb is type of bulb you most likely think about when you think of a traditional light bulb]

- 1. Yes
- 2. No

- 8. (Don't know)
- 9. (Refused)

[ASK OT2 and OT2A IF OT1 = 1 ELSE SKIP TO OT4]

OT2. How many incandescent light bulbs – in total – did you buy in the last year to use in your home? Please try to estimate the total number of individual incandescent light bulbs, as opposed to packages.

- ____ [NUMERIC OPEN END]
- 98. (Don't know)
 - 99. (Refused)

OT2a. Did you purchase the incandescent bulbs for use in a specialty fixture such as one with a dimmer or takes another special bulb, or did you purchase the bulbs for use in a regular light fixture?

- 1. Dimmer or other specialty fixture
- 2. Regular light fixture
- 3. (Both)
- 8. (Don't know)
- 9. (Refused)

OT4(Q12i). Do you currently have any incandescent light bulbs installed in your home?

- 1. Yes
- 2. No
- 98. (Don't know)
- 99. (Refused)

[ASK IF Q12i = 1 & (Q3=1 OR QG2A=1)]

Q12a. When your next incandescent light bulb burns out, what will you do,,, (READ LIST)

- 1. Replace it with another incandescent
- 2. BLANK
- 3. Replace it with a CFL
- 4. BLANK
- 5. Depends on fixture/sockets/location
- 6. Depends on price
- 00. (Other, Specify: _____)
- 98. (Don't know)
- 99. (Refused)

[ASK IF Q12i = 1 & (Q3<>1 & QG2a<>1)]

Q12b. When your next incandescent light bulb burns out, what will you do..., (READ LIST)

1. Replace it with another incandescent
2. BLANK
3. BLANK
4. Replace it with a CFL
5. Depends of fixture/sockets/location
6. Depends on price
00. (Other, Specify: _____)
98. (Don't know)
99. (Refused)

[ASK IF Q2 <> 0,998,999 & (Q3=1 or QG2a=1)]

Q13a. When your next CFL burns out, what will you do... (READ LIST)

1. Replace it with another CFL
2. BLANK
3. Replace it with an incandescent
4. BLANK
5. Depends of fixture/sockets/location
6. Depends on price
7. Replace with both CFL and incandescent
00. (Other, Specify: _____)
98. (Don't know)
99. (Refused)

[ASK IF Q2 <>0,998,999 & (Q3<>1 & QG2a<>1)]

Q13b. When your next CFL burns out, what will you do... (READ LIST)

1. Replace it with another CFL
2. BLANK
3. BLANK
4. Replace it with an incandescent
5. Depends on fixture/sockets/location
6. Depends on price
7. Replace with both CFL and incandescent
8. Replace with LED
00. (Other, Specify: _____)
98. (Don't know)
99. (Refused)

[ASK IF NCFL=1]

NP1. Why have you not purchased any CFLs or high efficiency lighting products? (DO NOT READ)

1. (Too expensive)
2. (Unsure of quality)
3. (Waiting for discount/sale/coupon)
4. (Have not seen in stores)
5. (Do not like appearance)
6. (Waiting for current bulbs to burn out)
7. (Dangerous/mercury concerns)
8. (Satisfied with light bulbs I use)
9. (Not my responsibility to buy light bulbs)
10. (Don't need them)
11. (Do not like the light)
12. (Have lights in storage)
13. (Haven't thought about it)
14. (Have some that were free/given to me)
15. (Don't fit/don't work with certain applications)
16. (Haven't had time)
17. (Don't know enough about them)
00. (Other, Specify: _____)
98. (Don't know)
99. (Refused)

GL3 (BUY1). Where are you most likely to buy incandescent light bulbs? (PROMPT IF NECESSARY, RECORD UP TO THREE)

1. (Grocery store or supermarket)
2. (Warehouse/Club store, such as Sam's Club or Costco)
3. (Home improvement store, such as Home Depot or Lowe's)
4. (Hardware store, such as TruValue, ACE Hardware, or Blain's Farm and Fleet)
5. (Mass merchandise or discount department store, such as a Wal-Mart, Kohls, K-Mart, or Target)
6. (Drugstore, such as Walgreen's or CVS)
7. (Convenience store, such as 7-Eleven)
8. (Specialty lighting or electrical store)
9. (Home furnishing store, such as a Bed, Bath, and Beyond, Linens and Things, or Pottery Barn)
10. (Mail order catalogs)
11. (Through the Internet)
12. (Bargain store, such as the Dollar Store or Family Dollar)
13. (Office supply store, such as Office Depot or Staples)
14. (Electronics store such as Best Buy)
15. (Directly from distributor or contractor)
16. (Wherever they are on sale)
17. (Don't buy them)
00. (Other, Specify)
98. (Don't know)
99. (Refused)

