

Residential ENERGY STAR® Lighting PY5 Evaluation Report

Final

Energy Efficiency / Demand Response Plan:
Plan Year 5
(6/1/2012-5/31/2013)

Presented to
Commonwealth Edison Company

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E. Executive Summary

This report presents a summary of the findings and results from the Impact and Process Evaluation of ComEd’s EPY5¹ Residential ENERGY STAR® (ES) Lighting Program. 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. Program Savings

Table E-1 summarizes the electricity savings from the ComEd EPY5 Residential ES Lighting Program.

Table E-1. EPY5 Total Program Electric Savings

Savings Category †	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex Ante Gross Savings	418,865	-	-
Verified Gross Savings	394,595	345.2	41.8
Verified Net Savings	287,135	251.1	30.4

Source: ComEd tracking data and Navigant team analysis.

† See the Glossary in the Appendix for definitions.

In addition to the savings resulting from bulbs purchased during EPY5, savings from bulbs purchased during EPY3 and EPY4, but not installed until EPY5 (e.g., carryover savings), can be attributed to the EPY5 program. Table E-2 below provides an estimate of EPY5 Carryover bulb savings.

Table E-2. EPY5 Total Program Electric Savings from Carryover

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex Ante Gross Savings	178,757	-	-
Verified Gross Savings	187,018	152.1	20.6
Verified Net Savings	116,371	95.0	12.8

Source: ComEd tracking data and Navigant team analysis.

¹ The EPY5 program year is the period June 1, 2012 through May 31, 2013.

E.2. Program Savings by Bulb Type

Table E-3 summarizes the electricity savings from the EPY5 Residential ES Lighting Program by bulb type.

Table E-3. EPY5 Program Results by Bulb Type²

Savings Category	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
Ex Ante Gross Savings ³ (MWh)	n/a ⁴	n/a	n/a	n/a	n/a	n/a	418,865
Verified Gross Realization Rate†	n/a	n/a	n/a	n/a	n/a	n/a	0.94
Verified Gross Savings (MWh)	356,359	34,782	481	1,571	1,204	198	394,595
Net-to-gross ratio (NTG)†	0.72	0.80	0.79	0.80	0.79	0.72	0.73
Verified Net Savings (MWh)	256,579	27,826	380	1,257	951	142	287,135

Source: ComEd tracking data and Navigant analysis.

† A deemed value.

E.3. Impact Estimate Parameters

In the course of estimating verified gross savings, the evaluation team used a variety of impact parameters in its calculations. The majority of these parameters (delta watts, hours-of-use, peak coincidence factors, energy and demand interactive effects, and realization rates) were deemed for EPY5 based on the Illinois Technical Reference Manual v1.0⁵ (IL TRM) that went into effect at the beginning of the program year. The quantity of program bulbs sold and the split of bulbs that were installed in residential versus nonresidential locations was determined based upon evaluation research. Net savings were estimated based on the application of a NTGR that was determined based upon a Statewide Advisory Group process⁶. Complete details on the parameters used to estimate gross and net savings are included in Section 2.1.

E.4. Impact Estimate Parameters for Future Use

In the course of our EPY5 research, the evaluation did research on parameters used in impact calculations including those in the Illinois TRM (TRM v1.0). Some of those parameters are eligible for deeming for future program years or for inclusion in future versions of the TRM. The evaluation team's parameters recommended for future use are shown in Table E-4.

² Excludes carryover savings.

³ Ex Ante Gross Savings were not included in the tracking data. Ex Ante Gross Savings were based on estimates provided via email from Dave Nichols of ComEd on 8/30/2013.

⁴ Ex Ante Gross Savings were not available by Bulb Type from the program data. The evaluation calculated Ex Ante Gross Savings by dividing the Ex Ante Net Savings provided by ComEd by the NTG ratios.

⁵ State of Illinois Energy Efficiency Technical Reference Manual. Final, As of September 14th, 2012. Effective: June 1st, 2012.

⁶ http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August-5-6,2013-Meeting/ComEd-EPY5-EPY6-Proposal-Comparisons-with-SAG.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework-1.html>

Table E-4. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Res/NonRes Split ⁷	97% / 3%	3-year rolling average of Evaluation Research Findings
Standard and Specialty CFL Installation Rates	ComEd: 71.9% Standard CFL 81.7% Specialty CFL	3-year rolling average of Evaluation Research Findings
NTGR	60% Standard CFL 55% Specialty CFL	3-year rolling average of Evaluation Research Findings

Source: Navigant team analysis.

The Res/NonRes split is included in the second update to the IL TRM beginning in Version 2.0 (Effective June 1, 2013). Including this parameter as a deemed value in the TRM helps improve the verified savings realization rate by removing the uncertainty that surrounds this estimate within the calculation of verified savings. In Version 2.0 of the IL TRM, the Res/NonRes split is deemed at 96%/4% “based on a weighted (by sales volume) average of ComEd PY3 and PY4 and Ameren PY5 in-store intercept survey results.”⁸ The evaluation team recommends updating the deemed Res/NonRes split annually based on a rolling 3-year average from the most recent evaluation research findings from ComEd and Ameren.

At this time it is not possible to estimate what the statewide deemed Res/NonRes split would be for Ver. 3.0 due to the lack of Ameren IL data; however the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table E-5 below.

Table E-5. 3-Year Average Res/NonRes Split for ComEd

Program Year	Bulbs	Res/NonRes
EPY3	11,197,862	97% / 3%
EPY4	12,649,030	95% / 5%
EPY5	10,897,894	98% / 2%
3-year Weighted Average for EPY7	-	97% / 3%

Source: Navigant team analysis.

Version 1.0 and 2.0 of the IL TRM cite the source of first-year Installation Rate of standard and specialty CFLs as a “review of EPY1-EPY3 evaluations from ComEd and Ameren (see ‘IL RES Lighting ISR.xls’ for more information. The average first year ISR for each utility was calculated weighted by the number of bulbs in the each year’s survey. This was then weighted by annual sales to give a statewide assumption”. The evaluation team recommends updating the deemed installation rates for CFLs annually based on a rolling 3-year average from the most recent evaluation research

⁷ Residential/Nonresidential (Res/NonRes)

⁸ IL TRM Ver. 2.0 at p. 500.

findings (from both ComEd and Ameren IL when available). This would insure the deemed installation rates are reflective of the most recent data available. It is not possible at this time to estimate what the statewide deemed installation rate would be for Ver. 3.0 due to the lack of Ameren IL data, however the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table E-6 below.

Table E-6. 3-Year Average Standard and Specialty Installation Rates for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	ISR	Bulbs	ISR
EPY3	9,886,359	70.4%	1,218,595	77.7%
EPY4	11,419,752	69.7%	1,097,670	75.5%
EPY5	9,633,227	76.0%	1,197,896	91.6%
3-year Weighted Average for EPY7	-	71.9%	-	81.7%

Source: Navigant team analysis.

The NTGR for EPY5 was deemed based on a Statewide Advisory Group process. This process historically has been referencing the most recently available evaluation-based NTGR estimate (which is typically from the evaluation two years prior, which was EPY3 for the deemed EPY5 estimate) as one of the primary inputs for the deemed NTGR estimate. The evaluation team recommends utilizing a weighted rolling 3-year average of the standard and specialty CFL evaluation based NTGR estimate going forward in this process. This rolling average would provide some consistency from year to year and would ensure that the NTGR results from any one single year do not drastically alter the resulting net savings. Table E-7 below provides three years of evaluation research NTGR estimates for Standard and Specialty CFLs, as well as the 3-year weighted average which is the recommended EPY7 NTGR parameter estimate.

Table E-7. 3-Year Average Standard and Specialty NTGR for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	NTGR	Bulbs	NTGR
EPY3	9,893,196	71%	1,217,723	60 ⁹ %
EPY4	11,419,752	55%	1,097,670	44%
EPY5	9,633,227	55%	1,197,896	48%
3-year Weighted Average for EPY7	-	60%	-	51%

Source: Navigant team analysis.

⁹ In PY3, NTGR was not estimated separately for Standard and Specialty CFLs. In order to estimate a 3-year rolling average NTGR estimate for Specialty CFLs, the PY3 NTGR estimate was multiplied by the ratio of the average PY4 and PY5 Specialty CFL NTGR estimates over the average PY4 and PY5 Standard CFL NTGR estimates. The resulting ratio was 85%. Applying this ratio to the PY3 NTGR estimate (71%) results in a PY3 NTGR estimate (85%*71% = 60%) which the evaluation team believes more accurately reflects the NTGR estimate for Specialty CFLs.

E.5. Participant Information

Table E-8 below shows that a total of 10,897,894 bulbs were sold through program retailers across all bulb types in EPY5. Applying the deemed installation rates to these bulb sales results in a total of 7,706,971 EPY5 bulbs installed during the program year. An estimated 3,331,459 additional bulb installations stemming from prior program year bulb sales (EPY3 and EPY4) leads to a total of 11,038,430 high efficiency bulbs sold through the Residential ES Lighting program being installed within ComEd service territory in EPY5.

Table E-8. EPY5 Primary Participation Detail

	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
EPY5 Program Sales	9,633,227	1,197,896	8,767	28,230	24,268	5,506	10,897,894
EPY5 1 st Year Installs	6,695,093	952,327	7,671	26,819	21,235	3,827	7,706,971
EPY3 Carryover Bulbs	1,521,277	143,189	6,753				1,671,218
EPY4 Carryover Bulbs	1,541,667	109,767	4,650	2,492	910	756	1,660,241
Total Installed in EPY5	9,758,036	1,205,283	19,074	29,310	22,145	4,583	11,038,430

Source: ComEd tracking data and Navigant team analysis.

E.6. Conclusions and Recommendations

The goal of the Residential ES Lighting program for EPY5 was to sell 10,100,000 discounted CFL and LED bulbs and fixtures to residential customers within ComEd’s service territory. The program exceeded this goal by selling a total of 10,897,894 bulbs and fixtures. These bulbs and fixtures sales led to the program achieving 130% of their targeted Net energy savings. As in EPY4, Big Box, DIY, and Warehouse stores remained the dominant retail categories (responsible for selling over 91% of EPY5 program bulbs).

The EPY5 Residential ES Lighting program was successful in accomplishing its goals and objectives. The program significantly exceeded both its planning targets, by selling nearly 800,000 bulbs more than they projected, and their targeted Net energy savings (it achieved 30% more than their target, 220,000 MWh target vs. 287,135 MWh Verified). Despite these achievements, the Verified Savings realization rate (the percent of the Ex Ante savings estimate achieved) was slightly less than 100%, at 94%. The primary driver for this 6% gap in achieved savings was the Res/NonRes split, which is a big driver for the overall HOU and Peak CF estimates since the magnitude of the nonresidential HOU and Peak CF estimates are between 5 and 7 times larger than the residential estimates. It is for this reason that the evaluation team supports the inclusion of the Res/NonRes split in the TRM as a deemed parameter (effective v2.0), and recommends using a 3-year rolling average of Evaluation Research estimates to update this parameter annually.

Data gathered during the in-store intercept and shelf surveys indicates that awareness of the Residential ES Lighting Program seems to be increasing which is likely due to the new in-store marketing materials being prominently displayed at program retailers and catching customer’s

attention and alerting them of the program. Additionally, ComEd customer’s awareness of EISA continues to rise, but with only the 100-watt EISA standard in place throughout the entire program year and the continued availability of non-EISA compliant incandescent bulbs on store shelves.¹⁰ EISA still does not appear to be having a significant impact on customers lighting purchase decisions. The shelf surveys conducted in EPY5 indicated the availability of bulbs on store shelves continues to change from year to year with Halogen and LED products becoming more widely available, and incandescents becoming less available.¹¹ Analysis performed on shelf survey data collected during EPY3, EPY4 and EPY5 found the volume of 100-watt incandescent bulbs available on program retailers’ shelves fell by 36% between EPY3 and EPY5 and during that same time, 100-watt replacement halogen bulbs increased in volume by 22% and CFLs increased by 14%. So while 100-watt replacement CFLs have increased in shelf space, halogen bulbs have increased at a faster rate to fill approximately 2/3rds of the void left by the incandescent bulbs. The EISA standard changes continue to present an important opportunity of forced customer change that should not be missed. Focusing on in-store and out-of-store educational information on the benefits of high efficiency CFL and LED products over the new EISA compliant bulbs, as well continuing to provide incentives to entice CFL and LED purchases, is important to maximize the percentage of customers who switch to the highest efficiency choices. The opportunity will be at its peak over the next two years as the EISA standard changes impact 40 and 60-watt replacement bulbs, the largest segment of the medium-screw based (MSB) market.

Continued improvements to tracking data, such as including measure level ex ante savings estimates, specialty and reflector bulb type, and flags indicating bulb dimmability, will improve the accuracy of reported results and allow for realization rates to be estimated by bulb type.

Complete findings and recommendations are included in Section 6.

¹⁰ 18-months after the 100-watt EISA standards change, 100-watt incandescent bulbs were still found to be on the shelves at 50% of program retailers¹⁰ and six-months after the 75-watt EISA standards change, 75-watt incandescent bulbs were still found to be on shelves at 100% of program retailers.

¹¹ Appendix 7.7.4 contains a memo written by the evaluation team that contains additional details on the impacts the new EISA standards had on the marketplace during EPY5.

1. Introduction

1.1 Program Description

The Residential ES Lighting Program provides incentives to increase the market share of ES qualified compact fluorescent lamp (CFL) bulbs, light emitting diodes (LEDs) bulbs and both CFL and LED fixtures sold through retail sales channels. The program distributes educational materials designed to increase customer awareness and acceptance of energy-efficient lighting technology, as well as promote proper bulb disposal. The EPY5 Residential ES Lighting Program accounted for a substantial portion of ComEd’s residential energy efficiency portfolio, making an important contribution to meeting ComEd’s energy efficiency goals.

The majority of the Residential ES Lighting Program is delivered midstream¹² (at the retailer level), which minimizes the burden on consumers and lowers barriers to participation, but makes program participant identification (and thus evaluation) more difficult. As a result, it is not possible to match specific purchases in the program tracking data to other characteristics of those bulb purchasers or to specific details on how the bulbs will be used.

During EPY5, 18 retailers participated in the Residential Lighting Program which resulted in 1,021 retail outlets selling program bulbs within ComEd service territory. Across the 18 retailers, nearly 500 unique lighting measures were available to ComEd customers.

1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for EPY5:

1.2.1 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?
3. Did the program meet its energy and demand goals? If not, why not?

1.2.2 Process Questions

1. How aware are customers of the ComEd-sourced CFL bulb discounts? How effective are the in-store displays and marketing materials?
2. How aware are customers of the ComEd-sourced LED discounts? How effective are the in-store displays and marketing materials?

¹² A small percentage (less than 0.05%) of the CFL rebates was delivered via in-store coupons.

3. How aware are customers of changes in available lighting products as a result of EISA 2007 implementation? How do customers expect their own lighting purchasing decisions will be affected by the changes in the options available for purchase?
4. What does the marketplace currently look like within ComEd service territory for medium screw-based bulbs (including CFL, halogen, incandescent and LED technologies)?

2. Evaluation Approach

This evaluation of the ComEd EPY5 Residential ES Lighting Program reflects the fifth full-scale year of program operation. 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 that are delivered upstream at the retailer level such as this one. 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.

2.1 Primary Data Collection

2.1.1 Overview of Data Collection Activities

The core data collection activities for the evaluation of the EPY5 Residential ES Lighting Program included in-store intercept surveys and shelf surveys. The full set of data collection activities is shown in Table 2-1, below. Other primary data sources used to complete the evaluation included analysis of the program tracking database, the goals tracker spreadsheet, and the Illinois Technical Reference Manual.¹³

Table 2-1. Core Data Collection Activities

N	What	Who	Target Completes	Completes Achieved	When	Comments
<i>Impact and Process Assessment</i>						
1	In-store Intercept Survey	Program Participants	360	322	April - May 2013	Data collection supporting Gross and Net impact assessment and process analysis in the same instrument.
		Lighting Purchasers	800	792		
2	Shelf Surveys	All medium-screw based (MSB) Lamps	10	28	April - May 2013	Data collection supporting impact and process analysis in the same instrument.

2.1.2 Verified Savings Parameters

Verified Gross and Net Savings (energy, demand and coincident peak demand) resulting from the EPY5 Residential ES Lighting Program were calculated using the following algorithms as defined by the Illinois TRM version 1.0:

Verified Gross Annual kWh Savings = Program bulbs * Delta Watts/1000 * HOU * Energy IE*
Realization Rate

¹³ State of Illinois Energy Efficiency Technical Reference Manual v1.0. Final, As of September 14th, 2012. Effective: June 1st, 2012.

Where:

- Delta Watts = Difference between Baseline Wattage (incandescent wattage) and CFL Wattage
- HOU = Annual Hours of Use
- Energy IE = Energy Interactive Effects
- Realization Rate = Installation Rate

Verified Gross Annual kW Savings = Program bulbs * Delta Watts/1000 * Realization Rate

Verified Gross Annual Peak kW Savings = Gross Annual kW Savings * Peak Load Coincidence Factor * Demand IE

Where:

- Peak Load Coincidence Factor is calculated as the percentage of program bulbs turned on during peak hours (weekdays from 1 to 5 p.m.) throughout the summer.
- Demand IE = Demand Interactive Effects

Table 2-2 presents the parameters that were used in the verified gross and net savings calculations and indicates which were examined through EPY5 evaluation activities and which were deemed.

Table 2-2. Verified Gross and Net Savings Parameter Data Sources

Input Parameters	Data Source	Deemed or Evaluated?
Program Bulbs	PY5 Program Tracking Data	Evaluated
Delta Watts	TRM v1.0	Deemed
Res / NonRes Split	PY5 Intercept Survey	Evaluated
Hours of Use (HOU)	TRM v1.0 and EPY5 Intercept Survey	Deemed / Evaluated
Peak Coincidence Factor (CF)	TRM v1.0 and EPY5 Intercept Survey	Deemed / Evaluated
Energy Interactive Effects	TRM v1.0	Deemed
Demand Interactive Effects	TRM v1.0	Deemed
Realization Rate	TRM v1.0	Deemed
NTG Ratio	Statewide Advisory Group process †	Deemed

† ComEd EPY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

2.1.3 Verified Gross Program Savings Analysis Approach

Where data allowed, the evaluation team calculated verified savings by measure. For EPY5, the evaluation team calculated verified savings for standard CFLs, specialty CFLs and CFL fixtures, as well as LED bulbs and fixtures. This is the first year that deemed values from the TRM for LED bulbs and fixtures were in effect.

The data used to estimate the Verified Gross Program savings came from the EPY5 program tracking data, TRM v1.0, and EPY5 in-store intercept surveys. Data from the in-store intercept survey was used to weight¹⁴ the deemed parameters found in the TRM.

2.1.4 Verified Net Program Savings Analysis Approach

The evaluation team calculated verified net energy and demand (coincident peak and overall) savings by multiplying the Verified Gross Savings estimates by a net-to-gross ratio (NTGR). In EPY5, the NTGR estimates used to calculate the Net Verified Savings for the Residential Lighting Program were based on past evaluation research and defined through a negotiation process through SAG as documented in a spreadsheet.¹⁵ The NTGR estimates applied to calculate net savings were 0.72 for standard CFLs, 0.80 for specialty CFLs, and 0.79 for fixtures. LEDs were considered specialty bulbs from a NTGR perspective and thus the 0.80 NTGR was applied to EPY5 LED bulb sales to estimate net savings.

2.1.5 Process Evaluation

The process evaluation of the EPY5 Residential ES Lighting Evaluation assessed the impact of program processes (e.g., the mechanics of how the program was implemented) on consumers who participated in the program. For these consumers, we examined the reach of program marketing, prior usage of program bulbs, key considerations when making lighting purchasing decisions, awareness of bulb types, federal regulatory changes, and program discounts, and barriers to purchasing CFLs. The primary data sources for the process evaluation were the in-store intercept surveys (n=792) and the in-store shelf surveys (n=28).

¹⁴ Overall HOU, Peak CF and IE verified savings estimates were calculated by weighting the distinct Residential and Nonresidential estimates for these parameters found within TRM v1.0 by the EPY5 in-store intercept survey based Residential versus Nonresidential split.

¹⁵ The spreadsheet is found at: http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting and document titled ComEd EPY5-PY6 Proposal Comparisons with SAG.xls.

3. Gross Impact Evaluation

This section presents the results of the Verified Gross Impact findings. The resulting Verified Gross savings estimate was 378,902 MWh.

3.1 Tracking System Review

The tracking data delivered for this evaluation consisted of three databases. These databases consisted of the following:

- Residential Lighting Project Information Database* - This database was the primary upstream lighting database and contained a record for all retail program bulb sales invoices (by model number and store) that were sold during EPY1 through EPY5. The key variables in this database included the retailer store name and address, the bulb description and model number, the number of program bulbs sold, and the rebates paid for these program bulbs. The Residential Lighting Project Information Database included all upstream program CFL sales since the program inception. A number of data cleaning steps were taken to make sure EPY5 bulb sales were complementary and non-overlapping with bulb sales attributed to EPY1 through EPY4. A small number of bulbs sold in EPY4 were counted as EPY5 sales due to a delay in the receipt of the retailer invoices for these sales and, thus, exclusion from the bulbs counted as EPY4 sales.¹⁶ In addition, bulbs sold and included in EPY4 or EPY5 sales estimates that were later returned (as indicated by negative quantities in the program tracking data) were subtracted from the EPY5 sales. The EPY5 analysis dataset was finalized based on the most recent program tracking database received from ComEd (dated August 8, 2013). This dataset contained 270,709 records, representing 10,892,388 program bulbs and fixtures sold in EPY4 (late invoices) and EPY5. Additionally, the EPY5 coupon dataset contained 2,563 records and 5,506 bulbs.
- Residential Lighting Measure Lookup Database* – In EPY1-PY3, 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 for all program CFLs the wattage of the CFL, an estimate of the wattage of its incandescent equivalent, the bulb’s rated life, the number of bulbs included in the package, the bulb manufacturer, the program year, and for a portion of model numbers it included the lumen output. This table was not updated for EPY4 or EPY5 and was thus missing information for the majority of program bulbs. Because this data source was inadequate for such a large fraction of program bulbs, this database was not used to establish bulb information in EPY5.
- Residential Lighting Coupon Database* – This database contained a record for all bulbs purchased using a ComEd coupon. This database contained key information including the name, address and phone number of the coupon participant, the model and manufacturer of the program bulbs purchased,¹⁷ the store where the program bulbs were purchased, the date

¹⁶ The invoice dates in the program tracking database corresponding to EPY5 sales are 6/27/12 through 6/21/13. These dates do not align with actual program year dates (6/1/12 through 5/31/13) due to a delay in data submittal from program partners.

¹⁷ The model numbers were missing for approximately 3% of coupon sales records.

of the program purchase and the number of bulbs in the program package. However, this database did not include key bulb information such as manufacturer base wattage or lumen output. Additionally, the bulb model numbers were not readily matched to bulb information in the EPY5 Goals Tracker which made including coupon bulbs in the full evaluation analysis problematic.¹⁸

As in prior years, in EPY5 the evaluation team was also provided a spreadsheet created by APT for ComEd which is entitled the 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(s) requested from sponsor per package. Records also included manufacturer, product description, bulb type, actual bulb wattage, base wattage (per manufacturer), rated life, and the number of bulbs per package. Again in EPY5, the Goals Tracker was relied upon for all bulb information because the Residential Lighting Measure Lookup database does not contain complete records of the data required by the evaluation team.

Ex Ante Gross measure level savings were not available in EPY5. The tracking database lookup table which typically contains these savings estimates was not updated with EPY5 program bulbs and, thus, the evaluation team was unable to match it to EPY5 sales. The overall Ex Ante Gross savings reported here (418,865 MWh) were calculated by dividing the overall Ex Ante Net Savings estimate provided by ComEd by the program bulb overall weighted NTGR.

Finding. While we were able to extract most of the necessary information from the Residential Lighting Project Information database and the EPY5 Goals Tracker, these two data sources did not align perfectly. Matching across these two databases by manufacturer and model number initially matched 84% of unique model numbers. There were, however, 79 unique retailer and model number combinations in the tracking data that did not have a direct match in Goals Tracker.¹⁹ Manual matching on model number to goals tracker resulted in 78 more matches. Bulb information (excluding price) for the remaining model number was obtained through internet research. While the large majority of necessary bulb information was ultimately matched using the data provided, matching and partial matching across multiple incomplete databases and filling in the blanks with manual internet research was a time consuming process. After all matching was complete, nine model numbers had missing or incomplete bulb information (lumens, wattage, etc.), which were ultimately obtained through internet research. As in previous years, there were no fields for specialty bulb type, dimmable/non-dimmable, or reflector bulb type. These variables were extracted from the “Description” field for the purposes of this evaluation, but this is an imperfect process as the bulb description does not always specify the bulb type. These designations are important for establishing base wattages and would be helpful in future evaluations.

¹⁸ Based on the model numbers and bulb descriptions, it was possible to assign the specialty type for approximately 9% of coupon bulbs. The remaining bulbs were classified as Standard CFL twist. Because precise coupon bulb information was not readily available and due to the extremely low volume of coupon bulb sales (approximately 0.05%) coupon bulbs were included with standard (91%) and specialty (9%) bulbs in the overall portfolio analysis and so shared average impact parameter estimates with these bulb categories.

¹⁹ In some cases, the remaining non-matches were due to one data set listing the manufacturer model number and the other data set listing the manufacturer model number and the retail model number. In other cases, one data set sometimes listed the manufacturer model number plus some sort of bulb descriptor.

Recommendation. While model matching to goals tracker was a much more straightforward process in EPY5 than in previous program years, creating a bulb information database (Goals Tracker or otherwise) with a clear one-to-one match with the model numbers in the tracking data would streamline future evaluation efforts. It is our understanding that this has been addressed in the EPY6 Goals Tracker. We support this endeavor and provide the following recommendations:

- The “Unit Type” field (Standard CFL, Specialty CFL, Standard LED, Specialty LED, etc.) in the EPY5 Goals Tracker should be carried forward to EPY6.
- There should be an additional field for Specialty type (reflector, candelabra, globe, etc.). Our current method of extracting specialty type from the description field is imperfect. For instance, it is difficult to determine whether a bulb with “candelabra” in the description field is a decorative candelabra lamp or a different lamp type with a candelabra base. If possible, it would be useful to include an additional “base type” field (candelabra, standard pin, GU24, etc.). This would decrease the incidence of false matching.
- Because our Evaluation Research lumen mapping is also dependent on reflector bulb type, it would be useful to have a separate field for this parameter (R20, PAR38, BR30, etc.).
- Include a flag for dimmable / non-dimmable.

3.2 Program Volumetric Findings

The total number of bulbs sold during the EPY5 Residential Lighting Program is estimated to be 10,897,894,²⁰ which is a 14% decrease from the bulbs sold in the fourth program year (PY4) and a 3% decrease from the third program year (PY3) bulbs. Eighty-eight percent of these were standard bulbs, 11% were specialty bulbs, and the remaining 1% was comprised of LED lamps, LED fixtures, CFL fixtures, and coupon bulbs (mixture of bulb types). In EPY5 sales of Specialty CFLs, LEDs and LED Fixtures all increased,²¹ while sales of Standard CFLs dropped by almost 2 million bulbs and sales of CFL fixtures dropped to 10% of what they were in EPY4. This is shown in Table 3-1, below.

Table 3-1. EPY5 Volumetric Findings Detail

Program Year	Standard CFL	Specialty CFL	CFL Fixtures	LED Bulb	LED Fixtures	Coupons	Total
EPY5 Sales	9,633,227	1,197,896	8,767	28,230	24,268	5,506	10,897,894
EPY4 Sales	11,419,752	1,097,670	84,539	24,919	16,551	5,599	12,649,030
EPY3 Sales	9,893,196	1,217,723	86,943	0	0	0 ²²	11,197,862

Source: EM&V analysis

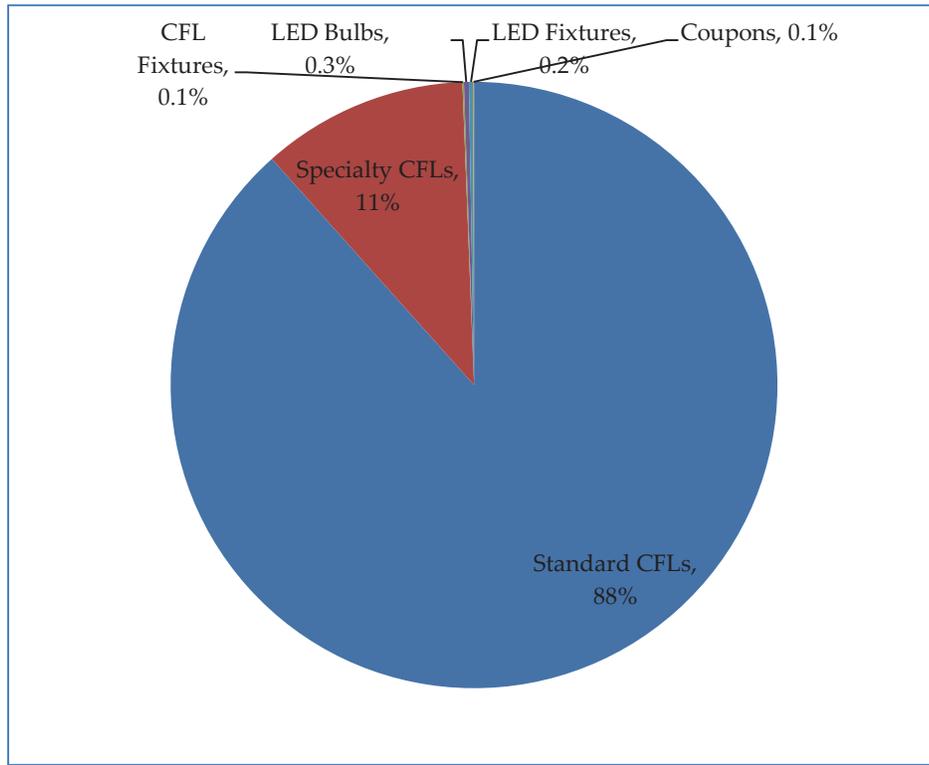
The figure below shows a graphical representation of the EPY5 Residential Lighting program bulbs sales across bulb types.

²⁰ Total bulbs analyzed in EPY5 include 10,869,358 bulbs sold in the EPY5 invoice date range, plus 23,030 bulbs from EPY4 that were not analyzed previously and 5,506 coupon bulbs..

²¹ Sales of Specialty CFLs and LED bulbs each increased by about 10 percent over EPY4, while sales of LED Fixtures increased almost 50 percent.

²² EPY3 coupon sales are included in the standard and specialty CFL numbers.

