LARGE FILING SEPARATOR SHEET

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VOL 2 CONT.

Track light bulbs	2	3%
Recessed bulbs	1	1%
Bulbs that brighten quicker	1	1%
Shorter bulbs	1	1%
Long thin kitchen lights	1	1%
LEDs to replace HIDs	1	1%

Other Energy Efficiency Products Desired

In addition to asking about other types of bulbs that the program might provide, we also inquired about other energy efficient products that property managers would like to have for the units that they manage. Among the products suggested, 29% requested weather stripping (20 requests), 19% wanted programmable thermostats (13), and 16% asked for water heater blankets (11). A full listing is included in theTable 14.

Table 14. Additional Energy Efficient Products to Consider Providing

Desired Product	Number of Requests	Percent of Respondents
Weather stripping	20	29%
Programmable thermostats	13	19%
Water heater blankets	11	16%
DK/NS	10	14%
No	10	14%
Door sweeps	9	13%
Powerstrips	4	6%
Low flow toilets	3	4%
Low flow shower heads	2	3%
Faucet aerators	2	3%
Motion detection lights	2	3%
Energy Star appliances	2	3%
Window replacement incentives	2	3%
HVAC	2	3%
Digital, not programmable thermostats	2	3%
Lighting timers	1	1%
Tinted window films	1	1%
Rebates for wall mounted heat pumps	1	1%
Additional attic insulation	1	1%
Common area bulbs	1	1%
Window strips	1	1%
Water heater timers	1	1%
Furnace filters	1	1%
Foam insultators for wall sockets	1	1%
Pilot for peak monitoring units	1	1%

Benefits of Participation

This program is specifically designed to benefit residential tenants by providing them with energy efficient light bulbs and resulting savings on their energy bills. The benefits to property managers are less immediate, so we asked them to help us identify those benefits that they found to be most direct.

Among those we spoke with, 42% felt that the program helped to improve their tenant relations, 39% felt that it improved their image by helping tenants to save money, and 33% felt it helped the company image by doing something positive for the environment. Only 14% felt that installing the CFLs actually helped them to attract new tenants, but those that did used the program to their advantage by advertising their energy efficiency efforts. One property used the bulb installs to help with LEED certification, and another used its participation to garner extra credibility with HUD and investors. Some used the installs as an opportunity to increase resident engagement with contests and parties, while others were simply pleased with reduced costs on bulb purchases and decreased requests for bulb replacement.

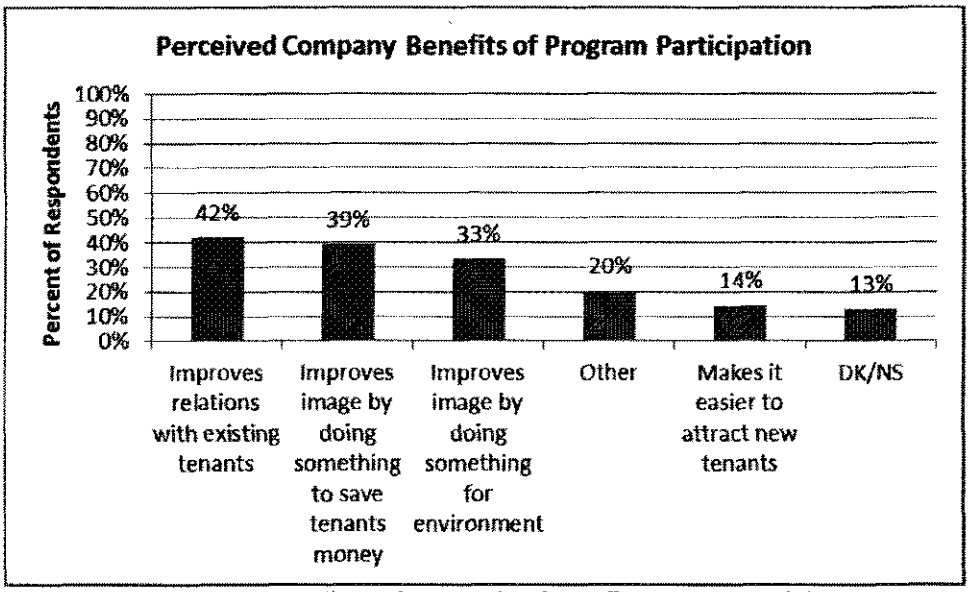

Figure 8. Perceived Benefits to Properties from Program Participation

When asked about their perceptions of tenant benefits (see Figure 9), 64% of respondents cited lower monthly bills, while 28% indicated that tenants saved money by not needing to purchase bulbs, this later percentage likely being reported by properties with policies requiring tenants to supply their own light bulbs. An additional three people (4%) gave other responses to this question. While not necessarily in context to the question, they are noted here for completeness.

- Good for the environment
- Less maintenance for light bulb replacement
- Some people say the lights too bright

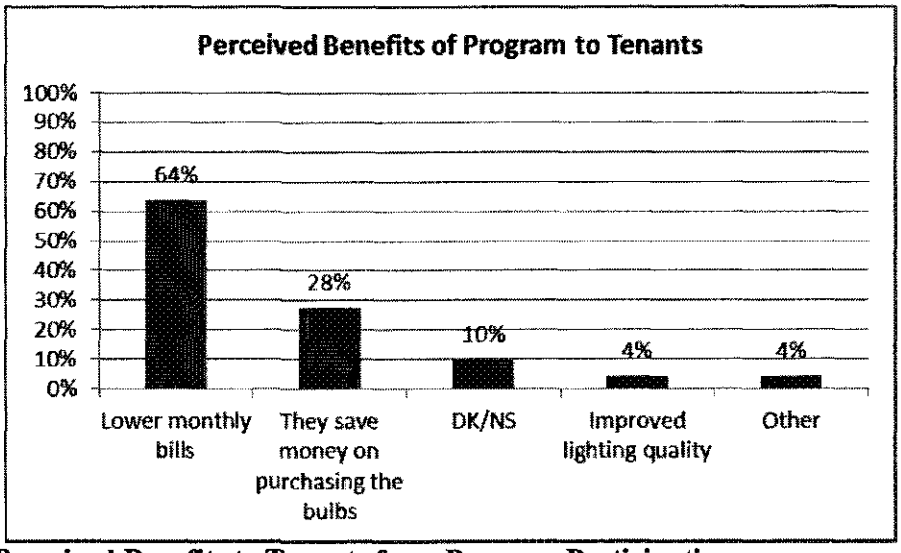

Figure 9. Perceived Benefits to Tenants from Program Participation

Customer Satisfaction with the Program

Property managers indicated a high level of satisfaction with the program. Among all program participants the mean satisfaction score was 8.7 on a scale of 1 to 10 with 1 meaning they were very unsatisfied and 10 meaning they were very satisfied. Seventy two percent of property managers rated the program as a 9 or 10.

When analyzed by state, Ohio participants reported a mean satisfaction score of 8.6 on the same scale with 62% rating the program a 9 or 10. North Carolina property managers reported a mean satisfaction score of 8.7 with 74% rating the program a 9 or 10. South Carolina participants reported a mean satisfaction score of 8.8 with 72% rating it a 9 or 10. Overall and state-by-state satisfaction scores are shown in the figures below.

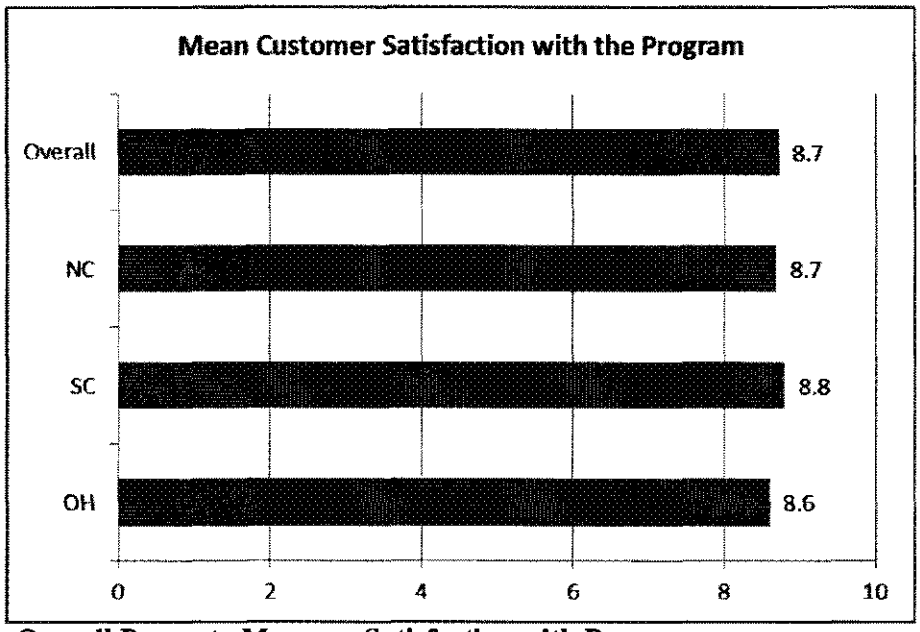

Figure 10. Overall Property Manager Satisfaction with Program

The following are the reasons given by participants for program satisfaction scores of 8 or less.

Table 15. Reasons for Satisfaction Ratings of 8 or Less

Reason for Score of 8 or Less	Frequency of Response
Too much labor involved	7
Need better communication	3
Tenants don't like bulbs	3
Bulbs burn out too quickly	2
Have not seen cost savings	2
Wanted more flexibility for the install time	1
Where do you put the 2400 light bulbs you take out?	1

Verbatim responses are shown below:

- "It was a pain due to communication, but it did positively introduce CFLs to people. Have not seen savings in bills."
- "Need better communication."
- "Bulbs are not energy efficient if off and on. Not everyone likes that kind of bulb."
- "Because of the high labor involvement."
- "Took too long, tenants didn't like the bulbs. Bulbs burn out very fast."
- "It took too much time to do the installs."
- "Wanted more flexibility for the install time."
- "Took too long to do bulbs installs, shape and light quality is a question."

- "It was too inconvenient. Why don't you put in the bulbs yourself? Where do you put the 2400 light bulbs you take out?"
- "Bulbs don't last. Took too much time and effort for too little return."

For the state of Ohio we also used a second approach for ascertaining customer satisfaction by asking the following question: If you were rating your overall satisfaction with the CFL Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied? Of the five survey respondents, three people (60%) were very satisfied, one person was somewhat satisfied (20%), and one respondent declined to state (20%). The distribution of scores is shown in the figure below.

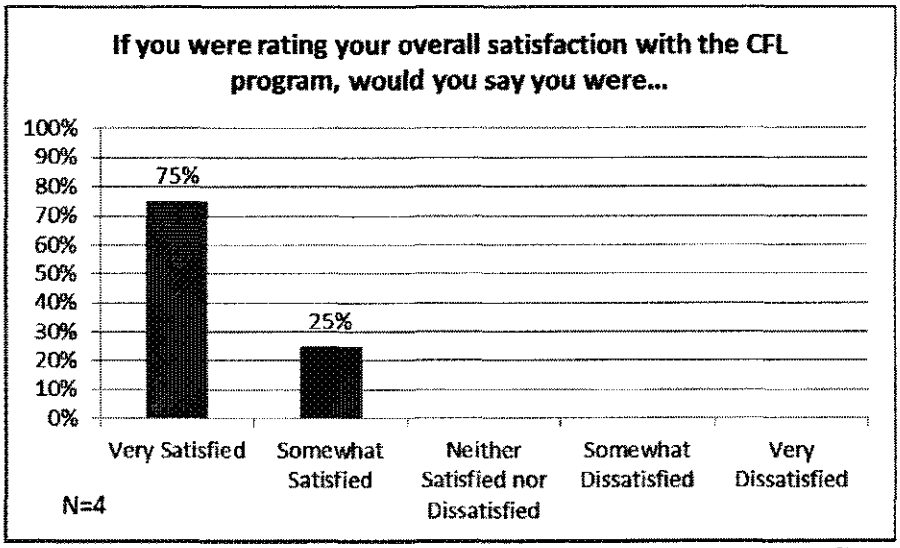

Figure 11. Ohio-Specific Satisfaction with the Property Manager CFL Program Using Verbal Scale

The following are the verbatim responses from the four Ohio participants who answered this survey question.

Rating	Verbatim Response
Very Satisfied	Free bulbs!
Very Satisfied	It's easy to do and a no brainer. 1500 bulbs for $130 is a great deal. Plus it lets us show people we are going green.
Very Satisfied	Going through the program was a bit of a pain. We tried to be accurate on paperwork. The return for us was minor. The residents gave us five minutes good will and then asked for other things.
Somewhat Satisfied	I had a few questions that never got answered. A few extra bulbs would be nice. I wanted more time to do the installs.

Customer Satisfaction with Duke Energy

To assess participants' satisfaction with Duke Energy, respondents were asked to rate their satisfaction with Duke Energy on a 1-to-10 scale with 1 being very dissatisfied and 10 being very satisfied. Their combined scores generated an average satisfaction of 7.8, with half (50%) of respondents rating Duke Energy with a 9 or 10.

When considered state by state, Ohio participants reported a mean satisfaction score of 8.6 on the same scale with 60% rating their satisfaction with Duke Energy a 9 or 10. North Carolina property managers reported a mean satisfaction score of 8.0 with 49% rating Duke Energy a 9 or 10. South Carolina participants reported a mean satisfaction score of 7.7 with 58% rating Duke Energy overall a 9 or 10. Overall satisfaction and state-by-state satisfaction scores are presented in the figures below.

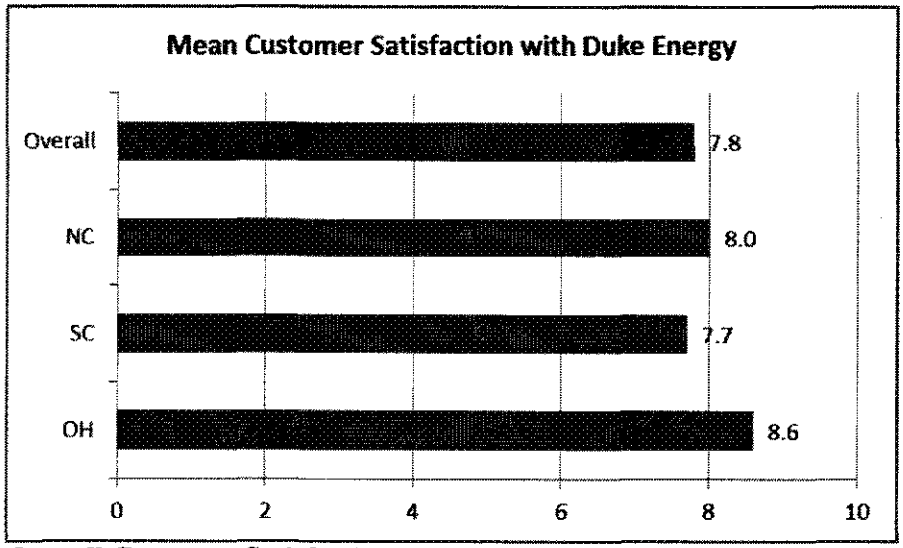

Figure 12. Overall Customer Satisfaction with Duke Energy on a 1 to 10 Scale

The following are the reasons for participants reporting lower (score of 8 or less) satisfaction scores with the program.

Table 16. Reasons for Satisfaction Ratings of 8 or Less

Reason for Score of 8 or Less	Frequency of Response
High rates	7
Overall customer service (not this CFL program)	6
Poor support for property managers such as power off/on, account changes, timely meter reading, tax id changes, etc. (not specifically this CFL program)	6
Credit requirements for tenants	2
Poor property manager web interface	1
Power reliability	1

Property Manager Suggestions for Improvement

Throughout the interview process the property managers that we spoke with offered suggestions for changes to program. In addition to the recommendations noted earlier in this report, we have cataloged the following additional suggestions.

Checklists and Documentation

- "I didn't know about the checklist spreadsheet until later. So we had to go back and fill it out. That was a pain. Make sure everyone knows about in advance."
- "The check sheets did not include a spot for closets."
- "I don't quite know how to say this, but maintenance guys are not very good at counting bulbs and filling out paperwork. At least not accurately. So it took a lot of my time to repeatedly count the bulbs during ordering, shipping, installing, inspecting, and returning them. Anything to cut down on that would be a big help."
- "The spreadsheets are painful. The less we need to fill out the better, but if you want us to fill something out, then explain why you need to know the number of bulbs in each area. Better explanations will make people more apt to take the forms seriously."
- "Skip all the spreadsheet forms and create an app for the iPad. Then we can enter the data and send it directly to you."

Bulbs

- "Give us bulbs for common areas, our offices, etc. The lights stay on longer in those areas so they'll accrue more energy savings."
- "Provide a greater variety of bulbs types and wattages, such as candelabra bulbs for ceiling fans, outdoor bulbs, shorter bulbs, Hollywood bulbs, etc."
- "People don't want bulbs made in China because they are worried about risk of mercury from faulty bulbs. Stay away from Chinese bulbs."
- "Make it standard practice to provide a small percentage of extra bulbs in case some blow out."
- "You need to provide bags or kits for broken bulbs. Getting rid of them may be no problem in Charlotte, but for those of us in remote areas the nearest recycling point is 40 miles away. So all broken bulbs go into the trash and landfill."

Other

- "Send a Duke representative to do the installs. We can send one too and they can work together."
- "Bigger boxes with more bulbs per box, so there is less individual light bulb packaging overall."
- "Faster shipping."
- "Free shipping."
- "Better communication from Duke and Honeywell."
- "Look at turnover ratio and if it's high enough allow them to do the installs when units change."

- "You might have better luck targeting newer properties since the maintenance teams will be less busy than at older properties."
- "We would like to have a display from Duke that explains the benefits of the bulbs in our office."
- "Keep providing participation certificates. Our owner uses the one we received in presentations. It's helped us during presentations at HUD and with investors for new properties."

Tenant Survey Results

Between April 18 and May 23, 2012 TecMarket Works called 872 tenants from a pool of 1,484 program participants in the state of Ohio and completed 45 phone surveys[5]. The effort had a 5% completion rate and an overall sample rate of 3%. Tenants were contacted a maximum of four times or until the contact resulted in a completed survey or refusal to complete the survey. The survey instrument can be found in Appendix C: Tenant Survey Instrument.

CFL Installs

Number of CFLs Now Installed

As seen in Figure 13 below, tenants reported that they now have between two and 14 CFLs installed in the permanent fixtures of their homes for an average of 10.2 bulbs per household. The most frequency cited number of bulbs was 12 CFLs, which had 9 respondents (11%), followed by 6 CFLs (7%). The average number of permanent fixtures with CFLs is 7.8.

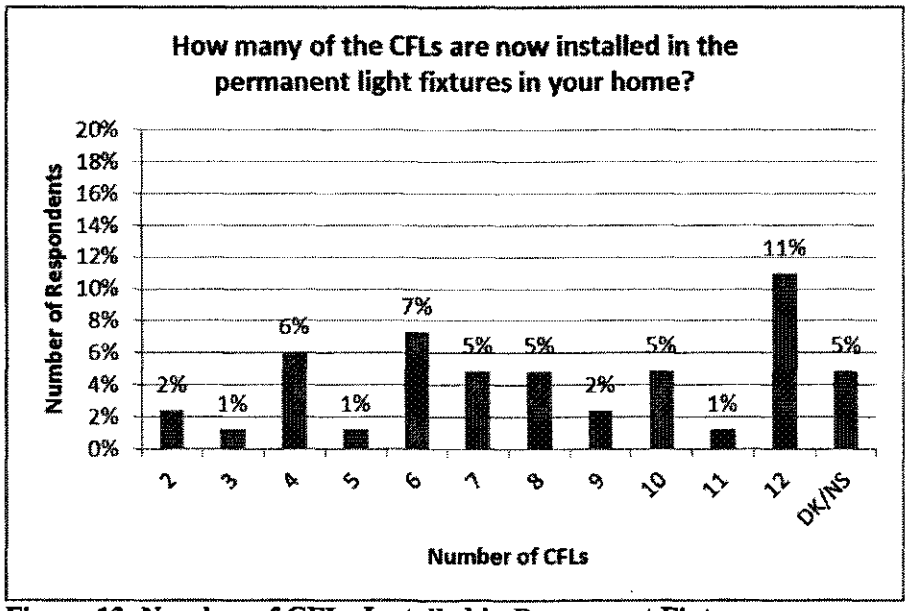

Figure 13. Number of CFLs Installed in Permanent Fixtures

Location of New CFLs

When asked in what rooms the first three bulbs were replaced, respondents indicated that kitchens were the most common room type with 27 responses (60%). Bathrooms placed second with 20 respondents (44%). [Note that this finding about bathroom lighting appears to be incongruent with property manager interviews in which a sizeable number of respondents reported NOT installing CFLs in bathroom vanities.] Master bedrooms (18, 40%) and living room or family room (17, 38%) rounded out the top 4 most common rooms mentioned. Figure 14 shows the full range of responses.