[IF Q1 = 2, 8, 9 SKIP TO GW1]

GL4 (BUY2). Where are you most likely to buy CFLs? (PROMPT IF NECESSARY, RECORD UP TO 3)

1. (Grocery store or supermarket)
2. (Warehouse/Club store, such as Sam's Club or Costco)
3. (Home improvement store, such as Home Depot or Lowe's)
4. (Hardware store, such as TruValue, ACE Hardware, or Blain's Farm and Fleet)
5. (Mass merchandise or discount department store, such as a Wal-Mart, Kohls, K-Mart, or Target)
6. (Drugstore, such as Walgreen's or CVS)
7. (Convenience store, such as 7-Eleven)
8. (Specialty lighting or electrical store)
9. (Home furnishing store, such as a Bed, Bath, and Beyond, Linens and Things, or Pottery Barn)
10. (Mail order catalogs)
11. (Through the Internet)
12. (Bargain store, such as the Dollar Store or Family Dollar)
13. (Office supply store, such as Office Depot or Staples)
14. (Electronics store such as Best Buy)
15. (Directly from distributor or contractor)
16. (Wherever they are on sale)
17. (Don't buy them)
00. (Other, Specify)

98. (Don't know)
99. (Refused)

Time. Approximately how many minutes, on average, does it take you get to the nearest large discount store or home improvement store such as WalMart, Target, Home Depot, or Lowes? Is it....

[IF RESPONDENT SAYS THEY DO NOT SHOP AT THAT THOSE STORES, SAY, "That's okay. But if you did, about how long would it take you to get there?"]

1. 0-15 minutes
2. 15-30 minutes
3. 30-60 minutes
4. 60-90 minutes, or
5. More than 90 minutes.
0. (Other, Specify)
98. (Don't know)
99. (Refused)

[ASK IF Q2 < 0, 998 999]

USE4. Please tell me which of the following statements most accurately describes why you currently use CFLs at your home. [RANDOMIZE AND READ]

- 1 I do not currently use CFLs at my home.
- 2 I want to save energy.
- 3 I want to save money.
- 4 I want to help the environment.
- 5 I want to reduce dependence on foreign oil, coal, or gas.
- 8 (Don't know)
- 9 (Refused)

Climate Change Attitudes

[ASK THIS SECTION OF ALL SURVEYED]

READ: I am going to ask you some questions about global warming, climate change and the environment.

GW1. Based on your understanding of the facts, is the earth's average temperature currently rising as a result of human activity?

- 1 Definitely yes
- 2 Probably yes
- 3 Probably no
- 4 Definitely no
- 8 (Don't know)
- 9 (Refused)

GW2. With which one of these statements about the environment and the economy do you most agree—

[RANDOMIZE AND READ]

1. Protection of the environment should be given priority, even at the risk of curbing economic growth OR
2. Economic growth should be given priority, even if the environment suffers to some extent?
8. (Don't know)
9. (Refused)

GW3. I'm going to read you a list of energy-related concerns. As I read each one, please tell me if you personally worry about this problem a great deal, a fair amount, only a little, or not at all. First, how much do you personally worry about – [READ AND RANDOMIZE]

- a. Global warming
 - b. Running out of fossil fuels such as coal, oil, and natural gas
 - c. Dependence on other countries for oil
4. A great deal
 3. A fair amount
 2. Only a little
 1. Not at all
 8. (Don't know)
 9. (Refused)

GW4. Please tell me if you strongly agree, agree, disagree, or strongly disagree with each of the following statements? [RANDOMIZE AND READ]

- 4 Strongly agree
- 3 Agree
- 2 Disagree
- 1 Strongly Disagree
8. (Don't know)
9. (Refused)

- a. Over the next few months I expect to take measures to reduce how much energy my household uses.
- b. I can't do much more than I'm already doing to reduce the amount of energy my household uses.
- c. It is too expensive for me to reduce my household energy use.
- d. I believe my actions have an influence on global warming and climate change.