Figure 3-1. EPY5 Residential Lighting Program Bulb Sales



3.3 Gross Program Impact Parameter Estimates

As described in Section 2, gross energy and demand savings are estimated using the following formula as specified in the TRM:

$$\text{Verified Gross Annual kWh Savings} = \text{Program bulbs} * \text{Delta Watts}/1000 * \text{HOU} * \text{Energy IE} * \text{Realization Rate}$$

Where:

- Delta Watts = Difference between Baseline Wattage (incandescent wattage) and CFL Wattage
- HOU = Annual Hours of Use
- Energy IE = Energy Interactive Effects
- Realization Rate = Installation Rate

$$\text{Verified Gross Annual kW Savings} = \text{Program bulbs} * \text{Delta Watts}/1000 * \text{Realization Rate}$$

$$\text{Verified Gross Annual Peak kW Savings} = \text{Gross Annual kW Savings} * \text{Peak Load Coincidence Factor} * \text{Demand IE}$$

Where:

- Peak Load Coincidence Factor is calculated as the percentage of program bulbs turned on during peak hours (weekdays from 1 to 5 p.m.) throughout the summer.
- Demand IE = Demand Interactive Effects

The EM&V team conducted research to estimate the Res/NonRes split that was not specified in the TRM. Other verified gross savings parameter estimates, such as HOU, Energy and Demand IE, and Peak CF were estimated by applying the evaluation research estimate of the Res/NonRes split to the deemed TRM residential and nonresidential parameter estimates. The resulting gross parameter estimates are shown in Table 3-2, below.

Table 3-2. Verified Gross Savings Parameters

Verified Savings Parameter	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
Bulb Sales	9,633,227	1,197,896	8,767	28,230	24,268	5,506	10,897,894
Delta Watts	46.7	31.0	58.3	50.9	52.7	45.3	45.0
Residential Installs	98%	98%	98%	98%	98%	98%	98%
HOU – Res / NonRes	2.74 / 13.16	2.84 / 13.16	2.57 / 13.16	2.77 / 13.16	2.57 / 13.16	2.74 / 13.16	2.75 / 13.16
Peak CF – Res / NonRes	0.10 / 0.69	0.11 / 0.69	0.10 / 0.69				
Installation Rate	69.5%	79.5%	87.5%	95.0%	87.5%	69.5%	70.7%
Energy IE ²³ - Res / NonRes	1.06 / 1.24	1.06/ 1.24	1.06 / 1.24	1.06 / 1.24	1.06 / 1.24	1.06 / 1.24	1.06 / 1.24
Demand IE – Res / NonRes	1.11 / 1.46	1.11 / 1.46					

Source: Deemed based on TRM v1.0 and Evaluation Team analysis.

3.4 Development of the Verified Gross Realization Rate

The gross realization rate is 94%. This estimate was derived by dividing the Verified Gross Savings estimate by the Ex Ante Gross Savings estimate²⁴ (394,595/418,865 = 94%). Estimates of the Verified Gross Savings by bulb type are provided in the section below.

3.5 Verified Gross Program Impact Results

The total EPY5 Residential ES Lighting Program verified gross savings is estimated to be 394,595MWh, 345.2 MW, and 41.8 Peak MW, as shown in Table 3-3, below. These saving estimates are based on deemed parameter estimates from the TRM v1.0. The evaluation team verified the quantity of bulbs sold, which matched 100%. There were an additional 23,030 EPY4 late invoiced bulbs that the evaluation team counted towards EPY5 sales since they were not counted in EPY4. Because Ex-Ante estimates were only available for the entire portfolio of EPY5 bulbs sold, it was only possible to calculate a realization rate on the total program bulb sales, not the individual bulb type sales.

²³ Development of these Energy and Demand IE estimates is provided in Appendix 7.2.2.

²⁴ The Ex Ante Gross Savings estimate was estimated by dividing the Ex Ante Net Savings estimate by the EPY5 program bulb weighted Ex Ante NTGR estimate (305,449 / 0.73 = 418,865).

Table 3-3. EPY5 Verified Gross Impact Savings Estimates

	Gross Energy Savings (MWh)	Gross Demand Savings (MW)	Gross Peak Demand Savings (MW)
Bulb Type Verified Gross Savings - Residential			
Standard CFLs	325,964	307.5	32.4
Specialty CFLs	31,914	29.0	3.4
CFL Fixtures	438	0.4	0.0
LED Bulbs	1,438	1.3	0.1
LED Fixtures	1,095	1.1	0.1
Coupons	181	0.2	0.0
Bulb Type Verified Gross Savings - NonResidential			
Standard CFLs	30,395	5.1	5.1
Specialty CFLs	2,868	0.5	0.5
CFL Fixtures	43	0.0	0.0
LED Bulbs	133	0.0	0.0
LED Fixtures	109	0.0	0.0
Coupons	17	0.0	0.0
Bulb Type Verified Gross Savings - Total			
Standard CFLs	356,359	312.6	37.5
Specialty CFLs	34,782	29.5	3.9
CFL Fixtures	481	0.4	0.1
LED Bulbs	1,571	1.4	0.2
LED Fixtures	1,204	1.1	0.1
Coupons	198	0.2	0.0
Total			
Ex-Ante EPY5 Gross Savings	418,865	n/a	n/a
Realization Rate	94%	n/a	n/a
Verified Gross Savings	394,595	345.2	41.8

Source: Evaluation Team analysis.

The EPY5 Residential ES Lighting program is able to claim energy and demand savings from program bulbs purchased during EPY3 and EPY4, but not installed (i.e., used by the consumer) until EPY5. Table 3-4 below provides estimates of the verified gross savings resulting from these carryover

bulbs.²⁵ The realization rate shown is the percentage of the estimated Ex Ante Gross carryover Savings achieved based on the EPY5 Verified Savings estimates.

Table 3-4. EPY5 Verified Gross Impact Savings from EPY3 and EPY4 Carryover Bulbs

	Gross Energy Savings (MWh)	Gross Demand Savings (MW)	Gross Peak Demand Savings (MW)
PY5 Verified Gross Carryover Savings			
Ex-Ante EPY5 Gross Savings	178,757	n/a	n/a
Realization Rate	105%	n/a	n/a
Verified Gross Savings	187,018	152.1	20.6

Source: Evaluation Team analysis.

²⁵ Complete details on the estimation of carryover savings are included in the memo titled, *PY5 ComEd Residential Lighting Impact Findings*, dated October 7th, 2013. This memo has been included in Appendix 0.

4. Net Impact Evaluation

Table 4-1 shows the NTGR values deemed by SAG²⁶ to be used to calculate EPY5 verified net savings.

Table 4-1. Verified Net Savings Parameters

Verified Savings Parameter	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
NTGR	0.72	0.80	0.79	0.80	0.79	0.72	0.73

Source: ComEd EPY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Using the deemed NTG values, the evaluation calculated verified net savings of 275,716 MWh, 251.1 MW, and 29.0 Peak MW as shown in Table 4-2.

²⁶ http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting/ComEd EPY5-EPY6 Proposal Comparisons with SAG.xls

Table 4-2. EPY5 Verified Net Impact Savings Estimates

	Net Energy Savings (MWh)	Net Demand Savings (MW)	Net Peak Demand Savings (MW)
Bulb Type Verified Net Savings - Residential			
Standard CFLs	234,694	221.4	23.3
Specialty CFLs	25,531	23.2	2.7
CFL Fixtures	346	0.3	0.0
LED Bulbs	1,151	1.1	0.1
LED Fixtures	865	0.9	0.1
Coupons	130	0.1	0.0
Bulb Type Verified Net Savings - NonResidential			
Standard CFLs	21,885	3.7	3.7
Specialty CFLs	2,295	0.4	0.4
CFL Fixtures	34	0.0	0.0
LED Bulbs	106	0.0	0.0
LED Fixtures	86	0.0	0.0
Coupons	12	0.0	0.0
Bulb Type Verified Net Savings - Total			
Standard CFLs	256,579	225.1	27.0
Specialty CFLs	27,826	23.6	3.1
CFL Fixtures	380	0.4	0.0
LED Bulbs	1,257	1.1	0.1
LED Fixtures	951	0.9	0.1
Coupons	142	0.1	0.0
Total			
Ex-Ante EPY5 Gross Savings	418,865	n/a	n/a
Realization Rate	94%	n/a	n/a
Verified Gross Savings	394,595	345.2	41.8
NTGR	0.73	0.73	0.73
Verified Net Savings	287,135	251.1	30.4

Source: Evaluation Team analysis.

Table 4-3 below provides estimates of the verified net savings resulting from EPY3 and EPY4 carryover bulbs installed in EPY5.²⁷

Table 4-3. EPY5 Verified Net Impact Savings from EPY3 and EPY4 Carryover Bulbs

	Net Energy Savings (MWh)	Net Demand Savings (MW)	Net Peak Demand Savings (MW)
PY5 Verified Net Carryover Savings			
Ex-Ante EPY5 Gross Savings	178,757	n/a	n/a
Realization Rate	105%	n/a	n/a
Verified Gross Savings	187,018	152.1	20.6
NTGR	0.65	0.65	0.65
Verified Net Savings	116,371	95.0	12.8

Source: Evaluation Team analysis.

²⁷ Complete details on the estimation of carryover savings are included in the memo titled, *PY5 ComEd Residential Lighting Impact Findings*, dated October 7th, 2013. This memo has been included in Appendix 0.

5. Process Evaluation

The process evaluation of the EPY5 Residential ES Lighting Evaluation assessed the impact of program processes (e.g., the mechanics of how the program was implemented) on consumers who participated in the program. For these consumers, we examined the reach of program marketing, usage of CFLs and purchasing decisions, awareness of bulb types, federal regulatory changes, and program discounts, and barriers to purchasing CFLs. The primary data sources for the process evaluation were the in-store intercept surveys (n=792) and the in-store shelf surveys (n=28). Complete process evaluation results are presented in Appendix 7.3. The following list summarizes the key process findings from the study:

- Program Awareness:** Awareness of ComEd’s Residential Lighting program seems to be increasing with 17% of EPY5 respondents surveyed reporting they were aware of ComEd discounts (up from 13% in EPY4, although the difference is not statistically significant at the 90% level). Additionally, in EPY5 24% of those buying ComEd bulbs knew the bulbs they were buying were discounted by ComEd, compared with only 9% in EPY4. The 28 shelf surveys performed as part of the EPY5 evaluation found that at 93% of program retailers (where intercepts were conducted) materials promoting ComEd’s CFLs discount program were prominently displayed (visibility level medium to high at all stores). The top reported source of program awareness from respondents purchasing program bulbs was a ComEd sticker on shelf where the bulbs were located (41%). Most (89%) of the shelf surveys found both the original and promotional prices located on the store shelf where the program bulbs were located.
- State of the LED Market:** Our analysis of the current LED market found increasing familiarity with LED technology with 70% of respondents either purchasing LEDs or reporting familiarity with LEDs (compared with 58% in EPY4). The percentage of respondents who reported they had at least one LED installed increased from 26% in EPY4 to 33% in EPY5. Cost was still the primary hurdle for most lighting purchasers, followed by lack familiarity with LED technology, and a dislike of LED’s look. We were unable to assess the role ComEd incentives played in customers purchasing decisions since only one of the retailers where surveys were conducted was still offering ComEd incentives at the time the surveys were conducted. The shelf surveys completed for the EPY5 evaluation found LED bulbs were quite prevalent at program retailers. One hundred percent of DIY and Warehouse stores inventoried carried LED bulbs and more than 70% of Big Box stores carried LEDs. LED bulbs made up 38% of the unique packages²⁸ available at Warehouse stores, 19% at DIY stores and 3% at Big Box stores. The most common type of LED available was reflectors (56% of the unique packages across all retail stores), followed by standard bulbs (37%). LEDs are still very expensive with the average retail price (after discounts were applied) for a reflector LEDs nearly \$32 and the average retail price for a standard LED nearly \$20.
- 75 and 100-watt Replacement Lamp Availability:** EPY5 shelf surveys of standard 75 and 100-watt incandescent replacement lamps revealed interesting findings. At the time of the EPY5 shelf surveys, nearly 18-months after the 100-watt EISA standard went into effect, 100-

²⁸ Unique packages are per individual retail store (i.e., if the package is present at multiple DIY stores it is included in these counts multiple times).

watt incandescent bulbs were still on the shelves at 50% of program retailers.²⁹ Similarly, 6-months after the 75-watt EISA standard went into place, 75-watt incandescent bulbs were still on the shelves at 100% of program retailers. The quantity of 100-watt lamps was significantly reduced, but they were still an option for consumers to purchase.

- **Impact of EISA 2007 on Marketplace:** Customer's awareness of EISA continues to rise but does not appear to be having a significant impact on their purchase decisions at this time. Sixty-four percent of those surveyed in EPY5 reported they had heard of the EISA standards, up from 53% in EPY4 and 35% in EPY3. This increase in EISA awareness does not seem to be impacting the bulbs customers are purchasing. In EPY5, 54% of standard bulb purchasers bought CFLs, 35% bought incandescents, 5% bought Halogen bulbs and 6% bought LEDs. Analysis of the type of standard bulb purchased by EISA awareness found no differences between those who were aware as compared to those who were unaware of EISA.
- **Retailer Participation:** Retailer participation in the Residential ES Lighting program remained very stable between EPY4 and EPY5. In total there were 18 retail chains participating in the EPY5 program (two more than in EPY4), resulting in a total of 1,021 individual retail locations where program bulbs could be purchased (a 10% increase over EPY4). As in EPY4, Big Box, DIY, and Warehouse stores remained the dominant retail categories (selling over 91% of EPY5 program bulbs).

²⁹ Where shelf surveys were conducted (n=28). Shelf surveys were conducted at four program retailers. These four program retailers accounted for 69% of EPY5 program bulb sales.

6. Conclusions and Recommendations

This section summarizes the key impact and process findings and recommendations.

The goal of the Residential ES Lighting program for EPY5 was to sell 10,100,000 discounted CFL and LED bulbs and fixtures to residential customers within ComEd's service territory. The program exceeded this goal by selling a total of 10,897,894 bulbs and fixtures. These bulbs and fixtures sales led to the program achieving 130% of their targeted Net energy savings. Retailer participation in the Residential ES Lighting program remained very stable between EPY4 and EPY5. In total there were 18 retail chains participating in the EPY5 program (two more than in EPY4), resulting in a total of 1,021 individual retail locations where program bulbs could be purchased (a 10% increase over EPY4). As in EPY4, Big Box, DIY, and Warehouse stores remained the dominant retail categories (responsible for selling over 91% of EPY5 program bulbs).

Program Savings Goals Attainment

Finding 1. ComEd significantly exceeded their planning targets in EPY5 by selling nearly 800,000 bulbs more than they projected and exceeding their targeted Net energy savings by more than 30% (220,000 MWh targeted vs. 287,135 MWh Verified).

Realization Rates

Finding 2. Although ComEd sold approximately 8% more bulbs than planned and exceed their targeted net savings estimate by more than 30%, the Verified Savings realization rate was 94% of the Ex Ante saving estimate. The primary driver for this 6% gap in achieved savings was the Res/NonRes split used to estimate program impacts (97%/3% Ex Ante vs. 98%/2% Verified Savings). The Res/NonRes split impacts the estimation of HOU, Peak CF and Energy and Demand Interactive Effects, and, thus, the resulting energy and demand savings estimates. In PY5, the magnitude of the nonresidential HOU and Peak CF estimates are between 5 and 7 times greater than the residential estimates, which is a large driver for the overall HOU and Peak CF estimates.

Recommendation 2a. The evaluation team supports the inclusion of the Res/NonRes split in the TRM as a deemed parameter. The evaluation team recommends deeming the Res/NonRes split based on a 3-year rolling average of Evaluation Research estimates which can then be updated annually. For example, inPY7 the Res/NonRes split would be deemed at 97%/3%.

Recommendation 2b. Providing the measure level Ex Ante savings estimates in the tracking data and/or the Goals Tracker would enable the evaluation team to gain a complete picture of the differences that exist between the Ex Ante and Verified Savings estimates, as well as allow for the estimation of Realization Rates by bulb type. Currently the estimate of overall program savings included in the Goals Tracker do not match the Ex Ante savings estimate and the Goals Trackers Delta Watts assumptions do not appear to come from the TRM and do not adjust the baseline for 100-watt replacement CFLs to reflect the EISA standard that requires the maximum wattage to be 72-watts.

Impact Parameters for Future Use

Finding 3. The Res/NonRes split is included in the IL TRM beginning in Version 2.0 (Effective June 1, 2013). Including this parameter as a deemed value in the TRM helps improve the verified savings realization rate by removing the uncertainty that surrounds this estimate within the calculation of verified savings.

Recommendation 3. The evaluation team recommends updating the deemed Res/NonRes split annually based on a rolling 3-year average from the most recent ComEd and Ameren Evaluation Research findings. At this time, it is not possible to estimate what the statewide deemed Res/NonRes split would be for Ver. 3.0 due to the lack of Ameren IL data; however, the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table 6-1 below.

Table 6-1. 3-Year Average Res/NonRes Split for ComEd

Program Year	Bulbs	Res/NonRes
EPY3	11,197,862	97% / 3%
EPY4	12,649,030	95% / 5%
EPY5	10,897,894	98% / 2%
3-year Weighted Average for EPY7	-	97% / 3%

Source: Navigant team analysis.

Finding 4. Version 1.0 and 2.0 of the IL TRM cite the source of first-year Installation Rate of standard and specialty CFLs as a “review of EPY1-EPY3 evaluations from ComEd and Ameren (see ‘IL RES Lighting ISR.xls’ for more information. The average first year ISR for each utility was calculated weighted by the number of bulbs in each year’s survey. This was then weighted by annual sales to give a statewide assumption”.

Recommendation 4. The evaluation team recommends updating the deemed installation rates for CFLs annually based on a rolling 3-year average from the most recent evaluation research findings (from both ComEd and Ameren IL when available). This would insure the deemed installation rates are reflective of the most recent data available. It is not possible at this time to estimate what the statewide deemed installation rate would be for Ver. 3.0 due to the lack of Ameren IL data, however the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table 6-2 below.

Table 6-2. 3-Year Average Standard and Specialty Installation Rates for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	ISR	Bulbs	ISR
EPY3	9,886,359	70.4%	1,218,595	77.7%
EPY4	11,419,752	69.7%	1,097,670	75.5%
EPY5	9,633,227	76.0%	1,197,896	91.6%
3-year Weighted Average for EPY7	-	71.9%	-	81.7%

Source: Navigant team analysis.

Finding 5. The NTGR for EPY5 was deemed based on a Statewide Advisory Group process. This process historically has been referencing the most recently available evaluation-based NTGR estimate (which is typically from the evaluation two years prior, which was EPY3 for the deemed EPY5 estimate) as one of the primary inputs for the deemed NTGR estimate.

Recommendation 5. The evaluation team recommends utilizing a weighted rolling 3-year average of the standard and specialty CFL evaluation based NTGR estimate going forward in this process. This rolling average would provide some consistency from year-to-year and would ensure that the NTGR results from any one single year do not drastically alter the resulting net savings. Table 6-3 below provides three years of evaluation research NTGR estimates for Standard and Specialty CFLs, as well as the 3-year weighted average which is the recommended EPY7 NTGR parameter estimate.

Table 6-3. 3-Year Average Standard and Specialty NTGR for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	NTGR	Bulbs	NTGR
EPY3	9,893,196	71%	1,217,723	60%
EPY4	11,419,752	55%	1,097,670	44%
EPY5	9,633,227	55%	1,197,896	48%
3-year Weighted Average for EPY7	-	60%	-	51%

Source: Navigant team analysis.

Awareness of ComEd Incentives Offered

Finding 6. Awareness of ComEd’s Residential Lighting program seems to be increasing with 17% of EPY5 respondents surveyed reporting they were aware of ComEd discounts (up from 13% in EPY4, although the difference is not statistically significant at the 90% level) which is likely attributable to the new POP design. Additionally, in EPY5 24% of those buying ComEd bulbs knew the bulbs they were buying were discounted by ComEd, compared with only 9% in EPY4. EPY5 Shelf surveys found materials promoting ComEd’s CFLs discount program prominently displayed at 93% of stores and 89% of stores had stickers with both the original and promotional prices on store shelves where program bulbs were located.

Recommendation 6. Continue work with program retailers to insure program marketing materials are present and properly displayed and that store shelves where program bulbs are found continue to clearly display both original and promotional price and clearly label it as being provided by ComEd (stickers on store shelves was a primary source of awareness for program participants in EPY5).

Impact of EISA 2007 on Marketplace

Finding 7. Customer’s awareness of EISA continues to rise, but with only the 100W EISA standard in place for all of EPY5 and non-reduced wattage incandescent bulbs present on

store shelves³⁰, these changes do not appear to have a significant impact on customers lighting purchase decisions. Availability of bulbs on store shelves is changing from year-to-year with Halogen and LED products becoming more widely available, and incandescents becoming less and less so.³¹

Finding 8. Evaluation team analysis of shelf survey data collected during EPY3, EPY4 and EPY5 found that the approximate volume of 100-watt incandescent bulbs stocked on program retailers’ shelves fell by approximately 36% between EPY3 and EPY5 (from 40% of available 100-watt bulbs to 4%). During that same time, 100-watt replacement halogen bulbs increased in volume on retailer shelves by 22% (from 5% to 27%) and CFLs increased by 14% (from 55% to 69%). So while 100-watt replacement CFLs have increased in shelf space, halogen bulbs have increased at a faster rate to fill approximately 2/3rds of the void left by the incandescent bulbs. In the 75-watt replacement lamp market a different trend appeared with CFLs making up a constant volume of replacement lamps between EPY4 and EPY5 (not increasing), halogens and LEDs decreasing in volume and incandescent lamps actually increasing (8% increase from EPY4 to EPY5).

Recommendation 7 / 8. Continue to capitalize on changes being brought by the EISA standards by providing in-store and out-of-store educational information on the benefits of high efficiency CFL products, as well as incentives to entice CFL purchases. The opportunity will be at its peak over the next two years as the EISA standard changes impact 40 and 60-watt replacement bulbs, the largest segment of the medium-screw based (MSB) market. Continue to track bulb availability on program retailers’ shelves via annual shelf surveys.

Program Tracking Data

Finding 9. Residential Lighting tracking database and the EPY5 Goals Tracker still do not line up entirely requiring either manual matching or internet research in order to collect key bulb information that is necessary to estimate program impacts (lumens, wattage, etc.). Additionally, as in previous years, there were no fields for specialty bulb type, dimmable/non-dimmable, or reflector bulb type. These variables were extracted from the “Description” field for the purposes of this evaluation, but this is an imperfect process as the bulb description does not always specify the bulb type. These designations are important for establishing base wattages and would be helpful in future evaluations.

Recommendation 9. While model matching to goals tracker was a much more straightforward process in EPY5 than in previous program years, creating a bulb information database (Goals Tracker or otherwise) with a clear one-to-one match with the model numbers in the tracking data would streamline future evaluation efforts. It is our understanding that this has been addressed in the EPY6 Goals Tracker. We support this endeavor and provide the following recommendations:

- The “Unit Type” field (Standard CFL, Specialty CFL, Standard LED, Specialty LED, etc.) in the EPY5 Goals Tracker should be carried forward to EPY6.

³⁰ 18-months after the 100-watt EISA standards change, 100-watt incandescent bulbs were still found to be on the shelves at 50% of program retailers³⁰ and six-months after the 75-watt EISA standards change, 75-watt incandescent bulbs were still found to be on shelves at 100% of program retailers.

³¹ Appendix 7.7.4 contains a memo written by the evaluation team that contains additional details on the impacts the new EISA standards had on the marketplace during EPY5.

- There should be an additional field for Specialty type (reflector, candelabra, globe, etc.). Our current method of extracting specialty type from the description field is imperfect. For instance, it is difficult to determine whether a bulb with “candelabra” in the description field is a decorative candelabra lamp or a different lamp type with a candelabra base. If possible, it would be useful to include an additional “base type” field (candelabra, standard pin, GU24, etc.). This would decrease the incidence of false matching.
- Because our Evaluation Research lumen mapping is also dependent on reflector bulb type, it would be useful to have a separate field for this parameter (R20, PAR38, BR30, etc.).
- Include a flag for dimmable / non-dimmable.

7. Appendix

7.1 Glossary

High Level Concepts

Program Year

- EPY1, EPY2, etc. Electric Program Year where EPY1 is June 1, 2008 through May 31, 2009, EPY2 is June 1, 2009 through May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 through May 31, 2012, GPY2 is June 1, 2012 through May 31, 2013.

There are two main tracks for reporting impact evaluation results, called Verified Savings and Impact Evaluation Research Findings.

Verified Savings composed of

- Verified Gross Energy Savings
- Verified Gross Demand Savings
- Verified Net Energy Savings
- Verified Net Demand Savings

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In EPY5/GPY2 the Illinois TRM was in effect and was the source of most deemed parameters. Some of ComEd's deemed parameters were defined in its filing with the ICC but the TRM takes precedence when parameters were in both documents.

Application: When a program has deemed parameters then the Verified Savings are to be placed in the body of the report. When it does not (e.g., Business Custom, Retrocommissioning), the evaluated impact results will be the Impact Evaluation Research Findings.

Impact Evaluation Research Findings composed of

- Research Findings Gross Energy Savings
- Research Findings Gross Demand Savings
- Research Findings Net Energy Savings
- Research Findings Net Demand Savings

These are savings reflecting evaluation adjustments to any of the savings parameters (when supported by research) regardless of whether the parameter is deemed for the verified savings analysis. Parameters that are adjusted will vary by program and depend on the specifics of the research that was performed during the evaluation effort.

Application: When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be labeled Impact Evaluation Research Findings and designated as "ER" for short. When a program does not have deemed parameters (e.g., Business Custom, Retrocommissioning), the Research Findings are to be in the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

Program-Level Savings Estimates Terms

N	Term Category	Term to Be Used in Reports‡	Application†	Definition	Otherwise Known As (terms formerly used for this concept)§
1	Gross Savings	Ex-ante gross savings	Verification and Research	Savings as recorded by the program tracking system, unadjusted by realization rates, free ridership, or spillover.	Tracking system gross
2	Gross Savings	Verified gross savings	Verification	Gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis	Ex post gross, Evaluation adjusted gross
3	Gross Savings	Verified gross realization rate	Verification	Verified gross / tracking system gross	Realization rate
4	Gross Savings	Research Findings gross savings	Research	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
5	Gross Savings	Research Findings gross realization rate	Research	Research findings gross / ex-ante gross	Realization rate
6	Gross Savings	Evaluation-Adjusted gross savings	Non-Deemed	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
7	Gross Savings	Gross realization rate	Non-Deemed	Evaluation-Adjusted gross / ex-ante gross	Realization rate
1	Net Savings	Net-to-Gross Ratio (NTGR)	Verification and Research	1 – Free Ridership + Spillover	NTG, Attribution
2	Net Savings	Verified net savings	Verification	Verified gross savings times NTGR	Ex post net
3	Net Savings	Research Findings net savings	Research	Research findings gross savings times research NTGR	Ex post net
4	Net Savings	Evaluation Net Savings	Non-Deemed	Evaluation-Adjusted gross savings times NTGR	Ex post net
5	Net Savings	Ex-ante net savings	Verification and Research	Savings as recorded by the program tracking system, after adjusting for realization rates, free ridership, or spillover and any other factors the program may choose to use.	Program-reported net savings

‡ “Energy” and “Demand” may be inserted in the phrase to differentiate between energy (kWh, Therms) and demand (kW) savings.

† **Verification** = Verified Savings; **Research** = Impact Evaluation Research Findings; **Non-Deemed** = impact findings for programs without deemed parameters. We anticipate that any one report will either have the first two terms or the third term, but never all three.

§ Terms in this column are not mutually exclusive and thus can cause confusion. As a result, they should not be used in the reports (unless they appear in the “Terms to be Used in Reports” column).

Individual Values and Subscript Nomenclature

The calculations that compose the larger categories defined above are typically composed of individual parameter values and savings calculation results. Definitions for use in those components, particularly within tables, are as follows:

Deemed Value – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a deemed measure shall use the superscript “D” (e.g., delta watts^D, HOU-Residential^D).

Non-Deemed Value – a value that has not been assumed to be representative of the average condition of an input parameter and has not been documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a non-deemed, researched measure or value shall use the superscript “E” for “evaluated” (e.g., delta watts^E, HOU-Residential^E).

Default Value – when an input to a prescriptive saving algorithm may take on a range of values, an average value may be provided as well. This value is considered the default input to the algorithm, and should be used when the other alternatives listed for the measure are not applicable. This is designated with the superscript “DV” as in X^{DV} (meaning “Default Value”).

Adjusted Value – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript “AV” as in X^{AV}

Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012³².

Evaluation: Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, accomplishments, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Impact evaluation in the energy efficiency arena is an investigation process to determine energy or demand impacts achieved through the program activities, encompassing, but not limited to: *savings verification, measure level research, and program level research*. Additionally, evaluation may occur outside of the bounds of this TRM structure to assess the design and implementation of the program.

Synonym: **Evaluation, Measurement and Verification (EM&V)**

Measure Level Research: An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.

Program Level Research: An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be

³² IL-TRM_Policy_Document_10-31-12_Final.docx

specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

Savings Verification: An evaluation process that independently verifies program savings achieved through prescriptive measures. This process verifies that the TRM was applied correctly and consistently by the program being investigated, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operating. The results of savings verification may be expressed as a program savings realization rate (verified ex post savings / ex ante savings). Savings verification may also result in recommendations for further evaluation research and/or field (metering) studies to increase the accuracy of the TRM savings estimate going forward.

Measure Type: Measures are categorized into two subcategories: custom and prescriptive.

Custom: Custom measures are not covered by the TRM and a Program Administrator’s savings estimates are subject to retrospective evaluation risk (retroactive adjustments to savings based on evaluation findings). Custom measures refer to undefined measures that are site specific and not offered through energy efficiency programs in a prescriptive way with standardized rebates. Custom measures are often processed through a Program Administrator’s business custom energy efficiency program. Because any efficiency technology can apply, savings calculations are generally dependent on site-specific conditions.

Prescriptive: The TRM is intended to define all prescriptive measures. Prescriptive measures refer to measures offered through a standard offering within programs. The TRM establishes energy savings algorithm and inputs that are defined within the TRM and may not be changed by the Program Administrator, except as indicated within the TRM. Two main subcategories of prescriptive measures included in the TRM:

Fully Deemed: Measures whose savings are expressed on a per unit basis in the TRM and are not subject to change or choice by the Program Administrator.

Partially Deemed: Measures whose energy savings algorithms are deemed in the TRM, with input values that may be selected to some degree by the Program Administrator, typically based on a customer-specific input.