[5] The pool of participants that TMW was able to call was reduced from 1,484 to 872 due to many of the phone numbers being for the property management companies instead of the tenants occupying the units, and others were removed due to being listed as a number that the evaluation team had contacted in the previous six months.

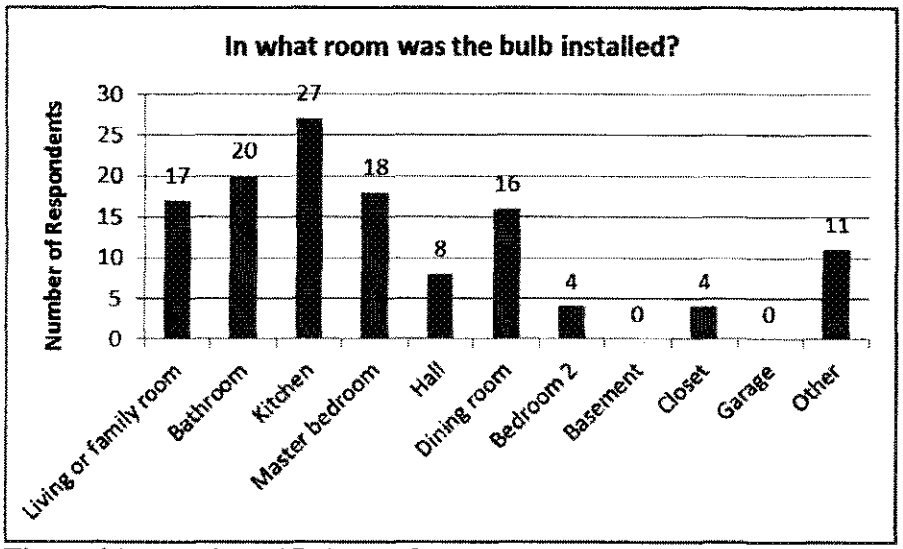

Figure 14. Location of Bulb Replaced

Estimated Hours of Bulb Use

CFL Estimates

In order to determine the average hours of use per bulb per day, tenants were asked to estimate the typical hours of use for the first three CFLs that were directly installed in their homes. Their estimates generated an average of 3.8 hours per day (See Figure 15). Moreover, 77% percent of respondents said that the hours of bulb usage remained the same after the installs were complete. Six percent of respondents felt that they were leaving the new CFLs on longer than the old bulbs for an average of 1.9 hours more usage each day. Three percent (3%) felt that their bulb usage had gone down by an average of 2.1 hours of use per day.

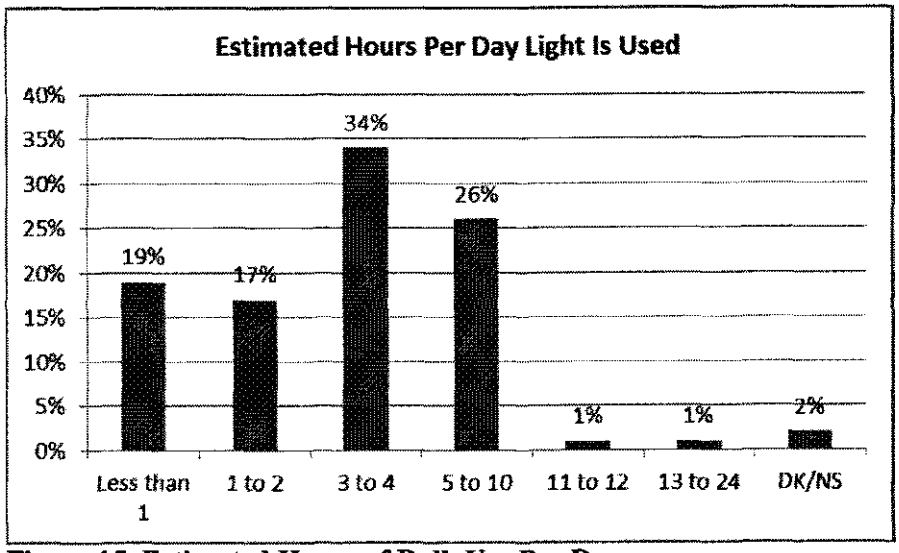

Figure 15. Estimated Hours of Bulb Use Per Day

Non-CFL Estimates

When asked how many non-CFL bulbs in their households were used more than two hours per day, 59% of tenants surveyed said that zero bulbs were used for more than two hours per day. An additional 14% said their non-CFL bulbs were used for just one hour per day, leaving just 18% of tenants who left their lights on for longer periods of time. Figure 16 shows the full range of responses respective to estimated hours of use.

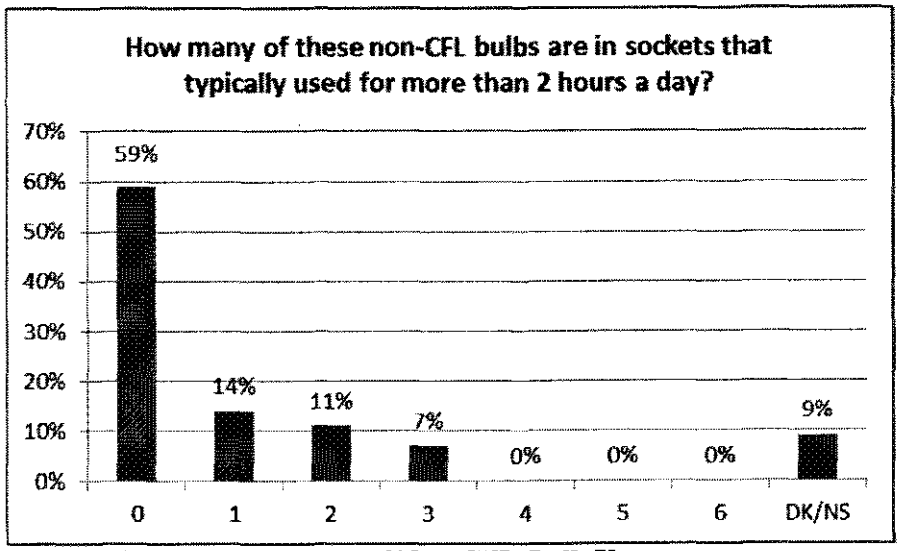

Figure 16. Estimated Hours of Non-CFL Bulb Use

Disposition of Replaced Bulbs

When asked what happened to the bulbs that were removed, 56% of respondents indicated that the installer removed them, 9% placed the old bulbs in storage, and 32% threw away their old bulbs.

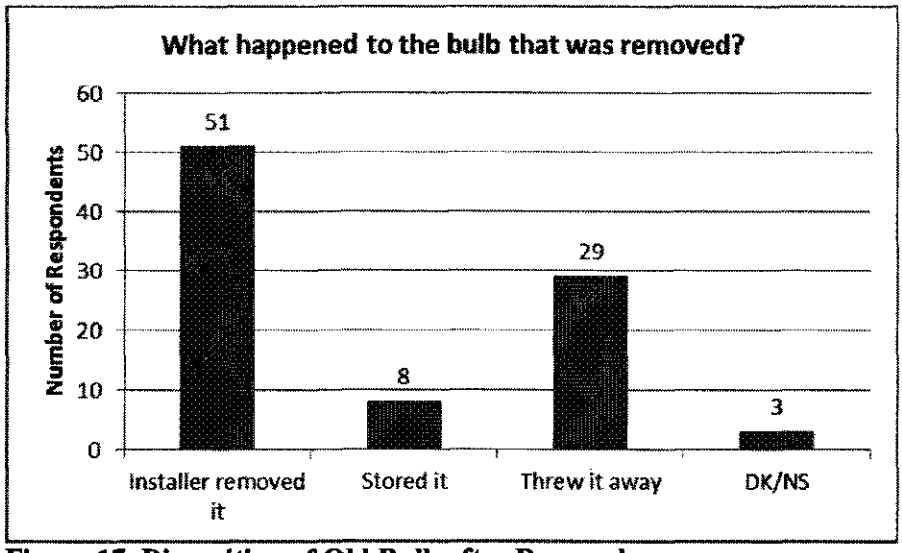

Figure 17. Disposition of Old Bulb after Removal

Types of Non-CFLs Remaining in Tenant Homes

Incandescent bulbs were far and away the most frequently mentioned type of bulb to be replaced with 83% of respondents mentioning this bulb type. More specifically, 39% of respondents reported that 45-70 watt bulbs had been replaced. Nine percent indicated that 71-99 watt bulbs had been replaced, and 12% reported replacing bulbs of 100 watts or more. Table 17 shows the full distribution of responses based upon number of respondents.

Table 17. Type of Bulb Replaced

Type of Bulb Replaced	Frequency of Response	Percent of Response
Incandescent: 100 or more	15	12%
Incandescent: 71 to 99	11	9%
Incandescent: 45 to 70	50	39%
Incandescent: < 44	4	3%
Incandescent: DK/NS	25	20%
CFL	3	2%
CFL in place when I moved in	8	6%
DK/NS	11	9%

Specialty Bulbs

In terms of the most popular specialty bulbs in tentant homes, three-way incandescents ranked first on the non-CFL list with 8 people reporting a total of 13 bulbs. The most popular specialty

CFL was recessed CFLs with 6 people reporting a total of 34 bulbs. Table 18 shows the number of people reporting specialty bulbs and the number of bulbs of that type.

Table 18. Specialty Bulb Types

Specialty Bulb Type	Number of Respondents	Number of Bulbs
Dimmable CFLs	0	0
Dimmable Incandescents	0	0
Outdoor flood CFLs	2	2
Outdoor flood Incandescent	0	0
Three way CFLs	3	4
Three way Incandescents	8	13
Spotlight CFLs	2	5
Spotlight Incandescents	3	10
Recessed CFLs	6	34
Recessed Incandesents	4	11
Candellabra CFLs	1	4
Candellabra Incandescents	2	13
Other CFLs	2	4
Other Incandescents	10	51
Round globe-type in bathroom fixture..	6	NA
Night light	1	NA
Outdoor bug light.	1	NA
Over the stove bulb is a non-CFL.	1	NA
25w pombillas	1	NA
Ceiling fan	1	NA

Number of Bulbs in Use

Because this program involved direct installs it was important to determine how many tenants were already using CFLs in their homes. Twenty four percent of respondents said that they had no CFLs previously installed, while 64% indicted that they had already installed CFLs, and an additional 7% reported that CFLs were installed before they moved in. When asked how many CFLs were already in use, 52% of respondents reported having two or fewer CFLs previously installed. As seen in Table 19 the most popular number of previously installed CFLs was two, with 41% of respondents.

Table 19. Number of Previously Installed CFLs

Number of CFLs Previously Installed	Number of Respondents	Percent of Those With Previously Installed CFLS
0	1	4%

1	2	7%
2	11	41%
3	1	4%
4	2	7%
5	2	7%
6	3	11%
8	1	4%
9	1	4%
10	1	4%
11	1	4%
Half	1	4%

Number of Non-CFLs Remaining in Tenant Homes

When asked to estimate the number of remaining bulbs in their homes that were not CFLs, 33% (15 people) reported zero, indicating that all the bulbs in their homes were CFLs. Forty two percent reported one to five bulbs as non-CFLs, while another 20% indicated that six to ten bulbs were non-CFLs. Figure 18 below displays the number of respondents and the number of non-CFLs.

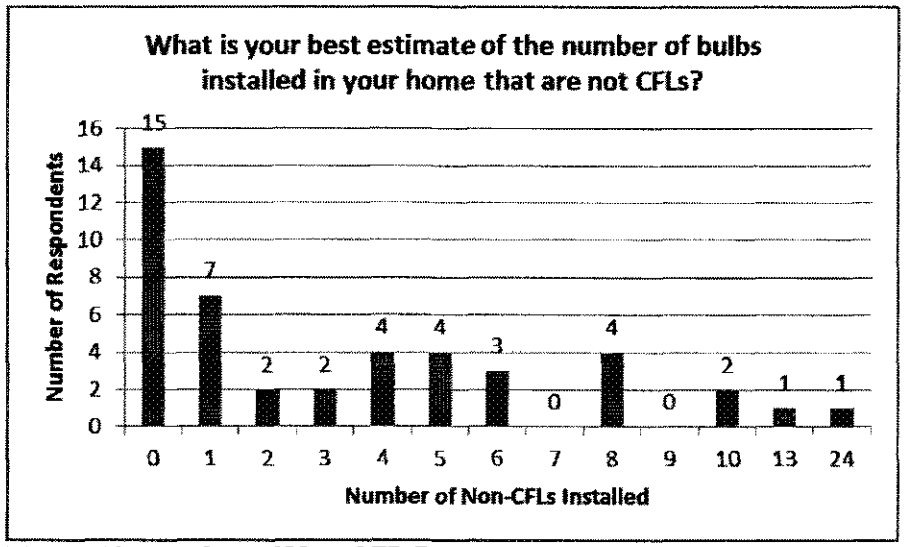

Figure 18. Number of Non-CFL Bulbs Remaining in Tenant Homes

CFL Usage

In addition to the energy savings generated via the direct installs, one of Duke Energy's primary goals was to encourage the use of CFLs in the future. To evaluate the effectiveness of the program in this regard, tenants were asked a series of questions to explore their propensity to purchase and install CFLs after participating in the program.

Previous CFL Usage

As shown in Figure 19, only 9% of respondents had never purchased a CFL and more than half (53%) of tenants had been using CFLs for two or more years, a time period that pre-dates the start of the program. This indicates that while the program has been successful in directly installing CFLs, a sizeable portion of tenants had already begun to use the bulbs prior to the start of the program. While such a notable amount of prior CFL use blunts the program's potential for first time exposure, its other goals of encouraging future CFL usage and initiation of other energy saving actions remain unhindered.

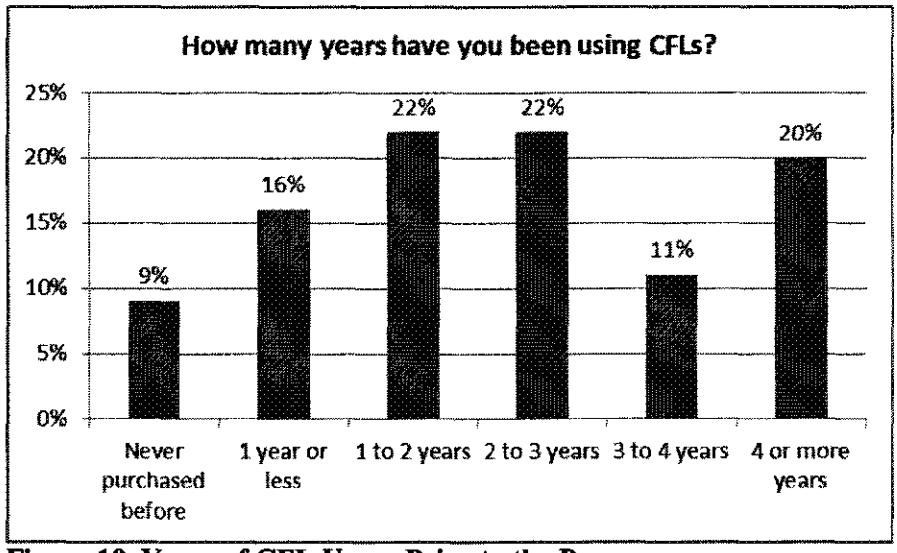

Figure 19. Years of CFL Usage Prior to the Program

Propensity for Future CFL Usage

When asked about the likelihood of buying and using CFLs in the future using a scale of 1 to 10 where 1 means not at all likely and 10 means very likely, respondents returned an average likelihood of 9.1. Sixty seven percent rated their likelihood as a 10, as shown in Figure 20.

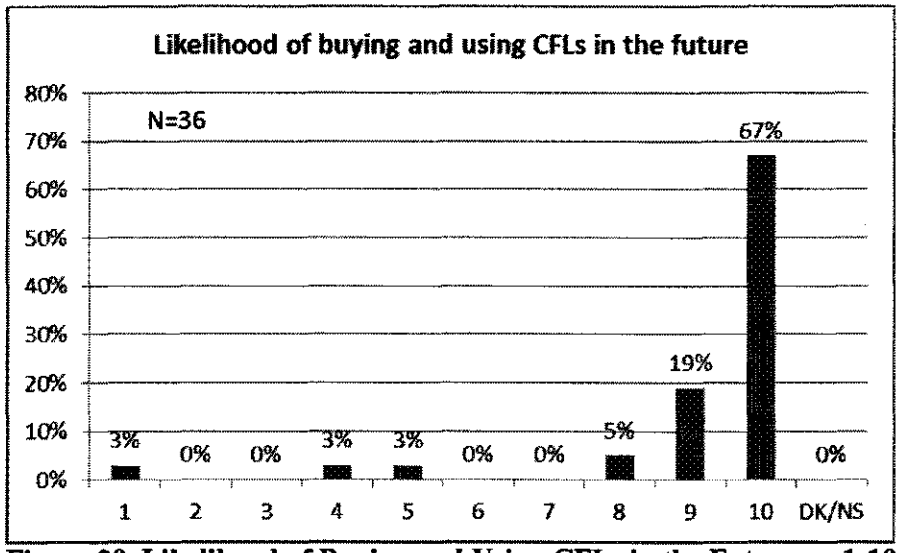

Figure 20. Likelihood of Buying and Using CFLs in the Future on 1-10 Scale

The positive response rate for future usage was even higher when tenants were asked to rate their likelihood of purchasing and installing CFLs using a verbal rather than numeric scale. After participating in the program, 78% percent of respondents felt that they were more likely to purchase and use CFLs in the future, compared to 7% who were less likely and 16% who were neither more nor less likely. When asked why they were more likely to do so, 31% answered because "CFLs save energy," and the same percentage said because "they last longer." Another 22% answered because "they save money," and 16% felt they would buy CFLs because they "like the brightness." Table 20 presents all of their reasons.

Table 20. Reasons for Being More Likely to Purchase CFLS in Future

Reason for being more likely to buy CFLs	N Responses	% of Respondents
Save energy/more efficient	14	31%
Last longer	14	31%
Save money/lower bills	10	22%
Brightness	7	16%
Other	5	11%
Light quality	3	7%
Bulb quality	1	2%
Bulb appearance	1	2%
Total Respondents	35	100%

Just three people felt they would be less likely to purchase CFLs in the future. Their responses are show below.

Table 21. Reasons for Being Less Likely to Purchase CFLS in Future

Reason for being more likely to buy	Frequency of

CFLs	Response
Additional cost of CFLs - doesn't justify *expense*	1
Light quality is unsatisfactory	1
CFLs aren't bright enough.	1

Because intended future behavior is not the same as present behavior, we also asked about any CFL purchases already completed since participating in the program. Thirteen percent of respondents reported purchasing additional CFLs, compared to the 80% who said that they had not purchased CFLs. While this 13% positive response rate is fairly low, the result is not surprising given that the currently installed bulbs have a projected life span that is longer than the interval between their installation and the date of our survey.

Factors Influencing the Purchase of CFLs

When making a light bulb purchase a number of different factors can influence a buyer's decision. To help determine which factors have a greater influence we asked customers to rate importance on a scale of 1 to 10 with 1 being not at all important and 10 being very important. When the responses are ranked according to mean importance scores "energy savings" tops the list as the most important factor at 9.6, followed by "cost savings on utility bill" with a score of 9.2. "Selection of wattage and light output" rounded out the top three with a score of 8.7. The full distribution of scores is presented in Table 22 below.

Table 22. Importance of Bulb Characteristics in Purchasing Bulbs

Bulb Characteristic	Mean Importance
Energy savings	9.6
Cost savings on utility bill	9.2
Selection of wattage and light output	8.7
Purchase price	8.5
Availability in stores you normally shop	8.3
Availability of utility programs	8.3
Ease of bulb disposal	8.1
Recommendations from utility company	7.8
Speed to full lighting level	7.3
Mercury Content	7.0
Recommendations from family and friends	6.7
Appearance of bulb	5.4
Ability to dim the lighting level	5.1

As seen in the table above, factors often perceived as barriers to CFL adoption, such as appearance (5.4) and ability to dim bulbs (5.1) were rated as the least important characteristics. Overall, this suggests that an effective way to increase CFL adoption and installation by tenants of multi-family properties is to focus messaging on cost and energy savings and to ensure a selection of wattage and light output in stores where they normally shop.

