

factor for the purposes of calculating spillover. A breakdown of savings by measure can be seen in Table 106.

For specialty bulb types that are also offered through the Store, spillover bulbs are assigned savings as assessed in the *Impact Analysis* section. There were no customers that purchased standard spiral CFLs outside of the Savings Store that both attributed program influence to the purchase and were not a 100% freerider.

Table 106. Spillover Contribution from Non-Incented Specialty Bulbs Purchased Outside of the Savings Store

Technology	Non-Incented Specialty Bulbs Installed	Spillover Installations	kWh	Spillover kWh
CFL Capsule (A Line)	4	1.4	74.28	26.00
LED Capsule (A Line)	35	20.6	649.92	382.53
CFL Indoor Reflector (Recessed)	4	0.9	80.46	18.10
LED Indoor Reflector (Recessed)	6	1.4	120.68	28.16
CFL Outdoor Reflector (Recessed Outdoor)	3	1	184.31	61.44
LED Outdoor Reflector (Recessed Outdoor)	1	0	61.44	0.00
CFL Globe	14	14	229.74	229.74
CFL Candelabra	2	0	32.89	0.00
LED Candelabra	3	2.1	49.34	34.54
LED Corn Bulb	2	2	37.14	37.14
LED Indoor Reflector (Recessed)	2	1.2	120.68	28.16
Total	76	44.6	1,640.88	845.80

Spillover savings contributions for the customers that attributed program influence to their purchase of specialty bulbs outside of the Savings Store are shown in Table 106. No freeridership deduction is made for specialty bulbs. These customers contributed 845.80 kWh toward program spillover.

Table 107. Total Program Spillover

Technology	Non-Incented Specialty Bulbs Installed	Spillover kWh
Savings Store Spiral CFLs	25	251.64
Non-Savings Store Spiral CFLs	0	0.00
Specialty Bulbs	76	845.80
Total	101	1,097.44

Table 107 sums the spillover contributions from all spillover bulbs. In total, the program motivated survey respondents to purchase an additional 101 energy efficient light bulbs of varying types. Total spillover savings for the program is 1,097 kWh. Total gross savings from survey respondents is 83,068 kWh (24.12 kWh/bulb * 3,444 bulbs). Comparing spillover kWh with the total kWh savings from all bulbs purchased by all survey participants yields a spillover percentage of 1.3% (1,097/83,068).

Net to Gross Ratio Calculation

The net to gross ratio is calculated as follows:

$$\begin{aligned}
 \text{NTGR} &= (1 - \text{freeridership}) * (1 + \text{spillover}) \\
 &= (1 - 0.233) * (1 + 0.013) \\
 &= 0.777
 \end{aligned}$$

$$\begin{aligned}
 \text{Total Discounting to be Applied} &= 1 - \text{NTGR} \\
 &= 1 - 0.777 \\
 &= 0.223 \\
 &= 22.3\%
 \end{aligned}$$

Impact Analysis

This section presents the impact evaluation for Duke Energy's Residential Specialty Bulb Program as it was administered in Ohio and Kentucky. The findings presented here were calculated using a combination of survey data from program participants and lighting logger data with algorithms from the Draft Ohio TRM. Calculations were performed in an Excel spreadsheet using exact mathematical values. As a result, some tables may contain round-off errors.

Table 108 shows the savings per bulb purchased adjusted downward for the ISR of 70.4% and incorporating the daylength adjustment applied to the hours of use (both explained in the *Methodology* section below), as well as the freeridership and spillover percentages computed from participants' survey responses. A breakdown of the mixture of CFL and LED bulb types and wattages that were purchased can be seen in the *Program Tracking Data* section. Estimated energy savings was calculated using the weighted mean specialty bulb wattage and hours of use by room type.

Table 108. Adjusted Impact: kWh and Coincident kW per Bulb Purchased

Metric	Result
Number of bulbs purchased	3,444
In service rate	70.4%
Gross kW per bulb	0.0028
Gross kWh per bulb	25.11
Freeridership rate	23.3%
Spillover rate	1.3%
Total discounting to be applied to gross values	22.3%
Net kW per bulb	0.0021
Net kWh per bulb	19.51
Measure life	8 years

Methodology

Primary data collected from survey participants was used to determine the number of bulb installations and mean wattage of bulbs removed seen in Table 120. A lighting logger study was used to determine the average daily hours of use as well as power fractions for the dimmable and 3-way bulb types, all of which can be found in the *Lighting Logger Data* section. From the bulb installation data, the in service rate (ISR) was calculated using the approach detailed in the *In Service Rate (ISR) Calculation* section. This data was combined as per *Appendix J: Impact Algorithms* to calculate gross savings per bulb. A net to gross question battery included in the participant survey was used to estimate program freeridership and spillover to determine the total discounting to be applied to gross savings, shown in the *Net to Gross Analysis* section.

Program Tracking Data

Table 109 shows bulb purchasing data by bulb type and wattage for all bulbs purchased by all program participants in Ohio and Kentucky from May 17, 2013 (the earliest recorded purchase after program launch) through June 30, 2014 (n= 9,215 customers). This data is used to calculate weights that are used to determine weighted average values throughout the impact analysis section of this report.

Table 109. Program Bulb Purchases by Type and Wattage

Bulb Type	Brand	Bulb Group	Wattage	Quantity
CFL Three-Way Spiral	Earthmate	Three-way	33	7,898
CFL Capsule (A Line)	TCP	Capsule	14	12,962
CFL Capsule (A Line)	MaxLite	Capsule	18	4,966
CFL Dimmable Spiral	TCP	Dimmable spiral	23	5,624
CFL Candelabra	Feit	Candelabra	7	10,993
CFL Candelabra	TCP	Candelabra	9	10,617
CFL Candelabra	TCP	Candelabra	5	218
CFL Globe	TCP	Globe	9	6,699
CFL Globe	TCP	Globe	14	18,357
CFL Indoor Reflector (Recessed)	TCP	Indoor Reflector	12	6,889
CFL Indoor Reflector (Recessed)	TCP	Indoor Reflector	14	22,190
CFL Indoor Reflector (Recessed)	MaxLite	Indoor Reflector	23	2,798
CFL Dimmable Reflector (Recessed Dimmable)	GE	Indoor Reflector	15	3,491
LED Reflector (Recessed LED)	Cree	Indoor Reflector	9.5	200
LED Reflector (Recessed LED)	Philips	Indoor Reflector	10.5	741
LED Reflector (Recessed LED)	Philips	Indoor Reflector	10	24
LED Reflector (Recessed LED)	Philips	Indoor Reflector	13	239
LED Reflector (Recessed LED)	Philips	Indoor Reflector	8	413
LED Reflector (Recessed LED)	TCP	Indoor Reflector	10	5,816
LED Reflector (Recessed LED)	TCP	Indoor Reflector	7	267
LED Reflector (Recessed LED)	Philips	Indoor Reflector	18	2
LED Reflector (Recessed LED)	Philips	Indoor Reflector	9.5	34
CFL Outdoor Reflector (Recessed Outdoor)	TCP	Outdoor Reflector	23	7,785
LED Capsule (A Line LED)	Philips	Capsule	7	199
LED Capsule (A Line LED)	TCP	Capsule	10	1,829
LED Capsule (A Line LED)	TCP	Capsule	10	8,193
LED Capsule (A Line LED)	Philips	Capsule	11	6,163
Total				145,607⁴⁶

Table 110 shows the average wattage for each bulb group based on the overall purchasing data. These values were used in conjunction with the participant survey data to determine the weighted average wattage of program bulbs installed in each room type. The average wattages for dimming and three-way bulbs have been adjusted downward to account for their respective power fractions as explained in the *Lighting Logger Data* section.

⁴⁶ The official total number of program bulbs sold in Ohio and Kentucky is 142,740. However, this data did not include non-incanted specialty bulb purchases. Since these bulb totals differ by only 0.2%, the potential effect on average watts by bulb type calculations from this discrepancy amounts to a rounding error; the maximum potential difference in average watts based on the different bulb totals is only 0.02 watts (for candelabras). Three-way, dimmable spiral and outdoor reflector bulb wattages are not affected by this discrepancy, since there was only one wattage purchased for each of these bulb types during the evaluation period.

Table 110. Average Wattage by Bulb Group for all Purchased Bulbs

Bulb Group	Average Wattage
CFL Indoor reflector (recessed)	13.06
CFL Outdoor reflector (recessed outdoor)	23.00
CFL Globe	12.66
CFL Candelabra	7.95
CFL Three-way spiral	24.78
CFL Dimmable spiral	12.60
Capsules (A Line CFLs and LEDs)	12.59

Survey Data

Participants were asked how many bulbs purchased through Duke Energy's Savings Store were currently installed in light fixtures. Additional, more specific information was collected for as many bulb types as possible, including the location, the type and wattage of the bulb that it replaced, and the mean hours per day that it is in use for comparison to the logger study. The compilation of this data is presented in Table 111. Survey participants were also asked to quantify the increased or decreased in lighting usage, if any, since installing program bulbs. The survey participants reported a small increase in operating hours after installing the program bulbs. This data is presented for informational purposes only. The post-installation operating hours taken from the lighting logger study were considered to be more reliable than the self-reported data, and were used to estimate impacts.