In addition, a third category is allowed as a deviation from the prescriptive TRM in certain circumstances, as indicated in Section 3.2:

Customized basis: Measures where a prescriptive algorithm exists in the TRM but a Program Administrator chooses to use a customized basis in lieu of the partially or fully deemed inputs. These measures reflect more customized, site-specific calculations (e.g., through a simulation model) to estimate savings, consistent with Section 3.2.

7.2 Detailed Impact Research Findings and Approaches

7.2.1 Gross Impact Results

On September 4th, 2013 the evaluation team submitted a memo to ComEd and the ICC that contained a detailed assessment of the Evaluation Research Gross Impact analysis and results. This memo was revised, updated and resubmitted to ComEd on October 7th.³³ It has been included as Appendix 7.7.2 to this report and should be referenced for complete details surrounding the estimation of the Evaluation Research Gross Impact parameters presented below.

7.2.1.1 Gross Evaluation Research Impact Parameter Estimates

As described in Section 2, gross energy and demand savings are estimated using the following formula as specified in the TRM:

Evaluation Research Gross Annual kWh Savings = Program bulbs * Delta Watts/1000 * HOU * Energy IE * Realization Rate

Where:

- Delta Watts = Difference between Baseline Wattage (incandescent wattage) and CFL Wattage
- HOU = Annual Hours of Use
- Energy IE = Energy Interactive Effects
- Realization Rate = Installation Rate

Evaluation Research Annual kW Savings = Program bulbs * Delta Watts/1000 * Realization Rate

Evaluation Research Annual Peak kW Savings = Gross Annual kW Savings * Peak Load Coincidence Factor * Demand IE

Where:

- Peak Load Coincidence Factor is calculated as the percentage of program bulbs turned on during peak hours (weekdays from 1 to 5 p.m.) throughout the summer.
- Demand IE = Demand Interactive Effects

Table 7-1 below contains the Evaluation Research Gross Savings parameter estimates. These estimates differ slightly from the Verified Savings estimates in the following places:

- The overall Evaluation Research Delta Watts (DW) is 1% (or 0.5 DW) higher than the Verified Savings estimate of DW. This difference is primarily driven by a higher Evaluation Research DW estimates for Specialty CFLs, specifically reflector lamps. This is due to the TRM's use of a generalized Energy Star lumen mapping for standard CFLs³⁴ applied to all specialty bulb types (directional and non-directional). Using the Evaluation method of different lumen mappings for different bulb shapes results in lower base wattages (and higher DW) for directional lamps. Evaluation Research estimates of DW for LED bulbs and fixtures are lower than the Verified Savings estimates due to, once again, reflector lamps. While the TRM

³³ Complete details on Evaluation Estimated Gross Savings parameters are included in the memo titled, *PY5 ComEd Residential Lighting Impact Findings*, dated October 7th, 2013. This memo has been included in Appendix 0.

³⁴ http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_lumens

applies different lumen mappings by reflector bulb type as recommended by the evaluation team, the TRM lumen ranges are based on common light output values for different technologies (incandescent, CFL, LED) and average bulb wattages by bulb type (PAR20, PAR30, etc.). The Evaluation Research lumen mapping, alternatively, is based on the federal standards for lumen output by reflector type. Due to the small quantity of LED bulbs and fixtures sold this discrepancy has little impact on the overall DW estimate.

- Evaluation Research estimated Installation rates were found to be 10% higher than the estimates included in the TRM. The Evaluation Research estimates for standard and specialty bulbs were based on customer self-reports during the EPY5 in-store intercept surveys and 100 percent installation rates were assumed for LED bulbs and CFL and LED fixtures.

Table 7-1. Evaluation Research Gross Savings Parameters

Parameter	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
Total Bulb Sales	9,633,227	1,197,896	8,767	28,230	24,268	5,506	10,897,894
Delta Watts	46.7	36.5	58.3	36.9	36.7	45.8	45.5
Res/NonRes Split	98%/2%	98%/2%	98%/2%	98%/2%	98%/2%	98%/2%	98%/2%
HOU - Res / NonRes	2.74 / 13.16	2.84 / 13.16	2.57 / 13.16	2.77 / 13.16	2.57 / 13.16	2.74 / 13.16	2.75 / 13.16
Peak CF - Res / NonRes	0.10 / 0.69	0.11 / 0.69	0.10 / 0.69	0.10 / 0.69	0.10 / 0.69	0.10 / 0.69	0.10 / 0.69
Installation Rate	76.0%	91.6%	100%	100%	100%	76.0%	77.9%
Leakage	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
Energy IE ³⁵ - Res / NonRes	1.03 / 1.21	1.03 / 1.21	1.03 / 1.21	1.03 / 1.21	1.03 / 1.21	1.03 / 1.21	1.03 / 1.21
Demand IE - Res / NonRes	1.09 / 1.36	1.09 / 1.36	1.09 / 1.36	1.09 / 1.36	1.09 / 1.36	1.09 / 1.36	1.09 / 1.36

Source: Evaluation Team analysis.

7.2.2 Development of the Evaluation Research Gross Realization Rate

The Evaluation Research Gross Realization Rate for the EPY5 Residential ES Lighting program is calculated as the ratio of the Evaluation Research Gross program savings over the Verified Gross Program Savings. The overall Evaluation Research Gross Realization Rate for EPY5 was estimated to be 109%.

7.2.3 Evaluation Research Gross Program Impact Results

The total EPY5 Residential ES Lighting Program evaluation research gross savings is estimated to be 417,078 MWh, 375.9 MW, and 44.5 Peak MW. Table 7-2 below shows evaluation research gross savings by bulb type and overall, and presents the evaluation research gross realization rates that associated with these impact estimates.

³⁵ Development of these Energy and Demand IE estimates is provided in Appendix 7.2.2.

Table 7-2. EPY5 Evaluation Research Gross Impact Savings Estimates

	Gross Energy Savings (MWh)	Gross Demand Savings (MW)	Gross Peak Demand Savings (MW)
Bulb Type Evaluation Research Gross Savings			
Standard CFLs	369,582	334.2	39.2
Specialty CFLs	44,725	39.1	5.0
CFL Fixtures	521	0.5	0.1
LED Bulbs	1,135	1.0	0.1
LED Fixtures	908	0.9	0.1
Coupons	207	0.2	0.0
Total	417,078	375.9	44.5
Evaluation Research Gross Savings Realization Rate			
Standard CFLs	104%	107%	104%
Specialty CFLs	129%	133%	129%
CFL Fixtures	108%	112%	109%
LED Bulbs	72%	74%	73%
LED Fixtures	75%	78%	76%
Coupons	105%	108%	105%
Total	106%	109%	106%

Source: Evaluation Team analysis.

As the table above shows, the Evaluation Research gross realization rates range from a low of 72% for LED bulbs to a high of 133% for Specialty CFLs, with the realization rate across all bulbs being between 106% and 109%. The primary differences between the Verified Savings and Evaluation Research parameters were the following:

- Specialty Bulbs - The Evaluation Research delta watts estimates were nearly 20% higher than the deemed specialty bulb delta watts estimate (36.5 vs. 31.0). As explained in the Evaluation Research impact findings memo in Appendix 7.7.2,³⁶ this is the result of applying a technology-neutral bulb-type, bulb shape and directionality specific lumen mapping. Additionally, the installation rates estimated for Specialty CFLs based on EPY5 in-store intercept surveys were 15% higher than the deemed estimates (92% vs. 79.5%).
- LED Bulbs and Fixtures - The primary difference between the Evaluation Research estimate of gross savings and Verified Savings estimate was driven by the delta watts estimate. The

³⁶ PY5 ComEd Residential Lighting Impact Findings, dated October 7th, 2013. This memo has been included in Appendix 0.

Evaluation Research delta watts estimate was around 70% lower for LED bulbs and fixtures than the deemed delta watts estimate for the same reason as explained above for Specialty CFLs.

- Interactive Effects Estimates – The evaluation Research estimates of Interactive effects were lower than the deemed estimates as they used ComEd customer data (albeit not specific to those customers purchasing PY5 program bulbs) to adjusted the IE estimates to account for bulbs installed in MF homes (which have lower IE). They also attempted to include the impact of heating penalties resulting from customers who have electric heat.
- Overall - The overall 109% realization rate for the Evaluation Research gross impacts was primarily driven by the increased installation rates found in EPY5 compared to what was deemed in the TRM for EPY5 (78% versus 71% across all bulb types).

7.2.4 Net Program Impact Results

On July 19th, 2013 the evaluation team submitted a memo to ComEd and the ICC that contained a detailed assessment of the Evaluation Research Net Impact parameter estimates. This memo was revised, updated and resubmitted to ComEd on October 8th.³⁷ It has been included as Appendix 7.7.1 in this report and should be referenced for complete details surrounding the estimation of the Evaluation Research Net Impact parameters presented below.

In EPY5, both free-ridership and spillover were explored during the in-store intercept surveys. The evaluation team calculated free-ridership and spillover estimate for both standard and specialty CFLs for each intercept respondent purchasing standard or specialty CFLs. The customer level estimates were then weighted by the quantity of program bulbs purchased by that individual and grouped by retailer type to come up with retailer type estimates of free-ridership. These estimates were then weighted by the proportion of the total EPY5 bulb sales each retailer type represented to come up with overall EPY5 free-ridership estimates for standard and specialty CFLs. The specialty CFL NTGR results were also applied to LED program bulbs since the volume of LED purchasers was not large enough in EPY5 to support a distinct LED NTGR. Overall program average NTGR were applied to LED and CFL fixtures which in total made up 0.3% of EPY5 sales. The table below shows the free ridership, spillover and resulting NTGR estimates that were calculated using the self-report method and data collected during the in-store intercept surveys. These NTGR estimates were used to calculate EPY5 Evaluation Research net savings.

³⁷ Complete details on Evaluation Estimated Net Savings parameters are included in the memo titled, *PY5 ComEd Residential Lighting NTG Results*, dated October 8th, 2013. This memo is included in Appendix 7.6.1.

Table 7-3. EPY5 Evaluation Research Net Savings Parameters

EPY5 Evaluation Research Net Savings Parameters	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
Free Ridership	0.47	0.53	0.48	0.53	0.48	0.47	0.48
Part Spillover	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NonPart Spillover	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Total Spillover	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Eval Research NTGR	0.55	0.48	0.54	0.48	0.54	0.55	0.54

Source: Evaluation Team analysis

Table 7-4 below shows the Evaluation Research NTGR estimates over the past three program years (EPY3, EPY4, EPY5), along with the EPY5 Deemed NTGR. As this table shows the Evaluation Research NTGR estimates from the past two program years (EPY4 and EPY5) were nearly identical. The estimate from EPY3 and the EPY5 deemed estimate (based partially on the EPY3 estimate) were significantly higher.

Table 7-4. Evaluation Research Net Savings Parameters

Evaluation Research NTGR Estimates	Stan. CFLs	Spec. CFLs	CFL Fixtures	LED Bulbs	LED Fixtures	Coupon Sales	Total
EPY5 Eval Research NTGR	0.55	0.48	0.54	0.48	0.54	0.55	0.54
EPY4 Eval Research NTGR	0.55	0.44	0.54	0.54	0.54	0.55	0.54
EPY3 Eval Research NTGR	0.71	0.71	0.71				0.71
EPY5 Deemed NTGR	0.72	0.80	0.79	0.80	0.79	0.72	0.73

Source: Evaluation Team analysis

Using the Evaluation Research NTGR values, the evaluation calculated verified net savings of 225,234 MWh, 203.1 MW, and 24.0 Peak MW as shown in the following table. As Table 7-5 shows the Evaluation Research Net energy savings estimates are only 78% of the Verified Savings Net estimate (and 74% of the Ex Ante Net savings estimate) despite the fact that the Evaluation Research Gross energy saving were actually 6% higher than the Verified Savings Gross estimates. The reason for this sharp decline in the net realization rate between the Evaluation Research and the Verified Savings is the result of the overall Evaluation Research NTGR being only 74% of the deemed Verified Savings NTGR ($0.54 / 0.73 = 74\%$). Specialty CFL and LED bulbs had the largest difference of NTGR estimates with the Evaluation Research NTGR estimates being only 61% of the deemed NTGR (0.48 vs. 0.80) and Standard CFLs had the smallest difference with the Evaluation Research NTGR estimates being 76% of the deemed NTGR (0.55 vs. 0.72).

Table 7-5. EPY5 Evaluation Research Net Impact Savings Estimates

	Net Energy Savings (MWh)	Net Demand Savings (MW)	Net Demand Savings (MW)
Bulb Type Evaluation Research Net Savings			
Standard CFLs	202,116	182.8	21.4
Specialty CFLs	21,684	19.0	2.4
CFL Fixtures	281	0.3	0.0
LED Bulbs	550	0.5	0.1
LED Fixtures	490	0.5	0.1
Coupons	113	0.1	0.0
Total	225,234	203.1	24.0
Evaluation Research Net Savings Realization Rate³⁸			
Standard CFLs	79%	81%	79%
Specialty CFLs	78%	80%	78%
CFL Fixtures	74%	76%	74%
LED Bulbs	44%	45%	44%
LED Fixtures	52%	53%	52%
Coupons	80%	82%	80%
Total	78%	81%	79%

Source: Evaluation Team analysis.

7.2.5 EPY6 Verified Savings Carryover Savings Estimate

Calculation of the EPY6 Verified Savings carryover estimate relies upon the IL TRM (v 1.0 and 2.0) and the EPY4 and EPY5 reports. At this time all of these data sources are available except and thus it is possible to estimate the gross and net carryover energy savings that will be counted in EPY6. The energy and demand savings from these EPY4 and EPY5 late installed bulbs are calculated based on the following parameters:

- Delta Watts – Verified Savings estimate from the year of installation (source: IL TRM v2.0)
- Res/NonRes Split - Evaluation Research from the year of purchase (EPY4 and EPY5 Report)
- HOU and Peak CF – Verified Savings estimate from the year of installation (source: IL TRM v2.0)
- Energy and Demand IE – Verified Savings estimate from the year of installation (source: IL TRM v2.0)

³⁸ Evaluation Research Net Savings Realization Rate is Evaluation Research Net Savings estimate divided by the Verified Savings Net Savings estimate.

- Installation Rate - Verified Savings estimate from the year of purchase (source: EPY4 report and IL TRM v1.0)
- NTGR – Evaluation Research from the year of purchase (EPY4 and EPY5 Report)

Table 7-6 below shows that the gross savings from the than 3.26 million bulbs sold in EPY4 or EPY5 and installed in EPY6 is estimated to be 176,194 MWh and the net savings is estimated to be 95,185 MWh.

Table 7-6. EPY6 Carryover Savings Estimates

PY6 Verified Savings Carryover Estimate	PY4 Program Bulbs	PY5 Program Bulbs	Total PY6 Carryover
Program Bulbs Installed During PY6	1,660,241	1,606,495	3,266,736
Average Delta Watts	45.1	44.6	44.8
Average Daily Hours of Use	3.22	2.92	3.07
Peak Load Coincidence Factor	0.12	0.11	0.11
Gross kWh Impact per unit	53.0	47.5	50.3
Gross kW Impact per unit	0.05	0.04	0.04
Installation Rate	100%	100%	100%
Energy Interactive Effects	1.07	1.07	1.07
Demand Interactive Effects	1.15	1.15	1.15
PY6 Carryover Gross Energy Savings (MWh)	94,357	81,837	176,194
PY6 Carryover Gross Demand Savings (MW)	74.8	71.6	146.5
PY6 Carryover Gross Peak Demand Savings (MW)	10.5	8.7	19.2
Net-to-Gross Ratio	0.54	0.54	0.54
PY6 Carryover Net Energy Savings (MWh)	50,811	44,374	95,185
PY6 Carryover Net Demand Savings (MW)	40.3	38.8	79.1
PY6 Carryover Net Peak Demand Savings (MW)	5.7	4.7	10.4

Source: Evaluation Team analysis.

7.3 Detailed Process Results

The process evaluation of the EPY5 Residential ES Lighting Evaluation assessed the impact of program processes (e.g., the mechanics of how the program was implemented) on residential lighting consumers who participated in the program. For these consumers, we examined the reach of program marketing, usage of CFLs and purchasing decisions, awareness of bulb types, federal regulatory changes, and program discounts, and barriers to purchasing CFLs. The primary data sources for the process evaluation were the in-store intercept surveys (n=792)³⁹ and the in-store shelf surveys (n=28).

Table 7-7 below shows the distribution of in-store intercept respondent's bulb purchases by retailer type. This table is at a bulb level so respondent bulb purchases, both program and non-program, are included in the table below. As this table shows, overall nearly 50% of the bulbs that respondents were buying were CFLs (standard or specialty and program or non-program) and 40% were incandescent (this is up from 30% in EPY4). Program LED sales were very low due to the timing with which the intercept surveys were conducted in EPY5. The intercept surveys were conducted in April and May of 2013, very near the end of the program year, at this time LED incentives were only still available at two program retailers (and one of the retailers where intercepts were conducted). The distribution of bulbs purchased by intercept respondents at Big Box and DIY retailers were quite similar with roughly a third of intercept respondents purchasing program bulbs. Sales of program bulbs to intercept survey respondents were much higher at Warehouse stores as the retailer visited no longer sells incandescent bulbs which made up 67% of non-program bulb sales at DIY stores and 84% of non-program bulb sales at Big Box stores.

Table 7-7. Distribution of In-store Intercept Respondent Bulb Purchases by Retailer Type

Program vs. Non Program	Bulb Type	Big Box		DIY		Warehouse		Total	
		Bulbs Sold	%						
Program Bulbs	Standard CFLs	280	30%	632	22%	762	84%	1,674	36%
	Specialty CFLs	46	5%	209	7%	62	7%	317	7%
	LED ⁴⁰	0	0%	12	0%	0	0%	12	0%
	Total	326	35%	853	30%	824	91%	2,003	43%
Non-Program Bulbs	Incandescent	514	55%	1,323	47%	0	0%	1,837	39%
	Halogen	46	5%	438	15%	42	5%	526	11%
	Non-program CFL	49	5%	129	5%	23	3%	201	4%
	LED	0	0%	96	3%	15	2%	111	2%
	Total	609	65%	1,986	70%	80	9%	2,675	57%

Source: In-Store Intercept Survey (PY5)

³⁹ 323 of the 792 respondents were purchasing at least one program bulb.

⁴⁰ No Big Box or Warehouse stores were offering incentives on LEDs at the time the in-store intercept surveys were conducted.

Table 7-8 below provides the average number of bulbs purchased by survey respondents across the various bulb types and program retailer types where intercepts were conducted. This table shows that on average, across all bulb types, survey respondents again tended to purchase higher volumes of bulbs at Warehouse stores (8.9 per respondent). DIY and Big Box stores had lower average bulb sales (5.6 and 5.0). Overall, the average number of bulbs purchased per intercept survey respondent remained very similar to last year (5.3 in EPY4 and 5.9 in EPY5), as did the average number of standard, specialty, incandescent and LED bulbs purchased. The only change found between EPY4 and EPY5 was an increase in the average quantity of halogen bulb purchases per respondent (increased from 4.2 in EPY4 to 6.7 in EPY5). This finding is not surprising as customers become more familiar with the new halogen technology and EISA legislation continues to make standard incandescent bulbs less available.

Table 7-8. Average Number of Bulbs Purchased per Intercept Respondent by Retailer Type

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stan CFL	Spec CFL	LED ⁴¹	Pgm Avg.	Stan CFL	Spec CFL	LED	Hal	Inc	NonPgm Avg	
Big Box	5.4	2.6	0.0	4.7	7.4	1.2	0.0	3.5	4.8	4.7	5.0
DIY	5.4	4.2	2.4	5.0	1.7	7.0	2.2	7.3	5.7	5.7	5.6
Warehouse	10.4	3.9	0.0	9.8	0.0	0.0	2.1	8.4	0.0	4.0	8.9
Total	6.9	3.8	2.4	6.2	4.0	3.4	2.2	6.7	5.4	5.4	5.9

Source: PY5 In-Store Intercept Survey

7.3.1 Program Implementation Strategy

The implementation strategy for the EPY5 Residential ES Lighting Program has not changed significantly from previous program years. Implementation details on items that have remained static over the course of the last program year include roles of the implementation contractors (APT and EFI), program delivery mechanisms and marketing strategies, and retail recruitment, education and outreach, see the EPY2 report.⁴²

7.3.2 Program Bulbs

In EPY5, APT and ComEd have continued to work to ensure that a wide variety of independently tested ES CFLs are available for the ComEd Residential ES Lighting program. As in EPY4, there were also a limited number of LED bulbs and LED fixtures were offered through the program in EPY5. Table 7-9 shows the distribution of program bulbs sold in EPY5 across the five bulb types and within specific product subcategories (base wattages for standard bulbs⁴³ and bulb type for specialty bulbs, LEDs, and fixtures). As this table shows, in EPY5 88% of the bulbs sold through the program were

⁴¹ No Big Box or Warehouse stores were offering incentives on LEDs at the time the in-store intercept surveys were conducted.

⁴² Navigant Consulting, 2010. *Energy Efficiency/Demand Response Plan Year 2 Evaluation Report: Residential Energy Star Lighting*. Prepared for Commonwealth Edison Company, December, 2010.

⁴³ Base wattages were determined using the Evaluation Research lumens based method described in the PY5 Residential Lighting Impacts Memo which is included in Appendix 7.6.1.

standard CFLs, 11% were specialty CFLs, and CFL fixtures, LED lamps and LED fixtures combined comprised less than 1% of sales (~0.6%). Within the standard CFL group, the majority of bulbs sold continued to be low-wattage CFLs (13 and 14-watts, with lumens equivalent to a 60-watt incandescent). In EPY4 these 60-watt replacement lamps comprised 76% of program bulb sales, and in EPY5 they decreased to 69% of total program bulb sales. Consistent with EPY3 and EPY4, most of the specialty CFLs sold in EPY5 were reflectors. Sales of standard CFLs in EPY5 decreased 2% from EPY4 while specialty bulb sales increased by 2%. LED sales (as a fraction of total bulb sales) did not increase appreciably from EPY4.

Table 7-9. Distribution of EPY5 Residential ES Lighting Program Sales across Bulb Types

Bulb Type	Product	% of Bulbs Sold	% of Bulbs Sold
Standard CFL	40 Watt Replacement	4.1%	88.4%
	60 Watt Replacement	69.1%	
	75 Watt Replacement	5.8%	
	72 (100) Watt Replacement	9.4%	
Specialty CFL	Reflector	6.7%	11.0%
	A-Lamp	1.2%	
	Candelabra	1.2%	
	Globe	1.1%	
	Other Specialty	0.8%	
LED	A-Lamp	0.1%	0.3%
	Globe	0.0%	
	Reflector	0.2%	
CFL Fixture	Fixture	0.1%	0.1%
LED Fixture	Fixture	0.2%	0.2%
Residential ES Lighting Program		100%	100%

Source: Evaluation Team analysis of EPY5 ComEd Tracking data

The process evaluation of the EPY5 Residential ES Lighting Evaluation assessed the program processes impacting residential lighting consumers who participated in the program. For these consumers, we examined the reach of program marketing, usage of CFLs and purchasing decisions, awareness of bulb types, federal regulatory changes, and program discounts, and barriers to purchasing CFLs. The primary data sources for the process evaluation include the in-store intercept surveys (n=792) and the in-store shelf surveys (n=28).

7.3.3 Prior Usage of CFLs and LEDs

Survey respondents purchasing program bulbs were asked about prior usage of CFLs and LED in their homes and businesses, and 91% reported they had CFLs installed in their homes and 88% reported they had CFLs installed in their businesses. These are very similar to the rates found in EPY4 (87% in homes and 88% in businesses). Table 7-10 below shows the self-reported prior purchasing experience that program and non-program bulb purchasers had with various bulb types. Ninety percent of those purchasing standard CFLs (program and non-program bulbs) reported they

had purchased them in the past, while fewer customers purchasing specialty CFLs and LEDs reported they had purchased them previously (67% and 70% respectively).⁴⁴

Table 7-10. Prior Purchasing of CFLs and LEDs by EPY5 Program Participants

Prior Purchases?	Standard CFL	Specialty CFL	LED
Yes	91%	67%	70%
No	9%	31%	30%
Don't Know	--	2%	--
N	260	112	56

Source: PY5 In-Store Intercept Survey

When asked about their bulb purchases over the past year, 36% of respondents reported that they had purchased incandescent bulbs, 35% had purchased CFLs, and fewer respondents had purchased halogen, fluorescent, and LED bulbs. Program bulb purchasers were more likely to have purchased CFLs within the past year than non-program bulb purchasers (49% versus 26%). Respondents who purchased CFLs (program and non-program) were asked if were planning to use their CFLs to replace incandescent bulb that was still in working order to start saving energy sooner. Forty-seven percent said that they would not use any of the CFLs that they purchased to replace incandescent bulbs, 29% reported that they were planning to use all of their CFLs to replace incandescent bulbs, and 19% said they would use at least some of their CFLs to replace incandescent bulbs. In EPY4, fewer respondents (39%) said that they would use the CFLs that they purchased to replace incandescent bulbs.

7.3.4 Effectiveness of Program Marketing

All in-store intercept respondents who were purchasing program CFLs were asked if they knew that they were purchasing a discounted bulb and if they knew that the discount was offered by ComEd. In EPY5, 56% of respondents said that they knew that they were purchasing discounted CFLs, with a higher awareness among Warehouse store customers compared to Big Box and DIY store customers, as shown in Table 7-11, below. Forty-three percent of respondents who were aware of the CFL discount knew that the discount was provided by ComEd. In total, 24% of EPY5 program participants reported they were aware of the CFL discounts offered by ComEd, which is an increase over the 15% who reported this in EPY4. Considerably fewer (11%) non-program bulb purchasers reported knowing about the ComEd lighting discount. Respondents who were purchasing program bulbs but reported they were not aware of the discount were asked if they thought the list price was low for CFLs and 61% reported that they thought it was low. It is somewhat surprising that so many customers continue to be unaware of the ComEd lighting program, as the EPY5 shelf surveys found that at 93% of program retailers (where intercepts were conducted) moderate to highly visible materials promoting ComEd’s CFLs discount program. Additionally, at 89% of the stores visited both the original and promotional prices were provided for program bulbs.

⁴⁴ We looked at the program and non-program participants’ prior purchase history separately and found that they followed the same trend that is reflected by the overall prior purchase experience in Table 7-18.

Table 7-11. Program Participants’ Self-Reported Awareness of Lighting Discounts

Aware of a CFL discount	Overall	Warehouse	DIY	Big Box
Yes	56%	80%	43%	57%
No	43%	19%	56%	43%
Don't know	1%	1%	1%	--
N	309	84	158	67

Source: PY5 In-Store Intercept Survey

As shown in Table 7-12, survey respondents who were purchasing program bulbs and were aware the bulbs they were purchasing were discounted by ComEd reported that they were made aware of the ComEd price discount as a result of a ComEd sticker on the shelf (41%). Other frequently reported sources of awareness of the ComEd CFL discounts being offered were seeing a retail lighting demonstration (28%), in-store marketing materials (16%), and a ComEd representative (12%). Based on the survey responses provided we are unable to determine exactly who the ComEd representatives were and where they interacted with the survey respondents. It was interesting to note that 89% of the non-program bulb purchasers who were aware of ComEd discounts reported that a ComEd representative was their source of awareness. The evaluation team hypothesized that possibly the respondents who reported a learning of the program through a ComEd representative had attended a demo event and were referring to the APT staff member who conducted the demo event as a ComEd representative. However, looking further into the data we found that while all of the program participants who reported hearing about the program through a ComEd representative purchased their program bulbs during a demo event, only 23% of non-program bulb purchasers bought these bulbs during a demo event. Therefore, it’s unclear how and where the respondents received information from a ComEd representative and whether the representatives’ presence was linked with in-store marketing.

Table 7-12. Respondents Self-Reported Method of Learning about ComEd Discounts

Source of ComEd Discount Awareness	Purchasing Program Bulbs	Not Purchasing Program Bulbs	Overall
ComEd sticker on the shelf	41%	0%	24%
Saw a retail lighting demonstration	28%	0%	16%
In-store Marketing Materials (unspecified)	16%	2%	10%
ComEd Representative	12%	89%	44%
Store Employee	4%	0%	2%
Internet	0%	5%	2%
Utility Bill	0%	2%	1%
Friend	0%	2%	1%
N	76	55	131

Source: PY5 In-Store Intercept Survey

All intercept respondents who were purchasing program CFLs were asked whether or not they had seen any information or displays about CFLs in the store. Table 7-13 below shows that most respondents (67%) reported they had not seen any in-store information about CFLs. A greater percentage (72%) of DIY shoppers were unaware of the in-store marketing materials compared to warehouse and big box store shoppers (53% and 58%, respectively), which indicated that the marketing materials may have been less apparent in DIY stores than the other locations where in-store intercepts occurred. Fifty five percent of customers who saw CFL information in the store reported that it was provided by ComEd, 25% did not know who sponsored the CFL information, and the remaining 20% reported it was sponsored by the retailer.

Table 7-13. Program Purchaser Self-Reported Awareness of CFL In-Store Materials

Awareness of CFL In-Store Materials	Overall	Warehouse	DIY	Big Box
Yes	36%	47%	28%	42%
No	64%	53%	72%	58%
N	309	85	164	67

Source: In-Store Intercept Survey (PY5)

The majority (65%) of respondents who purchased program bulbs and saw CFL information or displays in the store, reported that materials were extremely influential. Overall, the specialty CFL purchasers found the marketing materials to be less influential compared to standard CFL purchasers, as shown in Table 7-14. Based on respondent’s self-reported ratings, the in-store marketing materials were most influential in big box stores and the least influential in DIY stores, which indicates that the marketing materials may have been more prevalent or apparent in big box stores compared to other stores.

Table 7-14. Influence of CFL In-Store Materials

	Overall	Warehouse	Big Box	DIY	Standard	Specialty
Not Very Influential (0 to 3)	14%	10%	11%	20%	13%	28%
Moderately Influential (4 to 6)	21%	28%	7%	23%	21%	10%
Extremely Influential (7 to 10)	65%	62%	82%	57%	66%	62%
N	111	39	28	44	89	29

Source: PY5 In-Store Intercept Survey

As mentioned in previous sections of this report, in addition to the in-store intercept survey, the evaluation team conducted lighting shelf surveys at the 28 retail stores where the intercept surveys were conducted. As shown in Table 7-15 below, informational materials concerning CFL bulbs and discounts available on their purchase were found at the vast majority of program retailers. Informational materials on LED bulbs were found at all DIY stores, but very low percentages of Big Box and Warehouse stores. While information on EISA regulations continued to be quite low (overall 15% in EPY5 and 10% in EPY4), materials that explained Lumens was quite high (70% across all program stores). In the age of EISA 2007, with new bulb types coming on the market to replace bulbs

being phased out, consumers understanding of lumen output will become increasingly important to be able to select the appropriate bulbs for different locations in the home.