Preferred Channels for CFL Distribution

To discern preferences for bulb distribution methods and differences in discounting scenarios, TecMarket Works randomly assigned survey participants into two groups. We asked approximately half[6] (n=27, 60%) of the surveyed tenants to rate their likelihood of participation, on a 1-to-10 scale, in six hypothetical CFL distribution programs that offered **discount** CFLs, and then asked the other half (n=18, 40%) of surveyed tenants to rate their likelihood of participation, on a 1-to-10 scale, in six hypothetical CFL distribution programs that offered **free** CFLs. The mean ratings and program distribution methods are shown in Figure 21.

Likely participation is rated highest for programs that use direct mail (8.4 for discount, 9.6 for free), while retailer store coupons and manufacturer coupons follow close behind. For all distribution methods, scores for free bulbs were stronger than those for discount bulbs. However, tenant rank ordering of preferences remained consistent for free and discount bulbs, until the lowest rated methods (online vendor vs. stand in parking lot) , which were reversed.

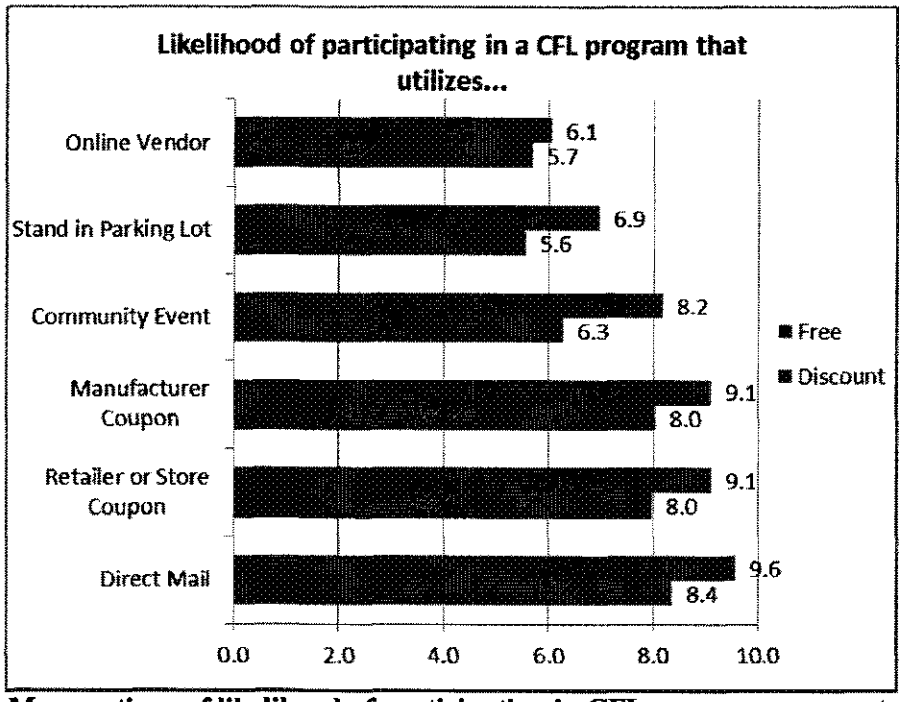

Figure 21. Mean ratings of likelihood of participation in CFL programs among tenants

We also delved a bit deeper into the direct mail distribution method to ask respondents to rate their interest in participating in a CFL program that uses direct mail to ship specialty bulbs. Their interest ratings averaged 7.1 on the 10 point scale (See Figure 22) with half (51%) rating their level of interest in participating a 9 or 10. This suggests a moderate interest in this type of program among tenants of multi-family properties.

[6] The survey data collection tool used has a function which assigns "free" or "discount" at random.

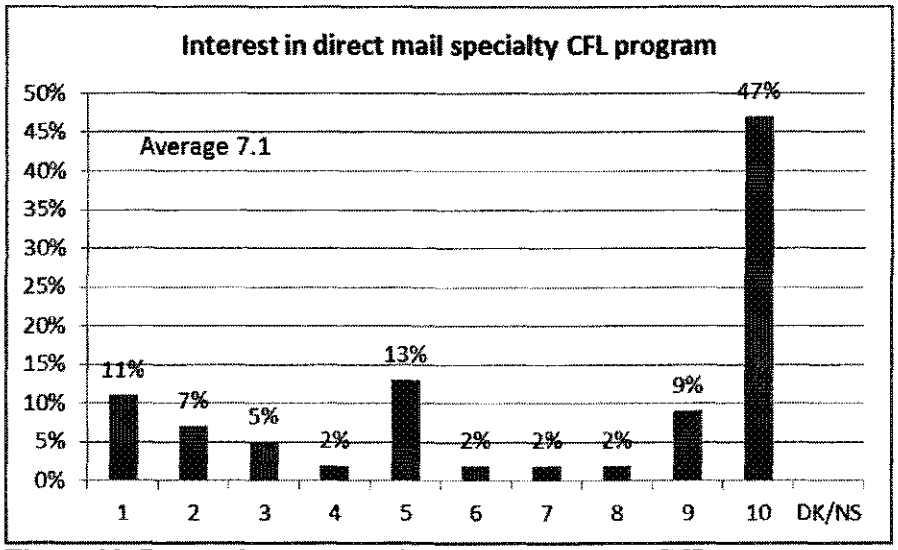

Figure 22. Tenant Interest in Direct Mail Specialty CFL Program

Behavior Change

To determine if participation in the program had impacts on tenant behavior, we asked tenants if they had changed any habits related to energy use. Among those surveyed, 67% (32 tenants) indicated no change, but 27% (12 tenants) did report changing their behavior. In a follow up question to the 12 tenants who did change their behavior, we found that among this group 75% reported turning off lights, and 8% unplugged items when not in use. Responses are shown below.

Table 23. Tenant Changes in Energy Habits

Behavior Change	Frequency of Response	Percentage Responding
Turn off lights	9	75%
Unplug or turn off when not in use	1	8%
Be conscious and conserve	1	8%
Use window film	1	8%
Do dishes by hand	1	8%

We also surveyed tenants to learn if they had made any energy efficiency improvements to their homes after participating in the direct install CFL program. While the number of renters who reported making energy efficiency improvements was likely lower than it might have been for homeowners, a respectable 47% of respondents reported making one or more energy efficiency improvements. Of those who took action, the most common improvement was installing a low flow showerhead, with nine people doing so. Installing weatherstripping was next, with seven respondents indicating that they had done so. All improvements are shown in the table below. Note that some respondents reported taking more than one action.

Table 24. Tenant Energy Efficiency Improvements

Efficiency Improvement	Frequency of Response	Percentage Responding
Low flow showerhead	9	15%
Weather stripping	7	12%
Caulking	3	5%
Faucet aerators	3	5%
Programmable thermostat	3	5%
Wall or ceiling insulation	2	3%
Outlet or switch gaskets	1	2%
None of these	32	53%

From these responses regarding energy efficiency improvements and personal behavior changes we conclude that the program was not only effective at placing energy efficient bulbs in tenant residences, but also instrumental in encouraging tenants to take action. These numbers can likely be improved in the future, if additional steps toward energy efficiency awareness and education are added to the program.

Attitudes and Awareness

Because tenants were informed about the program by their property managers and not by Duke Energy directly, we sought to ascertain why customers thought that Duke Energy was providing free CFLs through the direct install program. The highest scoring reason on the multiple choice response was "Duke Energy wants to save energy for environmental reasons;" followed closely by "Duke Energy wants to save energy for economic reasons. The distribution of scores is presented in Figure 23 below. Reasons for respondents selecting the "Other" category follow in Table 25 immediately after the figure.

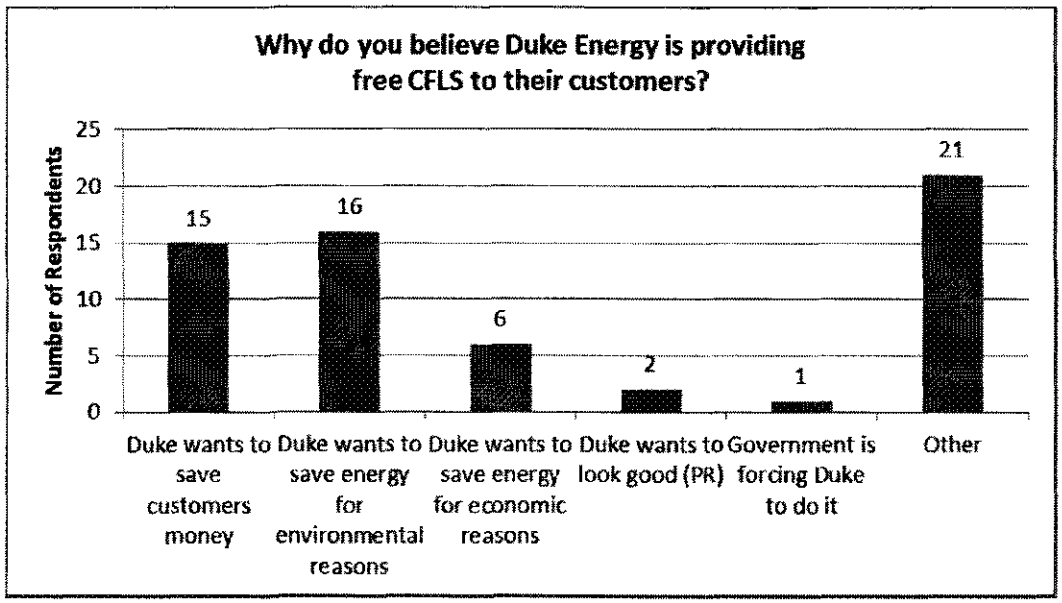

Figure 23. Customer Perceptions of Duke Energy's Reasons for Giving Free CFLs

Table 25. Reasons for "Other" Response

Reason for Other Response	Frequency of Response
Duke wants to get people started using CFLs.	6
DK/NS	3
It benefits Duke in some way.	2
CFLs will be another revenue stream for Duke.	2
Duke is trying to cut down on usage and save on energy.	2
Duke is doing this because of corporate partnerships.	1
Duke is doing this because of saftey considerations.	1
Duke wants to provide customers with longer-lasting bulbs.	1
Duke reduces own energy demand - saves costs on building/renovating old coal power plants	1
Decrease emissions and part of the smart grid initiative	1

Verbatim responses are listed below.

- DK/NS (n=3)
- "It benefits Duke in some way." (n=2)
- "To decrease emissions and smart of the smart grid initiative."
- "CFLs will be another revenue stream for Duke."
- "Duke is doing this because of corporate partnerships."
- "Duke is doing this because of saftey considerations."
- "Duke is trying to cut down on usage and save on energy."
- "Duke reduces own energy demand - saves costs on building/renovating old coal power plants."
- "Duke wants to expose people to the bulbs to show how good they are."
- "Duke wants to get people started on using CFLs so they can see the benefits of using the bulbs and to demonstrate that Duke is committed to upgrading their energy usage."
- "Duke wants to give people a chance to try the bulbs."
- "Duke wants to provide customers with longer-lasting bulbs."
- "Duke wants to raise awareness."
- "Duke wants to raise people's awareness of CFLs."
- "Duke wants to save energy."
- "Duke wants to show customers how well these bulbs work, which encourages customers to purchase them on their own."
- "Selling CFLs will be an additional revenue stream for Duke."

Customer Satisfaction

Customer satisfaction is generally high among surveyed tenants in Ohio. No customer satisfaction attribute scored less than a mean of 8.3 on a 1-to-10 scale, with 1 being very dissatisfied and 10 being very satisfied. More specifically, mean tenant ratings were: light quality (8.3) and bulb quality (8.9), ovreall program satisfaction (9.0), and satisfaction with Duke Energy (8.4).

Satisfaction with Light Quality

The overall customer satisfaction scores for light quality on the 10 point scale are fairly high with a mean satisfaction rating of 8.3 with 45% of respondents rating the light quality a 9 or 10. The distribution of scores is presented in Figure 24, while Table 26 shows their reasons for being less than fully satisfied.

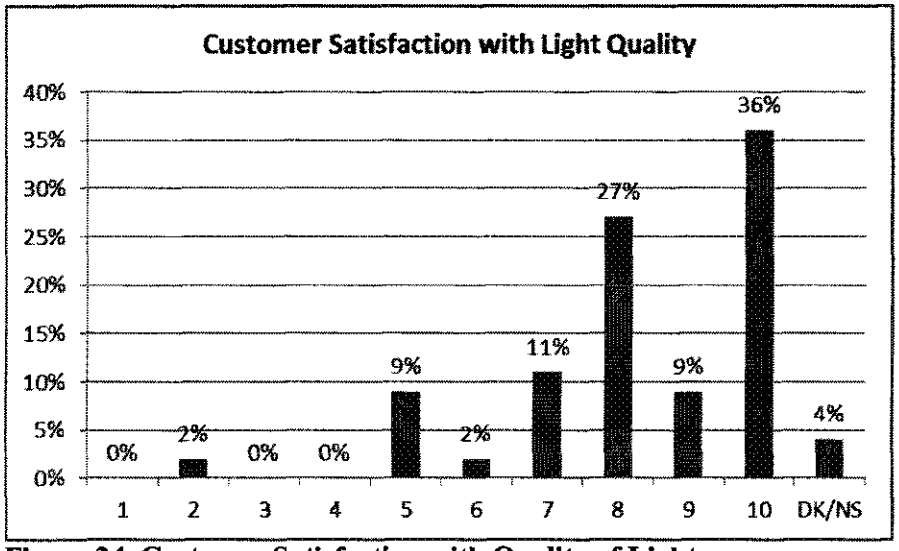

Figure 24. Customer Satisfaction with Quality of Light

Insufficient bulb brightness was the number one reason for lower satisfaction scores. This and other reasons for tenants reporting lower satisfaction scores (score of 7 or less) are shown below.

Table 26. Light Quality: Reasons for Satisfaction Ratings of 7 or Less

Reason for Score of 7 or Less	Frequency of Response
Not bright enough	8
Don't like light quality	2
Too long to warm up	2

Verbatim responses are shown below:

- "The bulbs are dull."
- "The light from the CFLs has a blue tint."
- "The bulbs seem dimmer than incandescent bulbs."

- "The bulbs are not bright enough. I don't like that it takes a while for the bulbs to come to full lighting level."
- "I had to get used to the dimmer light from CFLs."
- "I have noticed no significant difference in the light quality."
- "The bulbs take a long time to turn on."
- "I need to have brighter light for doing school work."
- "I have difficulty with reading. The bulbs are not bright enough, and the hue doesn't provide adequate contrast."
- "Not bright enough over the stove. Needed better lighting."
- "The CFLs are not bright enough."

Satisfaction with Bulb Quality

When asked to use the same 10 point scale to rate their satisfaction with the overall bulb quality, respondents gave an average satisfaction rating of 8.9. Fifty eight percent of tenants who participated rated their satisfaction with the bulb quality as a 9 or 10. The remainder of the ratings is shown in Figure 25. Table 27 shows reasons for the handful of lower satisfaction ratings.

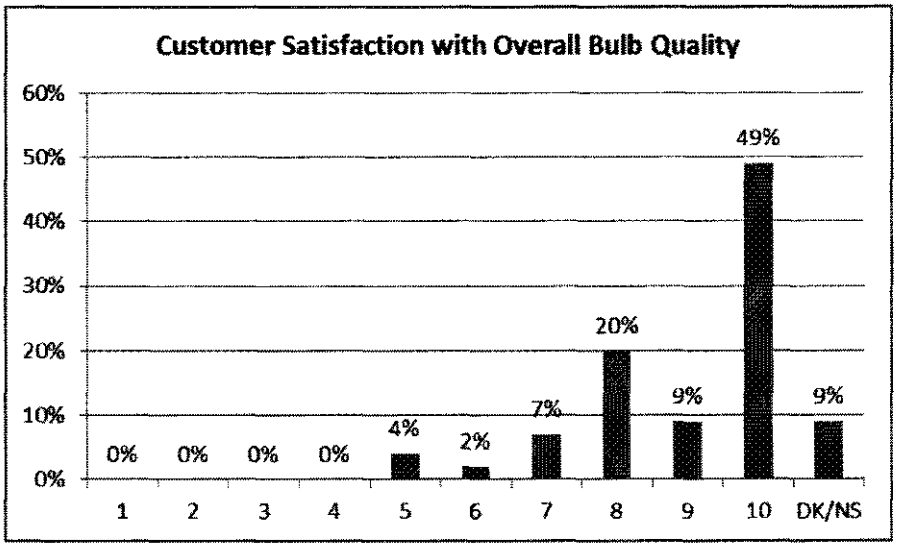

Figure 25. Customer Satisfaction with Overall Bulb Quality

Table 27. Bulb Quality: Reasons for Satisfaction Ratings of 7 or Less

Reason for Score of 7 or Less	Frequency of Response
Bulbs burn out too quickly	2
The bulbs lasted pretty long. They're OK.	1
A bulb is a bulb.	1

Verbatim responses are shown below:

- "I had some that were better, but they burned out quickly in the bathroom."
- "The bulbs lasted pretty long. They're OK."
- "A bulb is a bulb."
- "The bulbs burned out quickly."

Program Satisfaction

The overall customer satisfaction scores for the direct install CFL program are high with a mean rating of 9.0. What is more, 73% of respondents rated the program with a 9 or 10. The distribution of scores is presented in Figure 26. For tenants reporting lower (score of 7 or less) satisfaction scores with the program, we asked them how it might be improved. Their responses are shown in Table 28.

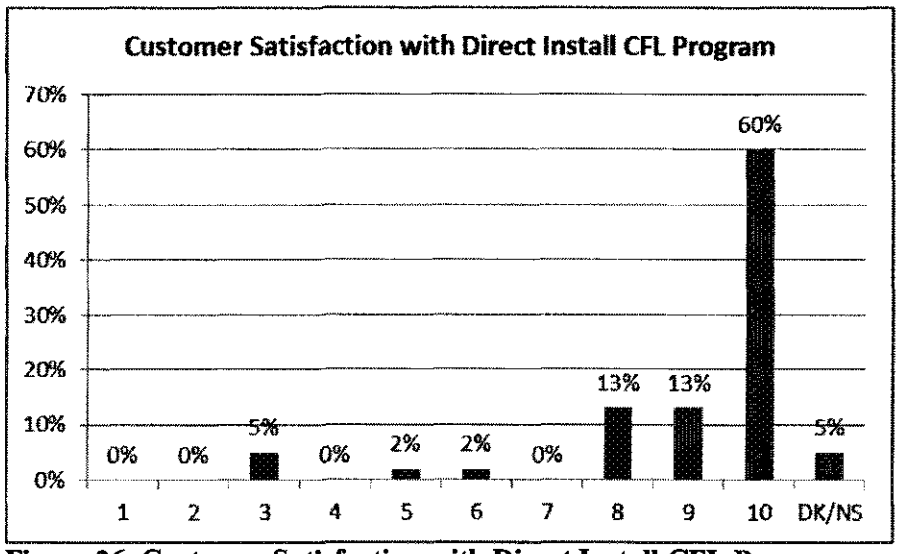

Figure 26. Customer Satisfaction with Direct Install CFL Program

Table 28. Program Satisfaction: How to Improve for Those with Score of 7 or Less

How to Improve Satisfaction	Frequency of Response
One of the bulbs burnt out very quickly.	1
Maintenance came, saw the CFLs, and didn't install anything, so I had no impression of direct install either way.	1
I didn't get all the bulbs that I requested or needed.	1
I feel the bulbs were forced on me and I don't like the light quality. I want my 100w incandescents back.	1

Tenants were also asked to rate their satisfaction using a verbal scale, ranging from very dissatisfied to very satisfied. More than two thirds of respondents (67%) indicated that they were very satisfied with the program, and another 20% reported that they were somewhat satisfied. Only a handful of customers were less than satisfied as shown in Figure 27. Their reasons are listed in Table 29.

