

Final Report

**Process and Impact Evaluation  
of the Residential Smart \$aver Energy Efficiency  
Products (CFLs) Program in Kentucky**

**Prepared for  
Duke Energy**

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## Executive Summary

### Key Findings and Recommendations

This section presents the key findings and recommendations identified through this evaluation of Duke Energy's Kentucky Residential Smart Saver Energy Efficiency Products Program. The program evaluation covers the period of time from September 10, 2012 through February 12, 2013 (n=26,725 participants). Table 1 presents the estimated overall ex post energy impacts from the engineering analysis.

**Table 1. Estimated Overall Impacts**

	Gross Savings	Net Savings
<b>Annual Savings Per Bulb Distributed</b>		
kWh	25.3	19.7
kW	0.0030	0.0023

The impacts in this table were calculated using engineering algorithms from Appendix H: Impact Algorithms. These estimates also take into account a participant's tendency to over-report operating hours. This is explained in further detail in the Self-Reporting Bias section. The net-to-gross ratio used to calculate net savings is 77.5%. Freeridership and spillover, the two components of the net-to-gross ratio, are calculated in their respective sections: Freeridership and Spillover. Market effects energy savings are not included in this program evaluation report and if present, are above and beyond those savings reported. Finally, program per unit savings as reported in Table 1 has been averaged over the effective useful life of a bulb. This is to account for the decrease in baseline wattage over time due to the phase out of standard wattage incandescent bulbs as stipulated in the Energy Independence and Security Act (EISA) of 2007. See Appendix I: EISA Schedule and CFL Baseline for a detailed description of baseline adjustments by year. A breakdown of gross and net savings by year can be seen in Table 64 through Table 67.

### Significant Process Evaluation Findings

#### From the Management Interviews

- Between its inception on September 10, 2012 and June 30, 2013, the program distributed 529,265 CFLs, which represents 105% percent of its goal of 500,000 CFLs.
  - See section titled "Program Eligibility, Goals, and Participation Levels" on page 11.
- In all, the program distributed 52,007 CFL kits to 42,027 Kentucky residents.
  - See section titled "Fulfillment" on page 18.
- Program marketing strategy utilizes a sophisticated combination of geodemographic customer segmentation, heat map targeting, and multi-channel marketing campaigns to achieve its goals.

- See section titled "Program Marketing" on page 14.
- The marketing strategy called for a phased approach to manage CFL uptake and program growth to align with budgets and fiscal year timing.
  - See section titled "Program Marketing" on page 14.
- The program offers customers two methods for ordering CFLs: via a toll free phone number using interactive voice response (IVR) and via a web-based online ordering system. Both methods confirm customer eligibility prior to accepting CFL requests. The systems are all operating smoothly.
  - See section titled "Order Processing" on page 17.
- Fulfillment operations are consistently completed in less than the nine day processing time allowed under service level requirements. Customer orders are generally filled and shipped within 48 hours, arriving in Kentucky residents' home an average of four days later.
  - See section titled "Fulfillment" on page 18.
- Working relations between Duke Energy and AM Conservation, the fulfillment contractor, are positive and highly functional.
  - See section titled "Working Relationships" on page 19.
- According to Duke Energy's analysis of its CFL Tracker database, CFL market saturation in Kentucky stands at 30 percent as of June 2013. This demonstrates strong performance to date with a healthy percentage remaining for program growth.
  - See section titled "Results" on page 20.
- The program appears well poised to achieve continued success in the future. Thus no changes are recommended at this time.
  - See section titled "Evaluation and Recommendations" on page 20.

### From the Participant Surveys

- Program and CFL satisfaction levels are very high, ranging from an average score of 9.7 out of 10 for the ease of ordering, to a low of 8.7 out of 10 for the light quality of the CFL bulbs (still a high satisfaction score). Overall satisfaction with the program was very high at 9.5 on a 10-point scale, and these customers' satisfaction with Duke Energy overall is also high at 8.6 on a 10-point scale. Using a 5-point Likert scale, 84.0% (68 out of 81) of surveyed participants gave this program the highest possible rating of "very satisfied".
- The very high satisfaction of 9.7 out of 10 for the ease of ordering is also reflected in the very low level of reported problems with ordering CFLs from the program: only one customer surveyed (1.2% of 81) had to make more than one attempt to sign up for their free bulbs.
- Barely one participant in five (19.8% or 16 out of 81) is aware that there is a system for tracking orders, and only 3.7% (3 out of 81) of surveyed customers actually used the order tracking system. Since the satisfaction rating with the ease of ordering is so high (9.7 out of 10), it can be concluded that few customers have any need or interest in an

order tracking service. However, among the three customers who did use the order tracking, satisfaction with this service was high (9.0 out of 10 among the two out of three customers who used the service and provided ratings).

- Customers were asked to name what they liked most and liked least about the program. The things that were most often mentioned as what they liked most about the program are that "it is free" (44.4% or 36 out of 81), the ease of participating and ordering (22.2% or 18 out of 81) and the convenience of direct mail delivery (21.0% or 17 out of 81). More than half (54.3% or 44 out of 81) of customers surveyed could not name a least favorite aspect, and the most frequent complaints were about shipping, packaging and delivery (7.4% or 6 out of 81) and the lack of order options for different wattages and bulb types and sizes (7.4% or 6 out of 81).
- When asked why they participated in the Duke Energy direct mail CFL program, the most common response was again "because it was free" (60.5% or 49 out of 81), although nearly half (45.7% or 37 out of 81) also mentioned "saving energy". When asked to rate the factors that led them to participate in the program, "desire to save on utility costs" received the highest mean rating of 9.1 out of 10, followed by "desire to save energy" with 8.4 out of 10 and "desire to be environmentally responsible" coming in third with 7.9 out of 10.
- Among the least influential factors on customers participation in the program are: the brand of CFLs (average influence rating 2.1 out of 10), Duke Energy advertising on social media sites (1.7 out of 10), friends and family via social media sites (1.4 out of 10), friends and family via email (1.3 out of 10) and a group or someone they don't know personally via social media (1.2 out of 10).
- Word of mouth is an important part of this program: 85.2% (69 out of 81) of surveyed customers said they told somebody they knew about the program, and overall these customers told an average of 4.5 people apiece about the program. Eleven customers in this survey (13.6% of 81) first became aware of Duke Energy's CFL direct mail offer from friends, family and co-workers. When asked to rate the likelihood that they would tell their friends and family about the free CFL program from Duke Energy, 70.4% (57 out of 81) of participants gave the highest possible "10 out of 10" rating, and the average likelihood rating is very high at 9.1 on a 10-point scale.
- Mailings, advertising (though not via online social media) and especially the Duke Energy website are also important channels for communicating about this program: 37.0% (30 out of 81) of surveyed customers first learned about this program at the Duke Energy website, which was the most frequently mentioned source of awareness. Also, most customers (50.6% or 41 out of 81) ordered their CFLs from the Duke Energy website, and 58.0% (47 out of 81) of these customers visit the Duke Energy website once a month or more often.
- The direct mail CFL program in Kentucky continues to effectively target participants with relatively little prior CFL use. Prior to the program, CFL saturation was relatively low within the participant population, with only 60.5% (49 out of 81) having any CFLs installed before the program and the median number of CFLs installed across all surveyed participants being only two bulbs (the mean number of CFLs installed before the program was 4.3 bulbs per household). Surveyed participants received an average of 12.4 CFLs apiece from the program, and at the time of the survey had installed an

- average of 6.3 of these bulbs apiece. Only 6.2% (5 out of 81) of customers ordered fewer than the maximum number of CFLs they were allowed by the program.
- This program is successful at getting customers to change their light bulb purchase behavior: Only 56.8% (46 out of 81) of customers surveyed were intending to purchase CFLs before participating in the program. After the program, three-quarters of participants (76.5% or 62 out of 81) say they are now more likely to use CFLs in the future, while only 6.2% (5 out of 81) say they are less likely to use CFLs in the future (including two participants, or 2.5% out of 81, who have concerns about mercury in the bulbs). The main reason customers who are more likely to use CFLs are more likely to use them is that they prefer CFLs and their light to standard bulbs (most frequent response given by 46.8% or 29 out of 62). When participants were asked to rate the likelihood that they would continue to use CFLs on a 10-point scale, 55.6% (45 out of 81) gave the highest possible "10 out of 10" rating, and the average rating across all survey respondents is a high 8.6 out of 10.
  - In order to stay abreast of the changing marketplace for efficient lighting, customers were also asked about their use of LED light bulbs and intentions for future LED usage, including interest in a Duke Energy direct mail LED program. Only 11.1% (9 out of 81) of surveyed customers had any LEDs installed before receiving their CFLs from Duke Energy, and these nine customers had an average of 6.1 LEDs apiece (across the entire surveyed population, the mean number of LED bulbs installed before the program was 0.7 per household, and the median was zero LEDs). Only 8.6% of participants (7 out of 81) were intending to purchase LEDs before the program, and only 16.0% (13 out of 81) are intending to buy any LEDs among the next ten bulbs they will purchase.
  - When customers were asked what types of bulbs they think they will purchase for the next ten bulbs they buy, more than three out of five bulbs are CFLs (61.8% or 473 out of 765 bulbs intended to be purchased) and only 33.3% (255 out of 765) are standard incandescent or halogen bulbs. Another 4.8% (37 out of 765) of these intended future bulb purchases are LEDs.
  - In terms of actual bulbs purchased since participating in the direct mail CFL program, seventeen participants (21.0% of 81) purchased an additional 141 CFLs on their own after the program, of which 114 bulbs (80.9%) are already installed. There are also four participants (4.9% of 81) who have purchased an additional 7 LED bulbs since the program, and installed all seven (100%). The much lower number of LED bulbs purchased per household, and the fact that 100% have been installed, indicates that long-lasting and expensive LED bulbs are not purchased in bulk and stored for future use; LEDs tend to be purchased one or two at a time, only when needed, and installed immediately.
  - By touting the benefits of CFL technology, as well as providing information and bulbs for customers to try at no cost, the Duke Energy CFL program may actually be discouraging LED adoption in the short term. After participating in this direct mail CFL program, 38.3% (31 out of 81) of surveyed customers say they are less likely to use LEDs in the future, versus only 13.6% (11 out of 81) who say they are more likely to use LEDs. When asked why they would be less likely to use LEDs in the future, by far the most frequently cited reason was that customers don't know what LEDs are, how they work, or why they would want to use them (45.2% or 14 out of 31), with the higher purchase price of LEDs coming in a distant second (16.1% or 5 out of 31). Even among the eleven