Table 7-15. In-Store Informational Materials Present

Informational Materials Present	Overall	Big Box	DIY	Warehouse
Information on CFL Discounts	93%	100%	93%	80%
Information on CFL Bulbs	89%	86%	93%	83%
Information on LED Bulbs	65%	17%	100%	20%
Information on EISA Regulations	15%	14%	20%	0%
Explanation of Lumens	70%	71%	80%	40%
Information on Proper CFL Disposal	44%	0%	80%	0%
N	28	7	15	6

Source: PY5 Shelf Surveys

7.3.5 Customer Purchasing Decisions

The influence of in-store marketing materials can also be seen by comparing customers’ purchase plans against their eventual purchases. Table 7-16 shows that 79% of the in-store intercept survey respondents reported that they had planned to buy light bulbs when they came to the store; 31% of these respondents were planning on buying CFLs exclusively, 58% planned to buy only non-CFLs, while another 2% planned to buy CFLs combined with other bulb types. Nearly all who intended to purchase CFLs exclusively at the time they entered the store did purchase CFLs only. Similarly, the majority of respondents who planned to purchase only non-CFL bulbs followed through with their plan, with the exception of 11% who ended up purchasing CFLs either exclusively or in combination with other bulbs. Forty percent (n=15) of the customers who planned to purchase a combination of CFLs and non-CFLs changed their plan and purchased CFLs exclusively. All but one of these respondents reported either seeing in-store materials or hearing about the lighting discount from a store employee. This indicates that the in-store marketing may have influenced these customers to change their purchase decision.

Table 7-16. CFL Purchase Intentions and Actual Purchases

Purchasing Intentions	(n=792)
Planned on purchasing light bulbs prior to entering the store	79%
Of them, planned on purchasing...	(n = 629)
CFLs only	31%
CFLs and another type of bulb	2%
Bulbs other than CFLs	58%
Don't know	9%
Ended up purchasing what they intended...	(n = 572)
CFLs Only	95%
CFLs and another type of bulb	40%
Bulbs other than CFLs	89%

Source: PY5 In-Store Intercept Survey

Respondents were asked about the factors that influenced their decision to purchase CFLs and their responses did not point to any one factor that significantly influenced the customers' purchase decisions over others. In EPY5, the top three factors that customers said most influenced their decision to buy CFLs included: reduced energy use (23%), electricity bill savings (22%), and longevity of CFLs (22%); however, longevity was also rated as one of the least influential factors, along with price and the environmental impact of using CFLs, as shown in Table 7-17 below.

Table 7-17. Factors Influencing CFL Purchase Decisions

Influence Factor	Most Important	Least Important
The energy used by CFLs	23%	9%
The monthly bill savings resulting from using CFLs	22%	12%
How long the CFLs will last	22%	21%
The purchase price of CFLs	13%	22%
The light quality that CFLs produce	12%	16%
The environmental impact of using CFLs	8%	20%

Source: PY5 In-Store Intercept Survey

Respondents who purchased more than one type of bulb during their current shopping trip were asked what percentage of the total bulbs that they had purchased in the past year were incandescent, CFL, halogen, and LED bulbs. The majority of respondents reported that incandescent bulbs made up less than 35% of their bulb purchases, halogens made up less than 20% of their purchases, and LEDs made up less than 10% of their purchases. Respondents reported that CFLs made up at least 25% of their bulb purchases, and 55% of respondents said that CFLs made up 40-75% of their bulb purchases

in the past year. Overall, respondents who purchased a mix of bulbs tended towards CFLs, but when asked why they were purchasing more than one type of bulb, 60% said that they needed multiple bulbs and it's too expensive to only buy CFLs. When the respondents were asked if the price of CFLs were the same as, or less than, the price of an incandescent or halogen bulb, how likely they would be on a scale from zero to 10 (with 0 being not likely and 10 being extremely likely) to purchase all CFLs, 65% of respondents gave a score of 8 or higher.

Another interesting survey finding is that 93% of respondents purchasing standard CFL opted for ComEd discounted program bulbs, while only 74% of respondents purchasing specialty CFLs selected program bulbs. The primary reason that specialty CFL purchasers provided for not purchasing program CFLs was that they had no knowledge of the discount (46%). Other reasons provided included not finding any discounted CFLs in the specialty type they needed (25%) and having prior experience with another model (13%).

7.3.6 Barriers to CFL Use

Forty-eight percent of the customers completing an in-store intercept survey (all of whom were purchasing light bulbs) did not purchase CFL or LED bulbs, and the majority of these respondents (94%) reported that they had not considered purchasing any CFLs during their current shopping trip (n=377). When the respondents were asked why they weren't purchasing CFLs, the top self-reported reason was their need for a different type of specialty bulb (22%). In EPY4, significantly more respondents (41%) cited the need for other specialty bulbs as their reason for not purchasing CFLs, which may indicate that people have become more familiar with the variety of CFLs in the meantime and are beginning to buy specialty CFLs to replace specialty incandescent bulbs.

Many customers who didn't purchase CFLs reported being deterred due to their familiarity with/prior use of incandescent bulbs (16%), dislike for the way CFLs look (14%), and dislike for CFL's light quality (13%). The respondents who reported that they didn't like the look of CFLs were asked why they didn't choose to purchase a glass case to make the CFL look more like incandescent bulbs. The majority of the respondents either said that they didn't know a cover was available for their CFLs (39%) or that CFLs with a glass covering were too expensive (30%).

Table 7-18, presents the barriers to purchasing CFLs reported by survey respondents. As this table shows, very few Warehouse store respondents are included in this analysis because the Warehouse retailer where intercepts were conducted primarily sold CFL and thus there were few non-CFL purchasers surveyed.

Table 7-18. Barriers to CFL Purchase

Reasons for not buying CFLs	Overall	DIY	Big Box	Warehouse
Needed other specialty bulb (including needed a dimmable, 3-way, or exterior bulb)	22%	23%	21%	40%
Accustomed to incandescent bulbs	16%	14%	20%	0%
Don't like the way CFLs fit or look in fixtures	14%	14%	17%	0%
Dislike the light quality/color of CFLs/flicker	13%	12%	15%	20%
CFLs are too expensive	10%	10%	8%	0%
CFLs take too long to reach full brightness	7%	8%	4%	0%
Don't know enough about CFLs/Not aware of CFLs before today	7%	8%	8%	0%
Mercury/Dangerous	3%	3%	3%	0%
Already have some/Don't need any	3%	3%	1%	0%
Don't Know	2%	2%	1%	0%
Other/misinformed	3%	3%	1%	20%
CFLs burn out too quickly	1%	0%	3%	20%
N	457	325	127	5

Source: PY5 In-Store Intercept Survey

7.3.7 EISA 2007

EISA raises the energy efficiency standards for incandescent lighting over time and will impact consumer lighting purchase behavior. During the intercept survey, respondents were asked a series of questions aimed at assessing awareness and familiarity with EISA 2007 and how it has, or respondents anticipate it will, impact their future lighting purchases. Survey respondents were first provided with a brief description of EISA and were asked whether or not they had heard of the new standards. Sixty-four percent said they were aware of the law, which is an increase over the last two program years (53% in EPY4 and 35% in EPY3). In EPY5, 94% of respondents who had heard of EISA said that they were somewhat or very familiar with the law. Knowledge of EISA did not seem to impact purchase behavior among the survey respondents. Customers who were unaware of EISA (n=279) were just as likely to buy CFLs, Halogen bulbs or incandescent bulbs as those who were unaware (n=507). LED bulbs were purchased slightly more frequently by respondents who were familiar with EISA, however the sample size of LED purchasers was quite small and thus this finding was not statistically significant.

During the survey respondents were read an explanation⁴⁵ of how the law affected 100-watt bulbs in 2012 and 75-watt bulbs in 2013 so they could be asked a series of questions about their past and likely future actions in response to this change. When asked if they stocked up on 100-watt incandescent bulbs while they were still available, 84% of respondents said no. Similarly, 80% of respondents said they did not plan to stock up on 75-watt bulbs before they are no longer available in stores.

As shown in Table 7-19 below, when asked what type of bulb respondents would buy the next time a 75- or 100-watt light bulb is needed, 51% said they would buy a CFL with equivalent light output, 16% said they would buy a lower watt standard incandescent, 9% said they would buy an LED, and 7% said they would buy a halogen bulb. It’s interesting to note that this represents a decrease from EPY4 in the percentage of people who thought that they would buy a halogen bulb (35% in EPY4) and an increase in those who thought that they would buy a CFL (31% in EPY4). It was not surprising that few respondents reported that they would replace their incandescent bulbs with halogen bulbs, because two-thirds of respondents said that they had never heard of or seen halogen bulbs. The table below, also shows that Warehouse store shoppers reported being much more likely to purchase a 75- and 100-watt equivalent CFLs and much less likely to purchase a standard incandescent bulb than Big Box and DIY store shoppers, which is likely the result of the Warehouse stores included in the intercept sample no longer selling standard incandescent bulbs.

Table 7-19. Respondent Self-Reported 75-watt and 100-watt Purchasing Plans Post EISA

What Will You Purchase Next Time You Need a 75-watt or 100-watt Bulb?	Overall	Warehouse	DIY	Big Box
75 or 100-watt equivalent CFL	51%	77%	45%	53%
Lower wattage standard incandescent	16%	2%	17%	20%
Equivalent light LED bulb	9%	6%	12%	1%
Equivalent light Halogen bulb	7%	5%	7%	9%
Don't Know	17%	10%	19%	17%
N	792	102	503	187

Source: PY5 In-Store Intercept Survey

As mentioned previously, the EPY5 shelf surveys focused on all medium-screw based (MSB) lamps that would replace standard or specialty incandescent bulbs.⁴⁶ The table below shows some key findings from the EPY5 shelf surveys. Across the 28 stores surveyed, CFLs (including a-lamp and dimmable CFLs, program and non-program CFLs) accounted for 48% of the unique packages of standard incandescent replacement bulbs inventoried.⁴⁷ Incandescent bulbs made up 30% of the unique packages, LEDs made up 10% and Halogen bulbs made up the remaining 10%. CFLs were

⁴⁵ Respondents were read the following description, “Last year, the law affected 100-watt incandescent light bulbs and this year it affects 75-watt bulbs. Once stores sell through their existing inventory of standard 75 watt incandescent bulbs, you will no longer be able to purchase them.”

⁴⁶ This is a change from EPY4 shelf surveys that focused solely on 75 and 100-watt standard incandescent equivalent bulbs only.

⁴⁷ These results are not weighted by the approximately number of packages of each bulb inventoried.

much more prevalent in the 100-watt category where very few incandescent bulbs remain and no LEDs exist. Similarly, halogen bulbs are also more prevalent in the 100-watt category as a replacement for incandescent bulbs post EISA. It is interesting to note that 6-months after the EISA standards change went into effect for 75-watt bulbs, 26% of the unique packages on the shelf in that wattage category are still incandescent bulbs and halogens only make up 11% of the unique packages inventoried. In the standard 60-watt category (where 69% of program bulbs fall) just under half of the available unique packages are CFLs. The distribution of specialty reflector bulbs (which make up 6.7% of EPY5 program bulbs) is quite different than that of standard bulbs, with halogen bulbs being the most common bulb type (33%), followed by LEDs (at 30%), CFLs and lastly incandescent bulbs.

Table 7-20. Distribution of Standard and Reflector Bulbs on Store Shelves

Unique Packages Inventoried	Standard Replacement Bulbs					Reflector Bulbs
	40W	60W	75W	100W	Overall	
CFL	32%	48%	54%	73%	48%	23%
Incandescent	45%	30%	26%	4%	30%	14%
LED	15%	14%	9%	0%	11%	30%
Halogen	7%	8%	11%	23%	10%	33%

Source: ComEd Shelf Surveys Survey (PY5)

7.3.8 LED Usage and Awareness

LEDs are often mentioned as the next alternative lighting technology and a potential direction for utility lighting programs. We asked some questions during the in-store intercept survey to gauge ComEd lighting purchasers’ current awareness level and usage of LEDs. At the time of the in-store intercepts only two program retailers were offering ComEd discounts on LEDs (and only one of these retailers allowed intercept surveys to be conducted in their stores), so the majority of the data collected during these intercepts does not capture effects stemming from ComEd sponsored LED price incentives. In total, 5 of the 792 respondents surveyed were purchasing program LED bulbs⁴⁸ and 51 of the 792 were purchasing non-program LEDs.

In EPY5, 70% of respondents purchased LEDs or reported that they were familiar with LED bulbs , which is an increase from EPY4 when only 58% of respondents either purchased or reported familiarity with LEDs. In total, 33% of those surveyed were either purchasing an LED to install in their home or indicated they had previously installed an LED bulb in their home or business. Those who had not purchased an LED in the past were asked about their barriers to purchasing LEDs and the majority reported that the price of LEDs was too high (54%), they were unfamiliar with LED technology (19%), or they disliked the look of LEDs (10%).

Data from the shelf surveys completed as part of this evaluation indicated that LED bulbs are currently fairly prevalent at program retailers. One hundred percent of DIY and Warehouse stores inventoried carried LED bulbs and more than 70% of Big Box stores also carried LEDs. LED bulbs

⁴⁸ Due primarily to the fact that few LED bulbs were being incentivized at the time the intercept surveys were being conducted.

made up 38% of the unique packages⁴⁹ available at Warehouse stores, 19% at DIY stores and 3% at Big Box stores. The most common type of LED available was reflectors (56% of the unique packages across all retail stores), followed by standard bulbs (37%). The availability of Globe and Candelabra LEDs was quite limited (both comprising less than 5% of total LEDs available). The average incandescent replacement wattage of a reflector LED was 70 watts, and the average wattage of a standard replacement LED was 64 watts. All reflector LEDs were sold in single packs and all but four of the 185 unique standard LED packages were single packs. The average retail price (after discounts were applied) for a reflector LEDs was nearly \$32, and the average retail price for a standard LED was nearly \$20. Approximately 10% of the LEDs inventoried were discounted, the majority of these discounts (>80%) were provided by the retailer, not ComEd since as mentioned only one of the retailers included in the shelf survey sample was still offering LED incentives when the shelf surveys were conducted.

⁴⁹ Unique packages are per individual retail store (i.e. if the package is present at multiple DIY stores it is included in these counts multiple times).

7.4 Future Deemed Recommendations

7.4.1 TRM Recommendations

Recommendation for TAC regarding Updates to the PY7 IL TRM

The evaluation team recommends updating the IL TRM based on 3-year rolling averages. In the course of our EPY5 research, the evaluation team conducted research on the parameters used in impact calculations including those in the Illinois TRM (TRM v1.0). Some of those parameters are eligible for deeming for future program years or for inclusion in future versions of the TRM. The evaluation team’s parameters recommended for future use are shown in the following table. It should be noted that including a 3-year rolling average of research findings in the TRM reduces volatility that a single year of research could introduce and ensures that the most recent evaluation research estimates are being applied. However, it should be noted that if a significant change is made to the Residential Lighting Program that would render the 3-year rolling average inappropriate and justifiably warrants a change to the parameter estimate away from a 3-year rolling average this should be considered.

Table 7-21. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Res/NonRes Split ⁵⁰	97% / 3%	3-year rolling average of Evaluation Research Findings
Standard and Specialty CFL Installation Rates	ComEd: 71.9% Standard CFL 81.7% Specialty CFL	3-year rolling average of Evaluation Research Findings

Source: Navigant analysis.

The Res/NonRes split is included in the IL TRM beginning in Version 2.0 (Effective June 1, 2013). Including this parameter as a deemed value in the TRM helps improve the verified savings realization rate by removing the uncertainty that surrounds this estimate within the calculation of verified savings. In Version 2.0 of the IL TRM the Res/NonRes split is deemed at 96%/4% “based on a weighted (by sales volume) average of ComEd PY3 and PY4 and Ameren PY5 in-store intercept survey results.”⁵¹ The evaluation team recommends updating the deemed Res/NonRes split annually based on a rolling 3-year average from the most recent evaluation research findings from ComEd and Ameren. It is not possible at this time to estimate what the statewide deemed Res/NonRes split would be for Ver. 3.0 due to the lack of Ameren IL data; however, the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table 7-22 below.

⁵⁰ Residential/Nonresidential (Res/NonRes)

⁵¹ IL TRM Ver. 2.0 at p. 500.

Table 7-22. 3-Year Average Res/NonRes Split for ComEd

Program Year	Bulbs	Res/NonRes
EPY3	11,197,862	97% / 3%
EPY4	12,649,030	95% / 5%
EPY5	10,897,894	98% / 2%
3-year Weighted Average for EPY7	-	97% / 3%

Source: Navigant team analysis.

Version 1.0 and 2.0 of the IL TRM cite the source of first-year Installation Rate of standard and specialty CFLs as a “review of EPY1-EPY3 evaluations from ComEd and Ameren (see ‘IL RES Lighting ISR.xls’ for more information. The average first year ISR for each utility was calculated weighted by the number of bulbs in each year’s survey. This was then weighted by annual sales to give a statewide assumption”. The evaluation team recommends updating the deemed installation rates for CFLs annually based on a rolling 3-year average from the most recent evaluation research findings (from both ComEd and Ameren IL when available). This would insure the deemed installation rates are reflective of the most recent data available. It is not possible at this time to estimate what the statewide deemed installation rate would be for Ver. 3.0 due to the lack of Ameren IL data, however the table below provides three years of evaluation research results for the ComEd program which could be used to estimate the statewide assumption. This is shown in Table 7-23 below.

Table 7-23. 3-Year Average Standard and Specialty Installation Rates for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	ISR	Bulbs	ISR
EPY3	9,886,359	70.4%	1,218,595	77.7%
EPY4	11,419,752	69.7%	1,097,670	75.5%
EPY5	9,633,227	76.0%	1,197,896	91.6%
3-year Weighted Average for EPY7	-	71.9%	-	81.7%

Source: Navigant team analysis.

7.4.2 SAG Recommendations

Recommendation for SAG regarding the PY7 NTGR estimate for ComEd

The NTGR for EPY5 was deemed based on a Statewide Advisory Group process. This process historically has been referencing the most recently available evaluation-based NTGR estimate (which is typically from the evaluation two years prior, which was EPY3 for the deemed EPY5 estimate) as one of the primary inputs for the deemed NTGR estimate. The evaluation team recommends utilizing a weighted rolling 3-year average of the standard and specialty CFL evaluation based NTGR estimate going forward in this process. This rolling average would provide some consistency from year-to-year and would ensure that the NTGR results from any one single year do not drastically alter the resulting net savings. It should be noted that if a significant change is made to the Residential Lighting Program that would render the 3-year rolling average NTGR inappropriate, and would justifiably warrant a revised NTGR estimate away from the 3-year rolling average, this should be considered.

Table 7-24 below provides three years of evaluation research NTGR estimates for Standard and Specialty CFLs, as well as the 3-year weighted averages which are the recommended EPY7 NTGR parameter estimates.

Table 7-24. Year Average Standard and Specialty NTGR for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	NTGR	Bulbs	NTGR
EPY3	9,893,196	71%	1,217,723	60% ⁵²
EPY4	11,419,752	55%	1,097,670	44%
EPY5	9,633,227	55%	1,197,896	48%
3-year Weighted Average for EPY7	-	60%	-	51%

Source: Navigant team analysis.

⁵² In PY3, NTGR was not estimated separately for Standard and Specialty CFLs. In order to estimate a 3-year rolling average NTGR estimate for Specialty CFLs, the PY3 NTGR estimate was multiplied by the ratio of the average PY4 and PY5 Specialty CFL NTGR estimates over the average PY4 and PY5 Standard CFL NTGR estimates. The resulting ratio was 85%. Applying this ratio to the PY3 NTGR estimate (71%) results in a PY3 NTGR estimate (85%*71% = 60%) which the evaluation team believes more accurately reflects the NTGR estimate for Specialty CFLs.

7.5 Data Collection Instruments

7.5.1 EPY5 In-store Intercept Survey Instrument

COMED PY5 LIGHTING INTERCEPT SURVEY

Customer Bulb Inventory

(RECORD UP TO 12 PACKAGES ALWAYS START WITH THE CFL PACKAGE WITH THE HIGHEST NUMBER OF BULBS. ALWAYS PRIORITIZE CFLS OVER OTHER BULB TYPES)

Q0. Enter Retailer

1. Home Depot
2. Lowe's
3. Sam's Club
4. Wal-Mart

Q1. Record Bulb Type

Bulb Type	Package 1	Package 2	Package 3	Package 4
CFL				
Incandescent				
Halogen				
LED				

Q2. Record number of bulbs in the package?

	Package 1	Package 2	Package 3	Package 4
# of Bulbs				

Q3. Record Bulb Shape?

Bulb Type	Package 1	Package 2	Package 3	Package 4
Spiral				
A-lamp				
Reflector				
Globe				
Candelabra				
Post				
Torpedo				

Q3a. Does this bulb have any of these other special features: dimmable, 3-way bulb, G-24 base (pin), candelabra base, ceiling fan bulb? [Multiple Response]

	Package 1	Package 2	Package 3	Package 4
Dimmable				
3-way				
G24 Base				
Ceiling Fan Bulb				
Candelabra Base				
None of the above				

Q4. Record Bulb Wattage? (IF Halogen, CFL OR LED RECORD ACTUAL WATTAGE – CFL TYPICALLY BETWEEN 9 AND 30 WATTS; LED TYPICALLY ARE SLIGHTLY LESS)

	Package 1	Package 2	Package 3	Package 4
Bulb Wattage				

Q5. ComEd Program Bulb? (DISPLAY COMED PROGRAM BULB MODEL NUMBERS HERE BASED ON ANSWERS TO QUESTIONS ABOVE)

	Package 1	Package 2	Package 3	Package 4
1. Program Model Number Match				
2. Model Number not in list but believe it is a program bulb (specify model number)				
3. Not a program bulb				

Q6. How many of these packages are being purchased? (RECORD # PACKAGES)

	Package 1	Package 2	Package 3	Package 4
# of Packages				

Q7. Are there any more unique lighting packages in the customers' basket?

1. Yes – If Yes, please go back to first question and record information for next package
2. No

CREATE FLAGS TO CLASSIFY BULB PURCHASES AND SUM PURCHASES:

If Q1(i) = CFL then BULBTYPE(i) = CFL

If Q1(i) = LED then BULBTYPE(i) = LED

If Q1(i) = Incandescent then BULBTYPE(i) = INC

If Q1(i) = Halogen then BULBTYPE (i)= HALOGEN

If Q5(i) in (1,2) then PGMBULB(i) = YES, ELSE PGMBULB(i) = NO

If Q1(i) = CFL and Q3 = Spiral and Q3a = None then BULBGROUP(i) = STANDARD

If Q1(i) = CFL and (Q3 = Spiral and Q3a ne None) or (Q3 ne Spiral) then BULBGROUP (i)= SPECIALTY

*PSTANCFL = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = STANDARD and PGMBULB(i) = YES*
*PSTANCFL = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = SPECIALTY and PGMBULB(i) = YES*
*PLED = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = LED and PGMBULB(i) = YES*

*STANCFL = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = STANDARD*
*SPECCFL = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = SPECIALTY*
*LEDs = sum of (Q2(i)*Q6(i)) where BULBGROUP(i) = LED*
*HALOGEN = sum of (Q2(i)*Q6(i)) where BULBTYPE(i) = HALOGEN*
*INCAND = sum of (Q2(i)*Q6(i)) where BULBTYPE (i) = INC*

IF BUYING CFLS (STANDARD + SPECIALTY > 0) READ:

“Going forward we are going to be asking you a number of questions corresponding to the CFLs you are purchasing today.”

IF BUYING STANDARD CFLS (STANCFL >0) READ:

“When I refer to Standard CFLs I am talking about spiral shaped CFLs that can be used to replace your basic incandescent bulbs.”

IF BUYING SPECIALTY CFLS (SPECCFL >0) READ:

“When I refer to Specialty CFLs I am talking about CFLs that either have a special shape (such as a globe, a candelabra or a covered glass (a-lamp) bulb) or special feature (such as dimmable, 3-way, floodlights, high wattage or non-Medium Screw Base).”

(IF PURCHASING PROGRAM STANDARD CFLS, (PSTANCFL >0))

Q15stan. Where are you planning to install the STANDARD CFLs you are buying today - in your home, a business, or both?

1. Home
2. Business
3. Both
4. Don't know

•

(IF PURCHASING PROGRAM SPECIALTY CFLS (PSPECCFL >0))

Q15spec. Where are you planning to install the SPECIALTY CFLs you are buying today - in your home, a business, or both?

1. Home
2. Business
3. Both
4. Don't know

(IF ANY OF THE BULBS WILL BE INSTALLED IN A BUSINESS, if Q15stan or Q15spec in (2,3))

Q16. What type of business is it?

1. Apartment Building/Multi-Family Dwelling
2. Office
3. Restaurant
4. Grocery

5. Retail/Service
6. Warehouse
7. Garage
8. Hospital
9. Health care clinic
10. Elementary School
11. High School/Middle School
12. College/University
13. Hotel/Motel
14. Public assembly, e.g. church/theater/conference
15. Heavy Industry
16. Light Industry
17. Other _____
18. Don't Know

•

(IF THE BULBS IN Q16 ARE FOR A HOTEL, MOTEL, OR APARTMENT, if Q16 = 1 or 12)

Q17. Will you install the bulbs you are buying today in common spaces such as hallways, or inside the individual units?

1. Common spaces
2. Within individual apartment units or hotel/motel rooms
3. Both
4. Don't know

Customer Intentions and History

Q9. Were you planning to purchase light bulbs when you entered the store today?

1. Yes
2. No **(SKIP TO Q12)**
3. Don't know **(SKIP TO Q12)**

Q10. What type (or types) of bulbs were you planning to buy? (Do not read, select all that apply)

1. CFLs
2. Incandescent
3. Halogen
4. LED
5. Other _____
6. Don't know

(IF PURCHASING STANDARD CFLs, STANCFL > 0)

Q12stan. Have you ever purchased or been given any **STANDARD** CFLs before today?

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

•

(IF PURCHASING SPECIALTY CFLs, SPEC CFL > 0)

Q12spec. Have you ever purchased or been given any **SPECIALTY** CFLs before today?

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

(IF PURCHASING LEDs, LEDs > 0)

Q13. Have you ever purchased or been given any LEDs before today?

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

(IF ANY OF THE BULBS WILL BE INSTALLED IN A BUSINESS- Q15stan=2 or 3 or Q15spec=2 or 3)

Q18. Do you have any CFLs installed right now in your business?

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

•

(IF ANY OF THE BULBS WILL BE INSTALLED IN A BUSINESS- Q15stan=2 or 3 or Q15spec=2 or 3)

Q19. Does ComEd deliver electricity to your business?

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

•

(If Q19 = 2 or 3)

Q19_B. Does your business receive a bill from ComEd for your electricity usage? **(IF NEEDED, READ: "Some businesses in this region purchase their electricity from a Retail Electric Supplier but ComEd still handles the billing of these customers.")**

1. Yes we receive a ComEd bill
2. No we don't receive a ComEd bill
3. Business is not in this area/Illinois
4. Don't know

(IF THE PROGRAM BULBS ARE FOR A HOME- Q15stan = 1 or 3 or Q15spec =1 or 3)

Q20. Do you have any CFLs installed right now in your home?

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

(IF THE PROGRAM BULBS ARE FOR A HOME- Q15stan = 1 or 3 or Q15spec =1 or 3)

Q21. Does ComEd deliver electricity to your home?

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

(IF Q21 = 2 or 3)

Q21_B. Do you receive a bill from ComEd for your electricity usage? **(IF NEEDED, READ: “Some customers in this region purchase their electricity from a Retail Electric Supplier but ComEd still bills these customers.”)**

- 1 Yes I receive a ComEd bill
- 2 No I don't receive a ComEd bill
- 3 I do not live in this area/Illinois
- 4 Don't know

Q22. Over the past year or so, and not including today, what type of light bulbs have you purchased?
[ROTATE ANSWERS, MULTIPLE RESPONSE]

1. Incandescents
2. Halogens
3. CFLs
4. LEDs
5. (Fluorescents)
6. (I have not purchased anylight bulbs in the past year or so prior to today)
7. (Other)

[ROTATE Q22a – Q22d]

[ASK IF MORE THAN ONE TYPE OF BULB PURCHASED]

[Ask if Q22 =1]

Q22aa. What percentage of the bulbs you have purchased in the last year or so, not including today, were incandescents?

[Ask if Q22 =2]

Q22ab. What percentage of the bulbs you have purchased in the last year or so, not including today, were halogens?

[Ask if Q22 =3]

Q22ac. What percentage of the bulbs you have purchased in the last year or so, not including today, were CFLs?

[Ask if Q22 = 4]

Q22ad. What percentage of the bulbs you have purchased in the last year or so, not including today, were LEDs?

(ASK Q11 and QPRICE IF PURCHASING CFLs AND INCANDESCENT BULBS OR HALOGEN BULBS, (STANCFL > 0 or SPECCFL > 0) and (HALOGEN > 0 or INCAND > 0 or LED > 0))

Q11. We are interested in learning more about how people use different types of light bulbs. I see that you are purchasing multiple types of bulbs including CFLs, <READ IN IF BUYING LEDs> LEDs <READ IN IF BUYING INCANDESCENT> incandescents <READ IN IF BUYING HALOGEN> halogen bulbs. Why are you buying these other bulb types in addition to CFLs? **(DO NOT READ;**

SELECT ALL THAT APPLY. NOTE: IF NONE OF THE ANSWERS FIT, PLEASE USE THE OPTION TO WRITE IN RESPONDENTS ANSWERS)

Why are you buying a mix of bulb types? **(DO NOT READ- ACCEPT MULTIPLE)**

1. Need multiple bulbs and it is too expensive to buy only CFLs
 2. CFLs were on sale/inexpensive
 3. Want to try CFLs
 4. Want to try LEDs
 5. Has fixtures that need 3-way bulbs
 6. Has fixtures that need dimmable bulbs
 7. There are certain fixtures where they prefer the look of incandescent bulbs
 8. There are certain fixtures where they prefer the light quality of incandescent bulbs
 9. For fixtures that can't use CFLs (not reason 4 – 7) List reason: _____
-
10. Other _____
 11. Don't Know

(ASK IF Q11 = 5 and (HALOGEN > 0 or INCAND > 0) and (STANCFL > 0 or SPEC CFL > 0))

Q11a. Why did you choose an incandescent/halogen bulb for your 3-way light socket instead of a 3-way CFL? **(DO NOT READ)**

1. The 3-way CFL was too expensive
2. Did not know they made 3-way CFLs
3. Do not like 3-way CFLs
00. Other:

98. Don't know

(ASK IF Q11 = 6 and (HALOGEN > 0 or INCAND > 0) and (STANCFL > 0 or SPEC CFL > 0))

Q11b. Why did you choose an incandescent/halogen bulb for your dimmable light socket instead of a dimmable CFL? **(DO NOT READ)**

1. The dimmable CFL was too expensive
2. Did not know they made specialty CFLs with a dimmable function
3. Do not like dimmable CFLs
00. Other:

98. Don't know

(ASK IF Q11 = 7 and (HALOGEN > 0 or INCAND > 0) and (STANCFL > 0 or SPEC CFL > 0))

Q11c. For the light sockets where you don't like the look of CFLs, why did you choose an incandescent/halogen light bulb instead of a CFL that has a glass cover to look more like a regular incandescent light bulb? **(DO NOT READ)**

1. The specialty CFL with a glass covering was too expensive
2. I did not know they made covered CFLs
00. Other:

98. Don't know

(ASK IF Q11 = 8 and (HALOGEN > 0 or INCAND > 0) and (STANCFL > 0 or SPEC CFL > 0))

Q11d. What do you not like about the light quality of CFLs? (DO NOT READ)

1. CFLs take too long to reach full brightness
2. CFLs flicker
3. Just don't like the light of CFLs in this fixture
00. Other:

98. Don't know

(ASK IF (HALOGEN > 0 or INCAND > 0) and (STANCFL > 0 or SPEC CFL > 0))

QPRICE. Using a scale of 0 to 10 where 0 means not at all likely and 10 means extremely likely, if the price of CFLs were the same as, or less than, the price of an incandescent or halogen bulb, how likely would you be to purchase all CFLs?