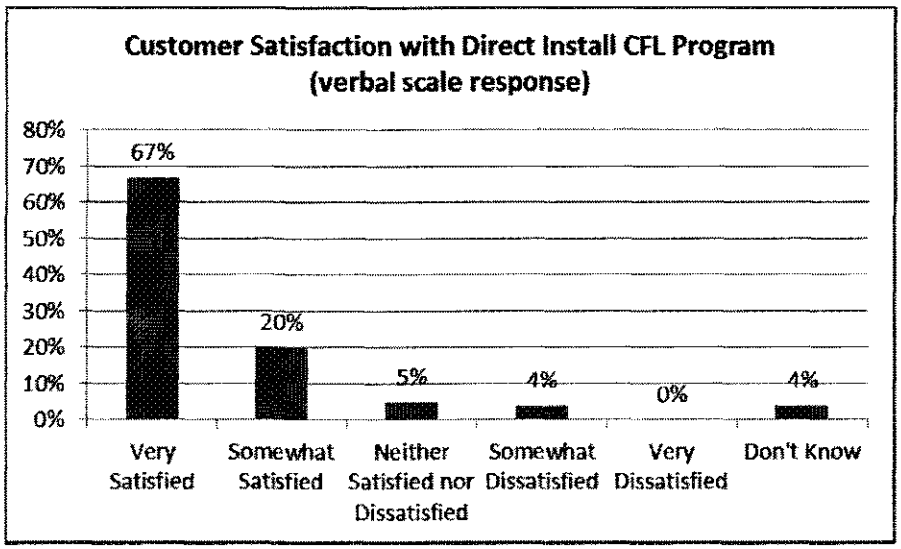

Figure 27. Customer Satisfaction with Direct Install CFL Program (verbal scale)

Table 29. Reasons for Being Less than Very Satisfied with the CFL Program

Reason for Less than Very Satisfied	Frequency of Response
Not bright enough	5
Mercury concerns	1
Don't like light quality	1
Bulbs burn out too quickly	1
I didn't get all the bulbs I requested	1
I don't have a choice. I just have to go along with it.	1
I think Duke could do more to educate the populace instead of just providing the bulbs.	1

Other reasons or comments given included:

- "I like the light quality."
- "It conserves energy and money."
- "I like anything we can do to be more efficient and produce less waste. The more green the better."

Satisfaction with Duke Energy

When tenants rated their satisfaction with Duke Energy their satisfaction scores averaged 8.4 on the same 10 point scale. However, only a modest 59% of customers deigned to rate Duke Energy with a 9 or 10. The distribution of scores is presented in Figure 28 below. For tenants reporting lower (score of 7 or less) satisfaction scores with Duke Energy, we asked them how those scores might be improved. Their responses are shown in Table 30.

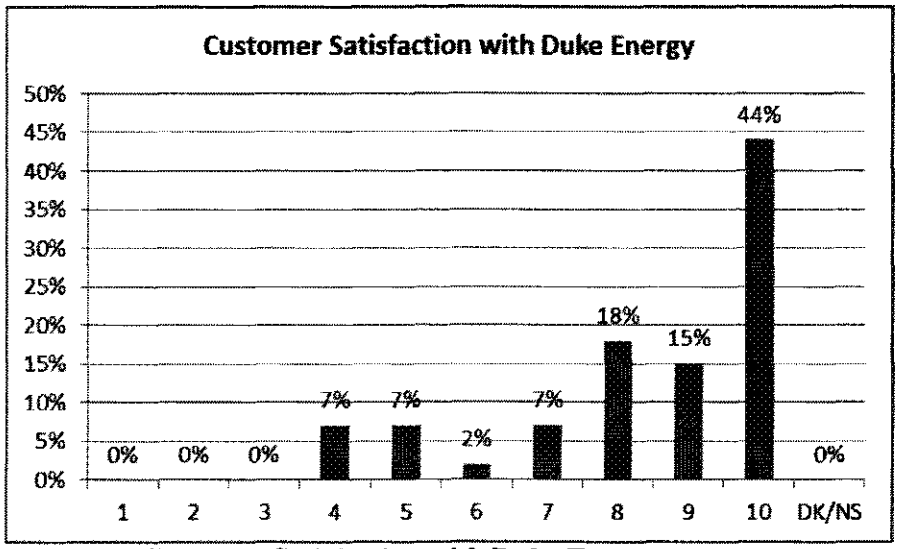

Figure 28. Customer Satisfaction with Duke Energy

Table 30. Duke Energy Satisfaction: How to Improve for Those with Score of 7 or Less

How to Improve Satisfaction	Frequency of Response
Duke could lower its rates.	1
I feel like I get charged for estimated energy use and not my actual use.	1
I pay too much for energy in my apartment.	1
DK/NS	1

Conclusions and Recommendations for Program Changes

The section below summarizes the most important findings and recommendations of this evaluation.

Management Interviews

1. The program received very few customer complaints and appears to be working smoothly and effectively from the managers' perspective. The managers interviewed all indicate that communications and coordination between all three teams (Duke Energy, Honeywell, and AM Conservation) is working very well.

2. The primary "sales points" that seem to resonate well with properties are: that properties can make a positive environmental impact by participating in program; that CFLs last longer and don't need to be replaced as often; and that CFLs increase tenant satisfaction and decrease their electric bills.

3. Program managers have made efforts to clarify property manager confusion about the differences between this program and other Duke Energy programs, which offer CFLs directly to tenants with individual electric accounts.

4. While shipping costs were initially intended to be used as an "incentive" to encourage timely bulb installed, they appear to be a barrier to program participation instead. Finding an alternative means of incentive should improve enrollment numbers and customer satisfaction. Honeywell's proposal to credit back shipping costs for timely installs is worthy of consideration.

5. The largest barrier to participation and the most frequent complaint about the program focuses on manpower necessary to replace large quantities of bulbs. Providing a Duke Energy-sponsored installer to do the work is a frequently cited proposed solution. Another is to allow properties more time or to create smaller batches of installs so that they can be done over a longer period of time.

6. Bulb recycling is an important aspect of this program that may require more attention. While doing well in terms of educating customers on where and how to recycle the bulbs, property managers, particularly those in rural areas, expressed a desire for greater assistance with kits for safe disposal.

7. Program managers should continue to monitor and address safety issues surrounding CFLs, such mercury considerations.

Property Manager Surveys

1. Customer satisfaction with the program and with Duke Energy is high, despite the high labor costs, the indirect benefits to the property, and the fact that the majority of property managers were told they needed to participate by their bosses.

2. With 82% of property managers reporting that they would not have otherwise replaced their existing incandescent bulbs with CFL bulbs, and with 65% indicating that they will continue to provide CFLs in the future, the program is clearly having a positive impact on this market segment.

3. In addition to providing bulbs for tenant residences, the program should provide CFLs for common areas, administrative offices, and other locations managed by the properties. Doing so would likely increase property enrollments, improve property manager satisfaction, and facilitate additional energy savings.

4. Given the large number of bulbs to be installed, property managers find the bulbs to be over packaged. Shipping bulbs in containers with less individual packing would help to reduce the install time, eliminate waste, and cut down on shipping costs.

5. Hollywood (globe) bulbs for bathroom vanities are the most requested type of specialty bulb.

6. The tenant form letters and other materials provided by the program are often used and much appreciated by property managers. Further tools to make the process "turnkey" are likely to be well received.

7. Allowing properties to retain a small amount of extra CFLs for replacement purposes would be appreciated by property managers and it may help to ensure that broken or burned out CFLs are replaced with similar bulbs rather than reverting to incandescents.

8. Although far from saturating the market at this point, as CFLs increase in marketshare forward-looking property managers and tenants on the leading edge of the product adoption curve are beginning to look at alternative forms of lighting such as LEDs. Thus the opportunity exists to begin recruiting for pilot studies with other types of bulbs for this audience.

Tenant Surveys

1. The property manager direct install program enjoys a high satisfaction rating among tenants with an average score of 9.0 on a 10-point scale. Customers are also highly satisfied with light quality, bulb quality, and with Duke Energy overall.

2. In general the program appears to be operating as it is designed. That is large numbers of incandescent lights are being systematically replaced with CFLs in residences that would not have otherwise made the switch.

3. With more than half of tenants surveyed indicating that they still have non-CFLs installed in their homes, the opportunity remains to reach out for additional bulb replacements.

4. If tenants are targeted directly, then direct mail offers are their first choice for preferred distribution.

5. Tenants indicate that they will respond most favorably to marketing language that focuses on financial and energy savings, and to a variety of wattages and light outputs.

6. With 78% of tenants rating their likelihood of purchasing CFLs in the future, and an overall average likelihood of 9.1 on a 10 point scale, the program has been largely effective for encouraging future CFL purchases.

7. Beyond light bulb replacements, tenant behavior changes were modest. This suggests the potential for increases in the educational aspects of the program.

Net to Gross Analysis

Freeridership Levels

The property managers receiving the Duke Energy bulbs were instructed to install the CFLs in tenant's units so that each installation removed an incandescent bulb from a fixture that was being used by the occupants of that unit. This approach was taken because Duke Energy wanted to design a program with a low freerider rate, reducing the risk that the bulbs would be used by people who were already using CFLs in those fixtures. Duke Energy theorized that if the fixture contained an incandescent bulb and was in use, then the conversion of that fixture to a CFL would acquire higher net savings than a typical CFL rebate program in which the customer installed the bulb where they wanted or placed part of the bulbs into storage.

The evaluation results support Duke Energy's theory. According to surveyed occupants, 90.3 percent of the property-manager-installed CFLs went into fixtures in which the tenant reported having an incandescent light bulb prior to the conversion. Only 9.7 percent of the property manager-installed CFLs were reported to have had a CFL in that fixture prior to the installation of the new bulb. From this perspective, 90.3 percent of the CFLs installed by the property managers provided net new energy savings.

Table 31. Net to Gross Analysis

CFL replaced:	Bulb1	Bulb2	Bulb3	Total	
An Incandescent	36	33	33	102	90.3%
A CFL	2	4	5	11	9.7%
Don't know	3	5	2	11	-
Missing	2	3	5	10	-

However, even though the property manager-installed CFLs went into incandescent fixtures, this does not mean that all fixtures in the apartments, including the program-targeted fixtures, had incandescent light bulbs.

When we asked if the tenants had already used CFLs in their units prior to the program-installed CFLs, 74 percent of the tenants reported having at least one CFL in their units prior to the program installed units. Seven percent of the tenants indicated that the CFLs in their units were installed prior to their taking possession of their units and an additional 64 percent of tenants indicated that they had installed one or more CFLs in their units. Twenty-six (26%) of the tenants indicated that there were no CFLs installed in their units prior to the program-installed CFLs.

Of the 26 tenants who reported having already used CFLs in their units and could also estimate the number of CFLs that were already in use, the typical unit had 3.9 CFLs prior to the program-installed CFLs. There is a possibility that some of the tenants who had incandescent bulbs in the fixtures that were replaced by CFLs via the program may have replaced that incandescent with a CFL when the incandescent burnt out.

Clearly, the majority of tenants (74%) had already used CFLs in the past and 64% of all tenants had installed at least one CFL on their own. However, with the average tenant having only 3.9

CFLs in their units there is not a strong indication that these tenants are committed CFL users. In addition, because over 90% of the program installed CFLs went into incandescent fixtures, these tenants had not yet made the switch to energy efficient lighting in all of their primary fixtures. Because the program is a direct install program in which the program installs CFLs in fixtures that are lit with incandescents, the level of freeridership is set at the level at which the tenants report having the property owners change their fixture from an incandescent to a CFL. As a result, the level of freeridership for this program is assessed to be 9.7 percent. We are not crediting Duke Energy with a net CFL installation if the tenant indicated that they had already been using a CFL in the fixture before the Duke Energy CFLs were installed. These tenants report that they had already converted their fixtures to CFLs. However, this reporting is suspect and may not be accurate. It is unlikely that a property manager would take out a CFL only to install another CFL. However, we take the tenant's response seriously and discount net savings by the level at which the tenant reports already using a CFL in the fixture targeted by the property owner.

There will also be times when the participant will remove a CFL installed by the property manager and replace them with an incandescent. In this study we incorporate this adjustment into the ISR (in service rate). The ISR is the rate at which the program-installed CFLs are still installed at the time of the survey, and are still providing savings. The ISR adjustment subtracts out savings that no longer are being achieved because the program-installed CFLs have been removed and replaced with incandescent bulbs.

Spillover Levels

The experience tenants gained with the Duke Energy program installed CFLs did not produce a large amount of spillover of additional CFL bulb purchases, but did induce some tenants to buy and use more CFLs. This is because most of the tenants had already experimented with CFLs on their own. However, for a few of the tenants, the Duke Energy CFLs did increase their likelihood to try CFLs on their own. A few of these tenants did buy and install more CFLs and attribute the cause of that purchase to the experience they obtained via the program-installed CFLs. In all cases, in which the surveyed tenants reported that their program experience made it more likely that they would have purchased additional CFLs (N=6), and they went out and purchased more CFLs (purchased 41 bulbs), and they installed those bulbs in fixtures they are using (installed 16 of the 41 bulbs); these individuals attributed those purchases to their program-installed CFL experience at a score of 10 on a 10 point scale. This is the maximum score possible for these added bulbs.

Thus, for this set of respondents, we are adding 16 bulbs to the 419 distributed by the program to survey respondents. This provides a level of spillover of 3.8 percent (16/419=.038). We did not count any spillover for any respondent who said that the program did not change their demand for CFLs or if they said that the program's bulbs made it less likely that they would acquire CFLs in the future. The 3.8 percent spillover is conservative, as it only counts the Duke Energy motivated purchases that were installed and which occurred between the period of time of the installation and the survey.

Table 32. Spillover Numbers

Experience with the	How many did you buy	How many are being	Attribution score

program CFLs on future purchase and use		used	(1-10 scale)
More likely (N=6)	41	16	10

Net Energy Savings Adjustment Factor

The combination of the reduction in energy savings attributed to freeriders plus the adjustment attributed to spillover provides a net adjustment factor of 0.937 (1 - 9.7% freerider)* (1 + 3.8% spillover). Accounting for freeriders, those that already indicated that they had installed a CFL, and for spillover, those indicated that the Duke Energy program caused them to buy and install more CFLs provides a net energy savings of 93.7% of the gross savings.

In-Service Rate

The in-service rate (ISR) for the CFLs shipped to Ohio property owners is calculated using Honeywell's program records for the quantity of bulbs shipped to Ohio property owners and the property-owner-reported installation counts for bulbs they received. In Ohio, 14 property owners reported the number of bulbs they had installed, totaling 8,649 bulbs. Honeywell's delivery records indicate that those 14 owners received a total of 8,760 bulbs from the Duke Energy via the Property Manager CFL program. These records indicate that the ISR for the Ohio component of this program is 98.7 percent (8,649/8,760=0.987).

Impact Analysis

Table 33 shows the estimated energy savings per bulb distributed adjusted downward for the ISR of 98.7% and incorporating the self-reporting bias applied to the hours of use as well as the freeridership and spillover percentages computed from participants' survey responses. The program distributed 13-watt CFLs exclusively. The average wattage of a replaced bulb was 60 watts.

Table 33. Adjusted Impact: kWh and Coincident kW per Bulb Distributed

Metric	Result
Number of Bulbs	125
In Service Rate	98.7%
Gross kW per bulb	0.0059
Gross kWh per bulb	45.7
Freeridership rate	9.70%
Spillover rate	3.70%
NTG Ratio	93.7%
Net kW per bulb	0.0055
Net kWh per bulb	42.8
Measure Life[7]	5 years
EUL net kWh per bulb	214

Survey Data

Property managers were asked how many CFLs distributed through Duke Energy's Property Manager CFL program they had installed in light fixtures. Additional, more specific information was collected through a phone survey of their tenants for a maximum of three bulbs, including the location of the CFL, the type and wattage of the bulb that it replaced, and the average hours per day that it is in use. TecMarket Works conducted the phone survey with a random sample of 45 tenants from Ohio between April 18, 2012 and May 23, 2012. The compilation of this data is presented in Table 34 in its unadjusted form; that is before the self-reporting bias is applied to the hours of use. The adjusted values appear in Table 36.

Table 34. Unadjusted CFL Survey Data

Room Type	Number of Installations	Average Wattage of Bulb Removed	Average Daily Hours of Use (Old)	Average Daily Hours of Use (New)
Other bedroom	4	68	3.25	3.25
Dining room	16	65	3.38	3.00
Hall	8	47	2.31	2.31
Kitchen	28	59	4.61	4.61
Living or family room	17	59	4.56	4.74
Master bedroom	18	61	4.72	4.78
Bathroom	21	60	2.42	2.62
Closet	4	51	1.00	1.00
Other	9	66	4.06	4.28
AVERAGE/TOTAL	**125**	**59.73[8]**	**3.75**	**3.78**

[7] Consistent with prior evaluations of CFL programs for Duke Energy, a measure life of five years was used for installed CFLs. No derate was performed for post-EISA years.

Figure 29 graphically shows the prevalence of CFL installations in each room type in ascending order.

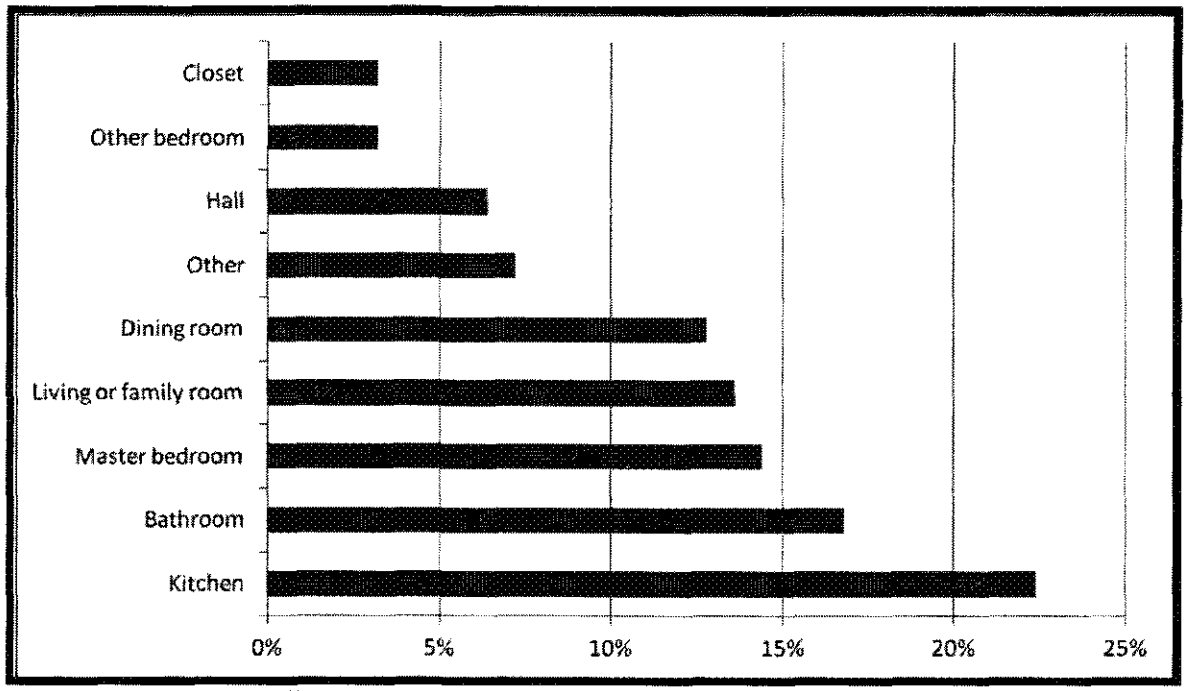

Figure 29. Percent of CFL Installations by Room Type

Self-Reporting Bias

A lighting logger study was attempted for this program. Efforts were discontinued during the recruitment phase as response rates were extremely low. Previous studies that have included both customer surveys and lighting loggers have shown that, comparing customers' self-reported hours of operation to the actual hours of operation, customers responding to the survey overestimated their lighting usage by about 27%[9]. As this study did not employ lighting loggers, there is no data with which to make a comparison for this program specifically. Consequently, the self-reported hours of use obtained from the survey were reduced by the 27% established through the collection of data from previous programs.

[8] The overall average wattage of the bulb removed is a weighted average that uses CFL installation distribution data from the entire survey population to assign weights. As this data was collected from the tenants, and not the property managers that did the installations, there is the potential for distorted results. However, TecMarket Works believes this to be a valid estimate of baseline wattage. This is consistent with the manufacturer-specified wattage equivalencies which show that 13-15 watt CFLs output approximately the same lumens as a 60 watt incandescent (around 800 lm).