EA1. Please tell me if you strongly agree, agree, disagree, or strongly disagree with each of the following statements? [RANDOMIZE AND READ]

- 4 Strongly agree
- 3 Agree
- 2 Disagree
- 1 Strongly Disagree
8. (Don't know)
9. (Refused)

- a. I am skeptical of new technology. I like to wait until a new technology is proven before I buy it.
- b. I always like to have the latest gadget.
- c. I am comfortable learning about how new technologies work.

Appliance Recycling Questions

AR1. Has your household purchased a refrigerator or stand-alone freezer since March 1st, 2006? This does not include rented or borrowed appliances.

1. Yes
2. No
8. (Don't know)
9. (Refused)

AR2. Since March 1, 2006, has your household discarded a refrigerator or stand-alone freezer that you owned? By discard, I mean selling it, giving it away, or having it hauled away.

1. Yes
2. No
8. (Don't know)
9. (Refused)

READ "I have just a few questions left for statistical purposes only"

AmD1(DEM1). What type of home do you live in? Is it a ...?

1. Single family detached (no common walls)
2. Single family attached, townhouse, or duplex
3. Apartment building with 2-4 units
4. Apartment building with 5 or more units
5. A mobile home or trailer
6. Condominium
00. (Other, Specify)
98. (Don't know)
99. (Refused)

AmD2 (DEM2). When was your home built? Please stop me when I get to the appropriate category

1. 1930's or earlier
2. 1940's
3. 1950's
4. 1960's
5. 1970's
6. 1980's
7. 1990's
8. 2000 or later
98. (Don't know)
99. (Refused)

D1(DEM3). Do you or members of your household own this home or do you rent?

1. Own
2. Rent
3. Occupied without payment of rent
4. Other
8. (Don't know)
9. (Refused)

[SKIP D2 IF D1=1 AND AmD1=1]

D2 (DEM9). Do you pay your electric bill directly, or is your electricity included in your rent or condo fee?

1. Pay directly to electric company
2. Electricity Included in Rent or Condo Fee
3. Paid for in some other way
8. (Don't know)
9. (Refused)

DEM7. Counting yourself, how many people live in your household year round?

[RECORD NUMBER PEOPLE]

- 98 (Don't know)
- 99 (Refused)

DEM7b. Are any of these individuals less than 18 years of age?

- 1 Yes
- 2 No
- 8 (Don't know)
- 9 (Refused)

DEM8. Are you satisfied or dissatisfied with your standard of living, that is, all the things you can buy or do? Would you say that you are...?

- 1 Very satisfied
- 2 Somewhat satisfied
- 3 Neither satisfied nor dissatisfied
- 4 Somewhat dissatisfied
- 5 Very dissatisfied
- 8 (Don't know)
- 9 (Refused)

D5 (DEM4). Approximately how many square feet is your home?

- 1 Less than 1,400
- 2 1,400 – 1,999
- 3 2,000 – 2,499
- 4 2,500 – 3,499
- 5 3,500 – 3,999
- 6 4,000 – 4,999
- 7 5,000 or more
- 8 (Don't know)
- 9 (Refused)

DEM5. How many rooms are in your home, not counting bathrooms?

- 1 1
- 2 2
- 3 3
- 4 4
- 5 5
- 6 6
- 7 7
- 8 8
- 9 9
- 10 10 or more
- 98 DON'T KNOW
- 99 REFUSED

D6. How long have you lived at your current residence?

- [ENTER YEARS]
- 0. Less than a year.
- 98. (Don't know)
- 99. (Refused)

D7b. What is the highest level of education that the head of household has completed so far?

- 1. Less than 9th grade
- 2. 9th to 12th grade; Non-high school graduate
- 3. High school graduate or equivalent (e.g., GED)
- 4. Attended some college, no degree (includes junior/community college)
- 5. Associates degree.
- 6. Bachelors degree

5. Graduate or Professional degree

97. (Other, Specify)

98. (Don't know)

99. (Refused)

DEM10. Is your home...

1 All electric

2 Gas and electric

3 Some other combination of energy sources

8 Don't know

9 Refused

DEM11. Please tell me the primary language spoken in your home.

