



Memorandum

To: Vincent Gutierrez, ComEd
CC: All Interested Parties in Illinois
From: Amy Buege and Vanessa Arent, Navigant Evaluation Team
Date: February 9, 2016
Re: *PY8 ComEd Residential Lighting NTGR Estimation*

This memorandum presents the Evaluation Research¹ PY8 net-to-gross ratio (NTGR) estimates for Standard CFLs and Omnidirectional and Directional LEDs sold through ComEd's Residential Lighting program in PY8.

Results Summary

The table below presents the PY8 Evaluation Research NTGR estimates for program Standard CFLs, Omni-directional LEDs, and Directional LEDs. These results were estimated using a participant self-report method that was similar to the method used in previous evaluation years. The NTGR results in Table 1 are inclusive of both participant and non-participant spillover.

As shown in Table 1, the NTGR estimates for LEDs purchased during demonstration events² were higher than the NTGR estimates for bulbs purchased during non-demonstration event periods for Omni-directional and Directional LEDs. Omni-directional LEDs had the highest NTGR differential (NTGR of 1.02 for bulbs sold during demo events versus 0.56 for bulbs sold outside of the demo event periods). Due to the increased program sales which occurred during demo events, and the fact that our in-store data collection methodology resulted in an over-sampling of demonstration period data,³ the final results were estimated separately for demonstration and non-demonstration event periods and then weighted by the estimated percentage of bulbs sold during demonstration events.

¹ It should be noted that the NTGR estimates presented here are based on the PY8 in-store intercept surveys and weighted by PY8 forecasted bulb sales as documented in the PY8 Goals Tracker spreadsheet provided to the evaluation team by ComEd.

² Demonstration events are events put on by CLEAResult, the program implementer, and involve CLEAResult personnel setting up an efficient lighting informational display within the retailers lighting aisle. These personnel actively work with retail shoppers within the aisle answering questions and providing information about the benefits of CFLs and LEDs and the ComEd lighting program.

³ Each three-day data collection period at a program retailer commenced with a half day demonstration event so that the program implementation staff were on hand to introduce the intercept surveyor to retail staff and secure approval for the in-store data collection activities. Demonstration events occurred on 12 of the 36 days when intercepts were being conducted (17% of the data collection period), which is a significantly higher percentage of time than throughout the remainder of the program year.

The recommended NTGR results below are based on a 5%/95% demonstration event/non-demonstration event period split which represents an upper bound on the likely percentage of program bulbs sold annually during demonstration events. Sensitivity analyses were performed on the demonstration/non-demonstration event split (ranging from a 1%/99% demo/nondemo split to a 10%/90% split) and the results showed little difference in the NTGR estimates for all of the program bulb types.

Table 1. PY8 Evaluation Research NTGR Results

Bulb Type	Segmentation	Free-Ridership	Participant Spillover	Nonparticipant Spillover	NTGR
Standard CFLs	Non-Demo Periods	0.45	0.004	0.009	0.56
	Demo Periods	0.37	0.032	0.000	0.66
	Recommended PY8 Estimate (5/95 Demo/Non-Demo split)	0.45	0.005	0.008	0.57
Omni-Directional LEDs	Non-Demo Periods	0.50	0.008	0.054	0.56
	Demo Periods	0.27	0.011	0.274	1.02
	Recommended PY8 Estimate (5/95 Demo/Non-Demo split)	0.49	0.009	0.065	0.58
Directional LEDs	Non-Demo Periods	0.43	0.008	0.014	0.59
	Demo Periods	0.31	0.011	0.020	0.72
	Recommended PY8 Estimate (5/95 Demo/Non-Demo split)	0.42	0.009	0.014	0.60

PY8 NTGR Methodology

The Evaluation Research NTGR estimates included in this memo are based on a total of 828 in-store intercept surveys conducted as part of the PY8 evaluation. Table 2 below shows (by retailer type and overall) the number of retail store locations where intercept surveys were conducted in PY8, the number of days of interviewing that took place, the distribution of completed intercept surveys, as well as the forecasted⁴ PY8 program bulb sales used for NTGR analysis retailer weighting. As this table shows, a total of 69 person days were spent in retail stores conducting intercept surveys and a total of 23 different program retail stores were visited across the three program retailers included in the sample. This table also shows that the greatest proportion of PY8 intercept surveys were conducted with lighting purchasers (program and non-program) in DIY stores (68%). DIY stores account for 41% of PY8 forecasted program bulb sales. The average number of intercept surveys completed per day varied by retailer type, ranging from a high of 15.5 in DIY stores, to a low of 4.8 in Warehouse stores. The NTGR results presented in this memo are weighted by the forecasted PY8 Retailer Type program bulb sales in order to make the results representative of the expected

⁴ Based on the PY8 program bulbs sales forecast in the PY8 Goals Tracking spreadsheet.

distribution of PY8 Residential Lighting program bulb sales. Once the PY8 program year is complete, the results shown here will be reweighted using the final PY8 program bulb sales.