customers who say they are now more likely to use LED bulbs, four (36.3%) merely said that they are more willing to try out other new lighting technologies after having tried out CFLs. If Duke Energy intends to launch an LED program, it must be accompanied by an information campaign to inform customers what LED bulbs "do" and why they are preferable to other types of lighting.

- When asked to rate their interest in using LEDs in the future, participants in this CFL program only rated their interest in LEDs at 4.5 out of 10. However, if Duke Energy were to offer a program similar to the direct mail CFL program only for LEDs, interest in such a program is a significantly higher 6.5 out of 10, indicating that CFL participants are more willing to try LEDs if Duke Energy offers them a risk-free way to try out LED bulbs.
- More than a third of these participants also participate in Duke Energy's online services (38.3% or 31 out of 81) and receive My Home Energy Report (35.8% or 29 out of 81). Another 22.2% (18 out of 81) have participated in the Personal Energy Report program, though fewer than 10% have participated in Home Energy House Call, Power Manager or Smart Saver. Overall, 65.4% (53 out of 81) of CFL participants also participated in at least one of the other programs listed above. Customers were also asked to rate their interest in participating in any of the programs they had not already participated in: Average ratings were moderately high in the 6.3 to 6.7 out of 10 range for all programs except Power Manager, which received a much lower 3.6 out of 10 mean interest rating. Among potential programs not yet being offered, customers expressed the highest interest in "rebates for energy efficient home improvements" (7.2 out of 10).
- Participants were asked about efficient specialty bulbs installed in their homes, and their interest in a specialty bulb program from Duke Energy. Overall, 29.3% of specialty bulbs installed in these customers' homes are already CFL (and another 8.0% are LED bulbs). The most promising types of specialty CFLs for such a program are outdoor flood lights (only 13.0% of these sockets currently have CFLs, 50.6% of respondents would be interested in ordering them from Duke Energy, and they are on an average of 4.8 hours per day), with dimmable and candelabra bulbs having the next-highest levels of interest, available sockets and hours of use. Interest in specialty LEDs was somewhat lower than for CFLs across the board, with outdoor floods again being the best candidate for such a program.

### Significant Impact Evaluation Findings

- Mean wattage of a replaced bulb is 57 watts.
  - See Table 60 on page 71.
- A first year installation rate of 50.9% was reported, with an ISR of 70.7%.
  - See In Service Rate (ISR) Calculation on page 71.
- Living/family room, master bedroom, and kitchen, in that order, are the three most popular room types for bulb replacements; together they make up 62% of all bulb installations.
  - See Figure 13 on page 71.
- Surveyed participants report slightly increased operating hours when switching from an incandescent to a CFL having a very small effect on energy savings.
  - See Table 60 on page 71.



## Introduction and Purpose of Study

### Summary Overview

This document presents the evaluation report for Duke Energy’s Residential Smart Saver Energy Efficiency CFLs Program as it was administered in Kentucky. The evaluation was conducted by TecMarket Works, Matthew Joyce, and BuildingMetrics, Inc.

### Summary of the Evaluation

The findings presented in this report were calculated using survey data from participants in the CFL campaigns as presented in Table 2 below.

**Table 2. Evaluation Date Ranges**

Evaluation Component	Sample Pull: Start Date of Participation	Sample Pull: End Date of EMV Sample	Dates of Analysis
Participant Surveys	September 10, 2012	February 12, 2013	Surveys conducted from May 24 through June 20, 2013
Engineering Estimates	September 10, 2012	February 12, 2013	July 2013

TecMarket Works conducted a phone survey with a random sample of 81 participants from Kentucky between May 24 and June 20, 2013.

Surveyed participants were asked how many CFLs that were currently installed in light fixtures were ordered through Duke Energy’s CFL program. Additional, more specific information was collected for a maximum of three bulbs. This information included the location of the installed CFL, the type and wattage of the bulb that it replaced, and the mean hours per day that it is in use. The decision to limit the number of CFLs about which to collect detailed information to three was made in the interest of time and evaluation cost, as the surveys are quite lengthy. The information gathered about the three CFLs is sufficient and provides statistically significant data.

An impact analysis was performed for all CFLs by room type and can be seen in the Impact Estimates section on page 73. However, it should be noted that individual room type samples are of insignificant size to achieve statistical relevance and are presented as anecdotal evidence. The impacts are based on an engineering analysis of the impacts associated with the self-reported installs identified through the participant surveys. The customer-reported hours of use were adjusted downward for the self-reporting bias identified in previous CFL studies<sup>1</sup> that included a reconciliation between customer reported and lighting logger data. The reasons for the inclusion of the self-reporting bias is explained in the Self-Reporting Bias section on page 72.

<sup>1</sup> The adjustment for the self-reporting bias used in this study was determined using paired lighting logger and customer self-reported data from Kentucky, Ohio, North Carolina, and South Carolina.

This report is structured to provide program impact estimations per bulb distributed as well as overall program savings based on an extrapolation of these results to the full participant population (participants from September 10, 2012 through February 12, 2013; n=26,725 participants).

## Overview and Purpose of Program

Duke Energy's Residential Smart \$aver Energy Efficiency CFLs (EE CFL) Program encourages the adoption and use of compact fluorescent light bulbs by Kentucky customers through a variety of marketing channels ranging from direct mail and bill inserts to online promotions and print and radio advertising. Customers can order up to 15 free CFLs via an interactive voice response (IVR) system or via an online ordering system. Both systems confirm customer eligibility and the number of remaining bulbs that may be sent to that customer. Bulbs are shipped at no charge and typically arrive within one week.

## Program Eligibility, Goals, and Participation Levels

The EE CFL program is open and available to any Duke Energy residential customer in Kentucky with an individual home meter and an active account on an electric or electric/gas combination rate schedule. Customers are eligible to receive up to 15 free CFLs.

The program goal for Kentucky is aligned with a fiscal year calendar that begins July 1 and ends June 30. As a result, the goal for the 2012-2013 program was adjusted to accommodate the fact that the Kentucky effort began on September 10, 2012. The primary metric for success for the first fiscal year of the program was set for the delivery of 500,000 CFLs to eligible customers within Duke Energy's Kentucky service territory. The program actually delivered 529,265 CFLs to 42,027 Kentucky residents, averaging 12.6 CFLs per customer. This represents 105% percent of goal as shown in Table 3.

No specific metrics were set for a targeted number of participating customers. Nor were goals established regarding an average number of the CFLs ordered per customer. Hence, any combination of order sizes and numbers of customers were allowable in reaching the program's goal. The table below shows program results through June 30, 2013.

**Table 3. Year One Program Participation**

CFL Goal	CFL Actual	% of Goal	Number of Customers	Average # CFLs per Customer
500,000	529,265	105%	42,027	12.6

## Methodology

### Overview of the Evaluation Approach

This evaluation consists of three parts: management interviews, participant surveys, and an impact analysis based on engineering algorithms.

### Study Methodology

#### Management Interviews

TecMarket Works conducted interviews with Duke Energy's Product Manager and with the Client Manager at AM Conservation Group, the vendor contracted to provide order tracking and bulb fulfillment.

#### Participant Surveys

This survey focused on customers who, according to program tracking records, responded to the CFL program marketing efforts by Duke Energy to receive free CFLs. The survey was conducted by phone by TecMarket Works staff from a randomly generated sample from a list of 18,044 customers who requested the CFLs and were eligible for the survey<sup>2</sup>, and 80 survey respondents completed the survey by telephone. Additionally, one participant did not complete the entire survey but answered all of the questions about CFLs provided by the program; therefore, responses are presented from a base of 81 responses including this partial survey. The survey instrument can be found in "Appendix C: Participant Survey Instrument".