1. Record Influence Level: 0 (not likely) – 10 (extremely likely) _____
2. Don't know

(IF NOT PURCHASING ANY CFLS SKIP TO Q30)

Q22a-f. Next I'm going to read you six different factors that some people consider when deciding which light bulbs to buy. Thinking **JUST** about the CFLs that you are purchasing **TODAY**, I'd like you to tell me which was the **MOST IMPORTANT** factor and which was the **LEAST IMPORTANT** factor. [PROGRAMMING WILL AUTOMATICALLY ROTATE ORDER IN WHICH ITEMS ARE READ, READ LIST TWICE, ONCE FOR MOST IMPORTANT FACTOR AND ONCE FOR LEAST IMPORTANT FACTOR]

	Most Important	Least Important
The purchase price of the CFLs		
The light quality that CFLs produce		
The energy used by CFLs		
The monthly bill savings resulting from using CFLs		
The environmental impact of using CFLs		
How long the CFLs will last		

(IF PURCHASING STANDARD CFLS, STANCFL > 0)

Q25stan. Of the <STANCFL> **Standard** CFLs you are purchasing today, how many do you expect to install in the next 6 months?

1. Record Number _____ [1 – STANCFL]
2. None of Them
3. All of Them
4. Don't Know

(IF PURCHASING SPECIALTY CFLS, SPECCFL > 0)

Q25spec. Of the <SPECCFL> Specialty CFLs you are purchasing today, how many do you expect to install in the next 6 months?

1. Record Number _____ [1 – SPECCFL]
2. None of Them
3. All of Them
4. Don't Know

Q29. Of the <STANCFL + SPECCFL> CFLs you are purchasing today, how many will you use to replace incandescent bulbs that still work?

1. Record Number _____ [1 – (STANCFL + SPECCFL)]
2. None of Them
3. All of Them
4. Don't Know

Program CFL Purchase Decision

(IF CUSTOMER IS PURCHASING 1 OR MORE CFLS DISCOUNTED BY COMED (PSTANCFL + PSPECCFL > 0), ASK Q33, OTHERWISE, SKIP TO Q30)

Q33. Did you know that you are purchasing some discounted CFLs today?

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

(IF Q33 = 2 or 3)

Q33b. Although you may not have noticed the CFLs were discounted, did you think the listed price was a low price for CFLs?

1. Yes, I thought the price was low for CFLs
2. No, I did not think the price was low for CFLs
3. I am not sure if the price was low for CFLs – not sure what they normally cost
4. I am not sure if the price was low for CFLs -I did not look at the price of the bulbs
5. Don't know

(IF Q33 = 1)

Q34. Did you know that the discount on the price of these CFLs is provided by ComEd?

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

(IF Q34 = 1)

Q35. How did you first find out about ComEd's discounts on CFLs?

1. ComEd sticker on the shelf
2. Saw marketing materials in the store
3. Read about it in my bill from ComEd

4. Discount was advertised in newspaper/tv/radio
5. Store employee made me aware of the discount
6. Saw a retail lighting demonstration
7. Friend
8. Other _____
9. Don't know

(IF Q34 = 1)

Q36. Did you come into the store today specifically to buy CFLs discounted by ComEd?

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

IF BUYING PROGRAM CFLS (PSTANCFL + PSPECCFL > 0) READ:

*"The discount ComEd offers on select CFLs is around \$1.00 per bulb for Standard CFLs and \$1.50 per bulb for Specialty CFLs. The <PSTANCFL + PSPECCFL> CFLs you are purchasing today that have been discounted by ComEd would have cost a total of \$<PSTANCFL*1 + PSPECCFL*1.5> more without the ComEd incentive."*

(IF PURCHASING PROGRAM STANDARD CFLS, PSTANCFL > 0)

Q23stan. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the (<IF Q33 = 1 READ> **discounted**) (<IF Q33=2 or 8 AND Q33B = 1 READ> **low**) price in your decision to purchase Standard CFLs today?

1. Record Influence Level: 0 (not influential) – 10 (extremely influential) _____
2. Didn't know Standard CFLs were discounted
3. Don't know

(IF PURCHASING PROGRAM SPECIALTY CFLS, PSPECCFL > 0)

Q23spec. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the (<IF Q33 = 1 READ> **discounted**) (<IF Q33B = 1 READ> **low**) price in your decision to purchase Specialty CFLs today?

1. Record Influence Level: 0 (not influential) – 10 (extremely influential) _____
2. Didn't know Standard CFLs were discounted
3. Don't know

(IF PURCHASING STANDARD CFLS DISCOUNTED BY COMED, PSTANCFL > 0)

Q37stan. If the ComEd discount had not been offered, and the <PSTANCFL> discounted standard CFL(s) you are purchasing had instead cost \$1 more per bulb, or a total of <\$1*PSTANCFL> more, would you still have purchased all of these Standard CFLs, some of them, or none of them?

1. All
2. Some
3. None
4. Don't know

(ASK IF Q37stan=2)

Q37stan2. How many of the <PSTANCFL> standard CFLs would you have purchased if they had cost \$1 more per bulb?

___ [NUMERIC OPEN END, 1 – <PSTANCFL>];

00 None

98. Don't know

(ASK IF Q37stan=2, 3)

Q38stan. Would you have purchased a different type of light bulb instead of the standard CFLs?

1. Yes, Would have purchased a different type of light bulb
2. No, Would NOT have purchased a different type of light bulb
3. Don't know

[ASK IF Q38stan =1]

Q38stan2. What type of light bulbs would you have purchased instead of the standard CFLs? Would you have purchased... **(ALLOW MULTIPLE RESPONSES)**

1. Incandescent light bulbs
2. Halogen light bulbs
3. LED light bulbs
4. Don't know

(IF PURCHASING SPECIALTY CFLS DISCOUNTED BY COMED, PSPECCFL > 0)

Q37spec.If the ComEd discount had not been offered, and the <PSPECCFL> discounted specialty CFL(s) had instead cost **\$1.50 more per bulb**, or a total of **<1.50*PSPECCFL> more**, would you still have purchased all of these **Specialty** CFLs, some of them, or none of them?

1. All
2. Some
3. None
4. Don't know

(ASK IF Q37spec=2)

Q37spec2. How many of the <PSPECCFL> **Specialty** CFLs would you have purchased if they had cost \$1.50 more per bulb?

___ [NUMERIC OPEN END, 1 – < PSPECCFL >];

00 None

98. Don't know

(ASK IF Q37spec=2, 3)

Q38spec. Would you have purchased a different type of light bulb instead of the specialty CFLs?

1. Yes, Would have purchased a different type of light bulb
2. No, Would NOT have purchased a different type of light bulb
3. Don't know

[ASK IF Q38Spec=1]

Q38spec2. What type of light bulbs would you have purchased instead of the specialty CFLs? Would you have purchased... (ALLOW MULTIPLE RESPONSES)

1. Incandescent light bulbs
2. Halogen light bulbs
3. LED light bulbs
4. Don't know

Q39. Did you see information or displays about CFLs in this store?

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

(ASK IF Q39 = 1)

Q40. Who sponsored the information about CFLs that you saw?

(DO NOT READ. CIRCLE ALL THAT APPLY)

1. ComEd
2. The store
3. Other _____
4. Don't know

(IF PURCHASING STANDARD CFLS DISCOUNTED BY COMED (PSTANCFL > 0) AND SAW INFO OR DISPLAYS (Q39 = 1))

Q41stan. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the in-store information in your decision to buy **Standard** CFLs?

1. Record Influence Level: 0 (not influential) – 10 (extremely influential) _____
2. Don't know

(IF PURCHASING SPECIALTY CFLS DISCOUNTED BY COMED (PSPECCFL > 0) AND SAW INFO OR DISPLAYS (Q39 = 1))

Q41spec. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the in-store information in your decision to buy **Specialty** CFLs?

1. Record Influence Level: 0 (not influential) – 10 (extremely influential) _____
2. Don't know

Non-Program CFL Purchases

(IF CUSTOMER IS NOT PURCHASING ANY CFL BULBS DISCOUNTED BY COMED, (PSTANCFL + PSPECCFL = 0), ELSE SKIP TO Q32)

Q30. Do you know that THIS STORE is selling CFLs that are discounted through a program by ComEd?

1. Yes
2. No (SKIP TO Q32)
3. Don't know (SKIP TO Q32)

(IF Q30 = 1)

Q31. How did you first find out about ComEd's discounts on CFLs?

1. ComEd sticker on the shelf
2. Saw marketing materials in the store
3. Read about it in my bill
4. Discount was advertised in newspaper/TV/radio
5. Store employee made me aware of the discount
6. Saw a retail lighting demonstration
7. Friend
8. Open End _____
9. Don't know

(IF CUSTOMER IS PURCHASING SOME NON-DISCOUNTED CFLS, IF (STANCFL+SPECCFL) > (PSTANCFL+PSPECCFL))

Q32. (Some of) The bulbs you are buying are NOT discounted by ComEd. Why did you choose these CFLs instead of the discounted ones? **(DO NOT READ, CIRCLE ALL MENTIONED)**

1. Prefer this brand/manufacturer
2. Prior experience with this model
3. No discounted CFLs in this bulb category
4. Didn't want to buy a multi-pack
5. Didn't know about the discount
6. Thought these bulbs were discounted
7. Other _____
8. Don't Know

(IF CUSTOMER IS PURCHASING NON-DISCOUNTED CFLS (STANCFL + SPECCFL) > (PSTANCFL + PSPECCFL) AND KNEW ABOUT THE COMED DISCOUNT (Q30 = 1))

Q32a. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was ComEd's program (either the financial incentives or the informational material) in your decision to purchase the **non-discounted** CFLs you are purchasing today?

1. Record Influence Level: 0 (not influential) – 10 (extremely influential) _____
2. Don't know

Incandescent or Halogen Purchaser Section

(IF NOT PURCHASING CFLs (STANCFL + SPECCFL = 0) & LED =0)

Q42. Did you consider purchasing any CFLs today?

1. Yes
2. No
3. Don't Know **(SKIP TO LED1)**

Q43. We are interested in learning more about how people decide which light bulbs to buy. Why aren't you purchasing CFLs? **(DO NOT READ. SELECT ALL THAT ARE STATED)**

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 or look in fixtures
5. Dislike the light quality/color of CFLs
6. Need dimmable bulbs
7. Need 3-way bulbs
8. Need other specialty bulb
9. CFLs take too long to reach full brightness
10. CFLs flicker
11. Accustomed to incandescent bulbs
12. Other _____
13. Don't Know

(IF Q43 = 7)

TWAY. Why didn't you choose a 3-way CFL?

1. The 3-way CFL was too expensive
2. Did not know they made 3-way CFLs
3. 3-way CFLs are too big
4. Do not like 3-way CFLs
5. Other: _____
6. Don't Know

(IF Q43 = 6)

DIM. Why didn't you choose a dimmable CFL?

1. The dimmable CFL was too expensive
2. Did not know they made dimmable CFLs
3. Do not like dimmable CFLs
4. Other: _____
5. Don't Know

(IF Q43 = 4)

LOOK. For the light sockets where you don't like the look of CFLs, why didn't you choose a CFL with a glass cover to look more like a regular incandescent light bulb?

1. The specialty CFL with a glass covering was too expensive
2. I did not know they made covered CFLs
3. Other: _____
4. Don't Know

(IF NOT PURCHASING CFLs (STANCFL + SPECCFL = 0))

QPRICE2. Using a scale of 0 to 10 where 0 means not at all likely and 10 means extremely likely, if the price of CFLs were the same as, or less than, the price of an incandescent or halogen bulb, how likely would you be to purchase a CFL instead of the bulbs you are purchasing today?

1. Record Influence Level: 0 (not likely) – 10 (extremely likely) _____
2. Don't know

(IF THE CUSTOMER IS NOT PURCHASING LED BULBS)

LED1. Are you familiar with LED light bulbs that can be used to replace standard light bulbs in your home?

1. Yes
2. No **(SKIP TO LAW1)**
3. Don't Know **(SKIP TO LAW1)**

(IF LED1 = 1)

LED2. Have you ever purchased an LED bulb for your home (or business)?

1. Yes **(SKIP TO LAW1)**
2. No
3. Don't Know

(IF LED2 = 2 or 3)

LED3. What has kept you from purchasing LED bulbs for your home (or business)?

1. Price of LEDs too high
2. Do not like look of LEDs
3. Unfamiliar with LED technology
4. Waiting for LED technology to become more mainstream
5. Other _____
6. Don't Know

EISA 2007 QUESTIONS

LAW1. In 2007, Congress passed a law to set higher energy standards for light bulbs. The law phases out 40 to 100 watt standard incandescent light bulbs from 2012 through 2014. Have you heard of these new light bulb standards before today?

1. Yes
2. No **(SKIP TO LAW4a)**
3. Don't know **(SKIP TO LAW4a)**

(IF LAW1 = 1)

LAW2. How familiar are you with the new light bulb standards? Would you say you are...

1. Not very familiar
2. Somewhat familiar
3. Very familiar
4. Don't Know

(IF LAW1 = 1)

LAW3a. Last year, the law affected 100-watt incandescent light bulbs and this year it affects 75-watt bulbs. Did you stock up on 100 watt bulbs while they were still being sold?

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

(IF LAW1 = 1)

LAW3b. Once stores sell through their existing inventory of standard 75-watt incandescent bulbs this year, you will no longer be able to purchase them. Do you plan on stocking up on extra 75-watt bulbs in anticipation of this change?

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

LAW4a. There is a new type of light bulb called a halogen bulb that looks like a traditional incandescent light bulb, produces the same amount of light, has the same one year bulb life, but uses about one-third less energy than a traditional incandescent. The new halogen bulbs use 150% more energy than a CFL and last only one-fifth as long as a CFL. The new halogen bulbs cost about \$1.25 more per bulb than a traditional incandescent light bulb, but about \$1.20 less per bulb than a CFL. Have you heard about or seen this new halogen light bulb?

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

LAW4b. The next time you need to buy a 100 or 75-watt light bulb, will you buy an equivalent light CFL, an equivalent light halogen bulb, an equivalent light LED, or buy a lower wattage traditional incandescent that is still available?

- 1 Lower wattage standard incandescent
- 2 Equivalent light CFL
- 3 Equivalent light Halogen
- 4 Equivalent light LED
- 5 Don't know

READ TO CUSTOMER:

Thank you for your time today. Here is a \$5 gift card for this store which may be used today. May I have your contact information for our records? This information is strictly confidential and may only be used to verify your answers in a follow up call if necessary. It will not be sold or shared.

Name: _____

Zip: _____

Phone: _____

Email: _____

(IF THE CUSTOMER ASKS WHY WE NEED THEIR PHONE NUMBER, READ: "Phone numbers are being requested for a follow-up lighting study that will occur within the next year. Customers will be paid \$100 for their participation in this follow-up study.")

AFTER CUSTOMER HAS LEFT, PLEASE FILL OUT INFORMATION:

QA1. Field Staff Name: _____

QA2. Date: _____

QA3. Store location: _____

1. 1232 West North Ave, Chicago (if Q0 = Home Depot)
2. 6930 Argus Dr, Rockford (if Q0 = Home Depot)
3. 6625 Grand Ave, Gurnee (if Q0 = Home Depot)
4. 655 Lake Cook Rd, Deerfield (if Q0 = Home Depot)
5. 2555 North Normandy, Chicago (if Q0 = Home Depot)
6. 321 South Larkin Ave, Joliet (if Q0 = Sam's Club)
7. 7971 S Cicero, Chicago (if Q0 = Lowe's)
8. 105 North Weber Rd, Bolingbrook (if Q0 = Home Depot)
9. 900 South Barrington Rd, Streamwood (if Q0 = Sam's Club)
10. 6570 Grand Ave, Gurnee (if Q0 = Sam's Club)
11. 600 Meacham Rd, Elk Grove Village (if Q0 = Home Depot)
12. 335 North Milwaukee Ave, Vernon Hills (if Q0 = Sam's Club)
13. 3080 Route 34, Oswego (if Q0 = Home Depot)
14. 140 Countryside Plaza, Countryside (if Q0 = Home Depot)
15. 440 Randall Rd, South Elgin (if Q0 = Home Depot)
16. 900 S Rte 83, Villa Park (if Q0 = Walmart)
17. 12690 S Rte 59, Plainfield (if Q0 = Walmart)
18. 801 Meacham Rd, Elk Grove Village (if Q0 = Walmart)
19. 200 South Bolingbrook Dr, Bolingbrook (if Q0 = Walmart)
20. 400 West Army Trail, Carol Stream (if Q0 = Lowe's)
21. 7151 Walton St, Rockford (if Q0 = Sam's Club)
22. 3900 Fountain Square, Waukegan (if Q0 = Walmart)
23. 621 Brook Forest Ave, Shorewood (if Q0 = Home Depot)

24. 2665 North Halsted St, Chicago (if Q0 = Home Depot)
25. 2131 West Galena Blvd, Aurora (if Q0 = Walmart)
26. 3500 North Kimball Ave., Chicago (if Q0 = Home Depot)
27. 7300 Woodward Ave, Woodridge (if Q0 = Sam's Club)
28. 1410 South Randall Rd, Algonquin (if Q0 = Walmart)
00. Other (Note store name and city)

QA4. Demo Period at Store

1. Yes
2. No

QA6. Where in store interview was completed:

- 1 Main lighting aisle / display
- 2 End-cap display (end of aisle)
- 3 Stand alone / Pallet display
- 4 Other _____

7.5.2 EPY5 Shelf Survey Instrument

COMED PY4 RESIDENTIAL LIGHTING SHELF SURVEY

Field Staff Name:	
Store name:	Date:
Store address:	
Store city:	Store zip code:

SS1. **What types of lighting information materials are present?** [CHECK ALL THAT APPLY.
Please take a photograph of any materials present]

Information On:	ComEd Sponsored (Smart Ideas)	Retailer	Manufacturer
CFL Bulbs	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
Proper CFL Disposal	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
CFL Discounts	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
Explanation of Lumens	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
EISA Regulations	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
LED Bulbs	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Visibility Level	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High

SS2. **Are there any off-shelf lighting displays (endcaps, wingstacks, register)?** (If no, skip to SS3) Yes No

a. Are CFL bulbs featured in the displays? **Yes**

No

b. Are ComEd-discounted CFL bulbs featured in the displays?..... **Yes**

No

c1. How did you determine that the discounted bulbs were in the display?

(Check 1)

By promotional materials on the end cap that showed ComEd as sponsor

By consulting my shelf inventory sheet to see which bulbs were

discounted

Other (Please

describe): _____

c. Are EISA compliant bulbs featured in the displays? **Yes**
 No

SS3. **How are the prices displayed for the ComEd discounted lighting?**

1 Discounted/sale price only displayed **Yes**
 No

2 Original price and discount price displayed **Yes**
 No

3 Price tag missing for discounted bulbs **Yes**
 No

4 Other (Describe)

SS4a. **Is the retailer currently running other CFL promotions? (Discounted CFLs in addition to ComEd discount) If so, describe promotion:**

SS4b. **Is the retailer currently running promotions on any EISA compliant bulbs? If so, describe promotion:**

[IF STORE SELLS CFLs AND OTHER TYPES OF LIGHT BULBS]

SS9. **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)

SS10. **Where are the ComEd-discounted CFLs located? [CIRCLE ALL THAT APPLY.]**

- 1 In the same aisle with other CFLs
- 2 In the same aisle with other light bulbs
- 3 In a different aisle or location from all other bulbs (e.g., display near cash register)
Describe:

- 4 Other location

Describe:

SS11. Do one or two particular CFL models (such as a 4-pack of GE Spiral bulbs) 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/pkg
_____ Watts _____

Manufacturer _____ Style _____ EStar? _____ #Bulbs/pkg
_____ Watts _____

Also describe degree of dominance (e.g., 100+ packages of this model, 4 or 5 packages of each other model):

Inventoried Products – includes all Standard and Specialty Medium Screw Base (MSB) bulbs:

All CFLs

- 40W-100W Equivalents

All Incandescents

- 40W-100W

All Halogens

- 40W-100W Equivalents

All LEDs

- 40W-100W Equivalents

CFLs - Specialty Bulbs (Con't)

Type	CFL Wattage	Incand Equiv Wattage	Bulb Type A=A-lamp 3=3-way D=Dimmable R=Reflector G=Globe C=Candelabra	Lumens	Bulbs in Pack	Manufacturer	Model Number	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11-25, 26+]	Price	Original Price (if on sale)	Discounted? C = ComEd R = Retailer N = None
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N

Type	CFL Wattage	Incand Equiv Wattage	Bulb Type A=A-lamp 3=3-way D=Dimmable R=Reflector G=Globe C=Candelabra	Lumens	Bulbs in Pack	Manufacturer	Model Number	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11-25, 26+]	Price	Original Price (if on sale)	Discounted? C=ComEd R=Retailer N=None
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N
CFL			<input type="checkbox"/> A <input type="checkbox"/> D <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C									<input type="checkbox"/> C <input type="checkbox"/> R <input type="checkbox"/> N

Incandescent Bulbs

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11-25, 26+]	Price	Original Price (if on sale)	Discounted? U=Utility R=Retailer N=None
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11-25, 26+]	Price	Original Price (if on sale)	Discounted? U = Utility R=Retailer N=None
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Incandescent	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____								<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

Halogen Bulbs

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	Halogen Wattage	Incand Equiv Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11-25, 26+]	Price	Original Price (if on sale)	Discounted? U = Utility R = Retailer N = None
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
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Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	Halogen Wattage	Incand Equiv Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11- 25, 26+]	Price	Original Price (if on sale)	Discounted? U = Utility R=Retailer N=None
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
Halogen	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

LED Bulbs

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	LED Wattage	Incand Equiv Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11- 25, 26+]	Price	Original Price (if on sale)	Discounted? U = Utility R=Retailer N=None
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

Type	Bulb Type S=Standard 3=3-way R=Reflector G=Globe C=Candelabra O=Other	LED Wattage	Incand Equiv Wattage	Lumens	Bulbs in Pack	Location A=Aisle E=End-cap O=Other	Approx # of Packs [1-10, 11- 25, 26+]	Price	Original Price (if on sale)	Discounted? U = Utility R=Retailer N=None
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N
LED	<input type="checkbox"/> S <input type="checkbox"/> 3 <input type="checkbox"/> R <input type="checkbox"/> G <input type="checkbox"/> C <input type="checkbox"/> O _____									<input type="checkbox"/> U <input type="checkbox"/> R <input type="checkbox"/> N

7.6 Other Evaluation Documents

7.6.1 EPY5 ComEd Residential Lighting NTGR Results Memo

Date: October 8th, 2013

To: David Nichols (ComEd), Jennifer Hinman (ICC), and ComEd Residential Lighting Interested Parties

CC: Jeff Erickson, Randy Gunn, and Rob Neumann; Navigant Consulting

From: Amy Buege; ComEd EM&V Team

RE: PY5 ComEd Residential Lighting NTGR Estimates
CCs

This memorandum presents an updated⁵³ version of the *Evaluation Research*⁵⁴ PY5 net-to-gross ratio (NTGR) estimates for standard and specialty CFLs sold through the ComEd Residential Lighting program. This memo provides analysis of the NTGR estimates by various segmentation variables and compares these results to the results from the PY2-PY4 evaluations. *The findings in this memo have been updated based on the inclusion of the final PY5 program tracking data and comments the evaluation team received from ComEd.*

PY5 Methodology

The Evaluation Research NTGR estimates included in this memo are based on a total of 792 in-store intercept surveys conducted as part of the PY5 evaluation. Table 7-25 below shows (by retailer type and overall) the number of retail store locations where intercept surveys were conducted, the number of days of interviewing that took place, the distribution of the completed intercept surveys, as well as the final ComEd PY5 program bulb sales.⁵⁵ As this table shows, a total of 83 person days were spent in retail stores conducting intercept surveys and a total of 28 different program retail stores were visited across the four program retailers included in the sample.⁵⁶ The table also shows that the greatest proportion of PY5 intercept surveys were conducted with lighting purchasers (both program and non-program) in DIY stores (64%). DIY stores also accounted 51% of PY5 bulb sales. The average number of intercept surveys completed per day varied by retailer type, ranging from a high of 11.7 in DIY stores, to a low of 5.7 in Warehouse stores. The overall NTGR results presented in this memo are

⁵³ Original memo with PY5 NTGR Estimates was delivered to ComEd on July 19, 2012.

⁵⁴ It should be noted that the NTGR estimates presented here are the evaluation verified estimates (based on the PY5 in-store intercept surveys) and weighted by the PY5 Final Tracking data.

⁵⁵ Based on the final PY5 Tracking database.

⁵⁶ Only 4 of the program retailers would either allow in-store data collection to take place in their stores or had sufficient enough sales volumes to make intercept surveys feasible.

weighted by PY5 retailer type program bulb sales to ensure the results are representative of PY5 Residential Lighting program.

Table 7-25. Distribution of PY5 Intercepts Completed and PY5 Program Bulb Sales by Retailer Type

Retailer Type	Stores	Days	PY5 Intercepts		Avg Intercepts /Day	PY5 Bulb Sales	
			#	%		#	%
Big Box	7	22	187	24%	8.5	1,401,194	13%
Do-It Yourself	15	43	503	64%	11.7	5,544,589	51%
Warehouse	6	18	102	13%	5.7	3,016,440	28%
Other	0	0	na	na	na	935,671	9%
Total	28	83	792	100%	9.5	10,897,894	100%

Table 7-26 below shows the distribution of PY5 intercept survey respondents by retailer type and bulb type purchased. As this table shows, 41% of intercept survey respondents purchased one or more program bulb (the majority of these being standard CFLs) and 63% of survey respondents purchased one or more non-program bulb (the majority of these being incandescent bulbs). While the majority of survey respondents purchasing CFLs (standard CFLs in particular) were purchasing program bulbs, the majority of respondents purchasing LEDs were buying non-program LEDs since at the time the intercept surveys were conducted (end of PY5) there were very few LEDs still being incentivized at program stores.⁵⁷ The percent of respondents' sums to more than 100% since many customers purchased more than one type of bulb.

Table 7-26. Distribution of PY5 Intercept Respondents by Bulb Type Purchased

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stan. CFL	Spec CFL	LED ⁵⁸	Total	Stan. CFL	Spec CFL	LED	Hal	Inc	Total	
Big Box	52	18	0	69	5	10	0	13	108	129	187
DIY	116	50	5	169	18	14	44	60	233	351	503
Warehouse	73	16	0	84	0	8	7	5	0	20	102
Total	241	84	5	322	23	32	51	78	341	500	792
% Surveyed	30%	11%	1%	41%	3%	4%	6%	10%	43%	63%	100%

Table 7-27 below is similar to Table 7-26 except that it shows the distribution of bulbs purchased by PY5 intercept survey respondents. As this table shows, 43% of the bulbs being purchased by intercept

⁵⁷ Menards and Lowes were the only two retailers still offering program incentives for LEDs at the time the in-store intercept surveys were conducted.

⁵⁸ No Big Box or Warehouse stores were offering program incentives on LEDs at the time the in-store intercept surveys were conducted.

survey respondents were program bulbs (84% of which were standard CFLs) and 57% of the bulbs being purchased were non-program bulbs (69% of which were incandescent bulbs and 20% of which were halogen bulbs). An analysis of program versus non-program bulb shapes and wattage levels purchases will be conducted for the final report.

Table 7-27. Distribution of Bulbs Purchased by PY5 Intercept Respondents

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stan. CFL	Spec CFL	LED ⁵⁹	Total	Stan. CFL	Spec CFL	LED	Hal	Inc	Total	
Big Box	280	46	0	326	37	12	0	46	514	609	935
DIY	632	209	12	853	31	98	96	438	1,323	1,986	2,839
Warehouse	762	62	0	824	23	0	15	42	0	80	904
Total	1,674	317	12	2,003	90	110	111	526	1,837	2,675	4,678
% of Bulbs Purchased	36%	7%	0%	43%	2%	2%	2%	11%	39%	57%	100%

Table 7-28 below shows the average number of bulbs purchased by retailer type and bulb type. As this table shows, the average survey respondent at Warehouse stores purchased three bulbs more than the average survey respondent at Big Box or DIY stores. Standard program CFLs were purchased on average in the largest quantities.

Table 7-28. Average Number of Bulbs Purchased by PY5 Intercept Respondents

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stand CFL	Spec CFL	LED ⁶⁰	Total	Stand CFL	Spec CFL	LED	Hal	Inc	Total	
Big Box	5.4	2.6	0.0	4.7	7.4	1.2	0.0	3.5	4.8	4.7	5.0
DIY	5.4	4.2	2.4	5.0	1.7	7.0	2.2	7.3	5.7	5.7	5.6
Warehouse	10.4	3.9	0.0	9.8	0.0	0.0	2.1	8.4	0.0	4.0	8.9
Total	6.9	3.8	2.4	6.2	4.0	3.4	2.2	6.7	5.4	5.4	5.9

PY5 NTGR Estimation Methodology

As we did in PY4, in PY5, NTGR was estimated using the customer self-report method based on data collected during the PY5 in-store intercept surveys. The in-store intercept data was used to estimate

⁵⁹ No Big Box or Warehouse stores were offering program incentives on LEDs at the time the in-store intercept surveys were conducted.