Table 111. Participant Survey Bulb Data by Room Type

Room Type	Number of Installations	Mean Wattage of Bulb Removed	Mean Daily Hours of Use (New)	Mean Daily Hours of Use (Old)
Bathroom	327	44.79	2.38	2.32
Dining room	138	37.56	4.69	4.55
Hall	38	42.59	2.11	2.50
Kitchen	295.5	51.86	5.76	5.72
Living/family room	232	63.39	4.41	4.50
Master bedroom	114	56.53	2.77	2.65
Other bedroom	59	36.03	2.30	2.15
Outside	137	53.80	6.23	5.42
Basement	134	41.81	3.12	2.59
Other	74	53.61	3.55	2.88
MEAN/TOTAL	1,548.5	49.72	4.01	3.84

There were a total of 1,564.5 specialty bulb installations surveyed. Omitting the "Don't know/Not sure" responses leaves the 1,548.5 valid installations seen in Table 111. Table 112 shows a compilation of the same data by bulb group rather than by room type.

Table 112. Participant Survey Bulb Data by Bulb Group

Bulb Group	Number of Installations	Mean Wattage of Bulb Removed	Mean Daily Hours of Use (New)	Mean Daily Hours of Use (Old)
CFL Indoor reflector (recessed)	461.5	49.83	3.84	3.61
CFL Outdoor reflector (recessed outdoor)	59	78.57	3.39	3.39
CFL Globe	288	46.73	2.82	2.74
CFL Candelabra	305	40.25	4.28	4.20
CFL Three-way spiral	98	79.87	4.08	3.68
CFL Dimmable spiral	69	52.51	5.70	5.66
Capsules (A Line CFLs and LEDs)	284	46.08	4.90	4.65

Figure 50 graphically shows the prevalence of program bulb installations in each room type in ascending order. Bathroom, kitchen, and living/family room, in that order, are the three most popular room types for bulb replacements; together they make up 55% of all bulb installations.

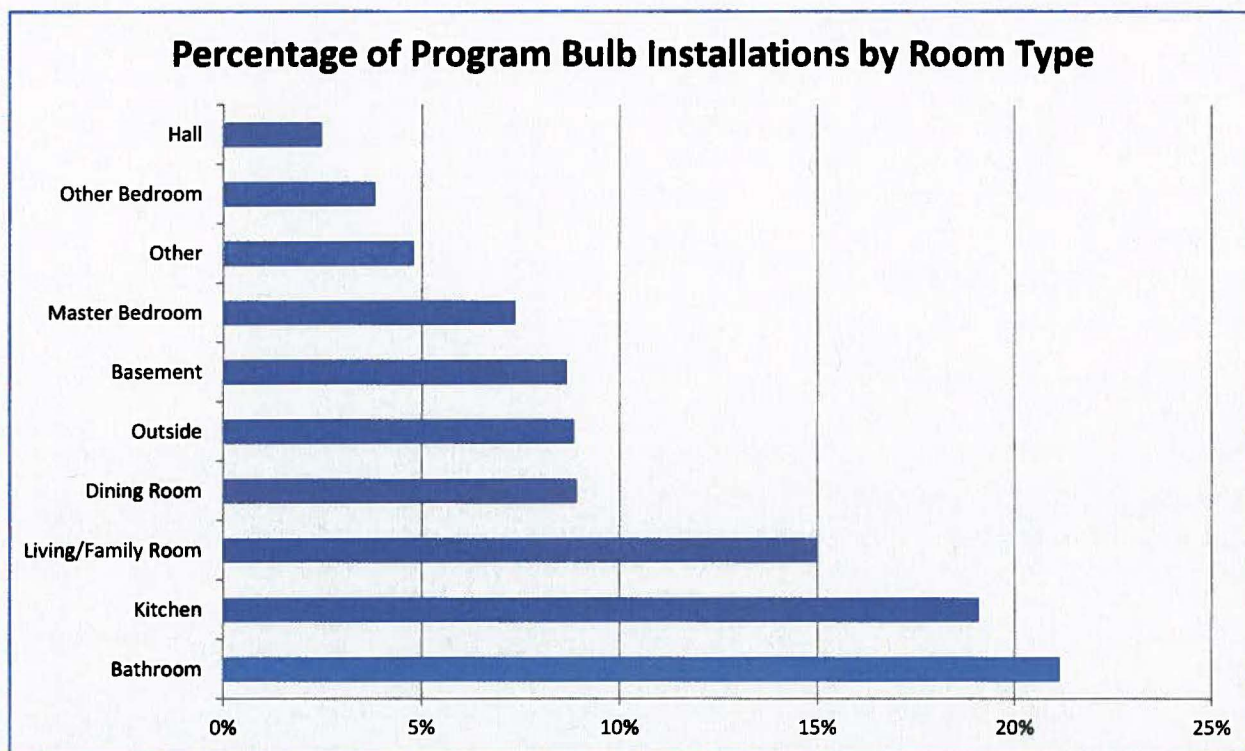


Figure 50. Percent of Specialty Bulb Installations by Room Type

In Service Rate (ISR) Calculation

A total of 3,444 program bulbs were purchased by survey participants. Respondents reported that 1,963 of them are currently installed in light fixtures, a weighted average first year ISR of 57.0%. To determine the final ISR, participant survey data concerning the total number of specialty bulb

filled sockets per household was analyzed in order to determine the fraction of program bulbs that were initially put into storage that could conceivably come out of storage and replace an incandescent or halogen bulb, thus generating energy savings. This was done at the bulb group level.

Table 113. Available Savings Generating Specialty Sockets for ISR

Bulb Group	Total Specialty Sockets Available	Specialty Sockets with Inc./Hal.	Percent Inc./Hal. (IR%)
CFL Indoor reflector (recessed)	1,158	380	32.8%
CFL Outdoor reflector (recessed outdoor)	156	45	28.8%
CFL Globe	779	262	33.6%
CFL Candelabra	859	382	44.5%
CFL Three-way spiral	244	46	18.9%
CFL Dimmable spiral	287	124	43.2%
Capsules (A Line CFLs and LEDs)	3,021.5	826.5	27.4%

Table 113 shows the average percent of specialty lamp sockets per household that are currently filled with incandescent or halogen bulbs. These sockets are assumed to have the potential to generate savings when efficient program bulbs are taken out of storage and installed. These percentages are used directly to augment the first year ISR using an adaptation of the Draft Ohio TRM ISR formula for standard spiral CFLs as follows, using indoor reflectors (“IR”) as an example:

$$\text{ISR} = \text{IR first year ISR} + (\text{IR}\% * \text{remainder}) = 60.3\% + (32.8\% * 36.7\%) = 72.3\%$$

Where “IR%” is equal to the percent of savings generating indoor reflector sockets from Table 113 and the remainder is the percentage of bulbs that are not installed in the first year (100% - 60.3% = 39.7%) less 3% for the 97% lifetime ISR⁴⁷. The “indoor reflector first year ISR” and the first year ISRs for all bulb groups are shown in Table 114. The final program ISR value has been weighted by bulb representation in the total participant population seen in Table 109.

Table 114. ISR by Bulb Group

Bulb Group	First Year ISR	Final Adjusted ISR
CFL Indoor reflector (recessed)	60.3%	72.3%
CFL Outdoor reflector (recessed outdoor)	41.7%	57.6%
CFL Globe	62.6%	74.2%
CFL Candelabra	53.0%	72.6%
CFL Three-way spiral	61.2%	67.9%
CFL Dimmable spiral	55.0%	73.2%
Capsules (A Line CFLs and LEDs)	54.2%	65.9%
Overall	57.0%	70.4%

The final, overall program ISR is thus 70.4%. This augmentation is intended to capture the anticipated burnout of any remaining incandescent or halogen specialty bulbs presently installed

⁴⁷ As established in the Nexus Market Research, RLW Analytics, and GDS Associates study, dated January 20th, 2009: “New England Residential Lighting Markdown Impact Evaluation”.

in participant households and their subsequent replacement with a more efficient program bulb taken out of storage. Incandescent and halogen specialty bulbs have a much shorter EUL than CFL or LED varieties. Given the discrepancy in EUL between efficient and inefficient lighting, incandescent and halogen bulbs will burn out faster, and it is more likely that they are replaced sooner, while the customer still has program bulbs in storage. It is therefore assumed that all light sockets currently containing inefficient specialty bulbs will contain program bulbs in the near future.

Lighting Logger Data

In conjunction with the phone surveys, a lighting logger study was performed with a subset of phone survey participants. The purpose of this logger study was to determine how participants are using specialty bulbs and how they are distributed (i.e., what room or fixture the bulbs are installed in), as well as to determine the actual hours of use, the coincidence factor, and power fractions for the dimmable and three-way bulbs.

A total of 211 lighting loggers were installed in the homes of 79 survey participants. Of these, 192 were retrieved with usable data. Table 115 shows the average daily hours of use for each room type and for both weekdays and weekends/holidays separately as well as weighted together assuming 116.3 weekends and holidays per year (31.9% of days). The values in the “MEAN/TOTAL” row have been weighted by bulb installations per room type from the participant survey, shown in Table 111, rather than the logger installations shown here. This is because the logger study was performed with a subset of the larger, more robust survey sample that better reflects actual bulb distribution.