#### Impact Analysis

Engineering algorithms taken from the Draft Ohio Technical Resource Manual (TRM) were used to estimate savings. These unit energy savings values were applied to customers in the engineering analysis sample.

### Number of Completes and Sample Disposition for Each Data Collection Effort

#### Management Interviews

Two out of two management representatives were contacted in June and July of 2013, representing a 100% response rate.

#### Participant Surveys

From the sample list of 26,725 customers, 670 participants were called between May 24 and June 20, 2013, and a total of 80 telephone surveys and one partially complete survey were conducted yielding a response rate of 12.1% (81 out of 670).

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<sup>2</sup> The Contact list provided by Duke Energy had 26,725 customers. TecMarket Works removed customers that had no phone number listed, those that requested to not be contacted, duplicate entries, and those called in the past six months for other surveys, yielding a final number of 18,044 customer from which a random sample was pulled.

**Impact Analysis**

A total of 81 participants answered the phone survey. One survey was only partially completed, but the respondent completed all relevant impact questions including the net to gross battery and so this data was used in the calculation of program impacts.

**Expected and achieved precision****Participant Surveys**

The survey sample methodology for the telephone survey had an expected precision of 90% +/- 9.2% and an achieved precision of 90% +/- 9.1%.

**Impact Analysis**

Engineering estimates rely on participant survey responses. Sampling procedures for the participant survey had an expected precision of 90% +/- 9.2% and an achieved precision of 90% +/- 9.1%.

**Description of baseline assumptions, methods and data sources**

Baseline assumptions were determined through phone surveys with customers providing self-reported values of baseline lamp watts and operating hours. Baseline wattage is further adjusted to account for the effects of EISA as per Appendix I: EISA Schedule and CFL Baseline. Robust data concerning HVAC system fuel and type was available from Duke Energy's Home Profile Database (appliance saturation survey type data) in Ohio. Kentucky being very similar geographically, interaction factors derived from this data were used in favor of deemed values from secondary sources as they recognize only Duke Energy customers and, therefore, more accurately represent the participant population. A breakdown of these factors by system and fuel type can be seen in Appendix H: Impact Algorithms.

**Description of measures and selection of methods by measure(s) or market(s)**

The program distributed CFLs exclusively. The Draft Ohio TRM's impact algorithms were enhanced with primary data<sup>3</sup> and used to calculate energy savings. All customers are in the residential market.

**Threats to validity, sources of bias and how those were addressed**

CFL installations and hours of operation were self-reported by the surveyed participants. There is a potential for social desirability bias<sup>4</sup> but the customer has no vested interest in their reported measure adoptions, therefore this bias is expected to be minimal. There is a potential for bias in the engineering algorithms, which was minimized through the use of building energy simulation models, which are considered to be state of the art for building shell and HVAC system analysis.

<sup>3</sup> Rather than just using one value for HOU, we use before and after HOU values.

<sup>4</sup> Social desirability bias occurs when a respondent gives a false answer due to perceived social pressure to "do the right thing."

## Management Interviews

### Description of the Program

Duke Energy's Residential Smart Saver Energy Efficiency CFLs (EE CFL) Program is designed to market and promote the use of compact fluorescent light bulbs among Duke Energy residential customers in Kentucky by providing up to 15 free CFLs (13- and 18-watt standard spiral bulbs) per qualifying customer account. Multiple marketing channels are employed to encourage customers to request the CFLs via a toll free IVR system or via an online ordering system. Both on-demand ordering systems use an automated method of checking Duke Energy's CFL tracker database to confirm the amount of bulbs for which customers are eligible. Once the orders are placed, they are fulfilled via AM Conservation Group, a third party vendor, and shipped at no charge to the customer via FedEx Smart Post, usually within one week's time. An online system provides a way for customers to track the status of their orders from initial request to final home delivery.

### Program Development

For many years Duke Energy provided its residential customers with discount coupons for CFLs sold at local retailers. However, Duke Energy management desired to reach even more customers by providing free CFLs via a coordinated system that 1) confirmed customer eligibility; 2) ensured more reliable inventory; 3) offered a more convenient delivery mechanism; and 4) provided a more manageable means of tracking and reporting participation levels.

Those intentions were realized in 2010 when the utility implemented the Residential Smart Saver Energy Efficiency Products Program, which is designed to provide qualifying residential customers with free CFLs mailed directly to their homes. The EE CFL program was first launched in the Carolina System and in Ohio on August 14, 2010. During the first year of the program, customer desire for the free CFLs was so great that orders in those service territories quickly grew to volumes measured in the millions. Managing such high volumes presented a difficulty for Niagara Conservation, the original fulfillment vendor tasked with stocking and shipping the bulbs. As a result Duke Energy changed providers, switching fulfillment operations to AM Conservation Group (AMC) of Charleston, SC in April of 2012. The first Kentucky customers began receiving their free CFLs via the program in September of 2012.

### Operational Roles

As administered in Kentucky since that time, the current program is run as a joint effort between Duke Energy and AMC. Duke Energy provides the program's marketing and eligibility confirmation, while AMC handles bulb sourcing and packaging, fulfillment and delivery, and bulb warranty efforts.

### Program Marketing

According to the Duke Energy product manager, the explosive growth of the program in Ohio and the Carolina System shaped the program's launch in Kentucky. A primary consideration being a measured roll out that paced marketing efforts with CFL orders to ensure that bulb supply and program funds would last throughout the year without concern for turning away

interested customers after Duke Energy had dispensed all the CFLs available within the Kentucky program's budget.

As a result, the program's initial marketing efforts focused on promotions via one-time pop-up intercept messages presented when customers accessed their accounts online via Duke Energy's Online Services (OLS). This marketing channel selection provided numerous advantages: 1) it used low cost internal marketing; 2) it presented messages to a sizeable yet manageable number of self-selecting customers; 3) any word-of-mouth marketing via customers would encourage other customers to use the OLS to access their accounts. In late October of 2012, the marketing plan expanded to another low cost channel, email, which was sent to 4,339 eligible Kentucky customers who had opted in to receive such offers from Duke Energy. Additional marketing campaigns began thereafter.

Due to this phased-in approach to the program launch, during 2012 the majority (89%) of CFL participation occurred via OLS intercepts, compared to 11% of customers who responded to other marketing channels. But that percentage shifted as the other efforts gained momentum; with response tracking during 2013 showing that OLS intercepts accounted for 31% percent of customers compared to 69% other channels.

In order to more effectively market the CFLs to eligible customers not captured via the OLS, Duke Energy's energy efficiency analytics team used geodemographic PRIZM coding to classify residential customers into four segments: child-centered, cautious seniors, rural lifestyle, and wealthy lifestyle. Each segment is targeted with its own marketing plan, which often involves customized marketing collateral and sometimes different marketing channels.

For instance, to reach parents with young children, Duke Energy prepared a direct mail piece showing an image of a refrigerator covered with pictures and papers, including a prominent note for free CFLs. The marketing copy acknowledged their busy lifestyles and emphasized the convenience of ordering the CFLs at any time and receiving them at home. Rural customers received a mailer that showed an image of a street sign custom printed to display the name of the customer's road. Its marketing copy accentuated the ability to receive free CFLs no matter where you live. Sample marketing collateral may be seen in Appendix D: Sample Marketing Materials.

Likewise, Duke Energy's marketing efforts focus on different marketing channels depending upon the segment. To reach cautious seniors the marketing plan called for a print piece with a crossword puzzle theme, in which the answer to one down was "free," while eight across was "light bulbs." Meanwhile younger customers, who may be less inclined toward crossword puzzles, are reached via zip code-specific targeted messaging on Facebook and website banner advertising.

Because repeated messaging yields higher results than one-time efforts, the Duke Energy product manager works closely with Duke Energy's energy efficiency analytics group to develop and implement persistent multi-channel and multi-message marketing campaigns for each segment. A full list of marketing channels used by the program includes: bill inserts, on-bill messages, direct mail, newspaper ads, radio ads, social media and web site banner ads, mentions on the Duke Energy IVR, ads on the Duke Energy web site, and the above mentioned intercept

messages when customers access their online accounts via the Duke Energy OLS. Combinations vary depending upon the segment.

To cost-effectively reach the four customer segments, the energy efficiency analytics group also creates geographic heat maps to better target the areas where each segment congregates for living, working, shopping, and socializing (Figure 1). The heat maps are color coded to show the relative density of customers who are eligible for CFLs (Full map shown in Appendix E: Sample Marketing Heat Map). These maps help Duke Energy to not only plan direct mail and internet marketing campaigns, but also to plan for mass media efforts such as local newspaper and radio advertising. Because a portion of Duke Energy's Kentucky service territory falls within the greater Cincinnati media market these media buys occasionally dovetail with the utility's efforts to reach Ohio customers, since circulation areas and radio waves extend beyond state boundaries, as do customer commute patterns for employment and shopping.