[9] TecMarket Works and Building Metrics. "Duke Residential Smart $aver® CFL Program in North Carolina and South Carolina". February 15, 2011. Pg. 35.

Impact Estimates

Customers were asked if they had increased or decreased their lighting usage since installing the CFLs they received through the program. The weighted average self reported hours of use going from an incandescent bulb to a CFL were nearly identical. Table 35 shows the weighted average of the unadjusted hours of use values along with the updated weighted average values after the self-reporting bias is applied. The final value for average daily hours of use is 2.74 and 2.76 for incandescent bulbs and CFLs respectively.

Table 35. Adjusted Average Daily Hours of Use

Adjustment	Magnitude of Adjustment	Average Daily Hours of Use (Incandescent)	Average Daily Hours of Use (CFL)
Unadjusted	N/A	4.04	4.03
Self-Reporting Bias	27%	2.74	2.76

Applying this bias to each individual room type allows a look at hours of use and bulb savings by room type. However, savings estimates at the room type level are unreliable and should not be used in any calculations.

Table 36. Adjusted CFL Survey Data with Gross Savings by Room Type

Room Type	Number of Installations	Average Wattage of Bulb Removed	Average Daily Hours of Use (Old)	Average Daily Hours of Use (New)	kWh per Bulb	kW per Bulb
Other bedroom	4	68	2.37	2.37	46.94	0.0070
Dining room	16	65	2.46	2.19	47.45	0.0066
Hall	8	47	1.69	1.69	20.70	0.0043
Kitchen	28	59	3.36	3.36	55.78	0.0059
Living or family room	17	59	3.33	3.46	54.88	0.0059
Master bedroom	18	61	3.45	3.49	59.45	0.0061
Bathroom	21	60	1.76	1.91	29.31	0.0060
Closet	4	51	0.73	0.73	10.02	0.0049
Other	9	66	2.96	3.12	55.90	0.0068

Appendix A: Management Interview Instrument

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the [STATE NAME] Property Managers CFL campaign. We'll talk about only this specific campaign and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about an hour to complete. May we begin?

General Description of Program

1. Describe the [STATE NAME] Property Managers CFL campaign. How has the program changed since it was it first started?

Program Objectives

2. In your own words, please describe the [STATE NAME] Property Managers CFL campaign's current objectives. How have these changed over time?

3. In your opinion, which objectives do you think are best being met or will be met?

4. Are there any program objectives that are not being addressed or not being addressed as well as possible 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?

5. Should the program objectives be changed in any way due to technology-based, market-based, or management based conditions? What objectives would you change? What program changes would you put into place as a result, and how would it affect program operations?

Operational Efficiency (Manager's Role)

6. Please describe your role and scope of responsibility in detail. What is it that you are responsible for as it relates to this program? When did you take on this role? *If a recent change in management*...Do you feel that Duke Energy gave you enough time to adequately prepare to manage this program? Did you get all the support that you needed to manage this program?

7. Please review with us how the [STATE NAME] Property Managers CFL campaign operates relative to your duties, that is, please walk us through the processes and procedures and key events that allow you do currently fulfill your duties.

8. Have any recent changes been made to your duties? If so, please tell us what changes were made and why they were made. What are the results of the change?

Program Design & Implementation

Property Manager Practices

9. *(If not captured earlier)* Please explain how the interactions between the property managers, tentants and the Duke [STATE NAME] Property Managers CFL campaign management team work. Do you think these interactions or means of communication should be changed in any way? If so, how and why?

10. Describe your quality control and tracking process.

11. Are key industry experts, trade professionals or peers used for assessing what the technologies or models should be included in the program? If so, how does this work?

12. Are key industry experts and trade professionals used in other advisory roles such as market or marketing experts or industry professionals? If so how does this work and what kind of support is obtained?

13. Describe the training and development orientation used to train the property managers for the [STATE NAME] Property Managers CFL campaign. Are property managers getting adequate program information? What can be done that could help improve property manager effectiveness? Can we obtain any informational materials that are being used?

Market Info

14. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?

15. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?

16. Anything on the horizon that you think will impact the sales or use of CFL or incandescent bulbs? What is that and how do you think it will affect your program

Overall Strengths, Needs, and Suggestions

17. Overall, what about the [STATE] Property Managers CFL campaign works well and why?

18. What doesn't work well and why? Do you think this discourages participation or interest?

19. Do you have suggestions for improvements to the program that would increase participation rates or interest levels?

20. Do you have suggestions for the making the program operate more smoothly or effectively?

21. Do you have suggestions for improving or increasing energy impacts?

Operational, Market, & Technical Barriers and Suggestions

22. Can you identify any market, operational or technical barriers that impede a more efficient program operation?

23. In what ways can these operations or operational efficiencies be improved?

Attracting More Participation (Suggestions)

24. In what ways can the program attract more property managers?

25. In what ways can the program attract more tenant/household participation?

Assessment Basis

26. How do you make sure that the best information and practices are being used in the [STATE NAME] Property Managers CFL campaign?

27. *(If not collected in #14 or other above)* What market information, research or market assessments are you using to determine the best target markets and program opportunities, market barriers, delivery mechanisms and program approach?

Closing Suggestions and Comments

28. If you could change any one thing about the program, what would you change and why?

29. Are there any other issues or topics you think we should know about and discuss for this evaluation?

Appendix B: CFL Property Manager Survey Instrument

We are conducting this interview to obtain your opinions about and experiences with the Duke Energy CFL campaign in [*State Name*]. We'll talk about your understanding of the CFL campaign and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about 20-30 minutes to complete. May we begin?

Identification:*

Survey ID: _____

Name: _____

Title: _____

Company: _____

Address: _____

City: _____

State: _____

Zip: _____

Phone: _____

Email: _____

Position description and general responsibilities:

_____

Program Design and Design Assistance

1. Of the ## CFLs that Duke sent to you, how many do you think have been installed?
(fill in as number if close estimate is possible): _____
(fill in as estimated percentage if number is not readily recalled): _____
Not Sure *(enter NS)*: _____

2. Was the number of bulbs appropriate?
( ) Yes
( ) No *ask:* **What should it be?**: _____
( ) Not sure

3. How many bulbs do you typically order per one bedroom unit?
( ) 0
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10
( ) 11
( ) 12+
( ) Don't have units of this size

4. How many bulbs do you typically order per two bedroom unit?

( ) 0
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10
( ) 11
( ) 12+
( ) Don't have units of this size

5. How many bulbs do you typically order per three bedroom unit?

( ) 0
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10
( ) 11
( ) 12+
( ) Don't have units of this size

6. Of the bulbs you order, on average how many bulbs do you eventually install per unit?

( ) All that were ordered for that unit

( ) One less than ordered for that unit

( ) Two less than ordered for that unit

( ) Three less than ordered for that unit

( ) More than three less than ordered for that unit

( ) Don't know / Not sure

7. Do you feel that the proper CFLs (wattage, size, etc) are being covered through the program?

( ) Yes

( ) No *ask:* **Why?**: _____

( ) Not sure

8. Are there other types of bulbs that you think should be included in the program? If so, what are they?

[ ] No

[ ] Higher watt equivalent

[ ] Lower watt equivalent

[ ] Dimmable bulbs

[ ] Outdoor flood bulbs

[ ] Three-way bulbs

[ ] Spotlight bulbs

[ ] Recessed bulbs

[ ] Candelabra bulbs

[ ] Other

[ ] Don't Know / Not Sure

9. Are there other energy efficient products that you think should be included in the program? If so, what are they?

[ ] No

[ ] Power strips

[ ] Weather stripping

[ ] Door sweeps

[ ] Programmable thermostats

[ ] Water heater blankets

[ ] Other *(please specify:)*

[ ] Don't Know / Not Sure

Reasons for Participation in the Program

We would like to better understand why property managers become partners in the Duke Energy CFL campaign in [*State Name*].

10. How long have you been a partner in the Duke Energy CFL campaign?

( ) Less than 3 months

( ) 3-6 months

( ) 6-12 months

( ) 12-18 months

( ) Longer than 18 months

( ) Don't Know / Not Sure

11. What are your primary reasons for becoming involved in the program? Why do you continue to be a partner?

(Check all that apply)

[ ] Your company told you to

[ ] It provides a service to your tenants

[ ] It's something you believe in professionally

[ ] It's a wise business move

[ ] It saves money

[ ] It's good for the environment

[ ] Other

[ ] Don't Know / Not Sure

12. Are your primary reasons for participation being met?

( ) Yes

( ) No - *ask:* **Why?:** _____

13. Has this program made a difference in your business? How?

14. How do you think Duke Energy can get more property managers to participate in this program?
(Check all that apply)

[ ] Free shipping

[ ] Hire someone to do the bulb installations

[ ] Simpler sign up process *(Ask how to improve.)*

[ ] Easier bulb ordering process *(Ask how to improve.)*

[ ] Allow bulbs to be installed in common areas

[ ] Different bulb types

[ ] Schedule during slow periods for easier workflow

[ ] Longer time to do the installs *(Ask how much longer.)*

[ ] Allow bulb replacements as units become vacant instead of all at once

[ ] Simpler documentation process *(Ask how to improve.)*

[ ] Easier extra bulb return process *(Ask how to improve.)*

[ ] Better marketing to property managers *(Ask how to improve.)*

[ ] Better materials for tenants

[ ] Other *(Ask to specify.)*

[ ] Don't Know / Not Sure

Program Participation Experiences

The next questions ask about the process for participation.

15. Do you think the bulb ordering and shipping process could be improved in any way? How?

16. Do you feel that the lead time, ordering support, and training provided by Duke Energy, Niagra, or Honeywell was adequate? Did you receive any support, what did you receive, was it helpful, would you change any of this?

17. How do you make tenants aware of the CFL Program?
[ ] Use the form letter provided
[ ] Use our own letter
[ ] Post notice in common areas
[ ] Phone calls
[ ] Emails
[ ] Public meetings
[ ] Newsletter
[ ] I don't inform them
[ ] No formal process
[ ] Other

18. Do tenants generally respond favorably or unfavorably?
[ ] Favorably
[ ] Unfavorably
[ ] Don't know

19. Do you have the right amount of materials such as information sheets, brochures or marketing materials that you need to understand the benefits of the bulbs and discuss them effectively with your tenants?
( ) Yes
( ) No *ask:* **What else do you need?:** _____
( ) I don't use them
( ) I don't discuss this with tenants

20. Please describe the process you used to install the new bulbs. What challenges did you have with the installation process? What could be improved? What worked well?

21. Did you install the full amount of (#) bulbs in each unit? If not, why?
[ ] Yes

[ ] No, only replaced burned out bulbs

[ ] No, not existing CFLs

[ ] No, only at tenant request

[ ] No, other *(specify)*

[ ] Don't Know / Not Sure

21a. If you did not install the full amount of bulbs, what happened to the bulbs that didn't make it into sockets?
[ ] Returned

[ ] Still in storage

[ ] Installed in common areas such as hallways, parking garages, laundry rooms, fitness rooms, etc.

[ ] Given to tenants for future use

[ ] Took them home

[ ] Other *(specify)*

[ ] Don't Know / Not Sure

22. Overall, what about the Duke Energy CFL campaign do you think works well and why?
(Check all that apply)

[ ] Sign up process

[ ] Ordering process

[ ] Variety of bulbs

[ ] Shipping costs

[ ] Shipping process

[ ] Property manager training

[ ] Tenant leave behind materials

[ ] Installation checklists

[ ] Documentation / reporting process

[ ] Communication with Honeywell

[ ] Communication with Duke

[ ] Follow up process

[ ] Other *(specify)*

[ ] Don't Know / Not Sure

23. What changes would you suggest to improve the program?
(Check all that apply)

[ ] Free shipping

[ ] Hire someone do the bulb installations

[ ] Better website *(ask how to improve?)*

[ ] Simpler sign up process *(ask how to improve?)*

[ ] Easier bulb ordering process *(ask how to improve?)*

[ ] Allow bulbs to be installed in common areas

[ ] Different bulb types

[ ] Schedule during slow periods for easier workflow *(ask when?)*

[ ] Longer time to do the installs *(ask how much longer?)*

[ ] Allow bulb replacements as units become vacant instead of all at once

[ ] Simpler documentation process *(ask how to improve?)*

[ ] Easier extra bulb return process *(ask how to improve?)*

[ ] Better marketing to property managers *(ask how to improve?)*

[ ] More / better materials for tenants *(ask how to improve)*

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

24. Do you feel that communications between you and Duke/Honeywell program staff is adequate? How might this be improved?
(check all that apply)

[ ] Fine as is

[ ] Ask my preference for how to be contacted

[ ] Faster / more responsive communication

[ ] More email communications

[ ] Other *(specify)*

[ ] Don't Know / Not Sure

25. What specific benefits do you and your company receive as a result of participating in this CFL campaign?
(check all that apply)

[ ] Improves image by doing something to save tenants money

[ ] Improves image by doing something for environment

[ ] Improves relations with existing tenants

[ ] Makes it easier to attract new tenants

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

26. What do you think are the primary benefits to the tenants who have CFLs installed as part of this campaign?

[ ] They save money on purchasing the bulbs

[ ] Lower monthly bills

[ ] Improved lighting quality

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

27. Have you heard any tenant feedback about the bulbs or the program? What have you heard?
(check all that apply)

[ ] Like the program

[ ] Don't like the program

[ ] Like the bulbs

[ ] Don't like the bulbs

[ ] Like the lighting quality

[ ] Don't like the lighting quality

[ ] Liked the installation process

[ ] Didn't like the installation process

[ ] Appreciate saving money by not purchasing the bulbs themselves

[ ] Lower monthly bills

[ ] Positive impression of Duke Energy

[ ] Negative impression of Duke Energy

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

28. If you were rating your overall satisfaction with the CFL Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?

( ) Very Satisfied

( ) Somewhat Satisfied

( ) Neither Satisfied nor Dissatisfied

( ) Somewhat Dissatisfied

( ) Very Dissatisfied

( ) Refused

( ) Don't Know

28a. Why do you give it that rating?

Standard Practice vs. Duke Energy coupon campaign CFL Practices

We would like to know what your bulb replacement practices were before your involvement in the Duke Energy CFL campaign.

29. Prior to your participation in this program what was your standard practice for bulb replacement?
(check all that apply)

[ ] Replaced burned out bulbs after tenants moved out

[ ] Replaced burned out bulbs as needed/upon request

[ ] Replaced burned out bulbs according to maintenance schedule

[ ] Didn't replace bulbs / Tenant responsibility

[ ] No standard practice

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

30. What wattage bulbs did you typically use before?
(check all that apply)

[ ] Incandescent 40 watt

[ ] Incandescent 60 watt

[ ] Incandescent 75 watt

[ ] Incandescent 100 watt

[ ] Incandescent >100 watt

[ ] CFL 9-13 watt (40 watt equivalent)

[ ] CFL 13-15 watt (60 watt equivalent)

[ ] CFL 18-25 watt (75 watt equivalent)

[ ] CFL 23-30 watt (100 watt equivalent)

[ ] CFL 30-52 watt (150 watt equivalent)

[ ] No standard bulbs

[ ] Other *(please specify)*

[ ] Don't Know / Not Sure

31. Have you changed your standard process for bulb replacement after participating in this program?

( ) Yes (*ask* **How?**): _____

( ) No

32. Would you have provided or installed CFLs without the program?

( ) Yes

( ) No

( ) Other *(please specify)*: _____

( ) Don't Know / Not Sure

33. If the program were to be discontinued, would you continue to provide the CFLs?

( ) Yes

( ) No (*ask* **Why?**): _____

( ) Other *(please specify)*: _____

( ) Don't Know / Not Sure

34. In your opinion is the Duke Energy CFL campaign needed to get people to buy and use more efficient bulbs? Why?
( ) Yes (*ask* **Why?**): _____
( ) No (*ask* **Why?**): _____

On a scale from 1-10, with 1 indicating that you were very dissatisfied, and 10 indicating that you were very satisfied, please rate your satisfaction with…

35. The Property Manager CFL program
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10
( ) DK/NS

If 7 or less to q35 (NC and SC only),

35a. How could this be improved?

36. …Duke Energy overall.
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5

( ) 6
( ) 7
( ) 8
( ) 9
( ) 10
( ) DK/NS

If 7 or less to q36

36a. How could this be improved?

Property Information

We're just about done. We just need to ask you some questions about your units.

37. What year were your units built?
( ) 1959 and before
( ) 1960-1979
( ) 1980-1989
( ) 1990-1997
( ) 1998-2000
( ) 2001-2007
( ) 2008-present
( ) Don't Know

38. Which of the following best describes your units' heating systems?
( ) **None**
( ) Individual forced air furnace
( ) Electric Baseboard
( ) Heat Pump
( ) Geothermal Heat Pump
( ) Shared central heating
( ) Other *(please specify)*: _____

39. How old are your heating systems?
(mark all that apply)

[ ] 0-4 years

[ ] 5-9 years

[ ] 10-14 years

[ ] 15-19 years

[ ] 19 years or older

[ ] DK/NS

[ ] Do not have

[ ] Other

40. What is the primary fuel used in your heating systems?
( ) Electricity

( ) Natural Gas

( ) Oil

( ) Propane

( ) Other: _____

( ) None

41. What is the secondary fuel used in the heating system, if applicable?
( ) Electricity

( ) Natural Gas

( ) Oil

( ) Propane

( ) Other: _____

( ) None

42. Do you use one or more of the following to cool your units? (Mark all that apply)
[ ] None, do not cool the units

[ ] Through the wall or window air conditioning unit

[ ] Individual central air conditioning

[ ] Shared central air conditioning

[ ] Heat pump for cooling

[ ] Geothermal Heat pump

[ ] Other

43. What is the fuel used in the cooling systems?

[ ] Electricity

[ ] Natural Gas

[ ] Oil

[ ] Propane

[ ] Other

[ ] None

44. How old are your cooling systems?
(Mark all that apply)

[ ] 0-4 years

[ ] 5-9 years

[ ] 10-14 years

[ ] 15-19 years

[ ] 19 years or older

[ ] Don't know

[ ] Do not have

[ ] Other

45. What is the fuel used by your water heaters?
(Mark all that apply)

[ ] Electricity

[ ] Natural Gas

[ ] Oil

[ ] Propane

[ ] Other

[ ] No water heaters

46. How old are your water heaters?
(Mark all that apply)

[ ] 0-4 years

[ ] 5-9 years

[ ] 10-14 years

[ ] 15-19 years

[ ] 19 years or older

[ ] Don't know

[ ] Do not have

[ ] Other

47. Do your units have clothes dryers?
(Mark all that apply)

[ ] Yes, individual dryers in units

[ ] Yes, shared dryers in common areas

[ ] Some units have individual dryers. Others do not

[ ] No, there are no dryers

[ ] Other

[ ] Don't know / Not sure

48. What type of fuel do you use for clothes drying?
(Mark all that apply)

[ ] Electricity

[ ] Natural Gas

[ ] Oil

[ ] Propane

[ ] Other

[ ] No clothes dryers

[ ] DK/NS

49. About how many square feet of living space are in your units?

(Mark all that apply)
(Do not include garages or other unheated areas)
Note: A 10-foot by 12 foot room is 120 square feet

[ ] Less than 500

[ ] 500 – 999

[ ] 1000 – 1499

[ ] 1500 – 1999

[ ] 2000 – 2499

[ ] 2500 – 2999

[ ] 3000 – 3499

[ ] 3500 – 3999

[ ] 4000 or more

[ ] Don't know

50. Do your units have heated or unheated basements?
(Mark all that apply)

[ ] Heated

[ ] Unheated

[ ] No basements

[ ] Don't know / Not sure

To help improve our evaluation of this program, we are looking for property managers to provide us with a list of bulbs being used in the buildings they manage. We will provide a $50 Visa card in exchange for your tracking of the wattage of any bulb replaced for one month. We will provide a form to you and will be available to answer any questions that you have during the course of the study. Would you be interested in participating in this study?

( ) Yes - **Someone will be in touch with you in the next two weeks.**

( ) No - *thank them for their time.*

notes to self

Thank You!
Thank you for taking our survey. Your response is very important to us.

Appendix C: Tenant Survey Instrument

Smart $aver Residential Energy Efficiency CFLs - Tenant Survey

INSTRUMENT

Introduction

Target 80 in Ohio, 40 in SC, 40 in NC

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. Eastern, or 9-7 Central Monday through Saturday. No calls on Sunday.