Table 115. Logger Hours of Use by Room and Day Type

Room Type	Number of Installations	Weekday Hours of Use	Weekend Hours of Use	Overall Hours of Use	Relative Precision
Bathroom	36	1.67	1.65	1.66	+/- 55%
Dining room	10	2.73	2.59	2.68	+/- 63%
Hall	8	3.24	3.21	3.23	+/- 92%
Kitchen	47	2.78	2.76	2.77	+/- 26%
Living/family room	34	4.66	4.58	4.64	+/- 30%
Master bedroom	9	1.59	2.08	1.75	+/- 50%
Other bedroom	4	0.21	0.28	0.23	+/- 97%
Outside	9	3.87	3.91	3.88	+/- 81%
Basement	17	1.80	1.97	1.86	+/- 51%
Other	18	1.87	1.82	1.86	+/- 47%
MEAN/TOTAL	192	2.62	2.64	2.63	+/- 16.2%

Our sample design targeted a relative precision of +/- 10% at 90% confidence based on previous studies of CFL hours of use in residential buildings. The specialty bulbs showed more variation in the hours of use than basic CFLs, resulting in a lower achieved precision.

Table 116. Logger Hours of Use by Bulb and Day Type

Bulb Group	Number of Installations	Weekday Hours of Use	Weekend Hours of Use	Overall Hours of Use	Relative Precision
CFL Indoor reflector (recessed)	62	2.16	2.11	2.14	+/- 26%
CFL Outdoor reflector (recessed outdoor)	8	4.30	4.39	4.33	+/- 80%
CFL Globe	31	1.89	1.88	1.89	+/- 35%
CFL Candelabra	16	1.95	2.10	1.99	+/- 62%
CFL Three-way spiral	13	6.05	6.92	6.32	+/- 44%
CFL Dimmable spiral	8	1.73	1.78	1.75	+/- 54%
Capsules (A Line CFLs and LEDs)	52	2.26	1.98	2.17	+/- 44%

The hours of use values in Table 115 and Table 116 are in their unadjusted form, which is the raw output of the lighting loggers before the daylength adjustment has been applied to them. This application is shown and explained in the *Daylength Adjustment* section.

The participants' loadshape is shown in Figure 51. As the shape demonstrates, lighting usage is at its peak around 8-9 PM. The coincident load from 4-5 PM, Duke Energy's peak time, is 9.14%.

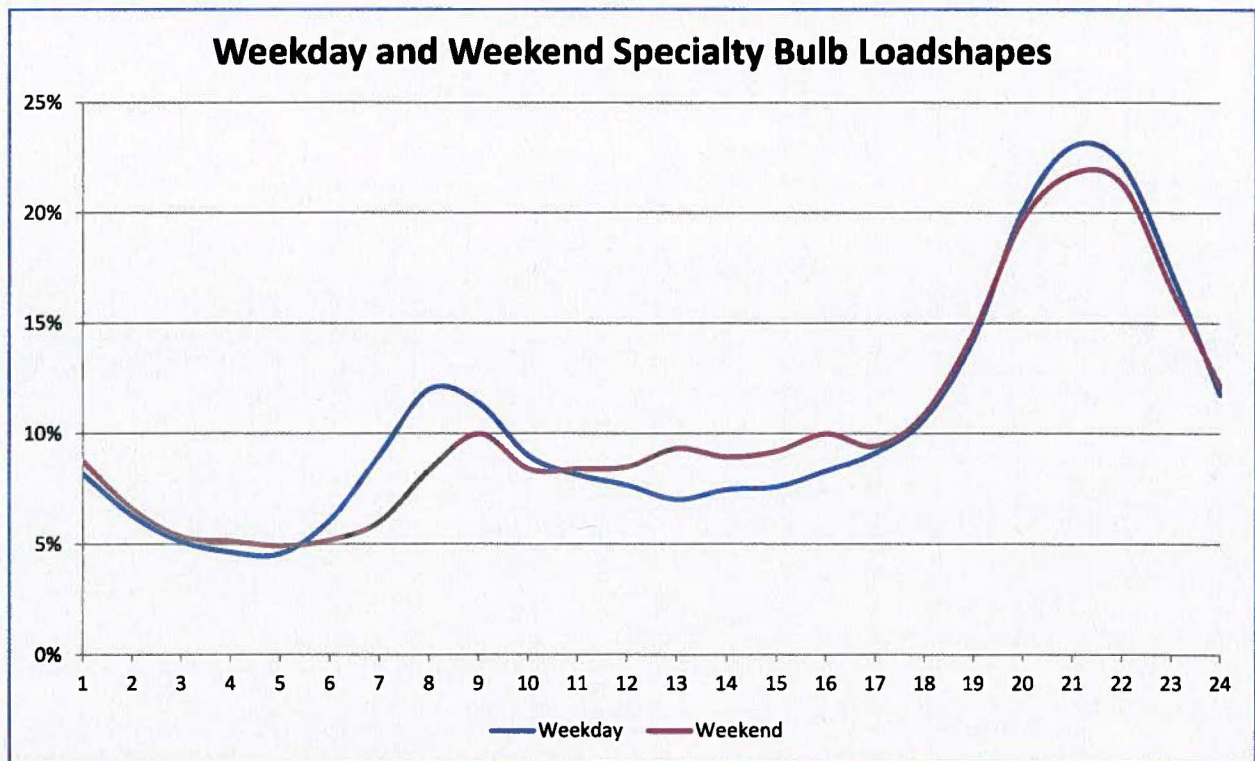


Figure 51. Weekend and Weekday Loadshapes

This load shape incorporates power fractions applied to the dimmable and three-way bulbs. These power fractions are simply the average fraction of maximum output a bulb operates at while turned on. In order to estimate these factors, solar cells were attached to lighting loggers installed on dimmable bulbs to measure light intensity and watt meters were installed on three-way bulbs to measure power output. Dimmable bulbs were found to average 54.8% of maximum power while turned on and three-way bulbs averaged 75.1%.

Table 117. Dimmable and 3-way Power Factors

Dimmable Bulb Power Fraction	3-Way Bulb Power Fraction
54.8%	75.1%

Daylength Adjustment

The frequency and length of time customers use their bulbs is affected by daylength. As days become longer and shorter throughout the year, the length of time a bulb needs to be used increases and decreases in rooms where natural lighting is used to offset bulb use. Depending on which time of the year lighting usage is measured, the amount of use recorded by the lighting loggers may over- or under-predict a customer's overall usage for the year. The amount of daylight during any given season is a factor of the position of the sun which determines the sunrise and sunset time and the number of hours of daylight. The increase and decrease in hours of daylight experienced throughout the year can be expressed as a sine function, and the average over- or under-prediction in hours of use as a result of increased or decreased daylight can be calculated using the following equation⁴⁸:

$$\text{Equation 1: Hours/day} = \text{hours/day average} * [1 + \text{Max deviation} * \sin(\theta d)]$$

This approach was used by the Cadmus Group to analyze seasonal light logger data in a large residential CFL study in California. To calculate the impact of daylight on daily use, a regression analysis was used to estimate the average hours per day and maximum deviation variables in Equation 1 from observed light logger data. The right side of the function represents a progression through the year where the right hand term goes to zero on the spring and fall equinox, and is a maximum value at the winter solstice and a minimum value at the summer solstice.

$$\text{Equation 2: } \theta d = 2\pi * (284 + n) / 365$$

Where n = Julian date (1 = Jan 1; 365 = Dec 31)

The Cadmus regression model predicted the annual average hours of use and the maximum deviation. The ratio of the maximum deviation to the annual average represents the maximum percent difference in the daily hours of use relative to the annual average. Equation 2 above can be used to predict the percent over- or under-estimation of lighting hours on any particular day of

⁴⁸ The Cadmus Group. "Upstream Lighting Program Evaluation Report. Prepared for CPUC". November 16th, 2009. Pg. 16.

the year. This is the daylength adjustment factor. The predicted maximum deviation from the annual average hours of use from the Cadmus study is on the order of ±16%.

To calculate the daylength adjustment factor for this study, Equation 2 was evaluated at the median date of the logging period (October 4, 2014):

$$\theta d = 2\pi * (284 + n) / 365 = 2\pi * (284 + 277) / 365 = 9.66$$

Equation 1 is evaluated using the average hours per day determined through the lighting loggers to determine the daylength-adjusted actual average hours of use per day:

$$\begin{aligned} \text{Hours/day} &= \text{hours/day average} * [1 + \text{Max deviation} * \sin(\theta d)] \\ &= 2.63 * [1 + 16\% * \sin(9.66)] = 2.53 \end{aligned}$$

This corresponds to a 3.7% downward adjustment to hours of use. Daylength-adjusted hours of use by room type can be seen in Table 118.

Table 118. Daylength-Adjusted Hours of Use by Room Type

Room Type	Weekday Hours of Use	Weekend Hours of Use	Overall Hours of Use
Bathroom	1.61	1.59	1.60
Dining room	2.62	2.49	2.58
Hall	3.12	3.09	3.11
Kitchen	2.68	2.66	2.67
Living/family room	4.49	4.42	4.47
Master bedroom	1.53	2.00	1.68
Other bedroom	0.20	0.27	0.22
Outside	3.72	3.76	3.74
Other	1.74	1.89	1.79
MEAN	2.53	2.55	2.53

Self-Report vs. Logger Results

Previous logger studies have shown that self-reported hours of use are typically estimated higher than the actual hours of use determined through a logger study monitoring a sample of the same fixtures. Table 119 shows a side by side comparison of the logger study results and the participant phone survey data collected for this evaluation. This data is presented for informational purposes only and is not used for the calculation of impacts.