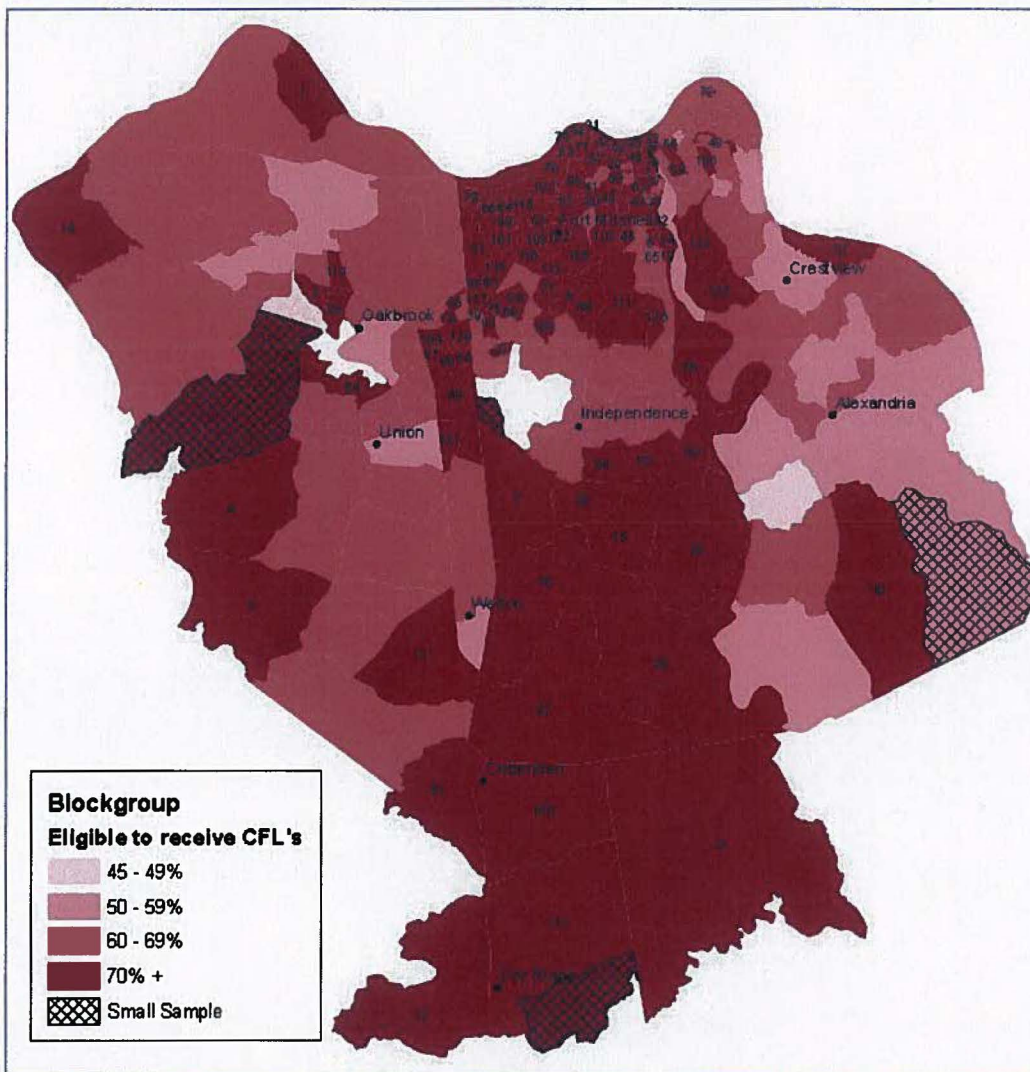


Figure 1. Marketing Heat Map

The Duke Energy product manager uses unique URLs and other tracking methods to measure response rates and CFL order numbers for each individual ad, marketing channel, and segment.



A representative sample of the program’s marketing results (Table 4) shows that offer take rate percentages range from the mid-teens to greater than 30 percent, while customers request an average of 12 CFLs per order. These healthy response rates demonstrate a strong demand for CFLs among the targeted customer groups.

**Table 4. Examples of Marketing Campaign Tracking**

Campaign Type	Date Launched	Target Customers	Target Population	# of Respondents	Take Rate	# CFLs Ordered	Average CFLs per Order
Email	10-31-12	Email Opt In	4,339	578	13.3%	6,989	12.1
Direct Mail	1-11-13	Rural	2,746	875	31.9%	10,957	12.5
Direct Mail	2-6-13	Seniors	3,214	551	17.1%	6,892	12.5
Direct Mail	2-6-13	Wealthy	3,622	798	22.0%	9,738	12.2
Direct Mail	2-6-13	Child-Centered	3,927	859	21.9%	10,648	12.4
Direct Mail	2-6-13	Rural	1,248	328	26.3%	4,211	12.8

### Order Processing

Once customers are aware of the program there are two ways that they can request the CFLs: an IVR system with a toll free number and an online ordering system. Both work similarly, although some marketing channels lend themselves more naturally to promoting one ordering system over the other. For instance, phone numbers may be more memorable than URLs via radio, while hyperlinks are more practical for online marketing.

When customers dial the toll free number they reach an interactive recording that allows them to check their eligibility. Eligibility can be checked with a Duke Energy account number, customer phone number, or the associated customer’s social security number. Once confirmed, the recording tells customers how many bulbs they can order and allows them to select the desired amount. A comparable process applies to the online version, which also presents two additional prompts: one asks customers how they learned about the program, while the other asks customers if they’d like to be notified about other Duke Energy programs.

The ordering systems don’t allow customers to request individual bulbs. CFLs must be ordered in kits consisting of a mix of 13- and 18-watt spiral standard CFLs in bundles of 3, 6, 8, 12, or 15 bulbs. The 3-packs include two 13-watt and one 18-watt CFLs. The 15-packs contain; eight 13-watt and seven 18-watt CFLs. The other size packs consist of equal numbers of each bulb type. This bundling of CFLs was instituted in order to make the fulfillment process faster and more cost-efficient by enabling AMC to pre-package various kit sizes that can be readily pulled from existing stocks for expedited shipping and handling.

### Eligibility Checking with CFL Tracker Database

Prior to completing the customers’ bulb order, all requests are checked against a database maintained by Duke Energy. This tracking system catalogs the number of CFLs sent to each customer by all Duke Energy efficiency programs that distribute CFLs. Because all the utility’s programs log information in this single system, Duke Energy can readily confirm the number of

CFLs that each account has received through various program efforts. The current total number of CFLs is then subtracted from the maximum allowance of 15 CFLs to determine the remaining number of bulbs for which that particular customer is eligible. What is more, the CFL tracking system also contains data on the number of discount coupon CFLs that the customer received. These bulbs are also deducted as the final eligibility number is calculated. So if the customer received six CFLs via coupons and requested six free CFLs via a previous order, then the customer would be eligible to receive up to three more CFLs (Figure 2). In other words, if customers qualify for a 12- or 15-pack, they can choose to take a lesser kit size (e.g. 6-pack) and get their remaining bulbs at a later time. The system is also flexible enough that if a customer is only eligible for two more CFLs (due to previous coupon redemption for example), and the smallest kit size is three CFLs, then the customer will still receive the 3-pack, and thus may receive one bonus bulb.

**FREE and Discounted Products**

1 Select FREE CFLs 2 Contact Info & Email 3 Shop Discounted Products

**Congratulations, you are eligible for FREE CFLs**

Select the number of FREE CFLs you would like from the eligible accounts below

Item/Qty	Reason/Status	Account	Mailing Address
3 CFL Bulbs	Eligible	[REDACTED]	[REDACTED]
12 CFLs Requested	Requested Date: 10-21-2010	[REDACTED]	[REDACTED]

Yes, I accept this offer. I understand that bulbs I receive must be installed at the service location that corresponds to my Duke Energy account.

No Thanks. Skip to Step 3

**Figure 2. Online Request System with CFL Tracking**

If the customers have already received the full allowance of 15 CFLs, the system reminds them of their previous orders and informs them that no more free CFLs are available. It then explains that customers are also eligible to shop for additional discounted CFLs through Duke Energy's web-based Savings Store that uses an online ordering system to sell customers discounted specialty CFLs and LEDs via a separate effort that was launched on April 26, 2013. Since the launch of the online Savings Store, the OLS pop up message has been modified to promote both the free CFL program and the discounted specialty bulbs available via the store. The free and discount programs are promoted with separate independent pop ups. The free CFL message appears once every thirty days for up to three times.

### Fulfillment

Once the eligible number of CFLs has been determined, the system prompts customers to confirm that the free bulbs will be installed at the address associated with their account (Figure

2). When the customer checks the box to agree, the system adds the new request to the pending set of CFL orders to be transferred to AMC for fulfillment.

AMC retrieves CFL orders from Duke Energy's online server each night and processes the information the next business day. AMC then prints mailing labels, prepares tracking numbers, and sorts the orders by kit size. Kits consist of the appropriate number of 13- and 18-watt CFLs and related packing materials, Duke Energy's marketing copy, and a thank you message containing information about the two year warranty on the CFLs and what to do if a bulb breaks in transit or expires in less than two years.