⁶⁰ No Big Box or Warehouse stores were offering program incentives on LEDs at the time the in-store intercept surveys were conducted.

the level of PY5 free ridership, as well as the PY5 participant and non-participant spillover⁶¹. Once these two parameters were estimated NTGR was calculated as follows:

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

The customer self-report method used for this analysis estimated free-ridership by first calculating the following two scores:

- 1) *Program Influence Score* (PI Score) - The degree of influence the program had on the customers' decision to install CFLs, on a scale of 0 to 10.
- 2) *No-Program Score* (NP Score) – The customer's self-reported purchasing plans if the ComEd incentive had not been offered and the bulbs had been more expensive.

Once these two scores were calculated for each survey respondent purchasing program bulbs, free-ridership was calculated as:

$$\text{Free-Ridership} = 1 - (\text{PI Score} + \text{NP Score}) / 20$$

The method used to estimate free-ridership in PY5 was very similar to the method employed in PY4. Two enhancements were made to the PY5 free-ridership algorithm which decreased the estimated level of free-ridership for a relatively small percentage of program participants. These enhancements were the following:

1. The first enhancement was to the PI Score. In a comparison between the free-ridership scores assigned based on the algorithm being applied for ComEd and the algorithm being applied for Ameren,⁶² the evaluation team noticed a handful of customers who based on an individual review of their intercept survey data we believed were not receiving an adequately high price influence score. To remedy this, an enhancement was made which increased the price influence score for customers who responded that without the discount they would not have purchased any program bulbs. This change impacted 14 of 222 survey respondents.
2. The second enhancement increased the NP Score for customers who reported the ComEd-sponsored informational materials they had seen had a moderate or greater level of influence and they would have purchased all of the program bulbs in the absence of the discount. The change replaced the NP Score with the level of influence they provided to the informational material. The evaluation team made this change as they believe it is entirely probable that a customer may have seen program marketing materials that influenced them to a degree after which they no longer required the program discount to incent them to purchase the program bulbs. This change impacted 28 of 222 survey respondents.

PY5 Evaluation Verified Free-ridership Results

Tables 5 and 6 below present the free-ridership estimates for standard and specialty CFLs, respectively. As these tables show, free-ridership segmentation analysis was conducted using numerous segmentation variables including:

⁶¹ Spillover in PY4 was based on the PY3 evaluation results (that were estimated by applying the SR method to data collected during the General Population phone surveys).

⁶² The methods used within ComEd and Ameren territory are very similar but not identical.

- Whether the intercept survey occurred during a demonstration event,
- The retail store at which the intercept was conducted,
- The retail store type (Big Box, Do-It-Yourself, Warehouse) where the intercept was conducted,
- Whether the respondent was purchasing one of the two program models that each accounted for more than 1.5 million program bulbs sold in PY5 (Standard CFLs only),
- Whether the respondent was purchasing one of the program models that received an extra deep discount (EDD). These standard CFL models were discounted \$1.5 per bulb rather than \$1 as the other standard program CFLs (Standard CFLs only), and
- Whether the respondent was aware of the ComEd discount.

The unweighted free-ridership estimates for standard CFLs based on these segmentation variables are provided in the Table 7-29 below.

Table 7-29. Unweighted Standard CFL Free-Ridership Segmentation Analysis

Standard CFL Free-Ridership Segmentation Analysis		N	%	Unweight FR	Lower 90%CL	Upper 90%CL	Stat Signif
All Standard CFLs		222	100%	0.43	0.38	0.49	
Demo Event	Yes	65	29%	0.29	0.20	0.38	A
	No	158	71%	0.49	0.42	0.55	A
Demo Event & Retailer	Big Box	15	7%	0.26	0.07	0.45	
	DIY	28	13%	0.37	0.22	0.52	B
	Warehouse	22	10%	0.25	0.10	0.40	
Non-Demo Event & Retailer	Big Box	32	14%	0.44	0.29	0.58	
	DIY	81	36%	0.65	0.56	0.73	B
	Warehouse	45	20%	0.35	0.24	0.47	
Retailer Type	Big Box	47	21%	0.37	0.26	0.49	C
	DIY	109	49%	0.58	0.50	0.66	C D
	Warehouse	67	30%	0.32	0.23	0.42	D
Retail Store	DIY #1	100	45%	0.58	0.50	0.66	E F
	DIY #2	9	4%	0.55	0.28	0.82	
	Warehouse#1	67	30%	0.32	0.23	0.42	E
	Big Box #1	47	21%	0.37	0.26	0.49	F
Top Selling Bulbs > 1.5MM	Yes	92	41%	0.35	0.27	0.43	G
	No	131	59%	0.53	0.46	0.60	G
Extra Deep Discounts (EDD)	Yes	115	52%	0.39	0.32	0.47	
	No	108	49%	0.50	0.42	0.58	
Awareness of Discount	Aware	136	61%	0.35	0.28	0.42	H
	Unaware	85	38%	0.61	0.53	0.70	H
	Don't know	2	1%	0.39	0	0.96	

A few notable findings from the standard CFL segmentation analysis shown in the table above:

- Free-ridership varied significantly across retailer type with Warehouse stores having the lowest levels of free-ridership, Big Box stores having slightly higher free-ridership and DIY stores having significantly higher levels of free-ridership than either of the other store types. Analysis by individual retail store chain did not add any additional significance as only the DIY retailer type where intercept surveys were performed include two distinct retail chains (there was a third DIY chain in the program but they did not allow for in-store intercept to be performed) and the free-ridership estimates for these two chains were not statistically significantly different from one another (the sample from one of the two stores was very small);
- While the table above indicates that customers who purchased Standard program CFLs while a demo event was occurring in the store had significantly lower levels of free-ridership, the analysis of demo event and retailer type found that only DIY stores had significantly lower levels of free-ridership during demo events. The demo event significance was primarily driven by the distribution of retailer types surveys that occurred during demo events;
- Survey respondents who were purchasing at least one of the two top selling program bulb packages were found to have significantly lower levels of free-ridership (0.35 vs. 0.53);
- Survey respondents who were purchasing a program bulb model that had an extra deep discount (\$1.25-\$1.50 per bulb rather than \$1 per bulb) did have lower free-ridership (0.39 vs. 0.50); however this difference was not statistically significant at the 90% level; and
- Survey respondents who were aware the bulbs they were purchasing were discounted were found to have significantly lower levels of free-ridership.

The unweighted free-ridership estimates for specialty CFLs are provided in Table 7-30 below.

Table 7-30. Unweighted Specialty CFL Free-Ridership Segmentation Analysis

Specialty CFL NTGR Segmentation		N	%	Unweighted FR	Lower 90%CL	Upper 90%CL	Stat Signif
All Specialty CFLs		77	100%	0.53	0.43	0.62	
Demo Event	Yes	20	26%	0.44	0.25	0.62	
	No	57	74%	0.55	0.45	0.66	
Demo Event & Retailer	Big Box	5	6%	0.32	0.0	0.66	
	DIY	8	10%	0.57	0.28	0.86	
	Warehouse	7	9%	0.30	0.02	0.59	
Non-Demo Event & Retailer	Big Box	13	17%	0.46	0.24	0.69	
	DIY	35	45%	0.56	0.42	0.70	
	Warehouse	9	12%	0.61	0.34	0.88	
Retailer Type	Big Box	18	23%	0.41	0.22	0.60	
	DIY	43	56%	0.56	0.44	0.68	
	Warehouse	16	21%	0.51	0.31	0.72	
Retail Store	DIY #1	40	52%	0.55	0.42	0.68	
	DIY #2	3	4%	0.84	0.49	1.0	
	Warehouse #1	16	21%	0.64	0.44	0.84	
	Big Box #1	18	23%	0.46	0.26	0.665	

- It is interesting to note that the segmentation analysis performed for specialty CFLs did not find any statistically significant differences amongst the segments analyzed. However, to be consistent with the standard CFL methodology, the evaluation team recommends weighting the retailer type results presented in the tables above by the PY5 bulb sales to come up with overall standard and specialty CFL free-ridership estimates.

Weights

Case weights were applied to the retailer-type free-ridership estimates for standard and specialty CFLs in order to come up with overall CFL free-ridership estimates that were representative of the distribution of PY5 bulb sales. The table below shows the distribution of PY5 standard and specialty CFL sales by retailer-type based on the final Goals Tracker spreadsheet provided to the evaluation team. As this table shows the final weighting of the free-ridership estimates makes the estimates representative of 91% of the standard CFLs sold in PY5 and 96% of specialty CFLs sold in PY5.

Table 7-31. Standard and Specialty PY5 Bulb Sales used for Analysis Weights

Intercept Store?	Retailer Type	Standard CFLs	%	Specialty CFLs	%
Yes	Big Box	1,267,477	13%	161,319	13%
	DIY	4,678,713	49%	763,277	64%
	Warehouse	2,785,202	29%	222,240	19%
	Intercept Stores	8,731,392	91%	1,146,836	96%
No	Dollar Store	401,515	4%	1,593	0%
	Grocery	156,870	2%	20,650	2%
	Hardware	320,496	3%	29,041	2%
	Non-Intercept Stores	878,881	9%	51,284	4%
Total		9,610,273	100%	1,198,120	100%

Weighted Free-ridership Results

Table 7-32 below presents the weighted standard and specialty free-ridership estimates for PY5 based on the customer self-report method.

Table 7-32. Standard and Specialty Weighted Free-Ridership Estimates

Retailer Type	PY5 Bulb Sales Weighted Free-Ridership	
	Standard CFLs	Specialty CFLs
Big Box	0.37	0.41
DIY	0.59	0.56
Warehouse	0.33	0.51
Overall Weighted	0.47	0.53

Figure 7-1 and Figure 7-2, below, shows the distribution of standard and specialty free-ridership scores across the in-store intercept analysis population.

Figure 7-1. Distribution of Standard CFL Free-ridership Scores

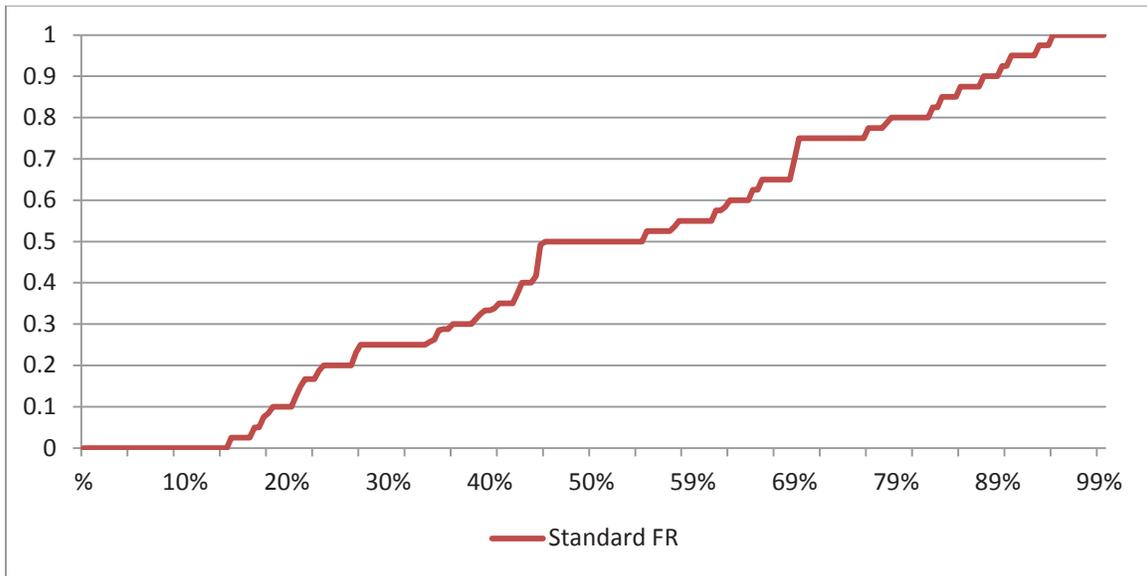
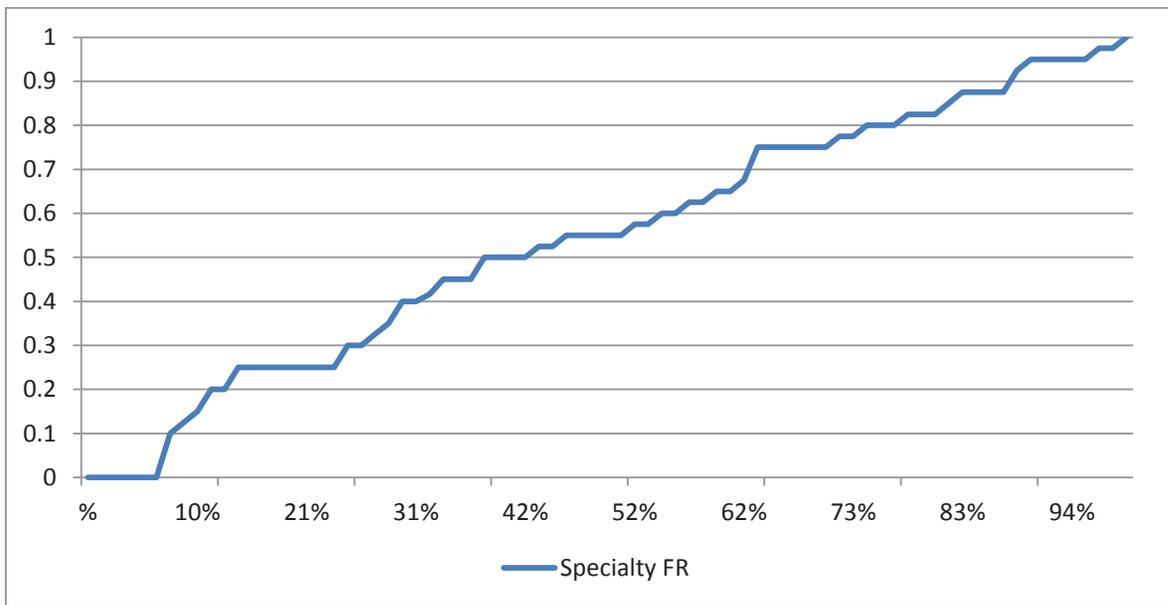


Figure 7-2. Distribution of Specialty CFL Free-ridership Scores



Spillover

In PY5, both participant and non-participant spillover were also estimated based on data collected during the in-store intercept surveys. The participant and non-participant spillover results are presented below.

Participant Spillover

Eleven customers surveyed who were purchasing program bulbs also reported purchasing non-discounted CFLs. A portion of the non-program bulbs purchases of five of these respondents were

classified as spillover bulbs as they reported that the ComEd program was influential in their decision to purchase these non-program CFLs.⁶³ Based on this data, the participant spillover rate is calculated as the ratio of the spillover purchases to the program purchases. This yields a participant spillover rate of 1.3%.

Table 7-33. PY5 Participant Spillover Results – Self-Report Method

Participant Spillover	n	Bulb/Purchase	Bulbs
NonPgm CFL Purchases By Participants	11	4.82	53
Spillover Purchases	5	5.04	25
Program Purchases	315	6.28	1,978
Participant Spillover Rate			1.3%

Non-Participant Spillover

Five customers who were not purchasing program bulbs also reported they were influenced to some degree by ComEd’s program which led them to purchase the non-program CFLs. Based on this data, the non-participant spillover rate was extrapolated to the population of ComEd customers to yield an estimated ~30,000 non-program bulbs being purchased by program non-participants. Dividing these bulbs by the estimated number of PY5 bulbs (from the final Goals Tracker Spreadsheet) resulted in an estimated non-participant spillover rate of 0.3%.

Table 7-34. PY5 NonParticipant Spillover Results – Self-Report Method

NonParticipant Spillover	n	Average Bulbs / Purchase	Total Bulbs
NP Spillover Purchases	5	2.2	11
Population Extrapolated Spillover Purchases	13,247	2.2	29,144
PY5 Program Bulbs			10,813,899
NP Spillover Rate			0.3%

NTGR

As shown in Table 7-35 below, the overall self-reported PY5 bulb-weighted NTGR (including participant and non-participant spillover) was estimated to be 0.54. The NTGR estimate for standard CFLs only was also 0.54 and the NTGR estimate for specialty CFLs was 0.48. The 90% Confidence Interval around these point estimates is approximately +/- 0.04.

⁶³ This portion is based on the number of non-program bulbs they purchased as well as the influence level they provided for the program.

Table 7-35. PY5 NTGR by Bulb Type

Program Bulb Type	Weighted Free-Ridership	Spillover	Weighted NTGR	90% Lower CI	90% Upper CI
Standard CFLs	0.47	0.02	0.54	0.50	0.58
Specialty CFLs	0.53	0.02	0.48	0.42	0.55
Overall⁶⁴	0.48	0.02	0.54	0.50	0.58

Table 7-36, below, compares the free-ridership, spillover and NTGR estimates for PY5 to those from the previous program years. As this table shows the PY5 estimate is nearly identical to the PY4 estimate. Both the PY4 and PY5 estimates are significant reductions from the PY3 estimates.

Table 7-36. PY5 FR, Spillover and NTGR Estimates Compared to Prior Program Years

Net Impact Parameters	Population	PY5	PY4	PY3	PY2
Free-ridership	Standard CFLs	0.47	0.47	--	--
	Specialty CFLs	0.53	0.58	--	--
	All Program Bulbs	0.48	0.48	0.31	0.46
Spillover	Standard CFLs	0.02	0.02		
	Specialty CFLs	0.02	0.02		
	All Program Bulbs	0.02	0.02	0.02	0.05
NTGR	Standard CFLs	0.54	0.55		
	Specialty CFLs	0.48	0.44		
	All Program Bulbs	0.54	0.54	0.71	0.60

⁶⁴ This program sales weighted average NTGR estimate can be applied to LED bulbs and all fixtures sold through the Residential Lighting program due to the lack of data available to estimate NTGR for these program offerings.

7.6.2 EPY5 ComEd Residential Lighting Impact Findings Memo

Date: October 7th, 2013 (Revised January 7th, 2014)

To: David Nichols, ComEd, Illinois Commerce Commission and ComEd Residential Lighting Interested Parties

CC: Jeff Erickson, Randy Gunn, and Rob Neumann; Navigant Consulting

From: Amy Buege, Luke Scheidler, and Vanessa Arent; Navigant Evaluation Team

RE: Revised PY5 ComEd Residential Lighting Impacts
CCs

This memorandum (memo) presents revised impact estimates (ComEd Reported, Verified Savings⁶⁵, and Impact Evaluation Research Findings⁶⁶) for the fifth program year (PY5) ComEd Residential Lighting Program evaluation. This memo was originally intended to provide ComEd with a preliminary review of the Residential Lighting Program impact estimation parameters prior to receiving the draft of the annual report. It has been revised as part of the final reporting process. The impact parameter estimates presented in this memo include estimates for PY5:

- Bulb Sales
- Delta Watts
- Installation Rates
- Leakage Rate
- Residential/Non-residential Installation Location Split
- Hours of Use (HOU) and Peak CF
- Energy and Demand Interactive Effects
- PY5 Carryover Bulbs

Preliminary PY5 Parameter Estimates

Table 7-37 below presents the PY5 Gross ComEd Reported, Verified Savings and Impact Evaluation Research impact parameter estimates (by bulb type where possible) alongside the similar estimates from PY4. A brief description of the derivation of the PY5 estimates is provided in the sections below.

⁶⁵ Verified Savings are calculated based on TRM deemed savings parameters (when available) and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals

⁶⁶ Impact Evaluation Research Findings are calculated based on evaluation estimated savings parameters regardless of whether the parameter is deemed for the Verified Savings analysis.

Table 7-37. PY5 Gross Impact Parameter Estimates Compared to PY4

Gross Impact Parameters	Population	PY5 ComEd Reported	PY5 Verified Savings	PY5 Evaluation Research	PY4 Verified	PY4 Research
Program Bulb Sales	Stan. CFLs	9,610,273	9,633,227	9,633,227	11,419,752	11,419,752
	Spec.CFLs	1,198,120	1,197,896	1,197,896	1,097,670	1,097,670
	LEDs	26,252	28,230	28,230	24,919	24,919
	Fixtures	34,713	33,035	33,035	101,090	101,090
	Coupons	5,506	5,506	5,506	5,599	5,599
	All PY5	10,874,864	10,897,894 ⁶⁷	10,897,894	12,649,030	12,649,030
Delta Watts	Stan.CFLs	-	46.7	46.7	48.7	48.6
	Spec.CFLs	-	31.0	36.5	39.6	50.0
	All PY5	-	45.0	45.5	48.0	48.8
Installation Rate	Stan. CFLs	69.5%	69.5%	76%	73%	70%
	Spec. CFLs	79.5%	79.5%	92%	80%	75%
	LEDs	79.5%	95.0%	100%	80%	100%
	Fixtures	87.5%	87.5%	100%	89%	100%
	All PY5	71%	70.7%	77.9%	74%	70%
	Res/NonRes	97%/3%	98%/2%	98%/2%	95%/5%	95%/5%
Hours of Use & Peak CF	Res HOU	HOU from Tracking Data * 1.089 to adjust for NonRes	2.75	2.75	2.74	2.74
	Res CF		0.10	0.10	0.10	0.10
	NonRes HOU		13.16	13.16	12.23	12.23
	NonRes CF		0.69	0.69	0.66	0.66
	Overall HOU		2.92	2.92	3.17	3.17
	Overall CF		0.11	0.1	0.13	0.13
Leakage	All PY5	0%	0% ⁶⁸	2.3%	0.0%	3.7%
Interactive Effects	Energy	1.06	1.07	1.04	1.03	1.03
	Demand	-	1.15	1.12	1.10	1.10
Carryover	PY3/4 Bulbs	-	3,331,459	N/A	2,673,129	2,673,129

Source: Evaluation Team Analysis

Table 7-38 below presents similar estimates for the PY5 net impact parameters.

⁶⁷ The Evaluation Research PY5 program bulb sales estimate is 23,030 bulbs higher than the ComEd reported due to a small number of bulbs sold in PY4 that were included as PY5 sales due to a delay in the receipt of the retailer invoices for these sales (and thus their exclusion from PY4 sales). This is described in further detail below.

⁶⁸ Lifetime installation rate was 0.98. No additional leakage estimate was applied.

Table 7-38. PY5 Net Impact Parameter Estimates Compared to PY4

Net Program Impact Parameters	Population	PY5 ComEd Reported	PY5 Verified Savings	PY5 Evaluation Research	PY4 Verified Savings	PY4 Evaluation Research
NTGR	Standard CFLs	0.72	0.72	0.54	0.58	0.55
	Specialty CFLs	0.80	0.80	0.48	0.80	0.44
	All PY5 Bulbs	0.73	0.73	0.54	0.60	0.54

Source: Evaluation Team Analysis

The upper and lower 95% confidence bound around the PY5 Evaluation Research NTGR estimate for Standard CFLs was +/- 0.09 (0.38 to 0.56). The upper and lower 95% confidence bound around the PY5 Evaluation Research NTGR estimate for Specialty CFLs was +/- 0.15 (0.38 – 0.68).

Preliminary PY5 Impact Estimation

Based on the Gross and Net impact parameter estimates shown in the tables above, Table 7-39 below presents estimated Net PY5 Program impacts for the Residential Lighting Program. The PY5 Verified Savings net energy savings estimate was 94% of the PY5 ComEd Reported net energy savings estimate.⁶⁹ The PY5 Impact Evaluation Research Findings net energy savings estimate was 78% of the Verified Savings net energy savings estimate.

Table 7-39. PY5 Net Program Impacts

PY5 Population	Estimated Net Impacts	PY5 ComEd Reported	PY5 Verified Savings	PY5 Evaluation Research
PY5 Bulb Sales	Net MWh Savings	305,449	287,135	225,234
	Net MW Savings	-	251.1	203.1
	Net Peak MW Savings	-	30.4	24.0
Carryover Bulbs (from PY3 and PY4)	Net MWh Savings	116,192	116,371	N/A
	Net MW Savings	-	95.0	N/A
	Net Peak MW Savings	-	12.8	N/A

Source: Evaluation Team Analysis

PY5 Primary Data Sources

The primary data sources for the evaluation of the PY5 Residential ES Lighting Program included a tracking database, a goals tracker spreadsheet, in-store intercept surveys, shelf surveys, and the PY5 Illinois Technical Reference Manual⁷⁰ (PY5 IL TRM). Table 7-40 below provides a summary of the data sources including the targeted populations, the sample sizes, and the objectives of the efforts.

⁶⁹ Using the ComEd reported estimate of 305,449 MWh.

⁷⁰ State of Illinois Energy Efficiency Technical Reference Manual. Final, As of September 14th, 2012. Effective: June 1st, 2012.

Table 7-40. PY5 Primary Data Sources and Objectives

Data Source	Targeted Population	Sample Size	Gross Impacts	Net Impacts	Process
Tracking Database	All Program Bulb Sales	All	X	X	
APT Goals Tracker Spreadsheet	All Program Bulb Sales	All	X	X	
In-Store Intercept Surveys	Retail Lighting Purchasers	792	X	X	X
In-Store Shelf Surveys	Program Stores	28 Stores	X	X	X
PY5 IL TRM	All Program Bulb Sales	All	X		

Tracking Database

The Residential Lighting Project Tracking Database included all upstream program CFL sales since the program inception. A number of data cleaning steps were taken to make sure PY5 bulb sales were complementary and non-overlapping with bulb sales attributed to PY1 through PY4. A small number of bulbs sold in PY4 were counted as PY5 sales due to a delay in the receipt of the retailer invoices for these sales and, thus, exclusion from the bulbs counted as PY4 sales.⁷¹ In addition, bulbs sold and included in PY4 or PY5 sales estimates that were later returned (as indicated by negative quantities in the program tracking data) were subtracted from the PY5 sales. The PY5 analysis dataset was finalized based on the most recent program tracking database received from ComEd (dated August 8, 2013). This dataset contained 270,709 records, representing 10,892,388 program bulbs and fixtures sold in PY4 (late invoices) and PY5. Additionally, the PY5 coupon dataset contained 2,563 records and 5,506 bulbs.

APT Goals Tracker Spreadsheet

The bulb information database tables typically used to obtain critical evaluation parameters such as lumens, manufacturer base wattage, and bulb wattage were not updated in PY5. Instead, these evaluation parameters were obtained from the APT Goals Tracker Spreadsheet. In general, the necessary evaluation parameters were available in Goals Tracker and the model numbers matched readily to the program tracking database. There were very few instances where lumen and/or manufacturer base wattage values were missing or incorrect. As in previous years, there were no fields for specialty bulb type, dimmable/non-dimmable, or reflector bulb type. These variables were

⁷¹ The invoice dates in the program tracking database corresponding to PY5 sales are 6/27/12 to 6/21/13. These dates do not align with actual program year dates (6/1/12 to 5/31/13) due to a delay in data submittal from program partners.

extracted from the “Description” field for the purposes of this evaluation, but this is an imperfect process as the bulb description does not always specify the bulb type. These designations are important for establishing base wattages and would be helpful in future evaluations.

In-store Intercept Surveys

The PY5 evaluation plan called for completing 800 in-store intercept surveys with customers purchasing lighting products in program retailers during the PY5 program year. This 800-point target was set in order to capture a large enough sample of customers who were purchasing of both standard and specialty bulbs to allow for the estimation of program impact parameters by bulb type.⁷²

Out of the 792 in-store intercept surveys completed, 323 were completed with customers purchasing program bulb and 500 were completed with customers purchasing non-program bulbs.⁷³ In total, 4,678 bulbs were purchased by the surveyed customers. Table 7-41 below provides a distribution of the number of program and non-program bulbs sold by bulb type. Similar to previous program years, intercept respondents purchased significantly more standard CFLs than specialty CFLs, and very few purchased program LEDs. Incandescent bulbs continued to be the type of non-program bulb purchased most frequently by surveyed respondents (69% of non-program bulbs purchased were incandescents), followed by halogen, non-program CFL and lastly LED bulbs.

Table 7-41. Distribution of Bulbs Purchased by Bulb Type for Intercept Respondents

Program vs. Non Program	Bulb Type	Number of Bulbs Sold	% of Bulbs Sold
Program Bulbs	Standard CFLs	1,674	36%
	Specialty CFLs	317	7%
	LED	12	0%
Non-Program Bulbs	Incandescent	1,837	39%
	Halogen	526	11%
	Non-program CFL	201	4%
	LED	111	2%

Source: Evaluation Team Analysis

Shelf Surveys

In PY5, 28 shelf surveys were conducted, one at each store where in-store intercept surveys were completed. Similar to past years the PY5 shelf surveys were made up of two parts. The first was an assessment of the lighting products and promotional materials found in the store. The second part was an inventory of all medium screw based (MSB) CFL, LED, Halogen and Incandescent light bulbs

⁷² Due to the very small number of LED bulbs and LED and CFL fixtures sold through the program (61,265, <1% of overall program sales) the evaluation team was unable to estimate installation rates for these products. An installation rate of 100% was assumed for these products due to their high price and hence the unlikelihood that they would be purchased and not installed.

⁷³ Thirty-one surveys were completed with customers purchasing of both program and non-program bulbs.

(no fixtures were inventoried). This is a change from the PY4 evaluation for which only 75 and 100-Watt A-lamp replacement bulbs were inventoried in an effort to focus solely on the impact of EISA 2007 on these lamp categories. The PY5 inventory noted the product manufacturer, model number, type of bulb, wattage (both CFL and incandescent equivalent when available), lumen output, location in the store, quantity in the pack, approximate number of packages on the shelf, original price and discounted price (when available).

PY5 IL TRM

PY5 is the first year that ComEd has had a TRM in place to guide the estimation of Verified Savings. The PY5 IL TRM was a collaborative effort by members of the Illinois Energy Efficiency Stakeholder Advisory Group (SAG). As stated in the TRM, its purpose is “to provide a transparent and consistent basis for calculating energy (kilowatt-hours (kWh) or therms) and capacity (kilowatts (kW)) savings generated by the State of Illinois’ energy efficiency programs.”⁷⁴ In some cases the Verified Savings impact parameters could be taken directly from the TRM; however in other cases it was necessary to estimate the Verified Savings impact parameters by applying findings from the PY5 Evaluation Research analysis to the TRM values (for example, estimating HOU using the residential vs. non-residential split of PY5 program bulbs).

PY5 Bulb Sales Estimates

Verified Savings and Impact Evaluation Research Findings program bulb sales estimates were derived from the PY5 tracking databases provided by ComEd to the evaluation team. The total number of bulbs sold during the PY5 Residential Lighting Program is estimated to be 10,897,894,⁷⁵ which is a 14% decrease from the bulbs sold in the fourth program year (PY4) and a 3% decrease from the third program year (PY3) bulbs. Eighty-eight percent of these were standard bulbs, 11% were specialty bulbs, and the remaining 1% was comprised of LED lamps, LED fixtures, CFL fixtures, and coupon bulbs (mixture of bulb types). Table 7-42, below, shows that the large majority of standard and specialty bulbs were sold in multi-packs (98% and 89%, respectively), while, in comparison, LED lamps, LED fixtures, and CFL fixtures were sold exclusively as single packs.