Table 2. PY8 Intercept Surveys and Forecasted Program Bulb Sales by Retailer Type

Retailer Type	Stores	Days	PY8 Intercepts		Avg Intercepts /Day	PY8 Bulb Sales ⁵	
			#	%		#	%
Big Box	6	18	197	24%	10.9	2,047,353	14%
Do-It Yourself	12	36	559	68%	15.5	5,893,255	41%
Warehouse	5	15	72	9%	4.8	3,505,765	24%
Other	0	0	n/a	n/a	n/a	3,039,081	21%
Total	23	69	828	100%	12	14,485,454	100%

Table 3 below shows the distribution of PY8 intercept survey respondents by retailer and bulb type purchased. As this table shows, 55% of intercept survey respondents purchased one or more program bulb (the majority of the bulbs being purchased were standard CFLs or Omni-directional LEDs) and 49% of purchased one or more non-program bulb (the majority of these being incandescent bulbs).

Table 3. Distribution of PY8 Intercept Survey Respondents by Bulb Type Purchased

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stan CFL	Omni LED	Dir LED	Pgm ⁶	Stan CFL	Spec CFL	LED	Hal	Inc	Non Pgm ⁷	
Big Box	64	33	16	110	3	4	10	33	44	91	197
DIY	100	139	48	283	12	27	72	76	133	304	559
Warehouse	24	18	25	65	0	0	5	2	0	7	72
Total	188	190	89	458	15	31	87	111	177	402	828
% Surveyed⁸	23%	23%	11%	55%	2%	4%	11%	13%	21%	49%	100%

Table 3 above shows that in PY8, 93% of intercept respondents purchasing Standard CFL were buying program CFLs, which similar to the PY7 findings (95% were buying program CFLs). The results for LEDs, however, changed significantly between PY7 and PY8 (the percentage of LED purchasers buying program LEDs increased from 50% in PY7 to 76% in PY8). This significant increase

⁵ Forecasted savings based on the PY8 Goals Tracker spreadsheet.

⁶ Some respondents purchased more than one type of program bulb, so the sum of the percentages of respondents surveyed for the three different program bulbs types is greater than the program percentage.

⁷ Some respondents purchased more than one type of non-program bulb, so the sum of the percentages of respondents surveyed for the five different non-program bulbs types is greater than the program percentage.

⁸ Bulb Type percentages sum to more than 100% since some customers purchased more than one type of bulb.

is likely attributable to ComEd’s increased program LED offerings in PY8 which allowed more LED purchasers to participate in the program. Based on the Goals Tracker, in PY8 ComEd is incentivizing a total of 216 LED models across the three program retailers where intercepts were performed. This is a significant increase over PY7 during which only 59 LEDs were included in the program. Table 4 shows the difference in Omni-directional and Directional LED offerings between PY7 and PY8. Both Big Box and DIY stores increased their offerings by over 300%, while Warehouse intercept stores offered one model number in 2015. In PY7, intercept retailers primarily offered three LED bulb types: A-lamp, slim lamps, and reflectors. In PY8, the types of LEDs offered expanded to include globes, candelabras, a larger variety of reflectors, and a wider range of replacement wattages.

Table 4. Number of Unique Model Numbers of Incentivized LEDs Sold by Intercept Retailers⁹

Type	PY8			PY7			YOY Increase
	Omni-directional LED	Directional LED	Total	Omni-directional LED	Directional LED	Total	
Big Box	21	64	85	7	13	20	325%
DIY	49	72	121	13	14	27	348%
Warehouse	4	7	11	5	7	12	-8%
Total	74	142	216	25	34	59	266%

Table 5 below is similar to Table 3 except that it shows the distribution of bulbs purchased by PY8 intercept survey respondents. As this table shows, 55% of the bulbs being purchased by intercept respondents were program bulbs (55% of which were standard CFLs) and the remaining 45% of the bulbs being purchased were non-program bulbs (52% of which were incandescent bulbs and 25% of which were halogen bulbs). In total, of the 4,576 bulbs purchased by intercept respondents, 34% were purchasing CFLs, 32% were purchasing LEDs, 11% were purchasing Halogen bulbs, and 23% were purchasing Incandescent bulbs.¹⁰ This represents nearly a 400% increase in LED purchasers, a 36% increase in halogen purchasers, a 39% drops in CFL purchasers, and a 23% drop in Incandescent purchasers in PY8.