Service level agreements with Duke Energy allow for up to 9 days for CFL order processing, but AMC typically fulfills orders within 48 hours. AMC maintains a list of temporary employees who supplement their regular staff as needed in order to keep to the shorter turnaround time. CFL orders are batched and shipped daily via FedEx Smart Post, which makes it possible for customers to track the status of their CFL shipments online. Customers are informed that the CFLs will arrive within four to six weeks in order to manage their expectations. In reality, the entire fulfillment and shipping process generally takes less than one week. Typical delivery time for Kentucky customers is four days.

AMC also maintains a call center with a toll free number for customer assistance with ordering difficulties, shipping issues, questions regarding the use of the CFLs, or broken bulbs. If customers call to request replacement bulbs, AMC confirms that the customer did in fact order CFLs and then promptly sends a replacement without any cost to the customer.

AMC reports that call center volumes are low (typically less than 20 per day for all Duke Energy efficiency programs and service territories served by AMC). AMC works with Duke Energy to coordinate activities between their respective call centers to help ensure that customer service agents at Duke Energy and at AMC know how to handle customer inquiries and direct calls to the other call center as necessary.

AMC and Duke Energy concur that the fulfillment process operates smoothly and that orders are consistently processed in less than the allotted nine-day time frame. AMC indicates that between the Kentucky program inception on September 10, 2012 and June 30, 2013 it had shipped to Kentucky customers 52,007 CFL kits (22,493 kits in 2012 and 29,514 CFL kits in the first six months of 2013). Since the average kit size ordered by customers contains 12 CFLs this correlates with the program exceeding its goal of 500,000 CFLs for the June 2012-June 2013 fiscal year. To help ensure an adequate supply of CFLs and sufficient staffing for fast processing times, Duke Energy provides AMC with schedules for its marketing efforts and forecasts of anticipated bulb orders. Both companies agree that this type of communication has been timely and helpful.

### Working Relationships

Duke Energy and AMC work closely together to implement the EE CFL program in an effective manner. Both parties indicate they enjoy a positive working relationship. "They're very easy to work with," says the Duke Energy product manager. "If anything isn't working well, they fix it immediately." Likewise, the AMC client manager says of her counterparts at Duke Energy,

“We’ve been very impressed with their marketing efforts,” and “Duke sets high standards for its systems and processes, and everything runs very smoothly.”

Communication between the two entities occurs on both an ad hoc and scheduled basis. The team meets face to face on a quarterly basis, while emails and phone calls occur as necessary. AMC reporting tools are available online to Duke Energy at any time.

Both parties agree that AMC has consistently met or bested all service level requirements throughout the life of the program in Kentucky.

## Results

During the approximately 10 months between program inception on September 10, 2012 and the end of the fiscal year on June 30, 2013, the EE CFL program successfully provided Kentucky residential customers with 529,265 CFLs. This represents 105% of the program’s goal of 500,000 CFLs.

While the program does not have a specific participation goal, Duke Energy tracks that statistic as well. Results tallied during the same period reveal that the program had 42,027 participants, who ordered an average of 12.6 CFLs per customer.

As of June 18, 2013, the EE CFL product manager reported that CFL market penetration within Duke Energy’s Kentucky service territory had reached 30%, when considering all sources of Duke Energy CFLs, including those provided by Duke Energy’s other efficiency programs and discount coupons issued prior to the launch of this program. Such results indicate that this program is off to a solid start within its first year of operation, yet customer demand remains strong and significant market potential remains available among the more than 85,000 eligible Kentucky customers who have not yet ordered all 15 CFLs available to them (Table 5).

**Table 5. CFL Market Penetration among Duke Energy Customers in Kentucky**

# CFLs Ordered Via Any Program	Zero	1-2	3-6	7-8	9-11	12-14	15 or More	Total Eligible Customers
# Participants*	70,632	2,872	6,942	1,573	1,125	2,368	37,519	123,031
% Participants	57%	2%	6%	1%	1%	2%	30%	100%

\*Numbers as of June 18, 2013.

## Evaluation and Recommendations

Overall the EE CFL program is a well-designed program that is effectively managed to ensure that it meets its goal of promoting the adoption of CFLs by Duke Energy’s residential customers in Kentucky. Program infrastructure for eligibility checking, order processing, tracking, inventory management and fulfillment is operating smoothly. As the program has matured across all Duke Energy service territories and in Kentucky in particular, the focus has concentrated on managed growth using a combination of simple OLS pop ups and increasingly sophisticated marketing efforts to reach more customers through improved segmentation, geographic targeting,

and customized messaging. This strategy appears to be successful, and it positions the program well to adapt to a residential customer base with growing adoptions of CFLs by all segments.

In summary, the program runs well, and thus no significant changes need be recommended at this time. TecMarket Works does however encourage Duke Energy to persist in continuous improvement of the program's marketing, delivery, and customer experience elements. We also caution the program implementation team to remain vigilant to the changing marketplace, so that they remain proactive in their efforts to promote the adoption of CFLs in as prolific a manner as possible.

## Participant Surveys

This survey focused on customers who, according to program tracking records, received free CFLs through the EE CFL program. Surveys with 80 participants were completed via telephone by TecMarket Works' staff, and one partially-completed survey is included in this report for the CFL-related program questions, yielding a total of 81 survey responses.

## Program Awareness

All of the customers responding to the survey (100% of 81) recall receiving the direct mail CFLs provided by Duke Energy. This was a requirement for participation in the survey.

Participants were asked to rate the influence that various factors had on their decision to obtain CFLs through the Duke Energy CFL program on a 10-point scale where 10 indicates the factor is "very influential". As seen in Table 6, the desire to "save on utility costs" received the highest average influence rating (9.08 out of 10), significantly higher than the next-highest scores for "saving energy" (8.39) and "being environmentally responsible" (7.91; both differences  $p < .05$  using ANOVA).

"Advertising on Duke Energy's website" was also an important influence for some customers, indicated by an average score of 5.42, which is significantly higher than the influence of other types of advertising asked about (2.46 for traditional media and 2.43 for non-Duke Energy advertising; both differences  $p < .05$  using ANOVA). "Friends and family by word of mouth" also had a moderate level of influence indicated by an average score of 3.85, which is significantly higher than the ratings for "friends and family by social media" (1.69) or "friends and family by email" (1.30; both differences  $p < .05$  using ANOVA). The remaining influence scores have averages under 3.0 on a 10-point scale, indicating that these factors had little influence on customers.

The four least-influential factors received average scores of less than 2.0, and all have to do with social networking and email. The least influential factor of all is "someone you don't know personally on Facebook or Twitter", which received an average influence score of just 1.15 on a 1-to-10 scale.

**Table 6. Factors Influencing Program Participation**

	Influence Score (Total N=81)
Your desire to save on utility costs	9.08
Your desire to save energy	8.39
Your desire to be environmentally responsible	7.91
Advertising on Duke Energy's Web site	5.42
Friends or family by word of mouth	3.85
Duke Energy advertising on TV, Radio, or newspaper	2.46
Other non-Duke Energy advertising	2.43
The brand of CFLs offered by the program	2.10
Duke Energy advertising on social media sites such as Facebook	1.69
Friends or family by social media such as Facebook	1.43
Friends or family by email	1.30

Someone you don't know personally or a group that you follow on Facebook or Twitter	1.15
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Participants were asked how they first became aware of the CFL program from Duke Energy, and these results are shown in Table 7. The most-mentioned source of awareness was the Duke Energy website (37.0% or 30 out of 81), followed by mailed brochures (25.9% or 21 out of 81) and advertisements sent with utility bills (24.7% or 20 out of 81).

Only five customers (6.2% of 81 surveyed) learned about the program via email, and only one (1.2% of 81) mentioned a social networking site. Only one customer (1.2% of 81) mentioned any form of advertising other than Duke Energy's website and billing inserts (this participant learned about the program from a newspaper ad).

**Table 7. Source of Awareness of the CFL Direct Mail Program**

Category	All survey respondents (N=81)	
	N	%
Duke Energy Web Site	30	37.0%
Brochure in the mail	21	25.9%
Advertisement in my bill	20	24.7%
Friends/Family	10	12.3%
Email from Duke Energy Employee	3	3.7%
Paperless Billing Email	2	2.5%
Other (listed below)	5	6.2%
Don't know / not specified	4	4.9%

*Percentages may total to more than 100% because participants could give multiple responses.*

Five surveyed customers offered other reasons for their awareness of the program, which are listed below:

- *I learned about it on Facebook.*
- *Advertisement in The Enquirer newspaper.*
- *Duke Energy customer service via phone call.*
- *I took a class about energy efficiency.*
- *Word of mouth through my co-worker.*

## Ordering CFLs

Half of the program participants surveyed (50.6% or 41 out of 81) ordered their CFLs online from the Duke Energy website, as seen in Table 8. Mail-in cards<sup>5</sup>, the 800 telephone number and calls to customer service were also each mentioned by more than 10% of customers surveyed.

<sup>5</sup> This program did not offer mail-in cards as a means of participation.