Table 7-42. PY5 Sales of Single Pack vs. Multi-Packs

Single vs. Multi Pack Sales	Stand CFL	Spec CFL	Stand LED	Spec LED	CFL Fixture	LED Fixture	Coupon	Total	
Single	183,881	133,317	9,472	18,758	8,767	24,268	1,088	379,551	3%
Multi	9,449,346	1,064,579	-	-	-	-	4,418	10,518,343	97%
PY5 Total Bulb Sales	9,633,227	1,197,896	9,472	18,758	8,767	24,268	5,506	10,897,894	100%

Source: Evaluation Team Analysis

Table 7-43 shows bulb sales by retailer type. Across all bulb types, 79% were sold at Do-It-Yourself (DIY) or Warehouse stores, driven primarily by large sales volumes of standard and specialty CFLs at

⁷⁴ Footnote from TRM: <http://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=1277&ChapterID=23>

⁷⁵ Total bulbs analyzed in PY5 include 10,869,358 bulbs sold in the PY5 invoice date range, plus 23,030 bulbs from PY4 that were not analyzed previously and 5,506 coupon bulbs..

these retailers. Standard LED lamps, CFL fixtures, and LED fixtures were sold almost entirely at DIY stores, and specialty LEDs were split approximately evenly between DIY and Warehouse stores. Coupon bulbs were only sold at small hardware stores in PY5.

Table 7-43. PY5 Bulb Sales by Type of Retailer

Retailer Type	Stand. CFL	Spec. CFL	Stand. LED	Spec. LED	CFL Fixture	LED Fixture	Coupon	Total
Big Box	1,238,082	163,057	4	51	-	-	-	1,401,194
DIY	4,729,492	762,885	9,468	9,709	8,767	24,268	-	5,544,589
Dollar Store	401,515	1,593	-	-	-	-	-	403,108
Electronics Store	4,770	277	-	-	-	-	-	5,047
Grocery	156,870	20,650	-	-	-	-	-	177,520
Small Hardware	317,296	27,194	-	-	-	-	5,506	349,996
Warehouse	2,785,202	222,240	-	8,998	-	-	-	3,016,440
PY5 Total Bulb Sales	9,633,227	1,197,896	9,472	18,758	8,767	24,268	5,506	10,897,894

Source: Evaluation Team Analysis

PY5 Delta Watts

Displaced watts or “Delta watts” is calculated as the difference between the program bulb wattage and baseline incandescent equivalent wattage. Program bulb wattages as specified by the manufacturer were easily obtained from the goals tracker.⁷⁶ Appropriate baseline wattages are more difficult to establish as this metric depends on various factors including bulb type / shape, directionality, and federal standards.⁷⁷ In PY5, the Verified Savings delta watts estimates were based on the deemed base wattage estimates outlined in the PY5 IL TRM and Impact Evaluation Research Findings delta watts were estimated by applying a lumen mapping based on the program bulb type, bulb shape, and directionality (omni-directional, globes, directional, decorative). This evaluation approach is technology neutral, meaning that lumen ranges for specific bulb types are consistent across technologies. This method is similar to the Impact Evaluation Research Findings method applied in PY4 and is also the method currently included in Version 2.0 of the IL TRM (which is effective beginning in PY6).

Verified Savings

The IL TRM specifies unique baseline watts calculation methodologies for standard CFLs, specialty CFLs, CFL fixtures, and LED downlights. For standard CFLs and CFL fixtures, delta watts were calculated based on the lumen ranges specified in Table 7-44. For the PY5 evaluation, bulbs with lumen output in the uppermost range (1490 – 2600 lumens) were subject to the new EISA standards

⁷⁶ The Goals Tracker spreadsheet contained manufacturer incandescent equivalent wattages for all retailers but one.

⁷⁷ The Energy Independence and Security Act 2007 (EISA) and the Energy Policy and Conservation Act of 2012 (EPACT).

and have reduced baseline wattage of 72 watts. All other standard CFLs and CFL fixtures were evaluated according to the “Pre-EISA” incandescent equivalent. Baseline wattages for standard LEDs (A-lamps) were also established using Table 7-44, as the PY5 IL TRM did not have specific guidance for this lamp type.

Table 7-44. IL TRM Baseline Wattage Specifications for Standard CFLs and CFL Fixtures

Minimum Lumens	Maximum Lumens	Incandescent Equivalent Pre-EISA 2007 (WattsBase)	Incandescent Equivalent Post-EISA 2007 (WattsBase)	Effective date for EISA 2007 implementation
1490	2600	100	72	June 2012
1050	1489	75	53	June 2013
750	1049	60	43	June 2014
310	749	40	29	June 2014

Source: Illinois Statewide Technical Reference Manual – effective June 1st, 2012

Baseline wattages for specialty CFLs were established based on the lumen ranges specified in Table 7-45.

Table 7-45. IL TRM Baseline Wattage Specifications for Specialty CFLs

Incandescent Bulbs (watts)	Minimum Light Output (lumens)	Common ENERGY STAR Qualified Bulbs (Watts)
25	250	4 to 9
40	450	9 to 13
60	800	13 to 15
75	1,110	18 to 25
100	1,600	23 to 30
125	2,000	22 to 40
150	2,600	40 to 45

Source: Illinois Statewide Technical Reference Manual – effective June 1st, 2012

Finally, baseline wattages for LED fixtures⁷⁸ and LED downlights were established based on Table 7-46 below.

Table 7-46. IL TRM Baseline Wattage Specifications for LED Fixtures and Downlights

Bulb Type	Efficacy (lumen/Watt)	Lumens	LED Watts (WattsEE)	Incand./Halogen Watts	CFL Watts
PAR20 screw-in lamps	10-15	460-810	13	46	18
PAR30 screw-in lamps	(incandescent/halogen) 35-45 (CFL reflector)	600-1005	15	67	20
PAR38 screw-in lamps	40-60 (LED)	630-1170	18	78	23
MR16/PAR16 pin-based lamps	15-25 (Incandescent) 50 (LED)	300-500	8	20	
		525-875	14	35	
		750-1250	20	50	
Recessed downlight luminaries	35 (fixture efficacy with a CFL lamp) 42-86 (LED fixture)	540	11	50	15
		500-650	12	65	18
		1000	13	100	25
Track lights (R20)	10-15	320-675	8	45	10
Track lights (BR30 and BR40)	(incandescent/halogen) 35-45 (CFL reflector) 40-60 (LED)	440-975	11	65	18

Source: Illinois Statewide Technical Reference Manual – effective June 1st, 2012

Evaluation Research Findings

The PY5 IL TRM base watt methodology is an improvement over the previous deemed “one-size-fits-all” lumen mapping for all bulb types used in PY4 as it uses different methods for establishing base watts for different bulb types. Despite this, the evaluation team believes there is still room for improvement. The evaluation team recommends establishing baseline wattage by using lumen mapping that is specific to bulb type, shape, and directionality (omni-directional, globes, directional, or decorative). Additionally, the evaluation team recommends a technology neutral approach, meaning that lumen ranges for specific bulb types should be consistent across technologies (the current TRM, for instance, uses different lumen ranges for CFL reflector bulbs than for LED reflector bulbs).

The proposed method was first used to calculate the Impact Evaluation Research Findings in PY4 and it has been included in Version 2.0 of the IL TRM which becomes effective beginning in PY6. The evaluation team believes this method is a more robust means of establishing incandescent equivalent wattage across all bulb types. This is especially true for specialty CFLs and LEDs. Since lumen output

⁷⁸ Technically the PY5 IL TRM did not contain a section specifically pertaining to LED fixtures and thus the LED Downlights section was applied as most LED fixtures contained LED downlight bulbs.

is a measure of the total light produced in all directions from a source, bulbs such as reflectors (and LEDs in general) that focus light in a single direction require a different lumen mapping than a standard CFL. It is important to note that while lumens are becoming a more universal metric for light output across bulb types, industry experts suggest that lumens alone are not adequate to fully characterize the performance of directional lamps.⁷⁹ The bulb type lumen mapping recommended for PY5 is adapted from the new Energy Star draft specification for lamps and the EPACT luminous efficacy requirements for incandescent reflector lamps.⁸⁰ The lumen ranges and incandescent equivalencies for bulbs subject to EISA⁸¹ are identical to the current specifications for standard CFLs and CFL fixtures presented in Table 7-44. Table 7-47 below shows the lumen to incandescent equivalencies for directional and non-directional bulbs for EISA exempt bulb types.

⁷⁹ The Lighting Research Center notes that “Most lamp manufacturers do not publish lumen output ratings for MR16 lamps or other reflectorized lamps in their catalogs. Instead, they publish beam angle and [Center Beam Candle Power], which provide more accurate information about the performance characteristics of the lamp.” Similarly, Sylvania reports that “Requests are often received for the lumen output values for aluminum reflector or AR-type lamps. Usually, this is a meaningless specification; candlepower is the appropriate value for a reflector lamp since they are used for accent and display lighting. “

<http://www.lrc.rpi.edu/programs/nlpip/lightingAnswers/mr16/performance.asp>

<http://assets.sylvania.com/assets/documents/faq0007-0297.cb5b8f25-05ee-463d-8d0c-c60912a4adf7.pdf>

⁸⁰<http://www.regulations.gov/#!documentDetail;D=EERE-2006-STD-0131-0005>

http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/lamps/V1.0_Draft_2_Specification.pdf?4749-8e30

⁸¹ Twist, dimmable twist, globe (less than 5" in diameter and > 749 lumen), candle (shapes B, BA, CA > 749 lumens), candelabra base lamps (>1049 lumens), intermediate base lamps (>749 lumens).

Table 7-47. Evaluation Baseline Wattage Specifications EISA Exempt Bulbs

Bulb Type	Lower Lumen Range	Upper Lumen Range	WattsBase
	2601	2999	150
Standard Spirals \geq 2601 lumens	3000	5279	200
	5280	6209	300
3-Way	250	449	25
	450	799	40
	800	1099	60
	1100	1599	75
	1600	1999	100
	2000	2549	125
	2550	2999	150
Globe (medium and intermediate bases less than 750 lumens)	90	179	10
	180	249	15
	250	349	25
	350	749	40
Decorative (Shapes B, BA, C, CA, DC, F, G, medium and intermediate bases less than 750 lumens)	70	89	10
	90	149	15
	150	299	25
	300	749	40
Globe (candelabra bases less than 1050 lumens)	90	179	10
	180	249	15
	250	349	25
	350	499	40
	500	1049	60
Decorative (Shapes B, BA, C, CA, DC, F, G, candelabra bases less than 1050 lumens)	70	89	10
	90	149	15
	150	299	25
	300	499	40
	500	1049	60
Reflector with medium screw bases w/ diameter \leq 2.25"	400	449	40
	450	499	45
	500	649	50
	650	1199	65
	2601	2999	150
R, PAR, ER, BR, BPAR or similar bulb shapes with medium screw bases w/ diameter $>$ 2.5" (*see exceptions below)	640	739	40
	740	849	45
	850	1179	50

Bulb Type	Lower Lumen Range	Upper Lumen Range	WattsBase
	1180	1419	65
	1420	1789	75
	1790	2049	90
	2050	2579	100
	2580	3429	120
	3430	4270	150
R, PAR, ER, BR, BPAR or similar bulb shapes with medium screw bases w/ diameter > 2.26" and ≤ 2.5" (*see exceptions below)	540	629	40
	630	719	45
	720	999	50
	1000	1199	65
	1200	1519	75
	1520	1729	90
	1730	2189	100
	2190	2899	120
*ER30, BR30, BR40, or ER40	400	449	40
	450	499	45
	500	649-1179**	50
*BR30, BR40, or ER40	650	1419	65
*R20	400	449	40
	450	719	45
*All reflector lamps below lumen ranges specified above	200	299	20
	300	399-639**	30

Source: Evaluation Team Analysis

Using the baseline wattages methods established above, delta watts was calculated for each program bulb by subtracting the program bulb wattage from the TRM or evaluation baseline wattage. Average delta watts values by bulb type are presented in Table 7-48, below.

Table 7-48. Average Delta Watts Value Across All Bulbs

	Stand. CFLs	Spec. CFLs	CFL Fixtures	Stand. LED	Spec. LED	LED Fixtures	Coupon	All PY5
Bulbs Sold	9,633,227	1,197,896	8,767	9,472	18,758	24,268	5,506	10,897,894
Avg Bulb Wattage	17.0	18.2	25.6	11.6	14.1	11.0	20.2	17.5
Avg Delta Watts (Verified Savings)	46.7	31.0	58.3	48.0	52.4 ⁸²	52.7	45.3	45.0
Avg Delta Watts (Eval. Research)	46.7	36.5	58.3	48.0	31.2	36.7	45.8	45.5

Source: Evaluation Team Analysis

Across all bulb types, the variation in delta watts resulting from the two methods (Verified Savings and Impact Evaluation Research Findings) is only 0.5%. However, this figure masks larger differences between the approaches for some lamp types. The largest portion of bulb sales (standard CFLs) has no variation between the two methods (the lumen mapping is identical between the two methods). This is also the case for CFL fixtures and standard LEDs. The other bulb types show higher variation across the delta watts calculations. The differences are most apparent for both specialty LED lamps and LED fixtures, where delta watts from the Impact Evaluation Research Findings approach are 40% and 30% lower, respectively, than the values from the PY5 Verified Savings approach.

Both the specialty LED and LED fixtures categories are comprised primarily of various types of reflector lamps (R20, R30, BR30, PAR30, etc.). The current TRM lumen ranges specified in Table 7-46 for LED reflectors are based on common light output values for different technologies (incandescent, CFL, LED) and average bulb wattages by bulb type (PAR20, PAR30, etc.) to establish wattage equivalencies (Verified Savings). Alternatively, the evaluation teams recommended Impact Evaluation Research Findings method starts with the lumen output requirements for incandescent reflector lamps as specified in EPACKT (and supplemented by Energy Star). Because the Impact Evaluation Research Findings method is based on the Federal standard for reflector lamps and the fact that any bulb replacing an incandescent bulb should have comparable light output, the evaluation team believes this method is a more robust means of establishing baseline wattages for these specialty lamps.

CFL Installation Rates

Verified Savings

As laid out in the PY5 IL TRM, the Verified Savings first-year installation rate estimate is assumed to be 69.5% for Standard CFLs, 79.5% for Specialty CFLs, 87.5% for CFL fixtures (based on the Interior

⁸² The TRM based delta watts estimate for specialty LEDs is based on the evaluation team’s interpretation of the TRM guidelines presented in Table 7-46 above, however not all PY5 program bulbs fit into the lumen bins specified by the TRM. Sam Dent of VEIC suggested (in an email dated 9/2/2013) using the midpoint of the LED luminous efficacy ranges presented to establish base wattages for these bulbs. Updating the base wattages to conform to this suggestion had little impact on the delta watts estimates, reducing the delta watts estimate for specialty LEDs by only 1% and reducing overall PY5 delta watts by only 0.002%.

Hardwired CFL Fixture section of the TRM which covers all PY5 CFL fixtures) and 95% for LEDs (based on the Downlight LED section of the TRM as 2/3rds of LED program bulbs are downlights and all LEDs are significantly more expensive than CFLs and thus are likely to have very high installation rates). LED fixtures were not called out separately in the PY5 IL TRM and so the CFL fixture installation rates were applied to LED fixtures as well as they represent the best proxy data for LED fixtures at this time.

Impact Evaluation Research Findings

The overall Impact Evaluation Research Findings estimated installation rate (IR) across bulb and retailer types based on the PY5 in-store intercepts was estimated to be 78%. This estimate is 11% higher than the PY4 Evaluation Research estimate of 70%. Both standard and specialty CFL installation rates were found to be higher in PY5 than in PY4 (standard increased from 70% to 76% and specialty increased from 75% to 92%).

As seen in past evaluation years, the installation rate for specialty CFLs was found to be higher (92%) than the installation rate of standard CFLs (76%).⁸³ An installation rate of 100% was assumed for LED bulbs and fixtures (both LED and CFL fixtures). Standard CFLs represent 88% of program bulb sales in PY5, so despite the high specialty CFL and LED installation rates, the overall PY5 installation rate (across all bulb types) was just 2% higher than the standard CFLs IR, at 78%.

Table 7-49 below shows installation rates broken out for standard and specialty CFLs⁸⁴ across a variety of factors: the retailer type (e.g., Big Box, DIY, Warehouse), whether or not the intercept survey took place during a demo event, total number of CFLs purchased, and whether or not the model the customer was purchasing was one of two “top-selling” program models.⁸⁵

⁸³ These results are retailer sales-weighted results, meaning the intercept survey results were weighted back by retailer type to the overall retailer type distribution of the population of program bulbs sold.

⁸⁴ This table does not include CFL fixtures or any LED products (bulbs or fixtures).

⁸⁵ These two “top-selling” models made up approximately 29% of total PY4 bulb sales.

Table 7-49. Installation Rate Estimates by CFL Type and Respondent Characteristic

Population		In-store Intercept Installation Rate		
		Standard	Specialty	All CFLs
Overall Non-Weighted		75%	92%	77%
Retailer Type	Big Box	76%	91%	78%
	DIY	80%	92%	82%
	Warehouse	69%	91%	70%
	Retailer Sales Wt'd	76%	92%	78%
Demo Event	Yes	72%	95%	-
	No	76%	90%	-
Total CFLs Purchased	1	100%	100%	-
	2-4	87%	91%	-
	5-10	72%	90%	-
	11+	69%	93%	-
Top sellers	Top 2 Models	71%	--	-
	Exclude Top 2 Models	79%	92%	-

Source: Evaluation Team Analysis

As the table above shows, installation rates seemed to vary by retailer type. On average, customers purchasing standard or specialty CFLs from DIY stores reported installation rates 16% higher than customers who purchased program CFLs from Warehouse stores (82% versus 70%, respectively). The overall installation rate for program CFLs sold at Big Box stores fell between the DIY and Warehouse, (78%). Across all three retailer types the installation rates for specialty CFLs remained largely unchanged, and the fluctuation in overall CFL installation rates was driven primary by the differences between the installation rates of standard CFLs (although these differences were not significant at the 90% level).

In PY5, a portion of the in-store intercept data collection coincided with in-store demonstration events being conducted by the program implementation team. The evaluation team looked into whether purchasing program bulbs during a demonstration event had a significant impact on the anticipated installation rate of program bulbs, to see if the information customers were receiving from program reps during demo events were encouraging them to install a greater percentage of the bulbs they were purchasing. The results for standard and specialty CFLs were mixed, with standard bulbs purchasers reporting lower installation rates if the bulbs were purchased during a demo event and specialty bulb purchasers reporting higher installation rates if the bulbs were purchased during a demo event. Neither of these differences was statistically significant at the 90% level.

As shown in the table above, an analysis of the correlation between installation rates and the total number of CFLs purchased found there was a clear and significant trend across standard CFL purchasers whereby the fewer the number of standard CFLs a respondent purchased, the higher their

reported installation rate. A similar trend was not found for specialty CFLs; however that may have been caused by the small samples sizes of respondents purchasing large quantities of specialty CFLs.

In PY5 there were two standard CFL program bulb models that received larger than average program discounts. The sales of these two models in PY5 accounted for approximately 29% of total program bulb sales. The two top-selling models were standard CFLs sold in multi-packs; one was a an 8-pack of standard CFLs manufactured by GE and sold through a warehouse store, and the other was a 4-pack of standard CFLs manufactured by TCP and sold through a DIY store. The evaluation team looked at installation rates specifically for these top-selling models, as well as for all other bulbs excluding these top-selling models, and found that installation rates for the top-selling models were approximately 10% lower than for the other models in the program.⁸⁶

Program Bulb Leakage Rate

Verified Savings

The PY5 IL TRM does not specifically call out a leakage rate for program bulbs; however, a lifetime installation rate of 98% is assumed for all bulb types (CFLs, LEDs and Fixtures), thus, the evaluation team equates this to a 2% non-installation rate would could be caused by a number of factors including leakage, breakage or loss.

Impact Evaluation Research Findings

In PY5, the overall leakage rate across bulb types and retailer types was estimated to be 2.3%⁸⁷, which is a decrease from the PY4 value which was just less than 4%. The PY5 program bulbs leakage was primarily driven by three program bulb purchasers who said that they were planning to install the bulbs they purchased in their homes that were located outside of ComEd service territory. The contact zip codes that the three leakage bulb purchasers provided were located in Wisconsin, Iowa, and Illinois.

In total, 12 survey respondents that were purchasing program bulbs said that they were planning to install the program bulbs outside of ComEd service territory, but nine of these 12 respondents then went on to provide a contact zip code located within ComEd territory. As a result the bulbs being purchased by these nine respondents were not deemed “leaked” bulbs. Bulbs purchased by customers who reside within ComEd service territory and have a supplier other than ComEd, but are still billed by ComEd, are not considered leakage bulbs.

⁸⁶ This difference was not statistically significant at the 90% level.

⁸⁷ The 90/10 confidence interval on the leakage estimate based on the intercept surveys is a lower bound of 2% and an upper bound of 5.5%.

Residential/Non-residential Installation Location Split

Verified Savings

The PY5 IL TRM does not dictate a residential versus non-residential split that is to be applied in the calculation of Verified Savings. Instead, it states “If the implementation strategy does not allow for the installation location to be known (e.g. an upstream retail program), evaluation data could be used to determine an appropriate residential versus commercial split.” Therefore the evaluation team has applied the 98/2 split based on the PY5 Evaluation Research analysis (described in detail below) to estimate the PY5 Verified Savings.

Impact Evaluation Research Findings

The percentage of program bulbs being installed in residential versus non-residential locations in PY5 was estimated to be 98/2⁸⁸ based on data collected during the in-store intercept surveys. This is a higher proportion of residential installations than the past three program years’ evaluation-based estimates (95/5 in PY4, 97/3 in PY3, and 90/10 in PY2). During the PY4 and PY5 data collection, a follow up question was asked of those respondents who indicated they planned on installing the program bulbs they were purchasing in their business which was either an apartment building or a hotel/motel. The follow up question asked these respondents whether these program bulbs would likely be installed within a common area of the building or within an individual unit/room. Those respondents reporting that the program bulbs would be installed within an individual unit/room were classified as residential installations and assigned residential HOU and CF estimates.

Residential/Non-residential HOU and Peak CF

The following HOU and Peak CF estimates are used for both the Verified Savings and Impact Evaluation Research Findings impact estimates.

Residential HOU and Peak CF

The residential HOU and Peak CF estimates used to calculate both the Verified Savings and Impact Evaluation Research Findings impact estimates for the PY5 Residential Lighting evaluation were taken from the PY5 IL TRM.⁸⁹ These TRM estimates were based on the lighting logger study conducted as part of the PY3 ComEd Residential Lighting evaluation and are the best estimates available for ComEd at this time. There are currently loggers installed in ComEd customer’s homes that will be analyzed as part of the PY6 evaluation.

⁸⁸ This analysis excluded program bulbs that were reportedly installed in locations outside of ComEd service territory.

⁸⁹ The residential HOU assumptions are based upon the Standard CFL TRM estimates for standard CFLs and coupons sales, the Specialty CFL TRM estimates for specialty CFLs (although the estimate for Globe bulbs in the Specialty portion of the TRM was in error and so Sam Dent has opened a TRM tracker request for next version of the TRM and we’ve applied the correct HOU estimate), the Interior Hardwired CFL fixture TRM estimates for CFL and LED fixtures, and the LED Downlights TRM estimates for all LEDs (downlights are 2/3rds of program LEDs).

Non-residential HOU and Peak CF

Similarly, the non-residential HOU and Peak CF estimates used to calculate both the Verified Savings and Impact Evaluation Research Findings impact estimates for the PY5 Residential Lighting evaluation were taken from the commercial lighting portion⁹⁰ of the PY5 IL TRM. The commercial lighting portion of the TRM provides distinct HOU and CF estimates for a large number of non-residential business types.

As mentioned above, in PY5 all customers who reported that they planned to install the program bulbs they were purchasing in their business were asked to describe the business type activity of that location. Of the respondents who purchased bulbs for their business, 35% reported that the bulbs would be installed in an apartment building, followed an equal number of respondents who reported that the bulbs would be installed in office buildings or retail/service locations (21% each), and the remaining 19% of respondents said that the bulbs would be installed in restaurants, hotel/motels, or public assembly locations (e.g. church, theater, conference center). Overall non-residential averages were estimated by weighting these business type specific HOU and CF estimates by the proportions of bulbs falling into each business type based on the self-reported data collected during the intercept surveys. These overall weighted non-residential estimates are shown in Table 7-50 below. The PY5 IL TRM did not include deemed HOU or Peak CF estimates for bulbs installed within public assembly buildings, and thus the “Miscellaneous” category estimates were used for these program bulbs.⁹¹

Table 7-50. Non-residential HOU and Peak CF Estimates

ComEd Business Type	%	Bulbs	Annual HOU	Daily HOU	Peak CF
Apartment	31%	8	5,950	16.30	0.75
Office	25%	22	4,439	12.16	0.66
Restaurant	6%	1	3,673	10.06	0.80
Retail/Service	25%	24	4,719	12.93	0.83
Hotel/Motel	6%	7	5,311	14.55	0.21
Public Assembly	6%	6	4,576	12.54	0.66
Bulb Weighted Average	100%	68	4,804	13.16	0.69

Source: Evaluation Team Analysis

⁹⁰ Due to the small percentage of program bulbs that are installed in non-residential locations (<3%) and the small proportion of PY5 bulbs that are LEDs or Fixtures (~0.5%), the non-residential HOU and Peak CF assumptions for all PY5 bulbs are all taken from the screw-based HOU and Peak CF estimates found in the table in section 4.5 of the TRM.

⁹¹ The “Miscellaneous” category HOU estimate is roughly 12 hours/day.

Interactive Effects

Verified Savings Interactive Effects

The methods used to estimate Interactive Effects for the Verified Savings and Evaluation Research Findings in PY5 were quite different from one another. The Verified Savings estimates of Interactive Effects (both Energy and Demand) were taken directly from the IL TRM v1.0 for bulbs installed in unknown locations. They only account for the cooling benefits resulting from the installation of program bulbs since the heating fuel of the homes where the program bulbs are installed is unknown.⁹²

Weighting the Energy and Demand Interactive Effects found in the IL TRM v1.0 for residential and commercial installations by the proportion of program bulbs going into each of these building types and the average HOU and Peak CF⁹³ of each of these installation locations, yields an overall program-wide Verified Savings Energy IE of 1.07 and Peak CF of 1.15, as shown in Table 7-51 .

Table 7-51. Weighted Overall Energy and Demand Interactive Effects

Sector	% of installs	HOU	Energy IE	Peak CF	Demand IE
Residential	98%	2.75	1.06	0.10	1.11
Non-Residential	2%	13.16	1.21	0.69	1.36
Overall	100%	2.92	1.07	0.11	1.15

Source: Evaluation Team Analysis

Evaluation Research Findings Interactive Effects

The approach taken to estimate the Evaluation Research Findings in PY5 assumes the distributions of ComEd Single-Family (SF) versus Multi-Family (MF) homes and gas versus electric heated homes are proxies for the distribution of the residential homes where PY5 program bulbs are installed. We realize these proxies are imperfect for reasons such as, customers who reside in SF homes likely have more MSB lighting sockets in their homes than those who reside in MF homes, and thus using the distribution of SF vs. MF homes may under represent the percentage of program bulbs being installed in SF homes. However, while this proxy method may be imperfect, the evaluation team believes it is a good start at refining the IE estimate to make them more representative of program bulb sales. As part of the PY6 evaluation home type (SF vs. MF) and heating fuel (gas versus electric) could be captured during the intercept surveys to improve the estimation of Interactive Effects. The

⁹² The IL TRM v1.0 states that “if heating fuel is unknown assume gas” and in PY5 the heating fuel was unknown. The assumption of gas means that the heating penalties from the installation of program bulbs are gas penalties (therms), rather than electric penalties, and gas impacts are not estimated as part of this evaluation.

⁹³ In order to get overall average Energy and Demand IE estimates across residential and nonresidential locations it is necessary to weight by the percentage of bulbs installed in each of these locations and by the average HOU (for Energy IE) or Peak Demand (for Demand IE) in order to account for the multiplicative impact of these estimates.

remainder of this section details how the Evaluation Research Interactive Effects estimates were derived.

Evaluation Research interactive effects estimates were developed using the PY5 IL TRM and data from the 2009 U.S. DOE EIA Residential Energy Consumption Survey (RECS 2009, for residential only). The analysis methods and data sources⁹⁴ used to estimate these Waste Heat factors in PY5 were nearly identical to those used in PY4, resulting in very similar results across the two program years. The exception to this was for the PY5 non-residential Waste Heat Factor estimates which were based upon those found in the PY5 IL TRM rather than the KEMA PY4 Operations Manual, and weighted based upon the distribution of self-reported⁹⁵ non-residential PY5 business types where program bulbs were installed. Additionally, the overall PY5 average Waste Heat Factors were weighted based upon the PY5 estimated Residential/Non-Residential split.

Residential

In order to estimate Energy Waste Heat Factors (WHFe) for program bulbs installed in residential locations, it was necessary to estimate both the cooling savings and heating penalties factors for these bulbs. The cooling energy savings factors for single family and multi-family homes were taken directly from the PY5 IL TRM. To populate the electric heating penalty algorithm for ComEd service territory, it was necessary to develop estimates for the proportion of single family and multi-family homes with electric heating, and then within those proportions, the relative distribution of resistance heating and heat pump heating (by vintage) to develop a weighted average heating COP. The evaluation team developed these estimates using PY5 ComEd estimates of the proportion of single family and multi-family homes with electric heating, and using the RECS 2009 dataset for the East North Central Census Division (IL, IN, MI, OH, WI) for the distributions of resistance heating and heat pump heating by vintage (there was insufficient data representation in the Illinois RECS dataset to develop parameter values at the necessary level of specificity by heating technology and vintage). As shown in Table 7-52 below, 1.5% of single family homes in ComEd territory have electric heat, while 13.2% of multi-family homes have electric heat. For both single family and multi-family homes, the large majority of electric heating systems are electric resistance technologies and the small percentage of homes with electric heat pumps tend to have systems built more recently than 2006. The weighted average COP from these technology distributions is 1.27 for single family homes and 1.02 for multi-family homes.

Table 7-52. Assumptions Used to Evaluation Research Electric Heating Penalties

Bulb Location	Dwelling Type	Electric Heat	Electric Resistance Heat	Heat Pump >2006	Heat Pump <2006	Heater COP, Wgtd Avg
Single family	69%	1.5%	1%	0.3%	0.1%	1.27
Multi-family	31%	13.2%	13%	0.2%	0%	1.02

Source: Evaluation Team Analysis

⁹⁴ At this time the RECS2009 data set and PY3 ComEd lighting inventory continue to be the most recently available data for this analysis.

⁹⁵ Based on the PY5 in-store intercept surveys.