Table 119. Self-Report vs. Actual Hours of Use

Room Type	Phone Survey Hours of Use	Logger Hours of Use	Onsite Survey Hours of Use
Bathroom	2.38	1.66	2.20
Dining room	4.69	2.68	1.00
Hall	2.11	3.23	3.03
Kitchen	5.76	2.77	4.24
Living/family room	4.41	4.64	4.13
Master bedroom	2.77	1.75	1.39
Other bedroom	2.30	0.23	0.83
Outside	6.23	3.88	5.79
Basement	3.12	1.86	1.67
Other	3.55	1.86	2.47
MEAN	4.01	2.63	2.98

For the Specialty Bulbs Program, participants overestimated their lighting usage by about 34% through the phone survey $[(4.01-2.63)/4.01 = 34\%]$. When asked onsite, lighting usage was overestimated by about 12% $[(2.98-2.63)/2.98 = 12\%]$.

Impact Estimates

Energy savings is calculated at the room type level and then weighted to represent the overall participant population. The values presented here at the room type level are not significant. Levels of precision for average daily hours of use at the room and bulb type level can be seen in Table 115 and Table 116 respectively.

Table 120. Engineering Algorithm Inputs by Room Type

Room Type	Daylength Adjusted Hours of Use	Average Replaced Wattage	Average Installed Wattage
Bathroom	1.60	44.79	12.50
Dining room	2.58	37.56	9.61
Hall	3.11	42.59	12.53
Kitchen	2.67	51.86	12.57
Living/family room	4.47	63.39	15.43
Master bedroom	1.68	56.53	14.27
Other bedroom	0.22	36.03	11.68
Outside	3.74	53.80	13.80
Basement	1.79	41.81	13.83
Other	1.79	53.61	12.25
MEAN	2.53	49.72	13.01

Table 120 shows the average daily hours of use and delta watts to be used in the calculation of gross savings as per *Appendix J: Impact Algorithms*. The ISR of 70.4% was calculated as a weighted average for all bulb types and is applied to all room types equally. Room types are weighted using the values from Table 111 to calculate the weighted average savings for each bulb purchased from the Savings Store.

Table 121. Gross and Net Energy and Demand Savings per Bulb Purchased

Room Type	Gross Annual kWh	Gross Coincident kW	Net Annual kWh	Net Coincident kW
Bathroom	13.22	0.0024	10.27	0.0019
Dining room	18.44	0.0021	14.32	0.0016
Hall	23.89	0.0023	18.56	0.0018
Kitchen	26.81	0.0029	20.82	0.0023
Living/family room	54.74	0.0036	42.52	0.0028
Master bedroom	18.16	0.0032	14.10	0.0025
Other bedroom	1.38	0.0018	1.07	0.0014
Outside	38.17	0.0030	29.65	0.0023
Basement	12.78	0.0021	9.92	0.0016
Other	18.89	0.0031	14.67	0.0024
MEAN	25.11	0.0028	19.51	0.0021

To determine energy impacts by bulb type, a realization rate was applied to the ex-ante savings estimates shown in Table 122. Comparing the weighted average ex-ante savings from this table to the evaluated savings from Table 121 yields a realization rate of 58.2% (25.11 / 43.1) for kWh and a realization rate of 71.2% (0.0028 / 0.0039) for coincident kW.

Table 122. Ex-Ante Savings by Bulb Type and Wattage

Bulb Type	Bulb Group	Wattage	Quantity	Ex-Ante kWh	Ex-Ante kW
CFL Three-Way Spiral	Three-way	33	7,898	58.2	0.0055
CFL Capsule (A Line)	Capsule	14	12,962	38.6	0.0037
CFL Capsule (A Line)	Capsule	18	4,966	35.3	0.0034
CFL Dimmable Spiral	Dimmable spiral	23	5,624	64.7	0.0062
CFL Candelabra	Candelabra	7	10,993	21.4	0.0020
CFL Candelabra	Candelabra	9	10,617	19.7	0.0019
CFL Candelabra	Candelabra	5	218	23.1	0.0022
CFL Globe	Globe	9	6,699	26.9	0.0033
CFL Globe	Globe	14	18,357	23.7	0.0029
CFL Indoor Reflector (Recessed)	Indoor Reflector	12	6,889	44.5	0.0042
CFL Indoor Reflector (Recessed)	Indoor Reflector	14	22,190	42.8	0.0041
CFL Indoor Reflector (Recessed)	Indoor Reflector	23	2,798	35.3	0.0034
CFL Dimmable Reflector (Recessed Dimmable)	Indoor Reflector	15	3,491	71.4	0.0068
LED Reflector (Recessed LED)	Indoor Reflector	9.5	200	74.5	0.0054
LED Reflector (Recessed LED)	Indoor Reflector	10.5	741	73.4	0.0054
LED Reflector (Recessed LED)	Indoor Reflector	10	24	73.9	0.0054
LED Reflector (Recessed LED)	Indoor Reflector	13	239	70.6	0.0052
LED Reflector (Recessed LED)	Indoor Reflector	8	413	76.1	0.0056
LED Reflector (Recessed LED)	Indoor Reflector	10	5,816	73.9	0.0054
LED Reflector (Recessed LED)	Indoor Reflector	7	267	77.2	0.0056
LED Reflector (Recessed LED)	Indoor Reflector	18	2	65.2	0.0048
LED Reflector (Recessed LED)	Indoor Reflector	9.5	34	74.5	0.0054
CFL Outdoor Reflector (Recessed Outdoor)	Outdoor Reflector	23	7,785	110.0	0.0054
LED Capsule (A Line LED)	Capsule	7	199	44.5	0.0042
LED Capsule (A Line LED)	Capsule	10	1,829	42.0	0.0040
LED Capsule (A Line LED)	Capsule	10	8,193	42.0	0.0040
LED Capsule (A Line LED)	Capsule	11	6,163	41.2	0.0039
Total/mean			145,607	43.1	0.0039

Table 123 presents the impacts by bulb group after the application of the realization rate.

Table 123. Gross and Net Energy and Demand Savings per Bulb Group

Bulb Group	Ex-Ante Annual kWh per bulb	Ex-Ante Coincident kW per bulb	Gross Annual kWh per bulb	Gross Coincident kW per bulb	Net Annual kWh per bulb	Net Coincident kW per bulb
CFL Indoor Reflector (Recessed)	42.5	0.0041	24.7	0.0029	19.2	0.0022
CFL Dimmable Reflector (Recessed Dimmable)	71.4	0.0068	41.6	0.0048	32.3	0.0038
CFL Outdoor Reflector (Recessed Outdoor)	110.0	0.0054	64.0	0.0038	49.7	0.0030
LED Reflector (Recessed LED)	74.0	0.0054	43.1	0.0039	33.5	0.0030
CFL Globe	24.6	0.0030	14.3	0.0021	11.1	0.0017
CFL Candelabra	20.6	0.0020	12.0	0.0014	9.3	0.0011
CFL Three-Way Spiral	58.2	0.0055	33.9	0.0039	26.3	0.0030
CFL Dimmable Spiral	64.7	0.0062	37.7	0.0044	29.3	0.0034
CFL Capsule (A Line)	37.7	0.0036	21.9	0.0026	17.0	0.0020
LED Capsule (A Line LED)	41.7	0.0040	24.3	0.0028	18.9	0.0022

Effective Useful Life

Bulb type effective useful lives are taken from the Franklin Energy Services residential lighting work papers. These values were found to be reasonable by the TecMarket Team. The overall program EUL is a weighted average based on the bulb distribution shown in Table 109. Program EUL is estimated to be eight years.

Table 124. Bulb EUL by Group with Weighted Average Program EUL

Bulb Group	Weight	Effective Useful Life
CFL Indoor Reflector (Recessed)	21.9%	8
CFL Dimmable Reflector (Recessed Dimmable)	2.4%	8
CFL Outdoor Reflector (Recessed Outdoor)	5.3%	5
LED Reflector (Recessed LED)	5.3%	12
CFL Globe	17.2%	6
CFL Candelabra	15.0%	7
CFL Three Way Spiral	5.4%	7
CFL Dimmable Spiral	3.9%	7
CFL Capsule (A Line)	12.3%	9
LED Capsule (A Line LED)	11.3%	12
Overall		8

Total Program Savings Extrapolation

Between program inception in April of 2013 and June 30, 2014, the Duke Energy Savings Store served 9,215 unique customers from Ohio and Kentucky who purchased a total of 145,607 specialty light bulbs. The overall gross savings numbers in Table 125 are arrived at by multiplying the total number of bulbs purchased and shipped in state by the mean gross energy savings per bulb purchased found in the bottom row of Table 121.

During checkout, customers are able to enter separate service and shipping addresses. While the vast majority of customers have the same service and delivery address, some small percentage of bulbs were shipped to states other than Ohio or Kentucky. As per the program tracking data laid out in the *Shipping and Delivery* portion of the process evaluation section on page 47, best estimates of bulbs shipped out of state put the number at 0.5%, including all bulbs sold through the Savings Store in Ohio and Kentucky. Accordingly, this percentage has been deducted from the total number of bulbs purchased for the purpose of extrapolating total program gross savings shown in Table 125.