Note: Only read words in bold type.

for answering machine 1st through penultimate attempts:

Hello, my name is [name] and I am calling with a survey about the CFLs that your landlord installed. I'm sorry I missed you. I'll try again another time.

for answering machine - Final Attempt:

Hello, my name is [name] and I am calling with a survey about the CFLs that your landlord installed. This is my last attempt at reaching you, my apologies for any inconvenience.

if person answers

Hello, my name is _____. May I speak with _____ please?

I am calling on behalf of Duke Energy to conduct a customer survey about a program offered by Duke Energy where your landlord installed compact fluorescent lightbulbs (or CFLs) in your apartment.

We are conducting this survey to get feedback on what happened to the CFLs installed, which may have been installed before you moved in. We are not selling anything, there are no wrong answers, and your responses to our survey questions will be combined with other responses and used to help us make improvements to the program.

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

State*
( ) Ohio

( ) North Carolina

( ) South Carolina

Survey Identification*

Surveyor Name: _____

Survey ID: _____

1. I'd like to talk about the CFLs installed in your home through this program. Our records indicate that your landlord installed (#) CFLs, is this correct?*

( ) Yes

( ) I think so / probably

( ) No

( ) Don't Know

2. How many of the CFLs are now installed in the permanent light fixtures in your home?*

Enter -99 for Don't know, Not sure, or Refused

_____

Questions about 3 installed CFLs

"Now I'm going to ask you about some of the CFL bulbs installed in your home..."
(Repeat Q3 a to e for up to 3 installed bulbs)

3. For the first CFL, in which room was the bulb installed?

( ) Living / family room

( ) Dining room

( ) Kitchen

( ) Master bedroom

( ) Bedroom 2
( ) Bedroom 3 or other bedroom
( ) Hall
( ) Closet
( ) Basement
( ) Garage
( ) Bathroom
( ) Other: _____

3a. Was the previously installed bulb a standard bulb or a CFL?
( ) Standard Incandescent
( ) I had a CFL installed there
( ) There was no bulb in the socket
( ) New CFL bulb was in place when I moved in
( ) Don't know/Don't remember – *ask if it was installed when they moved in*

3b. How many watts was the old bulb that was removed?
( ) Less than 44
( ) 45-70
( ) 71-99
( ) 100 or more
( ) There was no bulb in the socket
( ) DK/NS

3c. What did you do with the incandescent you removed?
( ) Recycled It
( ) Threw it away
( ) Stored it
( ) Installer removed it
( ) DK/NS

3d. On average, approximately how many hours per day is this light used?
( ) Less than 1

( ) 1 to 2

( ) 3 to 4

( ) 5 to 10

( ) 11 to 12

( ) 13 to 24

( ) DK/NS

3e. Did the hours of use for this fixture increase, decrease or stay the same since you replaced the old bulb with the CFL?

( ) Increased (*ask:* **How many hours per day?**): _____

( ) Decreased (*ask:* **How many hours per day?**): _____

( ) Stayed the same

( ) The bulb has been in place since I moved in

( ) DK/NS

( ) Not Applicable

Second Bulb

3~. For the second CFL, in which room was the bulb installed?

( ) Living / family room

( ) Dining room

( ) Kitchen

( ) Master bedroom

( ) Bedroom 2

( ) Bedroom 3 or other bedroom

( ) Hall

( ) Closet

( ) Basement

( ) Garage

( ) Bathroom

( ) Other: _____

3a~. Was the previously installed bulb a standard bulb or a CFL?

( ) Standard Incandescent

( ) I had a CFL installed there

( ) There was no bulb in the socket

( ) New CFL bulb was in place when I moved in

( ) Don't know/Don't remember – *ask if it was installed when they moved in*

3b~. How many watts was the old bulb that was removed?

( ) Less than 44

( ) 45-70

( ) 71-99

( ) 100 or more

( ) There was no bulb in the socket

( ) DK/NS

3c~. What did you do with the incandescent you removed?

( ) Recycled It

( ) Threw it away

( ) Stored it

( ) Installer removed it

( ) DK/NS

3d~. On average, approximately how many hours per day is this light used?

( ) Less than 1

( ) 1 to 2

( ) 3 to 4

( ) 5 to 10

( ) 11 to 12

( ) 13 to 24

( ) DK/NS

3e~. Did the hours of use for this fixture increase, decrease or stay the same since you replaced the old bulb with the CFL?

( ) Increased (*ask:* **How many hours per day?**): _____

( ) Decreased (*ask:* **How many hours per day?**): _____

( ) Stayed the same

( ) The bulb has been in place since I moved in

( ) DK/NS

( ) Not Applicable

Third Bulb

3-. For the third CFL, in which room was the bulb installed?

( ) Living / family room

( ) Dining room

( ) Kitchen

( ) Master bedroom

( ) Bedroom 2

( ) Bedroom 3 or other bedroom

( ) Hall

( ) Closet

( ) Basement

( ) Garage

( ) Bathroom

( ) Other: _____

3a- Was the previously installed bulb a standard bulb or a CFL?

( ) Standard Incandescent

( ) I had a CFL installed there

( ) There was no bulb in the socket

( ) New CFL bulb was in place when I moved in

( ) Don't know/Don't remember – *ask if it was installed when they moved in*

3b- How many watts was the old bulb that was removed?

( ) Less than 44

( ) 45-70

( ) 71-99

( ) 100 or more

( ) DK/NS

3c- What did you do with the incandescent you removed?

( ) Recycled It

( ) Threw it away

( ) Stored it

( ) Installer removed it

( ) DK/NS

3d- On average, approximately how many hours per day is this light used?

( ) Less than 1

( ) 1 to 2

( ) 3 to 4

( ) 5 to 10

( ) 11 to 12

( ) 13 to 24

( ) DK/NS

3e- Did the hours of use for this fixture increase, decrease or stay the same since you replaced the old bulb with the CFL?

( ) Increased (*ask:* **How many hours per day?**): _____

( ) Decreased (*ask:* **How many hours per day?**): _____

( ) Stayed the same

( ) The bulb has been in place since I moved in

( ) DK/NS

( ) Not Applicable

Satisfaction

4. How many standard incandescent bulbs do you have in storage to replace bulbs that burn out?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7 – 11

( ) 12+

( ) DK/NS

5. Have you removed or replaced any of the CFLs?*

[ ] Yes, my property manager replaced them with one or more CFLs from the company's supply of bulbs (*ask:* **How many?**)

[ ] Yes, my property manager replaced them with one or more normal incandescent bulbs from the company's supply of bulbs (*ask:* **How many?**)

[ ] Yes, I replaced them with one or more CFLs of my own (*ask:* **How many?**)

[ ] Yes, I replaced them with one or more normal incandescent bulbs of my own (*ask:* **How many?**)

[ ] Left the socket empty

[ ] No

[ ] Don't know / Not sure

5a. Why did you remove or replace them?

[ ] Not bright enough

[ ] Did not like the color of the light

[ ] The light was too bright

[ ] Too slow to start

[ ] Burned out

[ ] Not working properly

[ ] Did not like appearance / shape of the bulbs

[ ] Other

6. On a 1-to-10 scale with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with the light quality of your free CFLs.*

( ) very dissatisfied
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very satisfied
10

( ) DK/NS

If 7 or less.

6a. Why were you less than satisfied with the light quality?

_____

7. On a 1-to-10 scale with 1 being very dissatisfied and 10 being very satisfied, please rate your satisfaction with the overall bulb quality of your free CFLs.*

( ) very dissatisfied
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very satisfied
10

( ) DK/NS

If 7 or less.

7a.Why were you less than satisfied with the quality of the CFLs?

_____

8. On a scale from 1-10, with 1 indicating that you were very dissatisfied, and 10 indicating that you were very satisfied, please rate your satisfaction with the direct install CFL program?*

( ) very dissatisfied
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very satisfied
10

( ) DK/NS

If 7 or less (NC and SC only),

8a. How could this be improved?

_____

9. On a scale from 1-10, with 1 indicating that you were very dissatisfied, and 10 indicating that you were very satisfied, please rate your satisfaction with Duke Energy overall?*

( ) very dissatisfied
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very satisfied
10

( ) DK/NS

If 7 or less (NC and SC only),

9a. How could this be improved?

_____

More questions about CFLs

10. If you were rating your overall satisfaction with the CFL Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?

(Ohio only)

( ) Very Satisfied

( ) Somewhat Satisfied

( ) Neither Satisfied nor Dissatisfied

( ) Somewhat Dissatisfied

( ) Very Dissatisfied

( ) Refused

( ) Don't Know

(Ohio only)

11. Why do you give it that rating?

_____

12. Before you received these free CFLs from Duke Energy had you already installed CFLs in your home?*

( ) CFL bulbs were installed before I moved in

( ) Yes, I installed one or more CFL bulbs

( ) No

( ) Don't Know / Not sure

12a. How many CFLs were you using in your home before your property manager had the new bulbs installed?

_____

13. How many years have you been using CFLs?*

( ) Never purchased before

( ) 1 year or less

( ) >1 to 2 years

( ) >2 to 3 years

( ) >3 to 4 years

( ) 4 or more years

14. Did your experience with the CFLs provided by the Duke Energy Free CFL program make it more or less likely that you would purchase and install CFLs in the future when these eventually burn out?*

( ) More likely

( ) Less likely

( ) Neither more nor less likely

14a. Why are you more likely to use CFLs in the future?

14b. Why are you less likely to use CFLs in the future?

15. Have you purchased any additional CFLs since receiving the free CFLs?*

( ) Yes

( ) No

( ) Don't Know / Not Sure

15a. How many did you purchase?

*Enter **-99** for Don't know, Not sure, or Refused*

_____

15b. How many of those are you currently using?

*Enter **-99** for Don't know, Not sure, or Refused*

_____

15c. Using a 1 to 10 scale, with 1 meaning that the Duke program had no influence, and a 10 to mean that the Duke program was very influential, please rate the influence of the Duke Energy free CFL program on your decision to purchase additional CFLs.

( ) Not at all influential
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very influential
10

( ) DK/NS

15d. On a 1-to-10 scale with 1 being very unlikely and 10 being very likely, please rate your likelihood of buying and using CFLs in the future:

( ) very unlikely
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very likely
10

( ) DK/NS

Non-CFLs installed?

16. What is your best estimate of the number of bulbs installed in your home that are not CFLs?*

*Enter **-99** for Don't know, Not sure, or Refused*

_____

17. How many of these non-CFL bulbs are in sockets that are typically used for more than 2 hours a day?*

*Enter **-99** for Don't know, Not sure, or Refused*

_____

18. Please list the number of CFL and non-CFL bulbs currently installed in your home that are specialty bulbs such as dimmable bulbs, three-way bulbs, recessed, flood or directional lights, candelabra lights or other non-standard bulbs.

Enter -99 for Don't know, Not sure, or Refused

	CFLs	non-CFLs
Dimmable bulbs	___	___
Outdoor flood bulbs	___	___
Three-way bulbs	___	___
Spotlight bulbs	___	___
Recessed bulbs	___	___
Candelabra bulbs	___	___
Other *(specify below)*	___	___

19. What other type of specialty bulb?

_____

NOTE: the next page asks about the customer's interest in potential CFL programs. half the time the questions will ask about FREE CFLs, and the other half the questions will be about DISCOUNT CFLs. SurveyGizmo randomizes the choice, just make sure you get the Free vs Discount part correct

---

Interest in FREE CFLs

We would like to know if the direct installation of CFLs in your home made you more likely or less likely to obtain and use CFLs compared to several other methods:

20. On a 1-to-10 scale with 1 being very unlikely and 10 being very likely, please rate your likelihood of participating in a CFL program that:*

	1	2	3	4	5	6	7	8	9	10	DK/NS
a. Offers free CFLs by direct-mail sent to your home	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

b. Offers free CFLs through a retailer or store coupon	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Offers free CFLs through a manufacturers coupon that can be used at any store where that brand is sold	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Offers free CFLs at a stand at a community event such as a fair	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Offers free CFLs at a stand in a public parking lot	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. Offers free CFLs through an online vendor such as Amazon.com	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

Interest in DISCOUNT CFLs

We would like to know if the direct installation of CFLs in your home made you more likely or less likely to obtain and use CFLs compared to several other methods:

21. On a 1-to-10 scale with 1 being very unlikely and 10 being very likely, please rate your likelihood of participating in a CFL program that:*

	1	2	3	4	5	6	7	8	9	10	DK/NS
a. Offers discount CFLs by	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

direct-mail sent to your home											
b. Offers discount CFLs through a retailer or store coupon	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Offers discount CFLs through a manufacturers coupon that can be used at any store where that brand is sold	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Offers discount CFLs at a stand at a community event such as a fair	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Offers discount CFLs at a stand in a public parking lot	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. Offers discount CFLs through an online vendor such as Amazon.com	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

Importance of bulb characteristics

22. On a 1-to-10 scale with 1 being not at all important and 10 being very important, please rate the importance of each of the following characteristics on choosing a lightbulb for your home*

	1	2	3	4	5	6	7	8	9	10	DK/NS
a. Mercury content of the bulb	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
b. Ability to dim the lighting level	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
c. Speed of which the bulb comes up to full lighting level	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
d. Purchase price of the bulb	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
e. Availability of the bulb in stores you normally shop	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
f. Selection of wattage and light output levels available	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
g. Cost savings on your utility bill	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
h. Energy savings	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
i. Attractiveness or appearance of the bulb	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
j. Recommendations from family and friends	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
k. Recommendations from the utility company	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
l. Availability of utility programs or services that offer the bulbs to you directly	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
m. Ease of bulb disposal	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

23. On a scale from 1-10, with 1 indicating not at all interested and 10 indicating very interested, please rate your interest in Duke Energy providing a direct mail specialty CFL program that ships discounted specialty bulbs directly to your home:*

( ) Not at all interested
1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) very interested
10

( ) DK/NS

24. Since you received the free CFLs from Duke Energy, have you made energy efficiency improvements in your home, such as...?*

(read all choices)

[ ] **Wall or ceiling insulation**

[ ] Caulking

[ ] Faucet aerators

[ ] Outlet or switch gaskets

[ ] Low flow showerhead

[ ] Programmable thermostat

[ ] Weatherstripping

[ ] None of these

25. Since you received the free CFLs from Duke Energy, have you changed any of your habits related to energy use?*

( ) Yes

( ) No

( ) DK/NS

If YES to question 25, ask:

25a. What have you changed?

26. Why do you believe that Duke Energy is providing free CFLs to their customers?*

[ ] Duke Energy wants to save their customers money

[ ] Duke Energy wants to save energy for environmental reasons

[ ] Duke Energy wants to save energy for economic reasons

[ ] Duke Energy wants to look good (PR)

[ ] The government is forcing Duke Energy to do it

[ ] Other *(specify)*

Demographics

Finally, we have some general information questions...

27. In what type of building do you live?*

( ) Two or Three family attached residence-traditional structure

( ) Apartment (4 + families)---traditional structure

( ) Condominium---traditional structure

( ) Other

( ) Refused

( ) Don't Know

28. Does your home have cold drafts in the winter?*

( ) Yes

( ) No

29. Does your home have sweaty windows in the winter?*

( ) Yes

( ) No

30. Do you notice uneven temperatures between the rooms in your home?*

( ) Yes

( ) No

31. Does your heating system keep your home comfortable in winter?*

( ) Yes

( ) No

32. Does your cooling system keep your home comfortable in summer?*

( ) Yes

( ) No

33. Do you have a programmable thermostat?*

( ) Yes

( ) No

( ) Don't know

34. What temperature is your thermostat set to on a typical summer weekday afternoon?*

( ) Less than 69 degrees

( ) 69-72 degrees

( ) 73-78 degrees

( ) Higher than 78 degrees

( ) Off

( ) DK/NS

35. What temperature is your thermostat set to on a typical winter weekday afternoon?*

( ) Less than 67 degrees

( ) 67-70 degrees

( ) 71-73 degrees

( ) 74-77 degrees

( ) Higher than 78 degrees

( ) Off

( ) DK/NS

36. Would a two-degree increase in the summer afternoon temperature in your home affect your comfort....*

( ) **Not at all**

( ) **Slightly**

( ) **Moderately**

( ) **Greatly**

37. How many people live in this home?*

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8 or more

( ) Prefer Not to Answer

38. How many people are usually home on a weekday afternoon?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8 or more

( ) Prefer Not to Answer

The following questions are for classification purposes only and will not be used for any other purpose than to help Duke Energy continue to improve service.

Reading the answers is not necessary, but you may read them if they hesitate or seem unsure. Ranges are easier to identify with than specific numbers.

39. What is your age group?*

( ) 18-34

( ) 35-49

( ) 50-59

( ) 60-64

( ) 65-74

( ) Over 74

( ) Prefer Not to Answer

40. Please indicate your annual household income.*

( ) Under $15,000

( ) $15,000-$29,999

( ) $30,000-$49,999

( ) $50,000-$74,999

( ) $75,000-$100,000

( ) Over $100,000

( ) Prefer Not to Answer

We have reached the end of the survey. Do you have any comments that you would like for me to pass on to Duke Energy?

In addition, we are looking for residential customers to participate in a research study in which a Duke Energy representative will visit homes for 20 to 30 minutes and place small lighting monitors on 4 or 5 light fixtures, which would remain in place for 2 to 3 weeks. The monitors are smaller than a bar of soap and help us measure how often lights are turned on and off during the week. We plan on conducting this study in June 2012, and if your home is selected for the study you will receive $50 for participating.

Are you interested in participating?*

( ) Yes

( ) No

If yes, "Interested in participating":

Thank you, a Duke representative will contact you by mid-May to discuss the study in more detail and set up the two appointments to install and remove the light loggers, if you are eligible and available.

Survey ID*

_____

Do you have any comments that you would like to pass on to your supervisor about this survey?

_____

Thank You!

Thank you for your time and feedback today!

(Politely end call)

_____

Appendix D: Impact Algorithms

CFLs

General Algorithm

Gross Summer Coincident Demand Savings

$$\Delta kW = ISR \times units \times \left[\frac{Watts_{base} - Watts_{ee}}{1000}\right] \times CF \times (1 + HVAC_d)$$

Gross Annual Energy Savings

$$\Delta kWh = ISR \times units \times \left[\frac{(Watts \times HOU)_{base} - (Watts \times HOU)_{ee}}{1000}\right] \times 365 \times (1 + HVAC_c)$$

where:

ΔkW	= gross coincident demand savings
ΔkWh	= gross annual energy savings
units	= number of units installed under the program
$Watts_{ee}$	= connected load of energy-efficient unit = 13
$Watts_{base}$	= connected (nameplate) load of baseline unit(s) displaced = 60
HOU	= Mean daily hours of use (based on connected load)
CF	= coincidence factor = 0.11
$HVAC_c$	= HVAC system interaction factor for annual electricity consumption = -0.0058
$HVAC_d$	= HVAC system interaction factor for demand = 0.167

$HVAC_c$ - the HVAC interaction factor for annual energy consumption depends on the HVAC system, heating fuel type, and location. The HVAC interaction factors for annual energy consumption were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The weights were determined through appliance saturation data from the Home Profile Database supplied by Duke Energy.

Covington, KY

Heating Fuel	Heating System	Cooling System	Weight	HVACc	HVACd
Other	Any except Heat Pump	Any except Heat Pump	0.0029	0.079	0.17
		None	0.0002	0	0
Any	Heat Pump	Heat Pump	0.0760	-0.16	0.17
Gas	Central Furnace	None	0.0111	0	0
Propane		Room/Window	0.7571	0.079	0.17
Oil		Central AC		0.079	0.17
Electricity	Electric	None	0.0046	-0.45	0

	baseboard/ central furnace	Room/Window	0.1433	-0.36	0.17
		Central AC		-0.36	0.17
N one	None	Any	0.0049	0	0.17
Total Weighted Mean			1	-0.0058	0.167

$HVAC_d$ - the HVAC interaction factor for demand depends on the cooling system type. The HVAC interaction factors for summer peak demand were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix.

Prototypical Building Model Description

The impact analysis for many of the HVAC related measures are based on DOE-2.2 simulations of a set of prototypical residential buildings. The prototypical simulation models were derived from the residential building prototypes used in the California Database for Energy Efficiency Resources (DEER) study (Itron, 2005), with adjustments make for local building practices and climate. The prototype "model" in fact contains 4 separate residential buildings; 2 one-story and 2 two-story buildings. The each version of the 1 story and 2 story buildings are identical except for the orientation, which is shifted by 90 degrees. The selection of these 4 buildings is designed to give a reasonable mean response of buildings of different design and orientation to the impact of energy efficiency measures. A sketch of the residential prototype buildings is shown in Figure 30.