These values, when applied to the electric heating penalty algorithm in the TRM, yielded electric heating penalty factor values of 0.99 for single family homes (i.e., small electric heating penalty indicated by small difference from a value of 1.0) and a moderately larger heating penalty factor of 0.94 for multi-family homes. As shown in Table 7-53, when the electric cooling savings factors and electric heating penalty factors are combined for each dwelling type, the net result is a slight energy savings factor for single family homes at 1.05, a small penalty for multi-family homes at 0.98, and a weighted overall average of 1.03. That is, the electric heating penalty is less than the cooling energy savings benefit.

Table 7-53. Assumptions Used to Derive Evaluation Research WHFe for Program Bulbs installed in Residential Locations

Bulb Location	Cooling Benefit Factor	Electric Heating Penalty	Overall WHFe
Single family	1.06	0.99	1.05
Multi-family	1.04	0.94	0.98
All Dwelling Types	1.05	0.98	1.03

Source: Evaluation Team Analysis

The overall WHFe estimate of 1.03 is driven by a few key factors. Although a smaller percentage of homes have electric heating than have central AC systems, the percentage of light savings that must be heated (49%) is higher than the percentage of lighting savings that result in reduced cooling loads (27%), according to the REMRate modeling underlying the PY5 IL TRM values. These values are based on modeling results of several different configurations and IL locations of homes. Also, the average COP for heating systems (1.02-1.27) is considerably lower than that for cooling systems (2.8), which effectively means that heating systems have to expend more energy to replace a “lost” kWh of lighting waste heat than cooling systems would have to expend to remove that same kWh, so changes in lighting waste heat are effectively more.

To develop the overall WHFd estimate, the evaluation team first developed an interior WHFd estimate by dwelling type and then added an adjustment factor for the proportion of program bulbs installed in exterior locations, for which energy and demand interactive effects do not apply. The RECS 2009 data for Illinois indicate that 69% of homes in Illinois are single family homes, and 31% are multi-family. The evaluation team applied these proportions to the single family and multi-family WHFd factors from the TRM to yield a total interior WHFd of 1.10, as shown in Table 7-54. The evaluation team then used the ComEd PY3 lighting onsite inventory data to estimate the proportion of program bulbs that are installed in interior (93%) and exterior (7%) locations. Applying a neutral WHFd factor of 1.0 to these exterior bulbs yielded overall WHFd factors for single family and multi-family of 1.10 and 1.07, respectively. Weighted across dwelling types, these yielded an overall WHFd factor for all program bulbs of 1.09.

Table 7-54. Assumptions Used to Derive Evaluation Research WHFd

Bulb Location	Dwelling Type ⁹⁶	Interior Cooling Demand Factor, IL TRM	% Exterior Bulbs, Cooling Factor 1.0	Overall WHFd
Single family	69%	1.11	7%	1.10
Multi-family	31%	1.07	7%	1.07
All Dwelling Types	100%	1.10	7%	1.09

Source: Evaluation Team Analysis

Non-Residential Interactive Effects

Program bulbs reported to be installed in commercial location were assigned Energy and Demand Interactive Effects (IE) based on the PY5 IL TRM and the self-reported business type of the location where the program bulbs were installed. Table 7-55 below shows the distribution of commercial building types reported by respondents and the estimated Energy and Demand IE of these commercial locations based on the PY5 IL TRM. This table also presents the overall bulb weighted average Energy and Demand IE of the PY5 In-store Intercept survey respondents.

Table 7-55. Respondent Reported Business Type and Associated Energy and Demand IEs

ComEd Business Type ⁹⁷	n	Bulbs	Energy IE	Demand IE
Apartments – Common Areas ⁹⁸	5	8	1.04	1.07
Office Building	4	22	1.25	1.30
Restaurant	1	1	1.34	1.65
Retail/Service	4	24	1.24	1.44
Hotel/Motel	1	7	1.15	1.51
Public Assembly	1	6	1.24	1.46
Bulb Weighted Average	16	68	1.21	1.36

Source: PY5 In-store Intercept Surveys and PY5 IL TRM

Overall Interactive Effects

Weighting the overall Energy and Demand Interactive Effects residential and commercial installations by the proportion of program bulbs going into each of these building types and the

⁹⁶ Dwelling type is used as a proxy for the type of residential location where program bulbs are installed. We realize it likely under-estimates the percentage of bulbs installed in Single-Family homes which lessens the WHFd estimate slightly.

⁹⁷ The HOU and Peak CF estimates for Apartments, Public Assembly and Missing business types were set equal to the Miscellaneous HOU and Peak CF estimates from the Operations Manual.

⁹⁸ Respondents who reported their program bulbs were installed within private spaces (in-unit) at an apartment complex were treated as residential installations.

average HOU and Peak CF⁹⁹ of each of these installation locations yields an overall program-wide Evaluation Research Energy IE of 1.04 and Peak CF of 1.12, as shown in Table 7-56.

Table 7-56. Weighted Overall Energy and Demand Interactive Effects

Sector	% of installs	HOU	Energy IE	Peak CF	Demand IE
Residential	98%	2.75	1.03	0.10	1.09
Non-Residential	2%	13.16	1.21	0.69	1.36
Overall	100%	2.92	1.04	0.11	1.12

Source: Evaluation Team Analysis

Carryover Bulb Savings Estimation

The PY5 Residential CFL energy and demand savings estimates include savings resulting from bulbs purchased during PY3 and PY4, but that were not installed (i.e., used by the consumer) in the program year during which they were purchased. Similarly, savings from program bulbs purchased in PY5, but not installed in PY5, can be counted in future program years. This section presents the Verified Savings estimates from the carryover bulbs from PY3 and PY4 that were thought to have been installed in PY5. The Verified Savings carryover savings are estimated by applying the Delta Watts and HOU parameter estimates from the IL TRM v1.0 to the bulbs purchased in PY3 and PY4, but not installed until PY5. The Verified Savings carryover NTGR estimates are taken from the Evaluation Research Findings from the year the program bulbs were sold.

PY5 Current Carryover Savings Estimation

Table 7-57 below shows that 3.3 million bulbs sold through the program in PY3 or PY4 were estimated to have been installed in PY5. The estimated quantity of PY5 carryover bulbs from PY4 program sales differs from what was in the PY4 report since it reflects Verified Savings first-year installation rates rather than Evaluation Research first-year installation rates

Table 7-57. PY5 Carryover Bulb Estimates

Carryover Bulbs	PY3	PY4
Program Year Total Bulbs Sold	11,197,862	12,649,030
Installed During PY3	7,929,658	n/a
Installed During PY4	1,596,986	9,328,548
Installed During PY5	1,671,218	1,660,241

Source: Evaluation Team Analysis

⁹⁹ In order to get overall average Energy and Demand IE estimates across residential and nonresidential locations it is necessary to weight by the percentage of bulbs installed in each of these locations and by the average HOU (for Energy IE) or Peak Demand (for Demand IE) in order to account for the multiplicative impact of these estimates.

Carryover savings resulting from the installation of prior year program bulbs were estimated using the Verified Savings impact parameter estimates (HOU, Peak CF, DW, IE) from the year of bulb installation. NTGR estimates were taken from the Evaluation Research for the year of purchase, and leakage was taken from the Verified Savings from the year of purchase. .

Table 7-58 below provides estimates of energy and demand savings in PY5 resulting from the late installation of prior program year bulbs (PY3 and PY4) based on the Verified Savings parameter estimates from those program years.

Table 7-58. PY5 Verified Savings Estimate for Carryover Bulbs

PY5 Verified Savings Carryover Estimate	PY3 Program Bulbs	PY4 Program Bulbs	Total PY5 Carryover
Program Bulbs Installed During PY5	1,671,218	1,660,241	3,331,459
Average Delta Watts –IL TRM v1.0	45.6	45.7	45.7
Average Daily Hours of Use –IL TRM v1.0	3.06	3.22	3.14
Peak Load Coincidence Factor	0.11	0.12	0.12
Gross kWh Impact per unit	50.9	53.7	52.3
Gross kW Impact per unit	0.05	0.05	0.05
Installation Rate	100%	100%	100%
Energy Interactive Effects	1.07	1.07	1.07
Demand Interactive Effects	1.15	1.15	1.15
PY5 Carryover Gross Energy Savings (MWh)	91,326	95,692	187,018
PY5 Carryover Gross Demand Savings (MW)	76.2	75.9	152.1
PY5 Carryover Gross Peak Demand Savings (MW)	9.9	10.7	20.6
Net-to-Gross Ratio	0.71	0.54	0.62
PY5 Carryover Net Energy Savings (MWh)	64,841	51,530	116,371
PY5 Carryover Net Demand Savings (MW)	54.1	40.9	95.0
PY5 Carryover Net Peak Demand Savings (MW)	7.0	5.7	12.8

Source: Evaluation Team Analysis

PY6 Estimated Carryover Savings Estimation

Table 7-59 below provides estimates of energy and demand savings in PY6 resulting from the late installation of prior program year bulbs (PY4 and PY5) based on the Verified Savings parameter estimates from those program years.

Table 7-59. PY6 Verified Savings Estimate for Carryover Bulbs

PY6 Verified Savings Carryover Estimate	PY4 Program Bulbs	PY5 Program Bulbs	Total PY6 Carryover
Program Bulbs Installed During PY6	1,660,241	1,606,495	3,266,736
Average Delta Watts	45.1	44.6	44.8
Average Daily Hours of Use	3.22	2.92	3.07
Peak Load Coincidence Factor	0.12	0.11	0.11
Gross kWh Impact per unit	48.0	47.5	47.7
Gross kW Impact per unit	0.05	0.04	0.04
Installation Rate	100%	100%	100%
Energy Interactive Effects	1.07	1.07	1.07
Demand Interactive Effects	1.15	1.15	1.15
PY6 Carryover Gross Energy Savings (MWh)	94,357	81,837	176,194
PY6 Carryover Gross Demand Savings (MW)	74.8	71.6	146.5
PY6 Carryover Gross Peak Demand Savings (MW)	10.5	8.7	19.2
Net-to-Gross Ratio	0.54	0.54	0.54
PY6 Carryover Net Energy Savings (MWh)	50,811	44,374	95,185
PY6 Carryover Net Demand Savings (MW)	40.3	38.8	79.1
PY6 Carryover Net Peak Demand Savings (MW)	5.7	4.7	10.4

Source: Evaluation Team Analysis

7.6.3 EPY5 ComEd Residential Lighting NTGR Algorithm

Free ridership Scoring Algorithm – EPY5

This document outlines the steps involved in the algorithm used to estimate free ridership for the EPY5 Residential Lighting program. It provides the purpose, survey questions, method, and actual SAS code used in each step of the algorithm. This algorithm was run separately on the data collected from survey respondents who had purchased Standard and/or Specialty CFLs. The algorithms used for the two types of CFLs were similar and thus for simplicity sake only the Standard CFL algorithm is provided below.

Step 1: Calculation of Program Influence Score

Purpose: The goal of the program influence score is to capture the maximum level of influence the survey respondent reported that ComEd’s Residential Lighting Program had on their decision to purchase the ComEd discounted Standard CFLs they were purchasing in the store on the day of the survey. This influence can be come from either information materials on the benefits of efficient lighting provided through the program by ComEd or the influence of the monetary incentive provided by the program.

Survey Questions:

Q9. Were you planning to purchase light bulbs when you entered the store today? (Q9 = 1 means “Yes”)

Q10. What type (or types) of bulbs were you planning to buy? (Q10_CFL = 1 means respondent planned to buy CFLs when they entered the store)

Q36. Did you come into the store today specifically to buy CFLs discounted by ComEd? (Q36 = 1 means “Yes”)

Q23stan. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the “discounted” (if the survey respondent knew the program bulbs were discounted)/ “low” (if the survey respondent did not know the program bulbs were discounted) price in your decision to purchase Standard CFLs today?

Q37stan. If the ComEd discount had not been offered, and the <Enter #> discounted standard CFL(s) you are purchasing had instead cost \$1 more per bulb, or a total of <\$1*Enter #> more, would you still have purchased all of these Standard CFLs, some of them, or none of them? (1=All, 2=Some, 3=None)

Q41stan. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the in-store information in your decision to buy Standard CFLs?

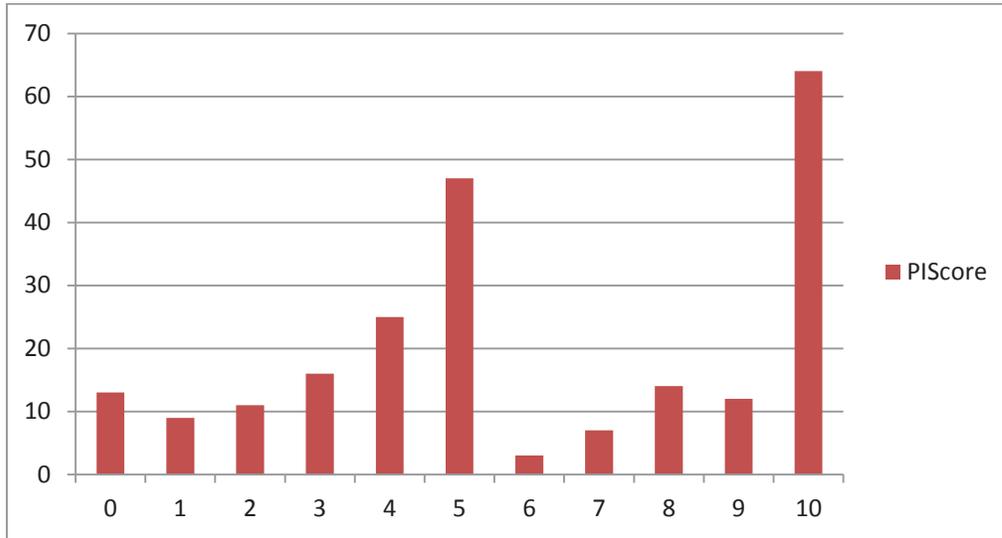
Method: Survey respondents who did not plan to purchase light bulbs when entered store on the day of the survey or indicated they did not plan to purchase CFLs or that they planned to purchase ComEd discounted CFLs were assigned a Program Influence score equal to the maximum of either their program informational materials influence score or their incentive influence score. Survey respondents who planned to purchase light bulbs when entered store on the day of the survey and indicated they planned to purchase CFLs (and not incandescents) and did not come into the store to specifically to buy CFLs discounted by ComEd were assigned a Program Influence score equal to the maximum of either their reported program informational materials influence score or their reported incentive influence score, divided by two. The influence score is divided by two for these respondents since they indicated an increased likelihood of buying CFLs in the absence of the program that we felt was not entirely being captured in the influence scores. In PY5, an adjustment was made that increased the reported influence level of the discounted price (Q23stan) for 14 respondents who stated (Q37stan) that without the incentive they would have purchased none of the program CFLs.

SAS Code:

```

q23adj = q23stan;
if Q37stan = 3 then do; tables = min((q23stan+10/2),10); change1 = 1; end; - 14 scores adjusted,
if q9 = 1 and (q10_cfl = 1 and q10_inc ne 1) and Q36 ne 1 then PIScore = max(q23adj,Q41STAN) / 2;
else PIScore = max(q23adj,Q41STAN)
;
    
```

Table 7-60 Histogram of PIScore Variable



Step 2: Calculation of Non-Program Score

Purpose: The goal of the non-program score is to capture how many of the program bulbs a respondent was buying they reported they would have purchased in the absence of ComEd’s Residential Lighting Program.

Survey Questions:

Q37stan. If the ComEd discount had not been offered, and the <Enter #> discounted standard CFL(s) you are purchasing had instead cost \$1 more per bulb, or a total of <\$1*Enter #> more, would you still have purchased all of these Standard CFLs, some of them, or none of them? (1=All, 2=Some, 3=None)

Table 7-61. Distribution of Q37Stan

If the ComEd discount had not been offered, and the <#> discounted standard CFL(s) you are purchasing had instead cost \$1 more per bulb, or a total of <\$1*Enter #> more, would you still have purchased all of these Standard CFLs, some of them, or none of them?	n	%
All	109	49%
Some	57	26%
None	43	19%
Don’t Know	14	6%

Q37stan2. How many of the < Enter # > standard CFLs would you have purchased if they had cost \$1 more per bulb?

Table 7-62. Distribution of Q37Stan2 as a % of Program Bulbs Purchased

<i>How many of the < Enter # > standard CFLs would you have purchased if they had cost \$1 more per bulb?</i>	<i>n</i>	<i>%</i>	<i>Mean Bulbs Purchased</i>
0-20%	2	4%	18
>20-40%	9	16%	9
>40-60%	37	65%	8
>60-80%	3	5%	8
Don't Know	6	11%	11

Q41stan. Using a scale of 0 to 10 where 0 means not at all influential and 10 means extremely influential, how influential was the in-store information in your decision to buy Standard CFLs?

Q40stan. Who sponsored the information about CFLs that you saw? (1 = ComEd, 98 = Don't Know)

Method: Calculation of this score is first based entirely on whether they reported they would have purchased all, some or none of the program CFLs in the absence of the incentive. Respondents who reported that they would have purchased none of the bulbs without the incentive were considered non-free riders and assigned a NP score of 10. Those who reported they would have purchased all of them without the incentives were classified as free riders and assigned a NP score of 0. For those who reported that they would have purchased some of the CFLs without the incentive it was first necessary to calculate how of the bulbs they would have purchased (NP_stan_purch) and then their NP score was set equal to 1 minus the percentage they would have purchased *10. So if they reported would have purchased 1 of the 10 their NP score would be 9 (very close to being a non-free rider) and if they reported they would have purchased 9 of the 10 their score would be 1 (very close to being a free rider). In PY5 the algorithm was changed so that respondents who were assigned a NP score of 0 (a free rider) based on their response to Q37stan (they would have purchased all bulbs) but reported that the in-store materials provided by ComEd were at least moderately influential received a new NP score equal to the level of influence they attributed to the informational materials.

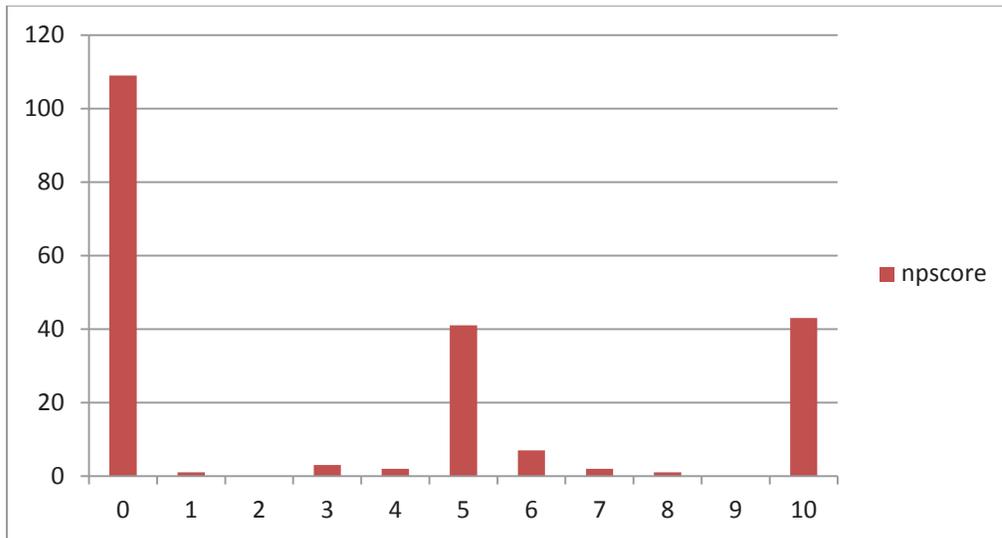
SAS Code:

```

if q37stan = 2 then NP_stan_purch = q37stan2;
if q37stan = 2 and q37stan2 = 998 then NP_stan_purch = PSTQTY/2; *some - but DK now many - estimate half of purchases;
if Q37stan = 3 then npscore=10; *None – Not Freerider;
else if Q37stan = 1 then npscore=0; *All - Freerider;
else if Q37stan = 2 then npscore=(1-(NP_stan_purch/PSTQTY))*10; * Some bulbs;
else if Q37stan = 8 then npscore=.; * Don't know;
if q41stan >=5 and q40m1 in (1,98) and q37stan = 1 then npscore = q41stan; * affects 28 out of 107;

```

Table 7-63. Histogram of NP Score Variable



Step 3: Calculation of Freeridership Score

Purpose: The Non-Program and Program Influence Scores are combined to come up with a freeridership score that takes into account both of the aspects of how the program can affect program participants.

Method: After the Non-Program and Program Influence Scores have been calculated, freeridership is calculated as 1 minus the sum of the two scores (Non-Program Score plus Program Influence Score) divided by 20. Dividing the sum of the scores by 20 allows us to calculate a ratio (between 0 and 1) that represents on the average of the two 0 to 10 scores, and subtracting this ratio from one allows us to “reverse” the scores to estimate freeridership, rather than NTGR (excluding spillover). If either the Non-Program or Program Influence Scores are missing the freeridership score is based solely on the available score.

SAS Code:

```
fr_score = 1-(npscore+piscore)/20;
if npscore = . then fr_score = 1-piscore/10;
if piscore = . then fr_score = 1-npscore/10;
```

7.6.4 EMV Response to ICC's 10.1.13 NTG Memo

To: Dave Nichols (ComEd), Jennifer Hinman (ICC), Annette Beitel (SAG)

From: ComEd EM&V Team (Evaluation Team)

Date: October 5, 2013

Re: ICC response to Navigant Memo about Significance of Market Change in ComEd's PY5 and PY6 Lighting Program

In a memo dated September 4, 2013, the ICC recommends a retrospective application of NTG for the Residential Lighting Program in PY5 and PY6 based on the ICC's opinion that significant market change has occurred in the lighting market and, thus, in accordance with the NTG Framework, retrospective application is appropriate. The ICC specifically asked the ComEd EM&V Team for a response to the September 4th Memo.

The Evaluation Team agrees with the staff's position that the market is changing for 100 Watt and 75 Watt equivalent bulbs but does not agree that this passes the "significant" threshold for the ComEd program as it is currently structured. Navigant's central point is that while there is evidence that EISA has begun to alter the market for 75 and 100 Watt equivalent bulbs since these form such a small portion of overall program bulb sales, there does not appear to be sufficient grounds to make the case that the market which the ComEd program is primarily targeting has changed enough to qualify as "significant" yet. EISA is certainly having an effect on the market, but it has been limited to bulbs that represent a small part of program sales. The question at hand focuses on the NTG for the entire residential lighting market, not just 75 and 100 Watt bulbs. This point is supported with the analysis set forth below.

Decrease in Sales of 100W and 75W Incandescent Bulbs

The first question is whether there has been a significant decrease in the sale of 100W and 75W incandescent bulbs? To assess the question, Navigant applied the results of the PY5 lighting program evaluation. The table below shows the approximate shelf space¹⁰⁰ taken up by different types of 100W equivalent lamps by program year. The data shows a 36% drop in incandescent shelf space from PY3 to PY5, a 22% increase in halogen shelf space, and a 14% increase in CFL shelf space. The percentage of shelf space for 100W replacement CFLs has increased between PY3 and PY5, but halogen bulbs are filling about 2/3rd of that shelf space and CFLs are filling only 1/3rd of that shelf space.

¹⁰⁰ The shelf surveys conducted did not measure the physical square-footage of shelf space taken up by each type of bulb. The approximations shown in the tables below were calculated in PY5 based on the percentage of packages found on the retail store shelves that were one bulb type or another.

Table 7-64. 100W Replacement Standard Bulb Shelf Space Approximation

Program Year	CFL	Halogen	Incandescent	LED
PY3	55%	5%	40%	0.0%
PY4	60%	10%	30%	0.0%
PY5	69%	27%	4%	0.2%
3 Yr. % Inc.	14%	22%	(36%)	0.2%

Navigant PY5 Residential Lighting Analysis.

There are very different trends for 75W replacement lamps, as shown in the following table. CFLs held a constant amount of shelf space between PY4 and PY5 (*not increasing*), halogens and LEDs decreased and incandescent space actually *increased* (8% increase from PY4 to PY5). The increase in 75W bulb shelf space is consistent with the supply constraint on 100W bulbs, as the increase in PY5 from PY4 may be caused by substitution out of 100W incandescents to 75W incandescents. Navigant does expect the shelf space for 75W incandescents to fall dramatically in PY6 due to the EISA-imposed supply constraint being in full force in PY6.

Table 7-65. 75W Replacement Standard Bulb Shelf Space Approximation

Program Year	CFL	Halogen	Incandescent	LED
PY3	52%	1%	46%	0.0%
PY4	44%	15%	32%	8.9%
PY5	45%	11%	40%	3.6%
3 Yr. % Inc.	(7%)	10%	(6%)	3.6%

Navigant PY5 Residential Lighting Analysis.

The table below shows program bulb sale in PY4 and PY5. Between PY4 and PY5 the relative share of program bulbs taken by 75 and 100 Watt replacement bulbs clearly increased, supporting the position that the market changed. However, it did not change dramatically. This implies that part of the decline in 100 Watt and 75 Watt incandescents was covered by an increase in sales of Halogen bulbs, which of course is as expected.

Table 7-66. Program Bulb Sales from PY4 and PY5 by Type

Bulb Type	Product	PY4 Sales	PY4 %	PY5 sales	PY5 %	% Change b/w PY4 and PY5
Standard	40 Watt Replacement	459,020	4%	449,478	4%	0%
	60 Watt Replacement	9,554,724	76%	7,530,950	69%	(7%)
	75 Watt Replacement	562,061	4%	630,992	6%	2%
	100 Watt Replacement	831,905	7%	1,021,807	9%	2%
	> 100 Watt Replacement	12,042	0%	0	0%	0%
	Total	11,419,752	90%	9,633,227	88%	(2%)
Specialty	Reflector	679,911	5%	730,335	7%	2%
	A-bulb	119,197	1%	129,612	1%	0%
	Globe	155,984	1%	115,526	1%	0%
	Other Specialty	142,578	1%	222,423	2%	1%
LED	Lamp	24,919	0%	28,230	0%	0%
CFL Fixture	Fixture	84,539	1%	8,767	0%	(1%)
LED Fixture	Fixture	16,551	0%	24,268	0%	0%
Total		12,643,431	100%	10,892,388	100%	NA

Navigant PY5 Residential Lighting Analysis.

Incandescent Price Changes

EISA created a decreased supply of 100W incandescent bulbs along with a corresponding price increase. This is shown in the average prices of bulbs for PY3-PY5 shown below.

Table 7-67. Average Price per Bulb

Retailer/PY	CFL	HAL	INC	LED	Total
PY3	\$4.46	\$4.60	\$0.72		\$3.33
PY4	\$4.12	\$1.83	\$1.68		\$3.25
PY5	\$3.62	\$2.22	\$2.92	\$34.98	3.40
Grand Total	\$3.90	\$2.41	\$1.43	\$34.98	\$3.35

Navigant PY5 Residential Lighting Analysis.

If EISA (or the ComEd program) were reducing demand for 100 W incandescents, we would expect to see the price of incandescents staying stable or at least not increasing. The fact that the price has increased therefore tells us that EISA has constrained the supply side of the supply-demand function, which is entirely consistent with its intent. On this point we are in agreement with ICC Staff.

Bulb Availability

Another market indicator to be considered is the percent of customers who can still buy 100W incandescent bulbs. The tables below provide the percentage of stores that had 75W and 100W incandescent bulbs available on the shelves for customer purchase in PY4 and PY5 (*based on the shelf survey*). As the first table shows, 100% of stores in PY4 and PY5 had 75W incandescent bulbs available for purchase. The second table shows that 86% of the PY4 stores surveyed and 50% of the PY5 stores surveyed had 100W incandescent bulbs available for purchase. We addressed this point in our earlier memo, making the point that both types of incandescents are still available in the market. However, the fact that they are not as available as they once were supports the ICC staff position that the market has changed.

Table 7-68. Stores with 75W Incandescents Available

Store Type	Stores visited		Number of Stores with 75W Incandescents Available		% of Stores with 75W Incandescents Available	
	PY4	PY5	PY4	PY5	PY4	PY5
Big Box	2	7	2	7	100%	100%
DIY	5 ¹⁰¹	15	5	15	100%	100%
Total	7	22	7	22	100%	100%

Navigant PY5 Residential Lighting Analysis.

Table 7-69. Stores with 100W Incandescents Available

Store Type	Stores visited		Number of Stores with 100W Incandescents Available		% of Stores with 100W Incandescents Available	
	PY4	PY5	PY4	PY5	PY4	PY5
Big Box	2	7	1	5	50%	71%
DIY	5*	15	5	6	100%	40%
Total	7	22	6	11	86%	50%

Navigant PY5 Residential Lighting Analysis.

Program Sales by Size

The table below shows program CFL sales by size for standard bulbs. Sales of 75W equivalent bulbs as a percent of total program sales increased 2% from 4% to 6% from PY4 to PY5 while 100 Watt bulbs also increased 2% from 7% to 9% of total program sales. Offsetting these increases, sales of the 40 and 50 Watt replacements declined by 4%. While sales of 75 and 100 Watt equivalent bulbs are growing relative to other program bulbs, a 2% increase is not dramatic. Together 100 and 75 Watt bulbs represent just 15% of total program bulb sales in PY5, up from 11%.

¹⁰¹ 6 DIY stores were surveyed in PY4; however the surveyor at one of the DIY stores inadvertently only recorded LED and CFL bulbs.

Table 7-70. Total Net Increase of Program Bulb Sales from PY4 to PY5

CFL Lamp Type	PY4 Sales	% of PY4	PY5 Sales	% of PY5	% Change PY4 to PY5
75 Watt replacement CFLs	562,061	4%	630,992	6%	2%
100 Watt replacement CFLs	831,905	7%	1,021,807	9%	2%
40 and 60 Watt replacement CFLs	10,025,786	89%	7,980,428	85%	-4%
Total	11,419,752	100%	9,633,227	100%	

Navigant PY5 Residential Lighting Analysis.

Conclusion

Navigant agrees that sales of 75 Watt and 100 Watt incandescent bulbs have been declining, their price has been increasing, and they are not as available as they used to be. This is evidence that the market is changing. If the ComEd program were primarily targeted at those bulbs, the answer to the question at hand might be different. However, the question at hand is on the NTG for the whole program, not just one piece of it.¹⁰² Sales of 75 and 100W CFLs at 14% of total program bulbs in PY5 are too small as a percentage of the program to support a conclusion that EISA has caused a significant change in the market targeted by the program at this time. For all of the above reasons, the Evaluation Team does not believe NTG should be applied retroactively to the residential lighting market for PY5 or PY6.

If “significant market change” remains in the NTG Framework as a criteria for determining whether or not to adjust net savings retrospectively, Navigant requests that SAG define what qualifies as “significant” and how that ought to be calculated.

¹⁰² The PY4 report did break NTG out by standard and specialty bulbs but not by size of standard bulb.