**Table 8. Method of Ordering Program CFLs**

How did you order the CFLs?	All survey respondents (N=81)	
	N	%
Duke Energy website	41	50.6%
Mail-in card	11	13.6%
Automated 800 number	9	11.1%
Called customer service	9	11.1%
Other method (listed below)	3	3.7%
Don't know / not specified	8	9.8%

Three customers gave unique responses to this question, which are listed below.

- *A friend signed me up.*
- *My daughter contacted Duke Energy.*
- *Manufacturer's coupon<sup>6</sup>.*

As seen in Table 9, nine out of ten surveyed participants (90.1% or 73 out of 81) said they were successful at placing their order on the first attempt, while only one surveyed customer (1.2% of 81) made multiple attempts using the same method (this customer ordered their CFLs online). There was also one respondent (1.2% of 81) who said that a friend of theirs had placed the order for them, and was successful on the first attempt. None of the surveyed customers (0% of 81) said they attempted more than one method. The remaining six respondents (7.4% of 81) could not recall or did not answer the question.

**Table 9. Level of Success in Ordering CFLs**

Which statement best describes the level of success you had in completing your order for CFLs?	All survey respondents (N=81)	
	N	%
Successful at placing the order on the first attempt	73	90.1%
Friend was successful at placing the order on the first attempt on behalf of customer	1	1.2%
Had to make more than one attempt using the same method	1	1.2%
Made more than one attempt using different methods	0	0.0%
Don't know / not specified	6	7.4%

Surveyed customers were also asked to rate the likelihood that they would order discounted CFL light bulbs through four different channels on a 10-point scale; these results are shown in Table 10. The most highly rated channels are a manufacturer's coupon (average rating 7.74) and direct mail (7.51), followed by retailer coupons (6.94) and an online store (5.46).

<sup>6</sup> There were no coupons offered through this program, so this customer is mistaken.



**Table 10. Likelihood of Ordering Discounted CFLs Through Various Channels**

Please rate your likelihood of participating in a CFL program that offers . . .	All survey respondents	
	Valid N	Average Rating
Discounted CFLs through a manufacturer's coupon that can be used in any store where that brand is sold	80	7.74
Discounted CFLs sent by direct mail to your home	79	7.51
Discounted CFLs through a retailer or store coupon	81	6.94
Discounted CFLs through an online vendor such as Amazon.com	80	5.46

## Reasons for Participation

Phone survey participants were asked for the reasons that made them decide to take advantage of the CFL offer from Duke Energy. The distribution of answers is shown in Table 11 in order of most to least frequently mentioned reasons. The most frequent reason given for signing up for the CFL offer was “because it was free”, mentioned by 60.5% (49 out of 81), followed by nearly half of participants surveyed mentioning “to save energy” (45.7% or 37 out of 81). Interestingly, while “saving money on utility bills” was the most highly-rated influence customers reported on joining the program (see Table 6), it was only the third-most mentioned reason for joining (22.2% or 18 out of 81).

**Table 11. Reasons for Participation in the CFL Direct Mail Program**

Category	All survey respondents (N=81)	
	N	%
Because it was free	49	60.5%
To save energy	37	45.7%
To save money	18	22.2%
Needed light bulbs	17	21.0%
CFLs last longer	10	12.3%
To try CFL	8	9.9%
Convenience	3	3.7%
Past experience / “I like CFLs”	3	3.7%
It was environmentally correct	2	2.5%
Want all CFLs in my house	1	1.2%
Don't know	1	1.2%

*Percentages may total to more than 100% because participants could give multiple responses.*

## Participants Promoting the Program

TecMarket Works asked surveyed program participants if they had told anyone about the CFL program and, if so, how many people they told and how they told them. As shown in Table 12, a large majority of 85.2% (69 out of 81) reported telling others about the program.

**Table 12. Participants who Told Others About the Program**

Did you tell others about the CFL program?	All survey respondents (N=81)	
	N	%
Yes	69	85.2%
No	11	13.6%
Don't Know	1	1.2%

Table 13 shows who participants told about the program, including how many people they told by category. Most participants (61.7% or 50 out of 81) told family members about the free CFLs from Duke Energy, with friends (32.1% or 26 out of 81) and co-workers (21.0% or 17 out of 81) being the next most mentioned groups they talked to about the program. Overall, participants told an average of 4.5 other people about the program, and nearly half of these (2.2 per respondent) were family members.

**Table 13. Type and Number of People Told About the CFL Program**

Who did you tell about the CFL program?	All survey respondents (N=81)			
	N	%	# of People Told	Average Told per Respondent
Family	50	61.7%	178	2.2
Friends	26	32.1%	82	1.0
Co-Workers	17	21.0%	74	0.9
Neighbors	7	8.6%	22	0.3
Other	2	2.5%	7	0.1
None of the above	12	14.8%	0	0.0
<b>Total:</b>			<b>363</b>	<b>4.5</b>

*Percentages may total to more than 100% because participants could give multiple responses.*

As seen in Table 14, word of mouth (97.1% or 67 out of 69) was overwhelmingly the most prevalent means for participants to tell others about the program. Only a very small percentage used email or other electronic methods.

**Table 14. Methods of Communication about the Program**

How did you tell others about the program?	Respondents who told someone about the program (N=69)	
	N	%
Word of mouth	67	97.1%
Email	2	2.9%
Facebook	1	1.4%
Text message	1	1.4%
Twitter	0	0.0%
Web site forum	0	0.0%

*Percentages may total to more than 100% because participants could give multiple responses.*

### Perception of Reasons for the Program

TecMarket Works asked participants to state the reason or reasons why they believe Duke Energy is providing free CFLs to its customers. The most cited reasons why customers believe Duke Energy is providing this program are “economic reasons” (29.6% or 24 out of 81) and “to save customers money” (24.7% or 20 out of 81). All answers given are summarized below in Table 15.

**Table 15. Reasons Customers Believe Duke Energy Provides Free CFLs**

Reason	All Surveyed Participants (N=81)	
	N	%
Duke Energy wants to save energy for economic reasons	24	29.6%
Duke Energy wants to save their customers money	20	24.7%
Duke Energy wants to save energy for environmental reasons	17	21.0%
To promote CFL usage / help customers “get used to” CFLs	12	14.8%
To raise awareness of energy efficiency / educate customers about energy efficiency / change behavior to be more efficient	8	9.9%
The government is forcing Duke Energy to do this	8	9.9%
Duke Energy has a financial interest in light bulb manufacturing (owns stock / sells bulbs)	7	8.6%
Duke Energy wants to save energy / reduce electrical demand / lessen strain on grid	7	8.6%
To provide good customer service / increase customer satisfaction	3	3.7%
Duke Energy wants to look good / appear responsible	2	2.5%
Duke Energy is getting a tax benefit from the government	1	1.2%
To avoid building new power plants	1	1.2%
None of the above / don't know / not specified	12	14.8%

*Percentages may total to more than 100% because participants could give multiple responses.*

## Prior CFL and LED Use

Survey respondents were asked if they had any CFL or LED bulbs installed before receiving their free CFLs from Duke Energy, and how long they have been using each type of bulb.<sup>7</sup>

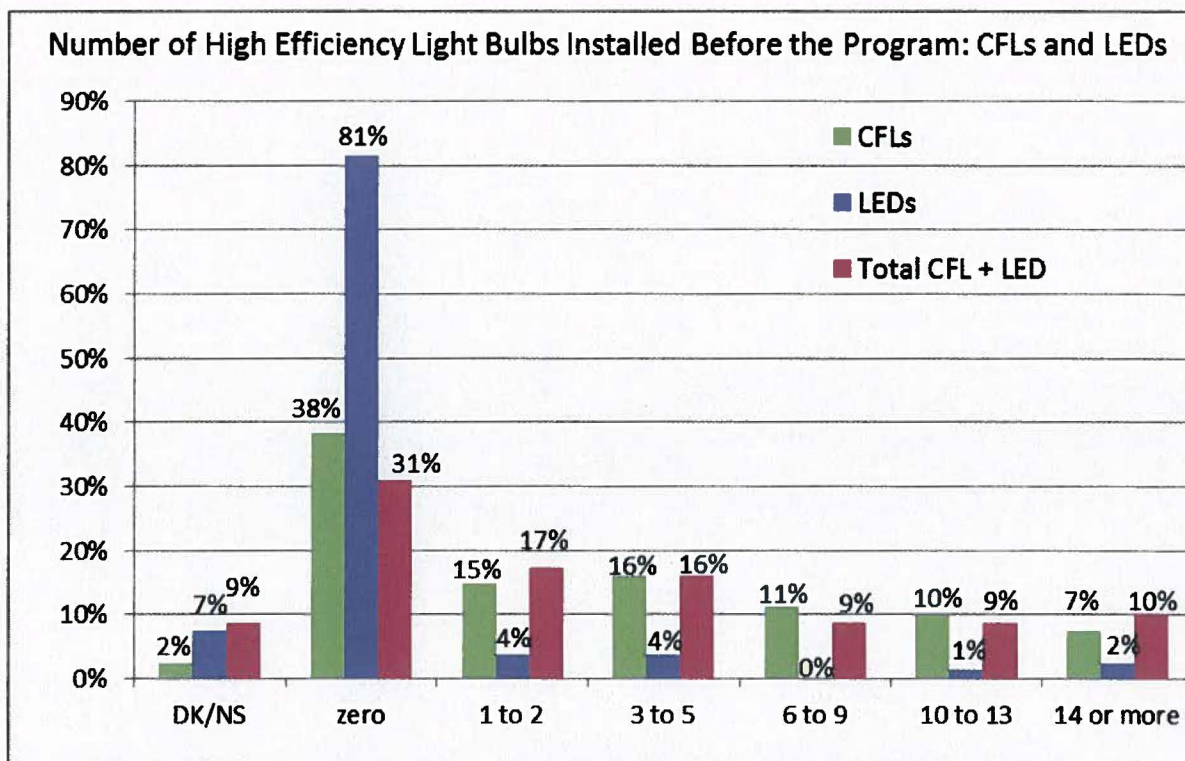
As seen in Table 16 below, most customers surveyed had CFLs installed in their homes before participating in this program (60.5% or 49 out of 81), though only 11.1% (9 out of 81) had LEDs installed before the program. Among the 49 respondents with CFLs installed before the program, the average number of CFL bulbs installed was 7.1. Among the nine respondents with LEDs installed before the program, the average number of LED bulbs installed was 6.1.