Table 125. Total Program Gross Savings Extrapolation

Participation Count	Total Bulbs	Bulbs in State	Gross kWh	Gross kW
9,215	145,607	144,879	3,637,912	406

Appendix A: Management Interview Instrument

Name: _____

Title: _____

We are conducting this interview to obtain your opinions about and experiences with Duke Energy's Specialty Bulb program. We'll talk about the program and its objectives, your thoughts on improving the program, and the technologies the program covers. The purpose of this study is to capture the program's current operations as well as to help identify areas where the program might be improved. Your responses will feed into a report that will be shared with Duke Energy and the state regulatory agency. We will not identify you by name, however, you may provide some information or opinions that could be attributed to you by virtue of your position and role in this program. If there is sensitive information that you wish to share, please warn me and we can discuss how best to include that information in the report. Do you have any questions for me before we begin?

Program Background and Objectives

Please describe your role and scope of responsibility in detail.

How long have you been involved with this program? Has your role in this program changed during that time? (If so, how?)

Describe the evolution of the program. Why was the program created, and how has the program changed since it was first started?

What are the customer eligibility requirements?

How many bulbs are customers allowed and of what type? Why that number?

What are you doing to keep freeridership low for this program?

What are the program's goals? That is, what goals and metrics are you tasked with achieving (such as bulbs distributed, numbers of new customers, numbers of returning customers, website visits, etc.)? What is the current performance towards these targets?

What are the current program's objectives? That is, aside from the numerical goals what is the program trying to accomplish (save energy, improve satisfaction, protect environment, etc.)? In your opinion, which objectives do you think are being met or will be met? Have the objectives changed over time. If yes, how do you think they have changed?

Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? How will these changes improve the program?

Program Implementation

Is there any other person or group within Duke Energy that you work with on the implementation of this program? Who is that and what role do they serve?

Which third parties or vendors do you work with to implement this program? Please describe their roles in the implementation of the program.

Can you please walk me through the program's implementation, starting with how the program is marketed and how you target your customers, through how the customer participates and finishing with how savings are verified?

Marketing

Roughly how many customers are eligible for this program and how are you targeting them?

What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program and its options?

Please describe the various marketing channels that you are using, including when and why you've selected to use them.

How did your experience marketing this program in other service territories inform your strategy for North and South Carolina?

How do you track the effectiveness of your various marketing efforts?

How is the customer education component of the program going? What are you educating customers about? How are these efforts going? How do you know?

Store Access

By what methods can customers access the store to purchase bulbs? How are the order platforms working?

How do you determine if customers are eligible? How does the system actually work? How is it used?

Fulfillment

What is the volume of bulb orders? What is the typical order size?

How does EFI receive and process orders?

What timeframe are customers told it will take to receive their orders? What is the actual delivery time on average?

What percent of customers are using the online CFL shipping tracking system?

Quality Assurance

Please describe your quality assurance measures for each step in the process, including tracking participants, bulbs numbers, ordering, shipping, bulb quality, and other program data. What issues have been uncovered and how have they been addressed.

What is the warranty policy on the bulbs distributed by this program? How do customers go about getting replacements?

How effective is the current program? (*Clarify standard for "effective"*) How does it compare to other programs? What do you think should be changed, and why?

Vendors

Do you use any vendors or contractors to help implement the program? What responsibilities do they have? Are there any areas in which think they can improve their services?

Please characterize your working relationship.

Please describe the reporting process that you use to track and manage vendor activities.

Do you think methods for coordination should be changed in any way? If so, how and why?

Improvements

Are you currently considering any changes to the program's design or implementation? If so, what are the changes? What is the process for deciding whether or not to make these changes?

Do you have suggestions for improvements to the program that would increase participation rates, or is Duke Energy happy with the current level of participation?

Do you have suggestions for increasing energy impacts per participant, given the same participation rates, or is Duke Energy happy with the current per participant impact?

Overall, what would you say about the program is working really well?

Is there anything in this program you could highlight as a best practice that other utilities might like to adopt?

What areas need the most improvement, if any? (If not mentioned before) What would you suggest can be done to improve things?

If you could change any part of the program what would you change and why?

Market Assessment and Barriers

Describe the use of any advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use them? What do you use them for?

What information, research or assessments are you using to identify barriers and to develop more effective approaches/mechanisms for achieving program goals?

Can you cite any market, operational or technical barriers that impede a more efficient program operation? Please describe.

How are you adjusting the program as the market becomes more saturated with CFLs?

Wrap Up

Are there any other issues or topics we haven't discussed that you feel should be included in this report?

Do you have any supporting materials about the program that you could share with me? For example, communication plan, program objectives, advertisement copy

Do you have any further questions for me about this study or anything else?

Whom else do you recommend that we interview?

Thank you!

Appendix B: Vendor Interview Instrument

Name: _____

Title: _____

We are conducting this interview to obtain your opinions about and experiences with Duke Energy's Specialty Bulb program. We'll talk about the program and its objectives, your thoughts on improving the program, and the technologies the program covers. The purpose of this study is to capture the program's current operations as well as to help identify areas where the program might be improved. Your responses will feed into a report that will be shared with Duke Energy and the state regulatory agency. We will not identify you by name. However, you may provide some information or opinions that could be attributed to you by virtue of your position and role in this program. If there is sensitive information that you wish to share, please warn me and we can discuss how best to include that information in the report. Do you have any questions for me before we begin?

Program Background and Objectives

1. We will talk about the Store in more detail throughout the interview. For the moment can you please summarize what this program does in just a few sentences?
2. Please describe your role and scope of responsibility in detail.
3. How long have you been involved with this program? Has your role in this program changed during that time? (If so, how?)
4. Describe the development of the program. Why was the program created, and how has the program changed since it was first started?
5. What were some of the challenges you faced as you prepared to launch? How did you address them?
6. What challenges and changes have you faced since program launch? How did you address them?
7. What are the customer eligibility requirements?
8. What are the program's goals? That is, what goals and metrics are you tasked with achieving (such as bulbs distributed, numbers of new users, website visits, etc.)? What is the current performance towards these targets?
9. What are the current program's objectives? That is, aside from the numerical goals what is the program trying to accomplish (educate customers, improve satisfaction, etc.)? In your opinion, which objectives do you think are being met or will be met? Have the objectives changed over time. If yes, how do you think they have changed??
10. Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? How will these changes improve the program?

Program Implementation

11. Can you please walk me through your company's role in the program's execution?
12. Do you have any role in marketing or otherwise driving traffic to your store?
13. How does your company receive and process orders?
14. What is typical volume of bulb orders? What is the typical order size?
15. What timeframe are customers told it will take to receive their orders? What is the actual delivery time on average?
16. What percent of NC and SC participants are using the online CFL shipping tracking system?

Quality Assurance and Data Handling

17. Please describe how this program handles the transfer of data between Duke Energy and EFI.
18. Please describe your data security measures.
19. Please describe your quality assurance measures for each step in the process. What issues have been uncovered and how have they been addressed.
20. What is the warranty policy on the bulbs distributed by this program? How do customers go about getting replacements? How do you decide if you need the merchandise returned? Please share with me the volume of warranty replacements.

Duke Energy

21. Please characterize your working relationship with Duke Energy.
22. Please describe the reporting process that you use to track and manage vendor activities.
23. Do you think methods for coordination should be changed in any way? If so, how and why?

Improvements

24. How do you track and measure the effectiveness of the Store? How effective is the current program? (Clarify standard for "effective") How does it compare to other programs? What do you think should be changed, and why?
25. Overall, what would you say about the program is working really well?
26. Is there anything in this program you could highlight as a best practice?
27. What area needs the most improvement, if any? (If not mentioned before) What would you suggest can be done to improve this?
28. Are you currently considering any changes to the program? If so, what are the changes? What is the process for deciding whether or not to make these changes?
29. Can you cite any market, operational or technical barriers that impede a more efficient program operation? Please describe.
30. How are you adjusting the Store as the market becomes more saturated with energy efficient bulbs?

Wrap Up

31. Are there any other issues or topics we haven't discussed that you feel should be included in this report?
32. Do you have any further questions for me about this study or anything else?
33. Whom else do you recommend that we interview?
34. Thank you!

Appendix C: Participant Survey Instrument

Use four attempts at different times of the day and different days before dropping from contact list. Call times are from 10:00 a.m. to 8:00 p.m. EPT Monday through Saturday. No calls on Sunday. (Sample size N = 80 per state)

Note: Only read words in bold type. Italics are instructions. All questions are required.

Surveyor Name

Survey ID

Total Number of Bulbs Ordered

State

Kentucky

Ohio

for answering machine 1st through penultimate attempts:

Hello, my name is _____. I am calling from TecMarket Works to conduct a customer survey on behalf of Duke Energy. I'm sorry I missed you. I'll try again another time.

for answering machine - Final Attempt:

Hello, my name is _____. I am calling from TecMarket Works to conduct a customer survey on behalf of Duke Energy. This is my last attempt at reaching you, my apologies for any inconvenience.

if person answers

Hello, my name is _____. I am calling from TecMarket Works to conduct a customer survey on behalf of Duke Energy. May I speak with _____ please?

If person talking, proceed. If person is called to the phone reintroduce.