1 ENGLISH

2 SPANISH

3 MANDARIN

4 CANTONESE

5 TAGALOG

6 KOREAN

7 VIETNAMESE

8 RUSSIAN

9 JAPANESE

97 OTHER (SPECIFY): _____

98 DON'T KNOW

99 REFUSED

DEM12. Do you consider yourself to be Spanish, Hispanic, or Latino?

1 YES

2 NO

8 (Don't know)

9 (Refused)

D12A. Do you consider yourself to be . . . ?

[SELECT ONE RESPONSE ONLY. IF MIXED RACE OR MULTIPLE RACES, RECORD IN 'OTHER']

- 1 White
- 2 Black or African-American
- 3 American Indian, Native Hawaiian, Pacific Islander, or Alaska Native
- 4 Chinese
- 5 Japanese
- 6 Korean
- 7 Vietnamese
- 8 Filipino
- 9 Hispanic/Latino
- 10 Mixed race
- 97 Other (Specify): _____
- 98 (Don't know)
- 99 (Refused)

D6A(DEM13). Which category best describes your total household income in 2009 before taxes? Please stop me when I get to the appropriate category.

- 1 \$14,999 or less
- 2 \$15,000 to \$19,999
- 3 \$20,000 to \$29,999
- 4 \$30,000 to \$39,999
- 5 \$40,000 to \$49,999
- 6 \$50,000 to \$74,999
- 7 \$75,000 to \$99,999
- 8 \$100,000 to \$149,999
- 9 \$150,000 or more
- 98 (Don't know)
- 99 (Refused)

RECRUIT FOR ON-SITE SURVEY AND LOGGING STUDY

[IF DISCOUNT = 1 ASK LOG1, ELSE ASK ONS1]

LOG1. Within a few weeks we will be offering people \$100 to allow a trained technician to visit their home. The visit should take about an hour, during which time a technician will gather information on the lighting products used in your home and install metering equipment on a few of the CFLs you have recently purchased. These metering devices record the number of hours each CFL is in use each day. The meters will be installed for approximately 6 months at which time the technician will return to collect them. BY SAYING YES, YOU ARE SIMPLY AGREEING TO BE RE-CONTACTED TO SET UP AN APPOINTMENT. DURING THE VISIT, THERE WILL BE NO ATTEMPT TO SELL YOU ANYTHING. Would you be interested in being a part of this type of visit?

- 1. Yes [Continue on to R3]
- 2. No [Continue on to END1]

- 8. (Don't know) [Continue on to R2]
- 9. (Refused) [Continue on to END1]

ONS1. Within a few weeks we will be offering people \$50 to allow a trained technician to visit their home. The visit should take about an hour, during which time a technician will gather information on the lighting products used in your home. BY SAYING YES, YOU ARE SIMPLY AGREEING TO BE RE-CONTACTED TO SET UP AN APPOINTMENT. DURING THE VISIT, THERE WILL BE NO ATTEMPT TO SELL YOU ANYTHING. Would you be interested in being a part of this type of visit?

- 1. Yes [Continue on to R3]
- 2. No [Continue on to END1]
- 8. (Don't know) [Continue on to R2]
- 9. (Refused) [Continue on to END1]

[IF LOG1 = 3 or ONS1=3 ASK R2]

R2. That is okay, you do not have to decide now. Would it be OK if I take your name and have someone call you when we are scheduling these visits?

- 1. Yes
- 2. No [END1]
- 8. (Don't know) [END1]
- 9. (Refused) [END1]

[IF LOG1 =1 or ONS1 = 1 THEN ASK R3]

R3. Is [ADDRESS] in [CITY] still your correct address?

- 1. Yes
- 2. No
- 9. (Refused)

[IF R3=2 ASK R4]

R4. Can you please give me your correct address and city?

- 1. [ENTER ADDRESS AND CITY]
- 2. (Refused)

R5. And what is your name?

- 1. [ENTER NAME]
- 2. (Refused)

R6. Is this the best number to reach you at?

- 1. Yes
- 2. No
- 3. (Refused)



[IF R6=2 ASK R7]

R7. What would be a better number?

[ENTER BEST NUMBER TO REACH PERSON AT]

1. (Refused)

END1. That is all of the questions I have for you today. Thank you very much for your time.

END2. That is all of the questions I have for you today. As I said, we will be scheduling these visits in the next few weeks and will call you then. Thank you very much for your time.