**Table 16. CFLs and LEDs Installed Before the Program**

EE Bulbs Installed Before Participating in the Program	All Surveyed Participants (N=81)	
	N	%
Had CFLs installed before the program	49	60.5%
Did not have CFLs installed before the program	31	38.3%
Don't know if had CFLs installed before the program	1	1.2%
<b>Average number of CFLs installed before the program (among only those customers who had CFLs installed):</b>	<b>7.1</b>	
Had LEDs installed before the program	9	11.1%
Did not have LEDs installed before the program	66	81.5%
Don't know if had LEDs installed before the program	6	7.4%
<b>Average number of LEDs installed before the program (among only those customers who had LEDs installed):</b>	<b>6.1</b>	

Figure 3 shows the distribution of high efficiency bulbs installed in participant households before they received free CFLs from the Duke Energy direct mail program. Only 9.9% (8 out of 81) of these customers had 14 or more efficient bulbs (combined LED and CFL) before receiving CFLs from Duke Energy, while 64.2% (52 out of 81) had fewer than five efficient bulbs (combined CFL and LED) installed. Across all surveyed respondents who were able to state the number of CFL and LED bulbs they had installed, the mean number of high efficiency bulbs installed before the program was 5.0 (4.3 CFL plus 0.7 LED), though the median number of efficient bulbs was only two per household (2 CFL plus 0 LED).

<sup>7</sup> This program does not offer LED bulbs to customers, however since LED bulbs are at least as efficient as CFL bulbs, prior installation of both types of efficient bulbs are now being used to calculate freeridership.



**Figure 3. Distribution of CFLs and LEDs Installed Before the Program (N=81)**

Table 17 and Table 18 show how long surveyed customers have been using CFL and LED bulbs. A third (33.3% or 27 out of 81) of participants had never used CFL bulbs before they were provided by this program from Duke Energy, although another third (33.3% or 27 out of 81) have been using CFLs for three years or longer. Among the nine customers with LED bulbs installed before the program, most (66.7% or 6 out of 9) have been using LEDs for more than two years, and only one (11.1% of 9) began using LEDs within the past year.

**Table 17. Length of Time Using CFL Bulbs**

How many years have you been using CFLs?	All Surveyed Participants (N=81)	
	N	%
4 years or more	19	23.5%
3 to 4 years	8	9.9%
2 to 3 years	9	11.1%
1 to 2 years	10	12.3%
1 year or less	6	7.4%
Never used until now (first time user)	27	33.3%
Don't know / not specified	2	2.5%

**Table 18. Length of Time Using LED Bulbs**

How many years have you been using LEDs?	All Surveyed Participants (N=81)	
	N	%
4 years or more	3	3.7%
3 to 4 years	1	1.2%
2 to 3 years	2	2.5%
1 to 2 years	2	2.5%
1 year or less	0	0.0%
Never used until now (first time user)	1	1.2%
Have never used LEDs	72	88.9%
Don't know / not specified	0	0.0%

Customers with LED bulbs installed before the program were also asked where they got their LED bulbs. Most respondents (77.8% or 7 out of 9) purchased their LEDs from a store; these responses are shown below in Table 19.

**Table 19. Source of Pre-Program LED Bulbs**

Where did you get your LEDs?	All Participants with LEDs Installed Before the Program (N=9)	
	N	%
Purchased from a store (total)	7	77.8%
Home Depot	2	22.2%
Wal-Mart	1	11.1%
Home Depot or Wal-Mart	1	11.1%
Lowe's	1	11.1%
The Light Bulb Shop	1	11.1%
Amazon.com	1	11.1%
Electrician installed during remodeling	1	11.1%
Gift from relative (lamp with bulb already installed)	1	11.1%

### Spare LED Bulbs in Storage

Customers with LED bulbs installed before the program were also asked if they currently had any additional LED bulbs in storage for future use. Seven out of nine (77.8%) did not have any spare LED bulbs in storage, while one participant had one LED in storage, and the other participant had two LEDs in storage, for an average of 0.3 spare LED bulbs per household with LEDs installed before the program.

### Purchase Intentions before the Program

Customers who participated in the survey were asked if they were intending to purchase CFL or LED light bulbs before they participated in the Duke Energy direct mail CFL program. As seen in Table 20, 56.8% (46 out of 81) of customers surveyed already intended to purchase CFLs before the program, and 8.6% (7 out of 81) intended to purchase LED bulbs.

Interestingly, most of the customers who intended to buy LEDs (71.4% or 5 out of 7) did not intend to buy any CFLs. Out of 24 customers surveyed who were not intending to purchase CFLs before the program, 20.8% (5 out of 24) were intending to purchase LEDs. There were only two customers surveyed (2.5% of 81) who intended to buy both CFLs and LEDs, while 19 customers (23.5% of 81) had no intentions of buying either type of high efficiency bulb before the program.

**Table 20. Intentions to Purchase Efficient Light Bulbs before the Program (N=81)**

Were you planning on buying CFLs before the program?	Where you planning on buying LEDs before the program?					CFL (row) totals	CFL (row) percent
	Yes	No	Maybe	No, already installed in all sockets	Don't know		
Yes	2	42	2	0	0	46	56.8%
No	5	19	0	0	0	24	29.6%
Maybe	0	7	1	0	1	9	11.1%
No, already installed in all sockets	0	1	0	0	0	1	1.2%
Don't know	0	1	0	0	0	1	1.2%
<b>LED (column) totals</b>	<b>7</b>	<b>70</b>	<b>3</b>	<b>0</b>	<b>1</b>		
<b>LED (column) percent</b>	<b>8.6%</b>	<b>86.4%</b>	<b>3.7%</b>	<b>0.0%</b>	<b>1.2%</b>		

Customers were also asked what they would have done if the program had not been available: purchase the same amount of CFLs at the same time, purchase fewer at the same time, purchase the CFLs at a later time, or not purchase any CFLs at all. As seen in Table 21, only three surveyed respondents (3.7% of 81) said they would have purchased the same amount of CFLs at the same time, while 19.8% (16 out of 81) would not have purchased any CFLs without the program.

**Table 21. Purchase Intention in the Absence of the Program**

If the CFL direct shipment program had not been available, would you have . . .	All Participants (N=81)	
	N	%
Purchased the same amount at the same time	3	3.7%
Purchased fewer CFLs at the same time	29	35.8%
Purchased the CFLs at a later time	33	40.7%
Would not have purchased any CFLs	16	19.8%

Customers who said they would have purchased fewer bulbs at the same time were asked how many fewer. These results are shown in Table 22; three-quarters (75.9% or 22 out of 29) would have bought at least six fewer bulbs than were provided by the program.

**Table 22. Customers Who Would Have Purchased Fewer Bulbs at the Same Time in the Absence of the Program**

Purchased fewer CFLs at the same time: How many?	All Participants Who Would Have Purchased Fewer CFLs at the Same Time (N=29)	
	N	%
Would have purchased <i>more</i> CFLs at the same time	1	3.4%
Would have purchased the same amount of CFLs	0	0.0%
Would have purchased 1 to 5 fewer CFLs	5	17.2%
Would have purchased 6 to 10 fewer CFLs	13	44.8%
Would have purchased 11 or more fewer CFLs	9	31.0%
Don't know	1	3.4%

Customers who said they would have delayed their purchase of bulbs without the program were asked how many bulbs they would have purchased, and when. Table 23 indicates that 21.2% (7 out of 33) of customers would have purchased at least the same amount of bulbs (or more) at a later date, though the most frequent responses were more than 11 bulbs fewer than provided by the program<sup>8</sup> (42.4% or 14 out of 33).