If not home, ask when would be a good time to call and schedule the call-back:

We are conducting this survey to obtain your opinions about the Duke Energy Savings Store, the website where you purchased discounted specialty CFL and LED light bulbs. We are not selling anything. Your responses to our survey questions will be combined with other responses and be used to help make improvements to the online store to better serve others. If you qualify for the survey, we will send you a \$30 check for your time. The survey will take about 45 minutes. May we begin?

Note: If this is not a good time, ask if there is a better time to schedule a callback

1a. Do you recall visiting the online Duke Energy Savings Store to purchase light bulbs?

- Yes
- No
- DK/NS

If 'No' or 'DK/NS', ask:

1b. The Savings Store is offered through the Duke Energy website so you can order energy-efficient CFL and LED specialty light bulbs for your home, such as 3-way bulbs, dimmable bulbs, outdoor flood lights, and so on.

Do you recall visiting the Duke Energy Savings store to purchase light bulbs?

- Yes
- No
- DK/NS

If No or DK/NS terminate interview and go to next participant.

Sorry, you do not qualify to take this survey, because you are not aware of the program.

2. Based on Duke Energy's ordering records you purchased [Total Number of Bulbs Ordered] specialty light bulbs and had them shipped to your home. Is this correct?

- Yes
- No
- DK/NS

Read if "yes" in Q2

I am going to go over the types of light bulbs that the ordering records indicate you purchased; please let me know if anything does not seem correct. The records show that you purchased [NUMBER] of [BULB TYPE], is that right?

Read if "no" or "DK/NS" in Q2

Then let's go over the light bulb ordering records for your account; please let me know if anything does not seem correct. The records show that you or someone in your home purchased [NUMBER] of [BULB TYPE], does that sound right?

Interviewer: read numbers of bulbs from call sheet to customer to confirm (or correct) types and numbers of bulbs. Record the number of bulbs of each type; enter 0 (zero) if the customer did not order a bulb type. Read bulb type descriptions if customer is unclear on the bulb type.

DESCRIPTION IF NEEDED: Indoor reflector bulbs provide directional light and are commonly used in track lighting and recessed fixtures such as down lights and recessed cans.

Indoor Reflector Bulbs - non-dimmable CFL

Indoor Reflector Bulbs - Dimmable CFL

Indoor Reflector Bulbs - Dimmable LED

Outdoor reflector bulbs

DESCRIPTION IF NEEDED: Outdoor reflector bulbs provide directional light and are commonly installed outdoors to light entrances to the home, yards and driveways.

Globe Bulbs

DESCRIPTION IF NEEDED: These sphere-shaped bulbs are frequently used in open fixtures in which bulbs are visible, such as bathroom vanity strips and hanging ceiling pendants. Globes provide dispersed light and are suitable for general and decorative lighting

Candelabra Bulbs

DESCRIPTION IF NEEDED: These bulbs are commonly used in decorative fixtures, such as wall sconces and ceiling fans, in which bulbs are exposed. With small bases and sleek shapes — offered in flame tip or torpedo styles — these bulbs are ideal for tight-fitting fixtures.

3-Way CFL Bulbs

DESCRIPTION IF NEEDED: Spiral-shaped bulbs — sometimes called twisty or curly — are the most common and popular CFLs. These light bulbs will deliver three distinct levels of light when used in a fixture with a 3-way switch.

Dimmable CFL Bulbs

DESCRIPTION IF NEEDED: Spiral-shaped bulbs — sometimes called twisty or curly — are the most common and popular CFLs. Dimmable compact fluorescents are designed to dim well with mechanical slide and rotary dimmer controls.

DESCRIPTION IF NEEDED: Capsule bulbs, also known as "A" lamps, most closely resemble traditional incandescent bulbs although capsules are slightly larger in size. These encapsulated style light bulbs fit in standard sockets and are especially suitable for use in open fixtures in which the bulb will be visible.

CFL Capsule Bulbs

LED Capsule Bulbs

Spiral CFL Bulbs

DESCRIPTION IF NEEDED: Spiral CFLs are compact fluorescent light bulbs that have a "twisty" shape like a soft-serve ice cream cone. These are general-purpose bulbs that fit in most standard light sockets, and are the most common type of CFL.

3. How did you first learn about the Duke Energy Savings Store?

Check all that apply

- Advertisement with my bill
- I got a letter/brochure in the mail
- Email from Duke Energy / Duke Energy employee
- Paperless billing email
- Saw message while accessing my account online
- Saw a message on Duke Energy's public website (not the online account system part)
- From another website
ask 3b. Which one? _____
- TV, radio, newspaper, news reports, advertising (traditional media) 3c. *Specify source* _____
- CAP agency / Low income program
ask 3d. Which organization? _____
- Social media 3e. *Specify source* _____
- From friend/family/neighbor/co-worker (*ask if through email, if so, select item below*)
- Email from family/friend/neighbor/co-worker
- I contacted Duke Energy for information or help
3f. Specify method of contact (phone, email, employee, etc.) _____
- Some other way, 3g. *specify* _____
- DK/NS

4. What was the main reason that you decided to purchase light bulbs from the Duke Energy Savings Store?

(do not read list, check one response)

- To save energy
- To save money on utility bills
- To save money on light bulb purchases
- I needed light bulbs
- To try specialty CFLs
- To try specialty LEDs
- To help the environment / "green" reasons
- Offer made it easy to get bulbs (convenient)
- The bulbs last longer than standard bulbs
- Friends/neighbors/family encouraged me
- Because it was from Duke Energy
- Past experience with another energy efficiency program

4b. Specify program and sponsor. _____

- Other *4c. (please specify)* _____
- DK/NS

5. Were there any other reasons that you decided to purchase light bulbs from the Duke Energy Savings Store?

(check all that apply)

- NO OTHER REASONS
- To save energy
- To save money on utility bills
- To save money on light bulb purchases
- I needed light bulbs
- To try specialty CFLs
- To try specialty LEDs
- To help the environment / "green" reasons
- Offer made it easy to get bulbs (convenient)
- The bulbs last longer than standard bulbs
- Friends/neighbors/family encouraged me
- Because it was from Duke Energy
- Past experience with another energy efficiency program

5b. Specify program and sponsor _____

- Other *5c. (please specify)* _____
- DK/NS

6. The Duke Energy Savings Store is only available online. What method did you use to get to the Store?

- Via a link in my online services account ("My Account" at Duke Energy site)
- Via a link on the Duke Energy public website
- Used a web browser favorite/bookmark
- Entered URL directly into browser
- Used an online link via email, social media, etc.
- Other *6b. (please specify)* _____
- DK/NS

7a. How many times did you visit the Duke Energy Savings Store before you made your first purchase?

- Made purchase during first visit to Savings Store
- Made purchase during second visit
- Made purchase during third visit
- Made purchase after three or more visits
- Record number of visits before purchasing* _____
- DK/NS

7b. What is the total number of times you have visited the Savings Store including times you went to the site without making a purchase?

Enter 0 (zero) for DK/NS

7c. In total, how many times have you purchased light bulbs from the Duke Energy Savings Store?

Enter 0 (zero) for DK/NS

If customer visited store more times than they purchased bulbs, ask q9:
(in other words: If 7b is greater than 7c, ask q9)

**9. You visited the Savings Store site without making a purchase on at least one occasion.
Why did you visit the store without making a purchase?**

Check all that apply first, THEN ask the follow up questions

- Just looking to see what was there (curiosity)
- Just checking Duke's prices
- Making price comparisons with other retailers
- 9b. Which ones?** _____
- Could not decide on which bulbs to buy
- 9c. Why not?** _____
- Did not have credit card information available
- Had unanswered questions,
- 9d. What did you want to know?** _____
- Wanted more information from somewhere besides the online store
- 9e. Where?** _____
- Was not ready to make a purchase
- 9f. Why not?** _____
- Could not complete the transaction due to technical issues
- 9g. What happened?** _____
- Wanted to see physical products instead of images online
- Other reasons
- 9h. Specify** _____
- DK/NS

10. On a scale of 1-to-10, where 1 is very difficult and 10 is very easy, how easy was it to log onto the website?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

10b. How could this be improved?

11. On the same 1-to-10 scale, how easy was it to navigate around the website?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

11b. How could this be improved?

12. On the same 1-to-10 scale, how easy was it to find the items you were looking for?

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

12b. How could this be improved?

13. On a scale of 1-to-10, where 1 is not at all helpful and 10 is very helpful, how helpful were the bulb descriptions?

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

13b. How could this be improved?

14. On the same 1-to-10 scale, how helpful were the energy savings estimates provided for each light bulb?

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

14b. How could this be improved?

14c. On a scale of 1-to-10, where 1 is not at all influential and 10 is very influential, how influential was the information provided at the Savings Store website in your decision to purchase bulbs from the Store?

1 2 3 4 5 6 7 8 9 10 DK/NS

For any score

14d. Why did you give that score?

15a. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with price of light bulbs sold at the Savings Store.

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less

15b. Why did you give that score?

16. When you think of your most recent purchase, do you recall if Duke Energy was offering a reduced price for the bulbs ?

- Yes
- No
- DK/NS

17a. On a scale of 1-to-10, where 1 is not at all influential and 10 is very influential, how influential was the reduced pricing in your decision to purchase bulbs from the Savings Store?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

For any score

17b. Why did you give that score?