Table 5. Distribution of PY8 Bulb Purchases by Intercept Respondents

Retailer Type	Program Bulbs				NonProgram Bulbs						All Intercepts
	Stand CFL	Omni LED	Dir LED	Pgm	Stand CFL	Spec CFL	LED	Hal	Inc	Non Pgm	
Big Box	452	142	62	656	13	10	21	157	188	389	1,045
DIY	648	600	183	1,431	42	82	296	337	868	1,625	3,056
Warehouse	292	62	97	451	0	0	12	12	0	24	475

⁹ Some retailers carried the same model numbers, so the total number of unique Omni-directional model numbers in PY8 and the overall total number of unique model numbers in PY8 sum to less than the segmented values for these categories

¹⁰ In PY7, of the 4,193 bulbs purchased by intercept respondents, 56% were purchasing CFLs, 6% were purchasing LEDs, 8% were purchasing Halogen bulbs, and 30% were purchasing Incandescent bulbs.

Total	1,392	804	342	2,538	55	92	329	506	1,056	2,038	4,576
% Surveyed	30%	18%	7%	55%	1%	2%	7%	11%	23%	45%	100%

Table 6 below shows the average number of bulbs purchased by intercept respondents by Retailer and Bulb Type. As this table shows, the average survey respondent at Warehouse stores purchased more bulbs than respondents at Big Box or DIY stores.

Table 6. Average Number of Bulbs Purchased by PY8 Intercept Respondents

Retailer Type	Program Bulbs				NonProgram Bulbs					All Intercepts
	Stan CFL	Omni LED	Dir LED	Pgm	CFL	LED	Hal	Inc	Non Pgm	
Big Box	7.1	4.3	3.9	6.0	3.3	2.1	4.8	4.3	4.3	5.3
DIY	6.5	4.3	3.8	5.1	3.2	4.1	4.4	6.5	5.3	5.5
Warehouse	12.2	3.4	3.9	6.9	0.0	2.4	6.0	0.0	3.4	6.6
Total	7.4	4.2	3.8	5.5	3.2	3.8	4.6	6.0	5.1	5.5

Table 7 below shows the number of intercepts conducted and the volume of program versus nonprogram bulbs purchased during ComEd sponsored in-store demonstration events (versus non-demonstration event periods). In-store interviewers accompanied program implementation staff into program retail stores during demonstration events to familiarize themselves with the program offerings and be introduced to program retail staff. As this table shows, demonstration events were taking place during approximately 17% of the time interviewers were in the stores and 24% of the completed surveys were conducted during a demonstration event. Demonstration events, which promote the benefits of high efficiency lighting, led to increased rates of LED purchases (31% of survey respondents program LED sales occurred while a demonstration events was being held). Typically 20 to 40 ComEd-sponsored demonstration events occur each month across all program retailers, and thus intercepts occurring during a demonstration event are over-represented in our sample.¹¹ To account for the demonstration event bias, the NTGR results were segmented by the demonstration event status (Demo or NonDemo) at the time the in-store intercept survey took place.

Table 7. PY8 Intercept Surveys and Forecasted Program Bulb Sales by Retailer Type

Retailer Type	Days ¹²		Intercepts		Bulb Sales					
	#	%	#	%	Pgm LEDs	%	Pgm CFLs	%	NonPgm Bulbs	%
NonDemo Event	57.5	83%	626	76%	795	69%	1,100	79%	1,549	76%

¹¹ The evaluation team estimates that between 1% and 5% of all annual program sales occur during a demonstration event period. This assumption is based on roughly 40 demonstration events occurring monthly, roughly 800 participating retail store fronts and a four-fold increase in the rate of sale during a demonstration events.

¹² Demonstration events lasted approximately 4 hours and so were considered 0.5 of a day.

Demo Event	11.5	17%	202	24%	351	31%	292	21%	489	24%
Total	69	100%	828	100%	1,146	100%	1,392	100%	2,038	100%

PY8 NTGR Estimation Methodology

In PY8, NTGR estimates for CFLs and LEDs were calculated using the customer self-report method based on data collected during the in-store intercept surveys.