**Table 23. Number of Bulbs Customers Would Have Purchased at a Later Time in the Absence of the Program**

Purchased CFLs at a later time: How many?	All Participants Who Would Have Purchased CFLs at a Later Time (N=33)	
	N	%
Would have purchased more CFLs	2	6.1%
Would have purchased the same amount of CFLs	5	15.2%
Would have purchased 1 to 5 fewer CFLs	7	21.2%
Would have purchased 6 to 10 fewer CFLs	4	12.1%
Would have purchased 11 or more fewer CFLs	14	42.4%
Don't know	1	3.0%

Few surveyed customers would have delayed their bulb purchases for more than a year; though a large percentage (36.4% or 12 out of 33) do not know when they would have purchased bulbs in the absence of the program. A similar number (36.4% or 12 out of 33) would have delayed their purchases for less than six months, while 15.2% (5 out of 33) would only plan to purchase new bulbs as the old ones burn out.

<sup>8</sup> Some customers said they would purchase bulbs "one at a time, as needed". For Table 23, this response was counted as "one bulb" for calculating the difference between bulbs intended to be purchased and bulbs provided by the program.



**Table 24. Timeframe of When Customers Would Have Purchased Bulbs at a Later Time in the Absence of the Program**

Purchased CFLs at a later time: When?	All Participants Who Would Have Purchased CFLs at a Later Time (N=33)	
	N	%
Within the next 6 months or so	12	36.4%
6 months to a year later	2	6.1%
More than a year later	2	6.1%
As needed / when other bulbs burn out	5	15.2%
Don't know	12	36.4%

### Eligible Number of CFLs vs. Number of CFLs Ordered

At least 84.0% of customers surveyed (68 out of 81) ordered all of the bulbs they were eligible to order, with another 6.2% (5 out of 81) ordering fewer than they were eligible for, and 9.9% (8 out of 81) not being sure. Most customers (63.0% or 51 out of 81) received 15 CFL bulbs<sup>9</sup> through this program.

In total, these 81 customers received 1001 CFL bulbs from the Duke Energy direct mail program, which is an average of 12.4 CFLs per household.

**Table 25. Number of CFLs Ordered and Received**

Number of CFLs Ordered and Received	All Surveyed Participants (N=81)	
	N	%
Ordered all eligible bulbs	68	84.0%
Ordered fewer bulbs than eligible for	5	6.2%
Not sure if ordered all eligible bulbs or not	8	9.9%
Received 15 CFLs	51	63.0%
Received 12 CFLs	11	13.6%
Received 8 CFLs	4	4.9%
Received 6 CFLs	9	11.1%
Received 3 CFLs	6	7.4%

The five customers (6.2% of 81) who said they ordered fewer CFLs than they were eligible for were asked why they did so. These responses are categorized and listed below.

**Don't need that many bulbs / don't want to store extras (N=3)**

- *I didn't want to be a hog and consume more than I needed.*

<sup>9</sup> Seventy-eight out of 81 survey participants (96.3%) confirmed that they had received the same number of bulbs as indicated by Duke Energy's program records. Two participants said they received more bulbs than records indicated (one said they received 8 bulbs and the other 12 bulbs, though program records indicated both had received only 6 bulbs). One participant who program records show received 15 bulbs was not sure if that number was accurate or not. The reported total of 1001 program-distributed CFL bulbs, and distribution of bulbs shown in Table 18, includes the corrected totals for the two participants who told us that they had received more bulbs than program records indicated.

- *I had no need for additional bulbs.*
- *We didn't need that many on hand, and didn't want to store them.*

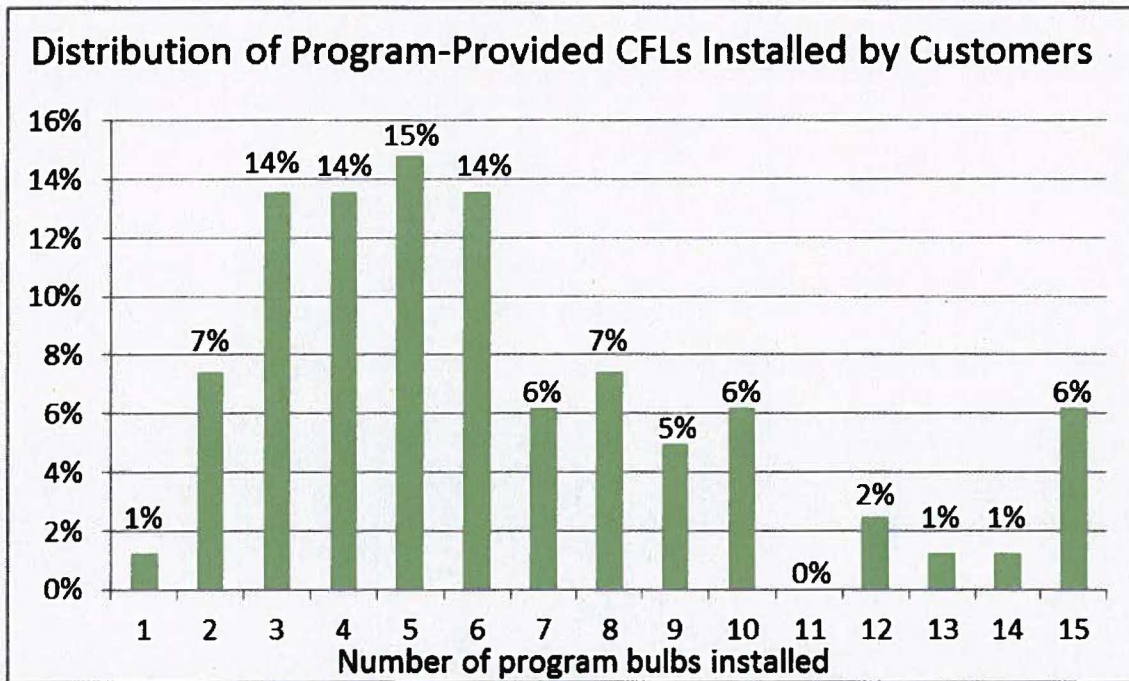
**Unique reasons (N=2)**

- *I just wanted to try CFLs.*
- *I received a pop-up notice on the Duke website discouraging me from ordering all of the bulbs.<sup>10</sup>*

**Program CFL Self-Reported Installation**

TecMarket Works asked all survey respondents how many of the CFLs they obtained through the program have been installed so far. Out of 1001 bulbs distributed through this program to the 81 surveyed customers, 511 have been installed (51.0% of 1001), for an average of 6.3 program-provided CFL bulbs installed per household.

All of the surveyed respondents (100% of 81) have installed at least one of the CFLs provided by the program, and half (49.4% or 40 out of 81) have installed six or more bulbs. The distribution of program CFLs installed by surveyed customers is shown below in Figure 4.



**Figure 4. Distribution of Program-Provided CFLs Installed by Customers (N=81)**

<sup>10</sup> In fact, there is no pop-up messaging on the Duke Energy website discouraging customers from ordering all of the bulbs that they are eligible for.

### Program CFL Removal

Of the 81 participants surveyed who installed CFLs provided by the program, 18.5% (15 out of 81) indicated that they have subsequently removed at least one program CFL from a working socket. These fifteen customers uninstalled a total of 37 program-provided bulbs, or an average of 2.5 bulbs per household that uninstalled program bulbs (none of these customers removed all of the program bulbs that they had installed). As a percentage of program bulbs installed, 7.3% (37 out of 508) have since been uninstalled.

The 15 customers who uninstalled program-provided CFLs were asked the reasons why they did so, which are shown in Table 26. The most common reasons were that the bulbs burned out (46.7% or 7 out of 15) and that the bulbs that didn't work properly (26.7% or 4 out of 15).

**Table 26. Reasons for Uninstalling Program-Provided CFLs**

Why did you uninstall the CFL(s)?	All Participants who Uninstalled Program-Provided CFLs (N=15)	
	N	%
Burned out	7	46.7%
Not working properly	4	26.7%
Not bright enough	3	20.0%
Does not work with dimmer switch	2	13.3%
Does not fit in light fixture	2	13.3%
Do not like color of light	1	6.7%
Too slow to start	1	6.7%

*Percentages may total to more than 100% because participants could give multiple responses.*

### Unused Program CFLs

About one customer in five (19.8% or 16 out of 81) has installed all of the program bulbs they received, and virtually all of the rest of the customers surveyed have stored their remaining bulbs (79.0% or 64 out of 81). There was only one participant surveyed (1.2% of 81) who gave away program bulbs (four of fifteen bulbs they received were given to their parents), and none of the customers in this survey said that they threw away or recycled any program bulbs.

**Table 27. Program CFLs That Have Not Been Installed Yet**

What have you done with the remaining CFLs that were not installed?	All Surveyed Participants (N=81)	
	N	%
Put them in storage	64	79.0%
Gave them away	1	1.2%
Have installed all bulbs	16	19.8%

Nearly three-quarters (71.9% or 46 out of 64) of participants with spare program CFLs in storage believe that they will install all of their bulbs in the next year, as seen in Table 28. Only about one participant in ten (9.4% or 6 out of 64) with spare bulbs believes he will not use all of his program CFLs in the next year.