17c. Did the pricing on the website cause you to buy:

(read the responses in Bold)

- More light bulbs than you might have otherwise,**
- Fewer light bulbs than you might have otherwise,**
- Or have no influence on the amount of bulbs you purchased?**
- Other _____
- DK/NS *(do not read)*

17d. Did the availability of low priced multi-packs, such as two-, three-, or six-packs of bulbs, cause you to buy

Read the responses in Bold

- More light bulbs than you might have otherwise**
- Fewer light bulbs than you might have otherwise,**
- Or have no influence on the amount of bulbs you purchased?**
- Other _____
- DK/NS *(do not read)*

If "More light bulbs than you might have otherwise" to q17d, ask

17e. How many more bulbs did you purchase than you would have otherwise?

If "Fewer light bulbs than you might have otherwise" to q17d, ask

17f. How many fewer bulbs did you purchase than you would have otherwise?

Now let's talk about some factors besides pricing.

18. On a scale of 1-to-10, with 1 being not at all important and 10 being very important, please rate the importance of each of the following characteristics when choosing a light bulb for your home

18a. Ability to dim the lighting level

1 2 3 4 5 6 7 8 9 10 DK/NS

18b. Speed of which the bulb comes up to full lighting level

1 2 3 4 5 6 7 8 9 10 DK/NS

18c. Ease of bulb disposal

1 2 3 4 5 6 7 8 9 10 DK/NS

18d. Availability of the bulb at stores and websites where you normally shop

1 2 3 4 5 6 7 8 9 10 DK/NS

18e. Selection of wattage and light output levels available

1 2 3 4 5 6 7 8 9 10 DK/NS

18f. Cost savings on your utility bill

1 2 3 4 5 6 7 8 9 10 DK/NS

18g. Energy savings

1 2 3 4 5 6 7 8 9 10 DK/NS

18h. Environmental or "green" concerns

1 2 3 4 5 6 7 8 9 10 DK/NS

18i. Attractiveness or appearance of the bulb

1 2 3 4 5 6 7 8 9 10 DK/NS

18j. Recommendations from family and friends

1 2 3 4 5 6 7 8 9 10 DK/NS

18k. Recommendations from the utility company

1 2 3 4 5 6 7 8 9 10 DK/NS

18l. Availability of utility programs or services that offer the bulbs to you directly

1 2 3 4 5 6 7 8 9 10 DK/NS

18m. Purchase price of the bulb

1 2 3 4 5 6 7 8 9 10 DK/NS

19. On a scale of 1-to-10, with 1 indicating that the factor was not at all influential, and 10 indicating that the factor was very influential, please rate the level of influence of the following factors on your decision to buy specialty bulbs through the Duke Energy Savings Store.

19a. Advertising when I accessed "My Account" in the Online Services section of Duke Energy's website

1 2 3 4 5 6 7 8 9 10 DK/NS

19b. Advertising on Duke Energy's public website

1 2 3 4 5 6 7 8 9 10 DK/NS

19c. Advertising via mailings received from Duke Energy

1 2 3 4 5 6 7 8 9 10 DK/NS

19d. Recommendation of friends or family by word of mouth, including email and social media

1 2 3 4 5 6 7 8 9 10 DK/NS

19e. Recommendation of someone you don't know personally or a group that you follow online at a site such as Facebook or Twitter

1 2 3 4 5 6 7 8 9 10 DK/NS

19f. The brands of light bulbs offered in the Savings Store

1 2 3 4 5 6 7 8 9 10 DK/NS

19g. The selection of types of bulbs for different purposes available at the Savings Store 1

2 3 4 5 6 7 8 9 10 DK/NS

19h. The selection of different wattages of bulbs available at the Savings Store

1 2 3 4 5 6 7 8 9 10 DK/NS

19j. The convenience of home delivery

1 2 3 4 5 6 7 8 9 10 DK/NS

19l. Your desire to save energy

1 2 3 4 5 6 7 8 9 10 DK/NS

19m. Your desire to save on utility costs

1 2 3 4 5 6 7 8 9 10 DK/NS

Now let's go back to your actual bulb buying experience.

20. On a scale of 1-to-10, where 1 is very difficult and 10 is very easy, how easy was it to use the shopping cart?

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

20b. How could this be improved?

21. On the same 1-to-10 scale, how easy was it to complete your purchase?

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

21b. How could this be improved?

22. Would you have preferred another method for buying these light bulbs other than ordering them online from the Savings Store?

- Yes *ask: 22a. Which method?* _____
- No
- DK/NS

23. How did you pay for your purchases?

- Credit card
- Check or money order
- DK/NS or Prefer Not to Answer

Ask if check/money order:

23a. How long was the interval between the date you mailed your payment and the date your order arrived?

24. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with the delivery time for your specialty bulbs.

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

24b. How could this be improved?

25. What shipping method did you choose?

- United States Post Office
- UPS (United Parcel Service)
- DK/NS
- Other _____

26. Were you aware of the order tracking features that allowed you to check the progress of your order?

- Yes
- No
- DK/NS

If "Yes" to q26, ask

26b. Did you use the order-tracking feature?

- Yes
- No
- DK/NS

If "Yes" to q26b, ask

26c. How did you access the order tracking feature?

Check all that apply

- via "My Account"
- via the Duke Energy Savings Store package tracking link
- by calling the phone number to check on post office delivery
- via the UPS website tracking feature
- Other 26d. specify _____
- DK/NS

26e. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with the order-tracking feature.

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

26f. How could this be improved?

27a. Did any bulbs arrive damaged or defective?

- Yes
- No
- DK/NS

27b. Have any bulbs become defective since you installed them?

- Yes
- No
- DK/NS

28a. Have you returned any of the bulbs that you ordered from the Savings Store, for any reason?

- Yes
- No
- DK/NS

If "Yes," ask 28b and 28c

28b. Which bulbs did you return, and how many?

Record type and quantity (such as "6 indoor reflector CFLs")

28c. Did you try installing these bulbs in your home before you returned them?

- Yes
- No
- DK/NS

If 'Yes' to q28c, ask

28d. What kind of light bulbs are currently installed in the sockets where you tried the Savings Store bulbs which were returned?

- Standard Incandescent
- Halogen
- CFL
- LED
- No bulbs (empty sockets)
- Other (including combination of bulb types – record details) _____

28e. Why did you return these bulbs?

28f. Did you receive replacement bulbs from the Savings Store for the ones you returned, or did you receive a credit or a refund?

- Replacement bulbs
- Credit
- Refund
- Other (including multiple outcomes) record details _____
- This transaction is currently in process (no replacement, credit or refund yet)
- DK/NS

28g. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your overall satisfaction with Savings Store's returns practices.

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

28h. How could this be improved?

29a. On a scale of 1-to-10, where 1 is not at all influential and 10 is very influential, how influential was the convenience of shopping for light bulbs online in your decision to purchase bulbs from the Savings Store?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

For any score,

29b. Why did you give that score?

Now I'd like to talk with you about some of the Store's features designed to help you to make decisions and purchases.

30. The website provides a number of resources designed to provide additional information, including written explanations and videos about bulb types and uses, brightness, and bulb recycling and safety. Do you recall any of these informational resources?

- Yes
- No
- DK/NS

If "Yes" ask 30b

30b. Was there any specific information that stands out in your mind as being particularly useful or important to you?

- Yes
- No
- DK/NS

If "Yes" ask

30c. What was it?

30d. On a scale of 1-to-10, where 1 is not at all helpful and 10 is very helpful, how helpful were the informational resources at the website?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

30e. How could this be improved?

31. The Duke Energy Savings Store features an Energy Savings Calculator that you can use to calculate the amount of money you'll save on bulb purchases and on your Duke Energy bill. It also shows how much CO2 you'll offset by using more energy efficient bulbs. Do you recall the Energy Savings Calculator?

- Yes
- No
- DK/NS

If "Yes" ask

31b. Did you view the Energy Savings Calculator?

- Yes
- No
- DK/NS

If "Yes" ask

31c. Did you know the Energy Savings Calculator on the Duke Energy Savings Store is interactive and that it allows you to adjust the number of bulbs and see the associated savings for your household?

- Yes
- No
- DK/NS

31d. On a scale of 1-to-10, where 1 is not at all helpful and 10 is very helpful, how helpful was the Energy Savings Calculator?

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

31e. How could this be improved?

32. Duke Energy has a support telephone number for assistance with the Savings Store website. Did you call the phone number at any point?

- Yes
- No
- Not aware of the phone number
- DK/NS

If "Yes" ask

32b. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your overall satisfaction with phone support provided for the Store.

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

32c. How could this be improved?

33. The website also has a Contact Us feature that can be used to email questions to the Store's support team. Did you use the Contact Us feature?

- Yes
- No
- Not aware of the Contact Us feature
- DK/NS

If "Yes" ask

33b. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your overall satisfaction with Contact Us feature provided for the Store.

1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

33c. How could this be improved?

Next I'd like to talk about the light bulbs that you ordered from the Duke Energy Savings Store...

Ask IR series of questions only if the customer bought any type of Indoor Reflector bulbs: Dimmable CFL, Nondimmable CFL, or LED.

IR-1. Our records show that you ordered [number] indoor reflector bulbs. How many of these indoor reflector bulbs that were ordered from the Savings Store are currently installed in fixtures in your home ?

DESCRIPTION IF NEEDED: Reflector bulbs provide directional light and are commonly used in track lighting and recessed fixtures such as down lights and recessed cans.