Once these parameters were estimated NTGR was calculated as follows:

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

Free-ridership was estimated by first calculating the following two scores:

- 1) *Program Influence Score* (PI Score) - The degree of influence the program¹³ had on the customers' decision to install CFLs or LEDs, 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 scores were calculated for all program bulb purchasers, free-ridership was calculated as:

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

PY8 Evaluation Verified Free-ridership Results

Table 8 through Table 10, below, present the *unweighted* free-ridership estimates for Standard CFLs, Omni-directional LEDs, and Directional LEDs, respectively. The tables below also presents the unweighted free-ridership results segmented by Demo Event (whether the intercept survey occurred during a demonstration event) and Retailer Type (Big Box, Do-It-Yourself, or Warehouse).

¹³ Program influence could be attributable to the program incentive, in-store information materials, placement of incentivized bulbs, or information from retail store personnel who call out the ComEd program.

Table 8. Unweighted PY8 Standard CFL Free-Ridership Segmentation Analysis

Standard CFL Free-Ridership		N	Free-Ridership	Lower 90%CL	Upper 90%CL
All Standard CFLs		155	0.42	0.38	0.46
Demo Event	Yes	36	0.40	0.31	0.49
	No	119	0.43	0.38	0.47
Retailer Type	Big Box	53	0.36	0.29	0.43
	DIY	79	0.50	0.45	0.56
	Warehouse	23	0.36	0.25	0.48
Demo Event and Retailer Type	Big Box – No Demo	39	0.40	0.32	0.48
	Big Box – Demo	14	0.24	0.10	0.38
	DIY – No Demo	59	0.53	0.46	0.59
	DIY – Demo	20	0.44	0.35	0.54
	WH – No Demo	21	0.33	0.22	0.44
	WH – Demo	2	0.80 ¹⁴	0.43	1.00

Table 9. Unweighted PY8 Omni-Directional LED Free-Ridership Segmentation Analysis

Omni-Directional LED Free-Ridership		N	Free-Ridership	Lower 90%CL	Upper 90%CL
All Omni-Directional LEDs		187	0.37	0.33	0.41
Demo Event	Yes	63	0.31	0.25	0.37
	No	124	0.40	0.35	0.45
Retailer Type	Big Box	33	0.36	0.27	0.45
	DIY	136	0.36	0.31	0.40
	Warehouse	18	0.54	0.38	0.69
Demo Event and Retailer Type	Big Box – No Demo	24	0.40	0.28	0.52
	Big Box – Demo	9	0.28	0.16	0.39
	DIY – No Demo	88	0.37	0.31	0.43
	DIY – Demo	48	0.33	0.25	0.41
	WH – No Demo	12	0.68	0.50	0.85
	WH – Demo	6	0.19	0.04	0.34

¹⁴ Due to the small sample size (n=2) associated with this result and its non-intuitiveness, the free-ridership estimate for Warehouse Demo Events was set equal to the Warehouse Nondemo Events estimate (which can be considered an upper bound on the Demo Event result).

Table 10. Unweighted PY8 Directional LED Free-Ridership Segmentation Analysis

Directional LED Free-Ridership		N	Free-Ridership	Lower 90%CL	Upper 90%CL
All Directional LEDs		59	0.42	0.36	0.48
Demo Event	Yes	20	0.35	0.24	0.46
	No	39	0.44	0.37	0.51
Retailer Type	Big Box	11	0.29	0.15	0.42
	DIY	38	0.46	0.39	0.54
	Warehouse	10	0.39	0.27	0.51
Demo Event and Retailer Type	Big Box – No Demo	9	0.30	0.14	0.45
	Big Box – Demo	2	0.18	0.0	0.40
	DIY – No Demo	22	0.50	0.41	0.59
	DIY – Demo	16	0.37	0.24	0.51
	WH – No Demo	8	0.41	0.26	0.55
	WH – Demo	2	0.29	0.28	0.31

As shown in the tables above, all three Bulb Types had lower free-ridership scores during demonstration events than during non-demonstration event periods.

Weights

Due to the differences in results related to demonstration event status and retailer type, the evaluation team developed case weights that were applied to the demo event and retailer-type free-ridership estimates in order to derive bulb type free-ridership estimates that were representative of the anticipated¹⁵ distribution of PY8 bulb sales. Table 11 below shows the distribution of PY8 Standard CFLs and Omni-directional and Directional LEDs forecasted by retailer-type and intercept-store status based on the preliminary Goals Tracker spreadsheet provided to the evaluation team. Applying the Retailer Type case weights makes the free-ridership estimates representative of 67% of the forecasted PY8 Standard CFL sales, 97% of the forecasted PY8 Omnidirectional LED sales and 94% of forecasted PY8 Directional LEDs sales.