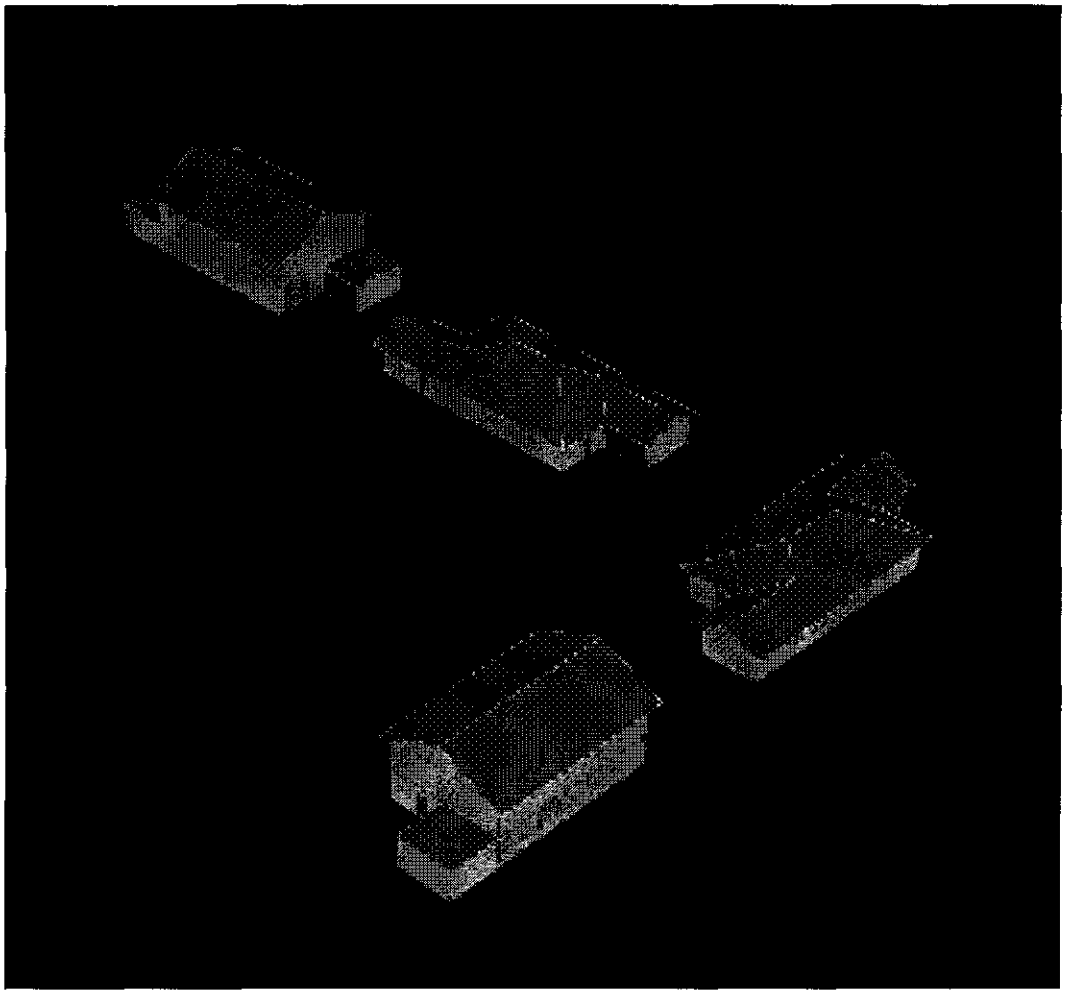

Figure 30. Computer Rendering of Residential Building Prototype Model

The general characteristics of the residential building prototype model are summarized below:

Residential Building Prototype Description

Characteristic	Value
Conditioned floor area	1 story house: 1465 SF 2 story house: 2930 SF
Wall construction and R-value	Wood frame with siding, R-11
Roof construction and R-value	Wood frame with asphalt shingles, R-19
Glazing type	Single pane clear
Lighting and appliance power density	0.51 W/SF mean
HVAC system type	Packaged single zone AC or heat pump
HVAC system size	Based on peak load with 20% oversizing. Mean 640 SF/ton
HVAC system efficiency	SEER = 8.5
Thermostat setpoints	Heating: 70°F with setback to 60°F Cooling: 75°F with setup to 80°F

Characteristic	Value
Duct location	Attic (unconditioned space)
Duct surface area	Single story house: 390 SF supply, 72 SF return Two story house: 505 SF supply, 290 SF return
Duct insulation	Uninsulated
Duct leakage	26%; evenly distributed between supply and return
Cooling season	Covington – April 27th to October 12th
Natural ventilation	Allowed during cooling season when cooling setpoint exceeded and outdoor temperature < 65°F. 3 air changes per hour

References

Itron, 2005. "2004-2005 Database for Energy Efficiency Resources (DEER) Update Study, Final Report," Itron, Inc., J.J. Hirsch and Associates, Synergy Consulting, and Quantum Consulting. December, 2005. Available at http://eega.cpuc.ca.gov/deer

Appendix E: DSMore Table

Impacts ⇨ / Technology ⇩	Product code	State	EM&V gross savings (kWh/unit)	EM&V gross kW (customer peak/unit)	EM&V gross kW (coincident peak/unit)	Unit of measure	Combined spillover less freeridership adjustment	EM&V net savings (kWh/unit)	EM&V net kW (customer peak/unit)	EM&V net kW (coincident peak/unit)	EM&V load shape (yes/no)	EUL (whole number)
CFLs		Ohio	45.7	0.0536	0.0059	bulb	6.30%	42.8	0.0503	0.0055	no	5
Program wide		Ohio	45.7	0.0536	0.0059		6.30%	42.8	0.0503	0.0055		5

Final Report

Process and Impact Evaluation of the Energy Efficiency for Schools Program (The National Theatre for Children (NTC)) in Ohio

Prepared for
Duke Energy
139 East Fourth Street
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March 22, 2013

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TABLE OF CONTENTS

Executive Summary

Key Findings and Recommendations

This section presents the key findings and recommendations identified through this evaluation of Duke Energy's Energy Efficiency for Schools Program in Ohio. The program evaluation covers the period of time from September 2011 to August, 2012[1]. The table below presents the estimated overall ex post net energy impacts from the billing analysis. The billing analysis approached used to assess energy saving provides a direct net impact estimate by employing quasi-experimental analysis designs.

	Net Savings
Annual Savings Per Participant Per Year	
kWh	237
kW	0.0268

The billing analysis gives the estimated overall net kWh savings per participant but is incapable of estimating coincident kW reduction. As a result, kW was calculated based upon the kWh savings and the kW/kWh ratio from the engineering analysis. Additionally, the billing analysis gives estimated impact of both kit and recommendations together, but is incapable of providing measure level savings. The main goal of the engineering analysis, aside from providing the kW/kWh ratio, is to offer insight into individual measure contributions to overall savings. All official impact results are net savings and are based on the outcome of the billing analysis.

Significant Process Evaluation Findings

Key Findings from the Management Interviews

- Duke Energy's Energy Efficiency (EE) for Schools program is a solid, well-run program with an excellent network of implementers to support and exceed Duke Energy's distribution goals for this program. Although this program has only been offered since 2011 in Ohio, the program is exceeding its goals for energy efficiency kit distribution.
- The high levels of successful participation could present a potential challenge in the future. In order to meet kit distribution goals during future years, customer eligibility and/or kit contents may need to be adjusted to allow for repeat family participation during returning school visits.

Key Findings from the Performance Reviews

- The performers are professional and courteous. They arrived at each school on time and always set up and readied their efforts well before the students arrived.
- "The Energized Guyz" performance was well-received by the students and got children excited about and focused on receiving their energy efficiency kit.

[1] Date ranges vary depending on the evaluation component.

- Every staff person we spoke with indicated that The National Theatre for Children was "wonderful" to work with.
- The troupes successfully altered the complexity of the material presented to match the comprehension ability of the age of the children attending. This is important because if the information is too advanced to understand, the lessons are lost to the younger children, and if the lessons are too simple the older students lose interest.

Key Findings from the Participant Surveys

Eighty-three (83) participating student families that live in Duke Energy's service territory in Ohio participated in an online survey which asked about what kit items they used and their satisfaction with the items.

The most commonly installed items, with installation rates of 75% or higher, were the kit's lighting items: 13-watt CFLs (90.4%), 18-watt CFLs (78.3%), and the night light (74.7%). The Department of Energy (DOE) booklet was the only other item used by over half of respondents (67.5%), though most of the remaining items had installation rates of over 40%. The kit items that respondents were least likely to use were the bathroom aerator (34.9%) and the water flow meter bag (27.7%).

	Percent Installed or Used	Mean Satisfaction Score
13-watt CFL	90.4%	8.70
18-watt CFL	78.3%	9.00
night light	74.7%	9.16
booklet	67.5%	8.79
switch and outlet gaskets	45.8%	9.00
low flow showerhead	45.8%	8.82
kitchen aerator	43.4%	9.11
water temp card	42.2%	9.20
bathroom aerator	34.9%	9.14
water flow meter bag	27.7%	7.73

Recommendations

- Consider the development of a second kit so that troupes can visit a school more than once in a three year period, as long as cost effective savings are achieved.
- Inform troupes that slowing their rate of speech[2] may improve students' comprehension of the material they are presenting. The typical adult speaks 160 words per minute. The central nervous system of pre-school through third grade children can process about 120 words per minute. Fourth grade students process 124-128 words per minute[3].

[2] "Spot checks" were conducted on portions of the performances using a timer and the known count of words used by the actors from the script. While these checks were not scientific, overall speech rates were found to be slightly too fast for the ages of the audience.

[3] Banotai, Alyssa. "How to Talk to Children". ADVANCE Speech-Language Pathologists & Audiologists, Vol. 18, Issue 3. January 21, 2008.
http://speech-language-pathology-audiology.advanceweb.com/Article/How-to-Talk-to-Children.aspx

- Consider revising the script so that saving energy is equated with their families lowering their utility bills and supporting environmental stewardship.
- Distribute the kit's "Decoder Ring" to each of the troupes. This ring was much more effective than the night light in getting the children excited about ordering the kit, and it can be easily incorporated into the script.

Significant Impact Evaluation Findings: Billing Analysis

Billing data was obtained for all participants in the K-12 program between September 21, 2011 and August 16, 2012 and that had accounts with Duke Energy. After processing, there were a total of 7,279 usable accounts[4]. A panel model was used to determine net program impacts, where the dependent variable was daily electricity consumption from September 2010 to August, 2012. The results of the billing analysis are presented in Table 1. This table shows that the K-12 program produced statistically significant savings for participants in Ohio.

Table 1. Estimated Ohio K-12 Impacts: Billing Analysis

	kWh	t-value
Per Participant Annual Savings (Net)	237	3.44

Significant Impact Evaluation Findings: Engineering Analysis

- Mean wattage of a replaced bulb is 62 watts for the 13-watt CFL and 72 watts for the 18-watt CFL.
  - See Table 42 on page 67.
- An ISR of 91.2% was reported for the 13-watt CFL and 84.3% for the 18-watt CFL.
  - See Table 43 on page 67.
- Average daily hours of use are 2.66 and 2.92 for the 13-watt and 18-watt CFLs respectively.
  - See Table 45 on page 69.

[4] In order to maximize the use of the data, a single model was estimated over all states (Ohio, North Carolina and South Carolina). Therefore, the actual sample size in the model included 7,279 households in Ohio; 21,230 in North Carolina and 7,990 in South Carolina for a total sample size of 36,499 households.

Introduction and Purpose of Study

Overview and Objective

This document presents the process evaluation report for Duke Energy's Energy Efficiency for Schools Program as it was administered in Ohio. The evaluation was conducted by TecMarket Works. The objective of this process evaluation is to document program operations and identify if there are any areas of improvement for future program implementation.

Summary of the Evaluation Data

The findings presented in this report were analyzed using participant survey data from student families, NTC performance reviews, and with program managers and vendors as presented in Table 2 below.

The impact findings presented in this report were calculated using monthly billing data (for program net savings) and participant survey data linked to engineering analysis (measure savings estimates).

Table 2. Evaluation Date Ranges

Evaluation Component	Start Date of Participation	End Date of Participation[5]	Dates of Survey	Dates of Analysis
Participant Surveys	November 3, 2011	March 31, 2012	Surveys were conducted from 8/18/12 through 9/19/12	October 2012
Performance Reviews	March 8, 2012	March 9, 2012	March 2012	March 2012 – May 2012
Program Managers and Vendors	November 3, 2011	March 31, 2012	June 2012 – August 2012	June 2012 – October 2012
Billing Analysis	September 21, 2011	August 16, 2012	N/A	November - December 2012
Engineering Analysis	November 3, 2011	March 31, 2012	Surveys were conducted from 8/18/12 through 9/19/12	November - December 2012

TecMarket Works developed, approved and supervised an online survey communicated to participants by Duke Energy to improve response rates consisting of a random[6] sample of 83 participants from Ohio between August 18 and September 19, 2012.

TecMarket Works visited 3 schools in Ohio and reviewed 5 out of 5 NTC performances scheduled at those schools in March of 2012.

[5] Cut-off date for when customer became a participant in EE for Schools, and last date of pre consumption data before post EE measure install data can be used in the EMV analysis.
[6] Email addresses for participating families were selected at random and sent invitations to complete the survey.

Two management interviews were conducted by TecMarket Works with program implementation staff and management in July and October of 2012.

Evaluation Objectives

The objective of this evaluation is to determine the effectiveness of and customer satisfaction with Duke Energy's EE for Schools program as it was administered in Ohio, and to determine estimated energy impacts.

Description of Program

Duke Energy has partnered with The National Theatre for Children (NTC) for the Energy Efficiency Education for Schools program. The Energy Efficiency Education program is an energy conservation program available in Ohio, North Carolina and South Carolina and is available to K-12 students enrolled in public and private schools who reside in households served by Duke Energy Ohio.

The Energy Efficiency Education Program for Schools provides principals and teachers with an innovative math and science related curriculum that educates students about energy, resources, electricity, ways in which energy is wasted, and how to use our resources wisely. Education materials focus on concepts such as energy, renewable fuels, and energy conservation through classroom and take home assignments to engage student's families. Curriculum materials are enhanced with a live 25 minute theatrical production for elementary students and a live 40 minute theatrical production for middle school students, both performed by two professional actors. The current program is developed to educate students in kindergarten through eighth grade. School principals are the main point of contact and NTC schedules the performance at their convenience for the entire school.

Once the principal has confirmed the performance date and time, two weeks prior to the performance, all curriculum materials are delivered to the principal's attention for teacher distribution. Materials include school posters, teacher guides, and classroom and family activity books. Students are encouraged to complete a home energy survey with their family (found in their activity book), to receive an Energy Efficiency Starter Kit that contains specific energy efficiency measures to reduce home energy consumption. Customers can receive a Duke Energy Energy Efficiency Starter Kit or non-Duke Energy customers at the participating schools can receive a non-Duke Energy Energy Efficiency Starter Kit.

Duke Energy Customers received:

- 1.5 GPM low flow shower head
- 1.5 GPM kitchen faucet aerator with swivel and flip valve
- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 18 watt Energy Star rated mini compact fluorescent (75 watt incandescent equivalent), with 12,000 hour life
- 1.0 GPM needle spray bathroom faucet aerator
- Combination Pack of switch and outlet gasket insulators: 8 outlets and 4 socket gaskets
- Energy Efficient Limelight style night light
- Duke Energy labeled DOE "Energy Savers" booklet
- Roll of Teflon tape for showerhead
- Product information and instruction sheet
- Glow Ring Toy

Non-Duke Energy Customers received:

- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 8 outlet gasket insulators
- Duke Energy labeled DOE "Energy Savers" booklet
- Glow Ring Toy

Methodology

Overview of the Evaluation Approach

This process evaluation had three components: management interviews, performance reviews, and participant surveys.

Study Methodology

Management Interviews

Two management interviews were conducted with program implementation staff and management in order to capture their insights about the programs operations and challenges. We interviewed Duke Energy's EE for Schools product manager and the project manager for the program at The National Theatre for Children (NTC).

Performance Reviews

Three participating schools were visited to review 5 NTC performances in March of 2012. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person that coordinated with NTC for the visit, covering various aspects of the program, such as program operations, aspects of their involvement, and communications with NTC.

Participant Surveys

TecMarket Works developed, approved and supervised an online survey communicated to participants by Duke Energy to improve response rates consisting of a random sample of 83 participants from Ohio between August 18 and September 19, 2012. This survey was conducted online with participating students' families that, according to program tracking records, received an energy efficiency kit from Duke Energy.

Billing Analysis

Billing data was obtained for all participants in the K-12 program between September 21, 2011 and August 16, 2012 and that had accounts with Duke Energy. After processing, there were a total of 7,279 usable accounts[7]. A panel model was used to determine program impacts, where the dependent variable was daily electricity consumption from September 2010 to August, 2012. The model included terms to control for the effect of weather on usage, the effect of impacts from other Duke Energy offers, the effect of normal non-program induced energy use changes, the effect of normal non-program induced energy use changes, as well as a complete set of monthly indicator variables to capture the effects of non-measureable factors that vary over time (such as economic conditions and season loads).

[7] In order to maximize the use of the data, a single model was estimated over all states (Ohio, North Carolina and South Carolina). Therefore, the actual sample size in the model included 7,279 households in Ohio; 21,230 in North Carolina and 7,990 in South Carolina for a total sample size of 36,499 households.

Engineering 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.

Data collection methods, sample sizes, and sampling methodology

Management Interviews
Two management interviews were conducted with program implementation staff and management in order to capture their insights about the programs operations and challenges. We interviewed Duke Energy's EE for Schools product manager and the project manager for the program at NTC.

Performance Reviews
Three participating schools were visited to review 5 NTC performances in March of 2012. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person that coordinated with NTC for the visit, covering various aspects of the program, such as program materials, aspects of their involvement, and communications with NTC.

Participant Surveys
A list of 3,692[8] Duke Energy participant records and 1,378 non-Duke Energy participant records (between the dates of November 3, 2011 and March 31, 2012) were randomly sorted by TecMarket Works. Email invitations were sent to a few hundred participants at a time until the targeted precision level for completed surveys was reached. Surveys were conducted online.

Billing Analysis
The billing analysis used consumption data from all complete data provided for the EE for Schools participants in Ohio that participated between September, 2011 and August, 2012.

Engineering Analysis
A participant survey was conducted between August 18 and September 19, 2012 with 119 randomly selected participants who received a kit in Ohio. Of the 119 total participants, 83 were Duke Energy customers and 36 were not.

Number of completes and sample disposition for each data collection effort

Performance Reviews
From the list of 9 performances scheduled in March 2012, 5 performances were reviewed in March of 2012 at 3 participating schools.

[8] This participation count uses a different date range than the billing analysis, and also excludes customers that do not wish to be contacted or do not have contact information available for the evaluation to use.

Participant Surveys

From the participant list of 3,692 Duke Energy customer records, students' families were invited to complete the survey online between August 18, 2012 and September 19, 2012, and a total of 83 usable surveys were completed by Duke Energy customers.

From the participant list of 1,378 non-Duke Energy participant records, students' families were invited to complete the survey online between August 18, 2012 and September 19, 2012, and a total of 36 usable surveys were completed by non-Duke Energy customers.

Billing Analysis

N/A (all participants included, sampling was not used)

Engineering Analysis

Engineering estimates rely on participant survey responses. An online survey was conducted between August 18 and September 19, 2012. From the participant list of 3,692 Duke Energy customers and 1,378 non-Duke Energy customers, students' families were invited to complete the survey online. A total of 119 usable surveys were completed, 83 by Duke Energy customers and 36 by non-Duke Energy customers.

Table 3. Summary of Data Collection Efforts

EE for Schools				
Data Collection Effort	**State**	**Size of Population**	**# of Successful Contacts**	**Sample Rate**
Duke Energy customer online survey	OH	3,692	83	0.022%
Non-Duke Energy customer online survey	OH	1,378	36	0.026%

Expected and achieved precision

Participant Surveys

Duke Energy Customers: The survey sample methodology had an expected precision of 90% +/- 9.1% and an achieved precision of 90% +/- 8.9%.

Non-Duke Energy Customers: The survey sample methodology had an expected precision of 90% +/- 8.9% and an achieved precision of 90% +/- 13.5%.