- None
- One or more *record number* _____
- DK/NS

IR-2. And how many of these indoor reflector bulbs are currently stored for future use?

- None
- One or more *record number* _____
- DK/NS

If "one or more" in IR-2, ask

IR-2a. Do you plan on eventually installing and using these indoor reflector bulbs?

- Yes
- No
- Maybe
- DK/NS

If "no" to IR-2a

IR-2b. Why not?

If "Maybe" or "DK/NS" to IR-2a

IR-2c. Why are you not sure you will use them all?

If "Yes" to IR-2a, ask

IR-2d. How long do you think it will be before you will have installed all indoor reflector bulbs that you ordered from the Savings Store?

- 1 year or less
- 13 to 24 months (2 years)
- 25 to 36 months (3 years)
- 37 to 48 months (4 years)
- 49 to 60 months (5 years)
- More than 5 years
- Never
- DK/NS

IR-3a. Have you gotten rid of any of the indoor reflector bulbs that you ordered from the Savings Store – because they burned out or were defective, because you gave them to somebody else, or for any other reasons?

- Yes
- No
- DK/NS

If "yes" to IR-3, ask IR-3b, 3c and 3d

IR-3b. How many of the indoor reflector bulbs that you ordered from the Savings Store have you gotten rid of?

IR-3c. Why did you get rid of the bulb(s)?

IR-3d. How did you get rid of the bulb(s)?

If IR-1 is "one or more", continue with IR-4a.

If IR-1 is "none" or "DK/NS" skip ahead to next bulb section now

IR-4a. In how many different rooms in your home did you install these Savings Store indoor reflector bulbs?

- 1
- 2
- 3
- 4
- 5
- 6 or more
- DK/NS

If "one" in IR-4a,

IR-4b. In which room were the indoor reflector bulbs installed?

- Living/family room
- Dining room
- Kitchen
- Master bedroom
- Other bedroom
- Bathroom
- Hall
- Closet
- Basement
- Garage
- Outdoors/Exterior
- Other (specify) _____

If "two or more" in IR-4a, ask IR-4c and 4d,

IR-4c. Which room in your home has the largest number of Savings Store indoor reflector bulbs installed?

(NOTE: if they have equal numbers of bulbs per room, then ask customer to pick any one room to answer bulb questions about)

- Living/family room
- Dining room
- Kitchen
- Master bedroom
- Other bedroom
- Bathroom
- Hall
- Closet
- Basement
- Garage
- Outdoors/Exterior
- Other (specify) _____

IR-4d. How many of the indoor reflector bulbs are installed in this room?

IR-5a. Are all of the indoor reflector bulbs in your [room from IR-4b or IR-4c] controlled by the same on-off switch?

if needed: That is, do all of the bulbs in this room turn on and off together, or are there different switches that control different bulbs?

- Yes
- No
- DK/NS

If "No" to IR-5a, ask

IR-5b. How many different sets of indoor reflector bulbs are there in your [room from IR-4b or IR-4c] that turn on and off together?

If "yes" in IR-5a, ask:

IR-6a. Are these indoor reflectors dimmable bulbs installed on a dimmer switch?

- Bulbs do dim (dimmable bulbs AND on a dimmer switch)
- Bulbs do not dim (Not dimmable bulbs and/or not on a dimmer switch)
- DK/NS

If "No" or "DK/NS" in IR-5a, ask

IR-6b. Are any of these indoor reflectors dimmable bulbs on a dimmer switch?

- Some bulbs do dim (dimmable bulbs AND on a dimmer switch)
- None dim (none are dimmable bulbs and/or none are on dimmer switches)
- DK/NS

If "Some bulbs do dim", ask

IR-6c. How many of these indoor reflector bulbs are dimmable bulbs installed on dimmer switches?

IR-7a. What kind of bulbs were previously in the lamps or fixtures in your [room from IR-4b or IR-4c] where you installed the indoor reflector bulbs from the Savings Store?

Interviewer: for each bulb type, ask whether they were dimmable not.

- Standard Incandescent on a dimmer switch
- Standard Incandescent not on a dimmer switch
- Halogen on a dimmer switch
- Halogen not on a dimmer switch
- dimmable CFLs
- non-dimmable CFLs
- dimmable LEDs
- non-dimmable LEDs
- No bulbs (empty sockets)
- Other (including combination of bulb types – record details) _____
- There were bulbs previously installed, but I can't recall what type of bulb
- I am not sure if there were any bulbs installed or what type they were (if any)

If "No bulbs (empty sockets)", SKIP AHEAD TO IR-8a

IR-7b. How many watts were the old bulbs that were removed?

- Record response if known _____
- DK/NS

IR-7c. What happened to the old bulbs that were removed?

- Recycled
- Thrown away
- Given away
- Stored for future use
- Other _____
- DK/NS

IR-8a. On average, approximately how many hours per day are you using the lamps or fixtures in your [room from IR-4b or IR-4c] where you installed the indoor reflector bulbs from the Savings Store?

- Record response if known _____
- DK/NS

IR-8b. Did the hours of use for these lights increase, decrease or stay the same since the old bulbs were replaced?

- Increased
- Decreased
- Stayed the same

If 'Increased', ask

IR-8c. How many hours per day more?

If 'Decreased', ask

IR-8d. How many hours per day less?

IR-9a. When you installed these indoor reflector bulbs that you bought from the Savings Store, did you make any other changes to the fixtures those bulbs were installed in, such as installing a different switch or a lamp with a different number of bulb sockets?

- Yes
- No
- DK/NS

If "Yes", ask

IR-9b. Besides the bulbs, what else did you do to change this light fixture?

IR-10a. If you had not known about the light bulbs available at the Savings Store, would you have continued to install [bulb from IR-7a] bulbs in this light fixture?

- Yes
- No
- Maybe
- DK/NS

If "Maybe" or "No", ask IR-10b.

IR-10b. What type of bulbs would you have installed in this light fixture if you had not purchased bulbs from the Savings Store?

Interviewer: if they answer "CFL" or "LED" ask whether they would get dimmable bulbs or not.

- Standard Incandescent
- Halogen
- dimmable CFLs
- non-dimmable CFLs
- dimmable LEDs
- non-dimmable LEDs
- No bulbs (would have left sockets empty)
- Other (including combination of bulb types – record details) _____
- DK/NS

IR-11a. If one of the indoor reflector bulbs that you purchased from the Savings Store burns out, will you replace it with an incandescent, CFL, or LED indoor reflector, or with some other type of bulb?

Interviewer: if they answer "CFL" or "LED" ask whether they would purchase dimmable bulbs or not.

- Standard Incandescent
- Halogen
- dimmable CFL
- non-dimmable CFL
- dimmable LED
- non-dimmable LED
- A type of bulb that is not an indoor reflector
- It depends on which socket burns out (or other factors)
- DK/NS
- Other (including combination of bulb types – record details) _____

If "A type of bulb that is not an indoor reflector" ask:

IR-11b. What type of bulb would you install?

(record style AND type – such as "3-way incandescent" or "dimmable LED")

If "It depends on which socket burns out (or other factors)" ask:

IR-11c. Why do you say that?

IR-12. On a scale of 1-to-10, with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with the indoor reflector bulbs from the Savings Store.

- 1 2 3 4 5 6 7 8 9 10 DK/NS

If 7 or less,

IR-12b. Why were you less than satisfied with these bulbs?

Ask OR series of questions only if the customer bought Outdoor Reflector bulbs.

OR-1. Our records show that you ordered [number] outdoor reflector bulbs. How many of these outdoor reflector bulbs that were ordered from the Savings Store are currently installed in fixtures on or in your home?

DESCRIPTION IF NEEDED: Reflector bulbs provide directional light. These high-wattage bulbs are intended for outdoor use.

- None
- One or more *record number* _____
- DK/NS

OR-2. And how many of these outdoor reflector bulbs are currently stored for future use?

- None
- One or more *record number* _____
- DK/NS

If "one or more" in OR-2, ask

OR-2a. Do you plan on eventually installing and using these outdoor reflector bulbs?

- Yes
- No
- Maybe
- DK/NS

If "no" to OR-2a

OR-2b. Why not?

If "Maybe" or "DK/NS" to OR-2a

OR-2c. Why are you not sure you will use them all?

If "Yes" to OR-2a, ask

OR-2d. How long do you think it will be before you will have installed all of the outdoor reflector bulbs that you ordered from the Savings Store?

- 1 year or less
- 13 to 24 months (2 years)
- 25 to 36 months (3 years)
- 37 to 48 months (4 years)
- 49 to 60 months (5 years)
- More than 5 years
- Never
- DK/NS

OR-3a. Have you gotten rid of any of the outdoor reflector bulbs that you ordered from the Savings Store – because they burned out or were defective, because you gave them to somebody else, or for any other reasons?

- Yes
- No
- DK/NS

If "yes" to OR-3, ask OR-3b, 3c, and 3d

OR-3b. How many of the outdoor reflector bulbs that you ordered from the Savings Store have you gotten rid of?

OR-3c. Why did you get rid of the bulb(s)?

OR-3d. How did you get rid of the bulb(s)?

If OR-1 is "one or more", continue with OR-4a.

If OR-1 is "none" or "DK/NS" skip ahead to next bulb section now

OR-4a. In how many different places around your home did you install these Savings Store outdoor reflector bulbs?

- 1
- 2
- 3
- 4
- 5
- 6 or more
- DK/NS