¹⁵ Based on the PY8 Goals Tracker spreadsheet.

Table 11. Forecasted PY8 Sales used for Analysis Weights

Intercept Store?	Retailer Type	Standard CFL	%	Omni LED	%	LED Directional/Other	%
Yes	Big Box	1,068,390	13%	275,586	8%	480,264	18%
	DIY	1,713,506	21%	1,350,128	38%	630,114	24%
	Warehouse	768,002	9%	155,986	4%	384,994	15%
	Intercept Stores	3,549,898	43%	1,781,700	50%	1,495,372	57%
No	Big Box	129,904	2%	53,726	1%	39,483	2%
	DIY	1,298,022	16%	346,338	10%	555,147	21%
	Discount	460,000	6%	0	0%	0	0%
	Dollar Store	1,950,000	24%	0	0%	0	0%
	Electronic	51,942	1%	37,216	1%	23,216	1%
	Grocery	98,400	1%	11,555	0%	9,555	0%
	Hardware	201,616	2%	74,510	2%	121,071	5%
	Warehouse	530,500	6%	1,286,270	36%	380,013	14%
	Non-Intercept Stores	4,720,384	57%	1,809,615	50%	1,128,485	43%
Total		8,270,282	57%	3,591,315	25%	2,623,857	18%

As mentioned previously, the distribution of program bulbs sales by demonstration event status is unknown, but believed to be 5% or less. The final results will be calculated assuming three different demo/non-demo sales ratios (1/99, 5/95, 10/90) in order to test the sensitivity of this parameter.

Weighted Free-ridership Results

Tables 12 through 14 below present the weighted free-ridership estimates for Standard CFLs, Omni-directional LEDs, and Directional LEDs by Demo Event and Retailer Type segmentations.

As shown in these tables, all bulb types had lower free-rider scores during demonstration events, when the program was able to have its maximum influence due to implementation staff being present in the aisles to educate customers the various high efficiency bulb types.

Table 12 provides the Retailer Type weighted free-ridership estimate for program Standard CFL sales by demonstration event period (0.45 NonDemo period vs. 0.37 during Demo period). The last three rows of this table present the Standard CFL weighted free-ridership scores assuming 1%, 5%, and 10% of Standard CFL program bulb sales occur during a demonstration event. As this table shows, Standard CFL free-ridership is not very sensitive to a +/-5% shift in the percentage of program bulb sales occurring during demonstration events.

Table 12. Weighted CFL Free-Ridership Estimates

Demo Event	Retailer Type	PY8 Bulb Sales Weighted Free-Ridership	
		Retailer Type Wt.	Free-ridership
No	Big Box	14%	0.40
No	DIY	36%	0.53
No	Warehouse	16%	0.33
No Demo Retailer Type Weighted		n/a	0.45
Yes	Big Box	14%	0.24
Yes	DIY	36%	0.44
Yes	Warehouse	16%	0.33 ¹⁶
Demo Retailer Type Weighted		n/a	0.37
Weighted 1/99 demo/non-demo		n/a	0.45
Weighted 5/95 demo/non-demo		n/a	0.45
Weighted 10/90 demo/non-demo		n/a	0.44

Table 13 shows that the Retailer Type weighted free-ridership estimate for program Omni-directional LED sales by demonstration event period (0.50 NonDemo period vs. 0.27 during Demo period). Similar to the table above, the analysis results indicate that the weighted Omni-directional LED free-ridership estimates are fairly insensitive to a +/- 5% shift in the percentage of program sales that occur during a demonstration event.

Table 13. Weighted Omni-directional LED Free-Ridership Estimates

Demo Event	Retailer Type	PY8 Bulb Sales Weighted Free-Ridership	
		Retailer Type Wt.	Free-ridership
No	Big Box	9%	0.40
No	DIY	47%	0.37
No	Warehouse	40%	0.68
No Demo Retailer Type Weighted		n/a	0.50
Yes	Big Box	9%	0.28
Yes	DIY	47%	0.33
No	Warehouse	40%	0.19
Demo Retailer Type Weighted		n/a	0.27
Weighted 1/99 demo/non-demo		n/a	0.50
Weighted 5/95 demo/non-demo		n/a	0.49

¹⁶ The free-ridership estimate for Warehouse Demo Event was set equal to the Warehouse Nondemo Event estimate due to an extremely low sample size within the Demo Event Warehouse store category (n=2). The Nondemo result can be thought of as an upper bound on the true Demo Event result.

Weighted 10/90 demo/non-demo	n/a	0.48
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Table 14 shows that the Retailer Type weighted free-ridership estimate for program Directional LED sales by demonstration event period (0.43 NonDemo period vs. 0.31 during Demo period). Again, the results show that weighted Directional LED free-ridership estimates are fairly insensitive to a +/- 5% shift in the percentage of annual bulbs sold during demonstration events.

Table 14. Weighted Directional LED Free-Ridership Estimates

Demo Event	Retailer Type	PY8 Bulb Sales Weighted Free-Ridership	
		Retailer Type Weighting	Free-ridership
No	Big Box	20%	0.30
No	DIY	45%	0.50
No	Warehouse	29%	0.41
No Demo Retailer Type Weighted		n/a	0.43
Yes	Big Box	20%	0.18
Yes	DIY	45%	0.37
No	Warehouse	29%	0.29
Demo Retailer Type Weighted		n/a	0.31
Weighted 1/99 demo/non-demo		n/a	0.43
Weighted 5/95 demo/non-demo		n/a	0.42
Weighted 10/90 demo/non-demo		n/a	0.42

Spillover

In PY8, participant and non-participant CFL and LED spillover were estimated based on data collected during the in-store intercept surveys. Similar to the free-ridership results presented above, these results are broken down by intercepts occurring during demo and non-demo event due to the increased program influence which is likely to occur during demonstration events. The participant and non-participant spillover results are presented below.

Participant Spillover

Participant spillover occurs when a customer who is purchasing a program CFL or LED is influenced by the program to also purchase a non-program non-discounted CFL or LED bulb. Participant spillover was estimated separately for CFLs and LEDs.¹⁷ Table 15 and Table 16 below present the results of the Standard CFL and LED participant spillover analysis, segmented by demonstration and non-demonstration event period.

¹⁷ Participant spillover for Omni-directional and Directional LEDs was estimated together.

As shown in Table 15 below, a total of three respondents who purchased a program bulb also purchased non-discounted Standard CFLs. All three respondents reported that the program influenced their decision to purchase the non-program Standard CFLs. Two of these three surveys occurred during a demonstration event. Based on this data, the Standard CFL participant spillover rate was calculated as the ratio of the spillover Standard CFL bulb purchases to the program Standard CFL purchases (segmented by demonstration event status). As the table below shows, this yielded a participant Standard CFL spillover rate of 3.2% for bulbs purchased during a demo event and a 0.4% participant Standard CFL spillover rate for bulbs purchased outside of a demo event period.

Table 15. PY8 Participant CFL Spillover Results – Self-Report Method

Demo Event	Participant CFL Spillover	n	Bulb/Purchase	Bulbs
No	NonPgm CFL Purchases By Participants	1	4.00	4
	Spillover Purchases	1	4.00	4
	Program Purchases	142	7.75	1,100
	Participant CFL Spillover Rate			0.4%
Yes	NonPgm CFL Purchases By Participants	2	5.00	10
	Spillover Purchases	2	4.70	9
	Program Purchases	46	6.35	292
	Participant CFL Spillover Rate			3.2%

Similarly for LEDs, Table 16 shows that a total of nine respondents who purchased a program bulb also purchased a non-discounted LED. Of these nine respondents, seven respondents reported that the ComEd program was influential¹⁸ in their decision to purchase non-program bulbs. Two of these seven surveys occurred during a demonstration event. Based on this data, the LED participant spillover rate was calculated as the ratio of the spillover LED bulb purchases to the program LED purchases (segmented by demo event status). As the table below shows, this yielded a participant LED spillover rate of 1.1% for bulbs purchased during a demo event and a 0.8% participant LED spillover rate for bulbs purchased outside of a demo event period.

¹⁸ The portion of non-program bulbs counted as spillover is determined based upon the level of influence they attribute to the program for this non-program efficient lighting purchase.

Table 16. PY8 Participant LED Spillover Results – Self-Report Method

Demo Event	Participant LED Spillover	n	Bulb/Purchase	Bulbs
No	NonPgm LED Purchases By Participants	6	3.17	19
	Spillover Purchases	5	1.34	7
	Program Purchases	184	4.32	795
	Participant LED Spillover Rate			0.8%
Yes	NonPgm LED Purchases By Participants	3	3.33	10
	Spillover Purchases	2	1.90	4
	Program Purchases	91	3.86	351
	Participant LED Spillover Rate			1.1%

The level of participant spillover found for LEDs purchased during a demonstration event was notably higher in PY7 than in PY8 (6.1% versus 1.1%). The decline in participant spillover during a demonstration event is likely due to the greater quantity and variety of LEDs offered through the program in PY8. The level of participant spillover found for LEDs sold outside of a demonstration event was slightly lower in PY7 than in PY8 (0.3% versus 0.8%).

Nonparticipant Spillover

Nonparticipant spillover occurs when a survey respondent who is not purchasing a program CFL or LED reports that the program in some way influenced them to purchase a non-program non-discounted CFL or LED bulb. Nonparticipant spillover was estimated separately for Standard CFLs, Omni-directional LEDs, and Directional LEDs.¹⁹ Table 17 through Table 19 present the results for the Standard CFL and LED nonparticipant spillover analysis, segmented by demonstration event status. Survey respondents were included in this analysis if they did not purchase any program bulbs, but purchased one or more Standard CFL or LED.

As shown in Table 17, four customers who were not purchasing program bulbs reported they were influenced by ComEd’s program to purchase non-program Standard CFLs. Based on this data, and their stated purchase intentions when they entered the store, the nonparticipant spillover rate was extrapolated to the population of ComEd customers to yield an estimated 69,227 non-program Standard CFLs being purchased by program nonparticipants. All four of the customers who were included in this non-participant spillover analysis were surveyed during non-demo event periods, so dividing the extrapolated spillover purchases by the total number of program CFLs projected to be sold in PY8 resulted in an estimated nonparticipant spillover rate of 0.9% for bulbs purchased not during a demo event.

¹⁹ Participant spillover for Omni-directional and Directional LEDs was estimated together.

Table 17. PY8 Nonparticipant Standard CFL Spillover Results

Demo Event	Nonparticipant CFL Spillover	n	Bulbs / Purchase	Total Bulbs
No	Nonparticipant CFL Spillover Purchases	4	3.6	15
	Population Extrapolated Spillover Purchases	19,097	3.6	69,227
	PY8 Program CFL Sales			7,856,768
	Nonparticipant CFL Spillover Rate			0.9%

As shown in Table 18, 27 customers who were not purchasing program bulbs reported that influence from the ComEd residential lighting program led them to purchase non-program Omni-directional LEDs. Fifteen respondents purchased non-program Omni-directional LEDs during a non-demonstration event period, while twelve respondents purchased non-program Omni-directional LEDs during a demonstration event. Based on this data, and their stated purchase intentions when they entered the store, the nonparticipant spillover rate was extrapolated to the population of ComEd customers to yield an estimated 183,444 non-program Omni-directional LEDs being purchased by program nonparticipants during a non-demonstration event period and 49,209 non-program Omni-directional LEDs being purchased during a demonstration event period. Dividing the extrapolated spillover purchases by the total number of program Omni-directional LEDs projected to be sold in PY8, resulted in an estimated nonparticipant spillover rate of 5.4% for bulbs purchased during a non-demo event period and 27.4% for bulbs purchased during a demo event period.

Table 18. PY8 Nonparticipant Omni-directional LED Spillover Results

Demo Event	Nonparticipant Omni-directional LED Spillover	n	Bulbs / Purchase	Total Bulbs
No	Nonparticipant Omni-dir LED Spillover Purchases	15	2.4	36.40
	Population Extrapolated Spillover Purchases	75,595	2.4	183,444
	PY8 Program Omni-directional LED Sales			3,411,749
	Nonparticipant Omni-directional LED Spillover Rate			5.4%
Yes	Nonparticipant Omni-dir LED Spillover Purchases	12	4.3	51.10
	Population Extrapolated Spillover Purchases	11,556	4.3	49,209
	PY8 Program Omni-directional LED Sales			179,566
	Nonparticipant Omni-directional LED Spillover Rate			27.4%

As shown in Table 19, 10 customers who were not purchasing program bulbs reported that influence from the ComEd residential lighting program led them to purchase non-program Directional LEDs. Six respondents purchased non-program Directional LEDs during a non-demonstration event period, while four respondents purchased non-program Directional LEDs during a demonstration event. Based on this data, and their stated purchase intentions when they entered the store, the nonparticipant spillover rate was extrapolated to the population of ComEd customers to yield an estimated 34,490 non-program Directional LEDs being purchased by program nonparticipants during

a non-demonstration event period and 2,671 purchased during a demonstration event period. Dividing the extrapolated spillover purchases by the total number of program Directional LEDs projected to be sold in PY8, resulted in an estimated nonparticipant spillover rate of 1.4% for bulbs purchased during a non-demo event period and 2.0% for bulbs purchased during a demo event.

Table 19. PY8 Nonparticipant Directional LED Spillover Results

Demo Event	Nonparticipant Directional LED Spillover	n	Bulbs / Purchase	Total Bulbs
No	Nonparticipant Directional LED Spillover Purchases	6	1.2	7.10
	Population Extrapolated Spillover Purchases	29,147	1.2	34,490
	PY8 Program Directional LED Sales			2,492,664
	Nonparticipant Directional LED Spillover Rate			1.4%
Yes	Nonparticipant Directional LED Spillover Purchases	4	0.9	3.60
	Population Extrapolated Spillover Purchases	2,967	0.9	2,671
	PY8 Program Directional LED Sales			131,193
	Nonparticipant Directional LED Spillover Rate			2.0%

Nonparticipant LED spillover outside of a demonstration event decreased from PY7 to PY8 (16.8% versus 5.4% Omni/1.4% Dir), but increased for Omni-directional LEDs during demonstration events from PY7 to PY8 (6.4% versus 27.4% Omni/2.0% Dir). Overall, the combined Omni-directional and Directional PY8 LED nonparticipant spillover rate decreased slightly compared to PY7 (16% in PY7 and 15% in PY8), which is likely due to the increase in the quantity and variety of LEDs sold through the program.

NTGR

Table 20 through Table 22 below, present the overall self-reported PY8 bulb-weighted NTGR estimates for Standard CFLs, Omni-directional LEDs, and Directional LEDs, respectively.

Table 20 shows the NTGR for Standard CFLs purchased during demo events was 0.66 and the NTGR for Standard CFL purchased outside demo events was 0.56. The sensitivity analysis performed on the demo/nondemo rate showed little change on the NTGR estimate when the demo rate was dropped to 1% or increased to 10%. The evaluation recommended NTGR estimate for Standard CFLs based on the PY8 analysis is 0.57.

Table 20. PY8 Standard CFL NTGR

Segmentation	Free-Ridership	Participant Spillover	Nonparticipant Spillover	NTGR
Non-Demo Event Periods	0.45	0.004	0.009	0.56
Demo Event Periods	0.37	0.032	0.000	0.66
Recommended PY8 Estimate (5/95 Demo/NonDemo)	0.45	0.005	0.008	0.57
Demo Event Sensitivity (1/99 Demo/NonDemo)	0.47	0.004	0.008	0.56
Demo Event Sensitivity (10/90 Demo/NonDemo)	0.46	0.006	0.008	0.57

Table 21 shows the NTGR for Omni-directional LEDs purchased during demo events was 1.02 and the NTGR for Omni-directional LEDs purchased not during demo events was 0.56. The sensitivity analysis performed on the demo/nondemo rate showed a moderate fluctuation in the NTGR estimate when the demo rate was increased to 10%, however the evaluation team estimates that 10% is an overestimate of the percentage of program bulbs sold during demonstration event periods. As a result, the evaluation recommended NTGR estimate for Omni-directional LEDs based on the PY8 analysis is 0.58.

Table 21. PY8 Omni-directional LED NTGR

Segmentation	Free-Ridership	Participant Spillover	Nonparticipant Spillover	NTGR
Non-Demo Event Periods	0.50	0.008	0.054	0.56
Demo Event Periods	0.27	0.011	0.274	1.02
Recommended PY8 Estimate (5/95 Demo/NonDemo)	0.49	0.009	0.065	0.58
Demo Event Sensitivity (1/99 Demo/NonDemo)	0.50	0.008	0.056	0.57
Demo Event Sensitivity (10/90 Demo/NonDemo)	0.48	0.009	0.076	0.61

Table 22 shows the NTGR for Directional LED purchased during demo events was 0.72 and the NTGR for Directional LED purchased not during a demo event was 0.59. The sensitivity analysis performed on the demo/nondemo rate showed only a small fluctuation in the NTGR estimate when the demo rate was dropped to 1% or increased to 10%. The evaluation recommended NTGR estimate for LEDs based on the PY8 in-store data collection is 0.60.

Table 22. PY8 Directional LED NTGR

Segmentation	Free-Ridership	Participant Spillover	Nonparticipant Spillover	NTGR
Non-Demo Event Periods	0.43	0.008	0.014	0.59
Demo Event Periods	0.31	0.011	0.020	0.72
Recommended PY8 Estimate (5/95 Demo/NonDemo)	0.42	0.009	0.014	0.60
Demo Event Sensitivity (1/99 Demo/NonDemo)	0.43	0.008	0.014	0.60
Demo Event Sensitivity (10/90 Demo/NonDemo)	0.42	0.009	0.014	0.61