Billing Analysis

All savings estimates from the billing analysis were statistically significant at the 95% confidence level.

Engineering Analysis

Engineering estimates rely on participant survey responses. Sampling procedures for the participant survey had an expected precision of 90% +/- 9.1% confidence and an achieved precision of 90% +/- 8.9%.

Description of baseline assumptions, methods and data sources

Baseline assumptions were determined through online surveys with customers providing self-reported values of impact relevant data. Robust data concerning HVAC system fuel and type was available from Duke Energy's Home Profile Database (appliance saturation survey type data) in Ohio. 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)

Duke Energy Customers received:

- 1.5 GPM low flow shower head
- 1.5 GPM kitchen faucet aerator with swivel and flip valve
- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 18 watt Energy Star rated mini compact fluorescent (75 watt incandescent equivalent), with 12,000 hour life
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- Duke Energy labeled DOE "Energy Savers" booklet
- Roll of Teflon tape for showerhead
- Product information and instruction sheet
- Glow Ring Toy

Non-Duke Energy Customers received:

- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 8 outlet gasket insulators
- Duke Energy labeled DOE "Energy Savers" booklet
- Glow Ring Toy

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

Billing Analysis

The specification of the model used in the billing analysis was designed specifically to avoid the potential of omitted variable bias by including monthly variables that capture any non-program effects that affect energy usage, as well as other Duke Energy offers. The model did not correct for self-selection bias because there is no reason to as long as the program remains voluntary.

Engineering Analysis

The participant responses are self-reports and therefore may be affected by self-selection bias, false response bias or positive result bias. If these biases are present, the savings achieved can be expected to be higher than those reported in the impact evaluation.

Management Interviews

The management interviews revealed that the program is operating very well and is surpassing its goals for energy efficiency kit distribution. Overall, the satisfaction with program operations and communications is high.

The National Theatre for Children

The National Theatre for Children (NTC) is the contracted third-party implementer for the Energy Efficiency for Schools Program. The project manager for this program at NTC is the main liaison for Duke Energy and attends the weekly meetings with Duke Energy.

Program Goals

The program goals are as follows:

- The delivery of grade appropriate energy efficiency learning activities such as energy usage and conservation into existing science and/or math based curriculum across the selected territory served by Duke Energy.
- Integrate Duke Energy's Energy Efficiency Starter Kit sign up process into the science and/or math curriculum.
- Achieve target participation and energy impacts through the installation and tracking of energy efficiency measures to the specific household accounts of Duke Energy students.
- Create sustainability of the program and new impacts year after year of new families that haven't participated in the program in the last three (3) years.

NTC and Duke Energy agree that the program is meeting its goals.

The 2011-2012 school year was the first year of NTC's contract, and the goals for energy efficiency kit distributions for the first year were exceeded, and the staff expressed no doubt that goals will be exceeded again in the future.

All interviewees agree that the program is successful at meeting its goals. However, in order to meet future distribution goals at the current rates of distribution among the current number of schools it may be necessary to establish a second kit distribution so households can participate again.

This condition is in part due to the incentives provided through the program. There are multiple contests that involve the schools and the participating students' families that are designed to increase savings. The first is a contest by school, in which a school in Ohio is eligible to win $1,000 for their school by having the highest percentages of students ordering the kit in Ohio. The prizes are awarded by percent of students so that smaller schools would be just as likely to succeed as larger schools. These contests are promoted throughout the schools with posters, as can be seen in on the left of Figure 1 below. These posters were for the school administrators to gauge how well the school was doing with its energy efficiency kit orders.

The school prizes are awarded in September of the following school year (September of 2012 for the school year ending in Spring of 2012) so that the schools are in session and the children can

enjoy the announcement, and so that the photo opportunity it presented would revitalize the interest in the program in the territory.

The second offered contest is for the students' families (across Ohio and the Carolina System). Students' families that return the Business Reply Card are eligible to win $5,000 through random selection.

Figure 1. School Hallway with Two NTC Posters

Marketing

The program is marketed by NTC with mass mailings to school administrators occurring two or three times a year[9], and with smaller, more targeted campaigns throughout the year. Since the EE for Schools program is for grades kindergarten through 8, the NTC has flexibility in choosing the targeted schools and grades for the program. NTC decided that the younger children would be more likely to discuss the presentation and the availability of the free kit than older students, so the focus is on elementary students, with some programs also being presented to middle school children. At this time, there are no plans to target high school students.

NTC has the zip codes that are within the Duke Energy territory in Ohio, and also supplies statistics on the number of Duke Energy customers within each zip code, which allows NTC to target schools with a higher propensity of having a high number of Duke Energy customers with children enrolled at those schools. In the first year, NTC was able to schedule performances at more than 50% of the schools it contacted about the program.

[9] See the letter to Principals in Appendix F: Letter to School Principal.

With this success rate, managers agree that the program should consider a second visit within the three year time frame, but offer a second, different kit to the students' families.

Quality Control

When a request for an energy efficiency kit is received, it is reviewed for eligibility. If a customer is a Duke Energy customer that has a child in a participating school, they are sent a Duke Energy energy efficiency kit. If the request is coming from a family that is not a Duke Energy customer but has a child in a participating school, they are sent a non-Duke Energy energy efficiency kit. This is because Duke Energy is not allowed to count the energy savings from the non-Duke Energy serviced homes. The kit that is sent to non-Duke Energy customers contains fewer measures as a way to reduce the costs associated with providing kits for which Duke Energy cannot claim energy-savings credit.

However, in early 2012, many requests for kits were made from outside of Duke Energy's territory. This was a result of when NBC presented the availability of the free kits during its NBC Today Show advising listeners to log on and request a kit. The exposure caused increases in requests for non-Duke Energy kits in the targeted schools. Following this, many blogs that focus on household budgeting and couponing also featured Duke Energy's offer.

With the requests coming in at a rate of thousands per day, the program's processing and quality control efforts were tested. The program was successful at handling the increased load and processing requirements.

The site for ordering kits[10] includes a disclaimer indicating eligibility requirements[11], but the disclaimer was either not read or not heeded by many visitors. The process for handling the increased requests were to ignore kit requests from outside of the United States[12] or in states far removed from where the program operates. Customers within the United States that did not have a child attending a qualifying school were sent a letter (from NTC, on Duke Energy letterhead) explaining to them that they were not qualified and ineligible to receive a kit. There were no complaints from people that requested kits but were not eligible to receive them or about how the situation was handled.

Communication

Duke Energy and NTC report that they conduct weekly meetings to discuss scheduling, communications, problems that may have come up and the associated solutions, and program delivery strategies. During those meetings, NTC reported to Duke Energy about any issues that were identified during the week. NTC states that the Duke Energy program manager was always willing to consider new ideas and make adjustments to the program operations.

[10] https://www.myenergykit.org/default.aspx

[11] "Duke Energy Customers! Has your child's school recently hosted THE ENERGIZED GUYZ presentation sponsored by Duke Energy? Then your household may be qualified to receive a Free Energy Efficiency Kit as part of an approved curriculum for residents in Ohio, North Carolina and South Carolina."

[12] Program Managers report that many requests came from Russia.

Recommendation

While all interviewees agree that the program is successful at meeting its goals, the current high levels of participation may present a potential challenge in the future. In order to meet kit distribution goals during future years, customer eligibility and/or kit contents may need to be adjusted. Under current program rules, families are only eligible to receive one kit every three years. Therefore, in order to maximize the number of participating households at each school during repeat visits to the same school in future years, different kits containing unique items may be required each year so that energy savings can be counted among families who desire to participate multiple years in a row.

Summary

Duke Energy's EE for Schools program seems to be well structured and managed with a skilled network of implementers to support and exceed Duke Energy's distribution goals for this program. Although this program has only been offered in Ohio since 2011, the program is exceeding its goals for energy efficiency kit distribution.

Performance Reviews

Seventeen performances in Duke Energy's Carolina System and three performances in Ohio were reviewed in March of 2012. Most of the NTC performances were conducted at elementary schools. This review focuses on those performances.

Short onsite interviews were conducted with teachers and administrators depending on their involvement in the program and their availability during the visit to the school. TecMarket Works asked interviewees about various aspects of the program, such as their satisfaction with the program materials and with their communications with NTC staff.

The review also included discussions with NTC actors and an evaluation review of the performance. At times the troupes were aware of the evaluators' presence; at times they were not. There was no difference in the performances based on their awareness of the evaluators' presence.

We also visited classrooms after the performance to gauge the children's reaction to the performance and discuss the program with the teachers. The results of the site visits are presented below.

After the performances were conducted and the teachers and students had left the assembly area, each teacher was provided with a flier that contained detailed instructions on how their students could obtain an energy efficiency kit for their family. An example of this flier can be found in Appendix E: Teacher Survey and Instruction Flyer.

"The Energized Guyz" Performances

The primary purpose of the performance review was to see if NTC was fulfilling the goal of Duke Energy to share energy conservation tips and have students' families[13] order the energy efficiency kit. TecMarket Works and Minerva Smith, an educational consultant, observed six troupes perform the programs. Each troupe consisted of two people playing five characters: Nikki Neutron, U.R. Fired, Dr. Maybe, Cape Cod and Tech Guy.

Every performance started out by mentioning that the program was being provided by Duke Energy, and the troupes displayed the Duke Energy logo as shown in Figure 2 below. Duke Energy was also thanked at the end of each performance.

[13] As not all students live in households served by Duke Energy, there were two kits available, one for Duke Energy customers, and a smaller kit for non-Duke Energy customers, as described in in the Description of Program on page 6.

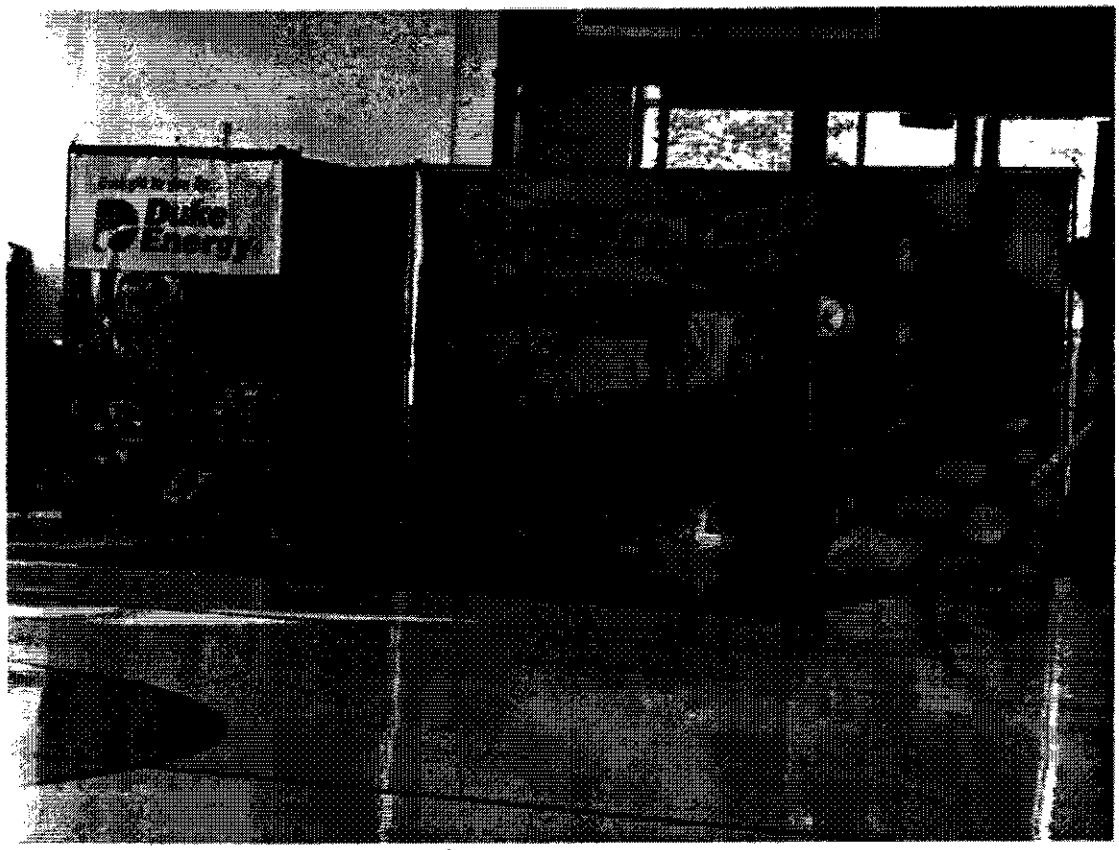


Figure 2. Duke Energy Sign on the Stage

Elementary School Performances

The actors were enthusiastic and energetic and the performance started with the actors listing the four main points for the program. The main points were: how energy and electricity are made, uses of electricity, how energy is wasted, and how to conserve energy. The children were told that coal, oil, natural gas and sometimes uranium are burned at a power plant to boil water and create steam. Diagrams were used to show the energy resources and the path they took to create electricity. The actors stated clearly that the more electricity we use, the more resources we use.

Figure 3. Elementary School Performance in Action

The next portion of the program told the children how to save electricity by turning off lights and appliances, turning the water heater to 120 degrees, and using compact fluorescent light bulbs. Solar, hydro and wind were explained and identified as renewable resources. Coal and natural gas were identified as non-renewable resources. The audience was told power companies use a combination of these resources. Again, diagrams were used to identify resources.

The importance of water conservation was also discussed. Suggested ways to conserve water included: shutting off the water when brushing teeth and washing hands; fixing leaky faucets; doing full loads when using dishwashers and washing machines; shutting off the hose when washing a car; filling up pitchers with water and storing them in the refrigerator; and using low flow showerheads.

Ways to save electricity were repeated five times throughout the 20-25 minute program, and renewable resources were identified three times. The slogan "*Open Your Eyes, Be Energy Wise*" was repeated at least six times, with the children enthusiastically joining in at the end of the performance.

The children were shown three items from the energy kit to encourage them to order a kit for their families. They were told how to get a kit by going online or mailing in the card from the

workbook that they either received before or after the performance in their classrooms from their teachers. Trading cards that had the web site address and a toll free number for ordering the energy kit were also given to the children to take home.

Children were told that their school had the opportunity to win $1,000, depending on how many kits were ordered from their school. The prize was awarded to the school with the highest percentage of students ordering the kit in Ohio. In addition, their parents would be eligible to win $5,000 by ordering the energy kit, with the winning family selected at random. These prizes seemed to get the children excited and motivated.

Our overall observation was that the program followed the information in the workbook provided to each child.

What Works Well

In reviewing the performances, the following were noted as working well in gaining attention and in relaying the energy efficiency information to the children.

1. Directions and expectations for behavior were set before the program began.
2. Key energy efficiency points were made repeatedly, with visuals and enthusiasm.
3. Children were involved by repeating the key points of information.
4. The actors would select a child from the audience, which increased excitement.
5. When visiting classrooms after the performance, all of the children were eager to share information they had learned.
6. Many teachers told us they thought that the program was great.
7. Fourth and fifth grade teachers said the performance addressed some of their science state standards.
8. Some principals said they planned to make a robo-call to all of the parents to let them know about the performance their children attended, and to let them know how to order the kit.
9. Use of charts during the performance gave the children a visual image to help them remember information.
10. When children were talking, one of the actors stood silent until they stopped. Very effective!
11. All of the children were attentive during the program and seemed to enjoy it very much.
12. When the troupes had room to be on the floor walking among the children, they seem to garner even more attention.
13. The troupes successfully altered the complexity of the material depending on the age of the children attending. This is very important because if the information is too difficult you lose younger children, and if it is too simple you lose the interest of the older children.

Recommendations

While the performance was informative and the troupes were effective at delivering the information, we offer the following recommendations for consideration.

1. All but one of the troupes said that Dr. Maybe couldn't decide which color of tennis shoes to wear for a field trip. It took so long to decide, that by the time he did, he missed the bus. After that he decided to waste energy. We could not see a connection between

missing a field trip and wasting energy. One troupe altered the script so that Dr. Maybe couldn't decide if he wanted a peanut butter, ham or turkey sandwich for lunch. By the time he made up his mind, lunch was over and he had no energy for the rest of the day. This revision made a little more sense to us but the point of the two was not clear with respect to the way energy is wasted or saved.

2. Some troupes said non-renewable resources "disappear," while others said that they "run out." "Run out" would be a more accurate terminology to use.
3. Some of the actor's rate of speech was too fast at times[14]. The typical adult speaks 160 words per minute. The central nervous system of a pre-school through third grade children can process 120 words per minute. Fourth grade students process 124-128 words per minute. Slowing the rate of speech will improve comprehension.[15]
4. Only one troupe mentioned that saving energy saves money[16]. Given the focus on the cash prizes at the end of the performance that garnered so much attention and excitement, it may be helpful to incorporate this message into the performance.
5. There was no mention of phantom power that is used when leaving appliances that many children use, such as game systems and computers.
6. Only one troupe had the "Decoder Ring" in their kit to show. The children became very interested in the ring when they saw it. The ring was much more effective than the night light in getting the children excited about ordering the kit, and the troupe with the ring was able to successfully incorporate it into the script.
7. One troupe pulled the CFLs and low-flow showerhead out of the kit at the end and asked the children if they would help save electricity, which resulted in getting agreements from the children that they understood the lessons presented.
8. Some of the cultural references were lost on the younger children. Troupes would reference YouTube, Facebook and Twitter. Facebook requires children to be 13 years of age to have an account and all of these children were 12 and under.
9. When the term "energy efficiency" is first used in the performance, the scripted response is to say "Hold on, those are some mighty big syllables there." Kindergarten children are just learning about syllables and it confuses students when incorrect information is presented. It may make teachers question the accuracy of the rest of the information.

Middle School Performances

The middle school performance was divided into four sketches. Each sketch addressed one of the four points that they were emphasizing through comedy with help from the attending children. The performances were excellent and provided good information and were well-received by the students.

What Works Well

1. The actors asked for certain types of words to be put in the idea bucket before the performance began. Some of the students included teachers' names. When a teacher's

[14] "Spot checks" were conducted on portions of the performances using a timer and the known count of words used by the actors from the script. While these checks were not scientific, overall speech rates were found to be slightly too fast for the ages of the audience.

[15] Banotai, Alyssa. "How to Talk to Children". ADVANCE Speech-Language Pathologists & Audiologists, Vol. 18, Issue 3. January 21, 2008.
http://speech-language-pathology-audiology.advanceweb.com/Article/How-to-Talk-to-Children.aspx

[16] This troupe mentioned that switching from incandescent bulbs to CFLs could save as much as $200 per year.

name was used in the script the kids reacted positively and interest was strengthened. They also included references to music bands and current movies in which the children were interested. This was effective in holding the children's attention.

2. The information presented to middle school students had more complex information.
3. Use of game systems and turning off power was included, providing examples that are relevant to their lives.
4. Excellent connections and examples were made about how saving energy impacts their lives and can add up over time. The troupes stated that if you left the water on while brushing your teeth you were wasting 1- 5 gallons of water each time, and then extrapolated that amount over a year. They also said that a leaky faucet could fill an above ground pool in a year.
5. The students were engaged during the whole performance and even came up to the actors after it was over. Middle school students are generally less reactive and do not express how much they are enjoying something, but this was not the case for these presentations that engaged the students' interests.

After reviewing the performances, the evaluation team visited selected classrooms to gauge students' satisfaction with the performance by obtaining a simple "thumbs up" or "thumbs down" regarding their satisfaction with the performance. Very few students gave the program a "thumbs down". Most students found the performance to be funny and informative.

Program Materials

The onsite visits indicate that NTC is supplying the schools with enough program materials before the performance to allow the schools to distribute the materials. The materials provided seemed to effectively promote the program and its objectives to the school staff and to the students. The materials provided include: teacher and student workbooks with energy-related assignments and instructions for ordering the kit; posters to display around the school; character trading cards for the kids (with the back of the card including instructions on how to order the kit); and NTC provided evaluation surveys for the teacher to complete and return to NTC. Some of these items can be seen in Appendix F: Program Materials.

Program Communications

All teachers and administrators that the evaluation team was able to speak to indicated that the communications with NTC in scheduling the performance and determining the logistics of the visit were appropriate. They indicated that NTC was very professional, and provided timely and detailed responses to their questions. When asked about the program NTC was repeatedly praised by the teachers and administrators.

While the school visits and performances are subject to "acts of nature" such as illness or transportation issues, the onsite reviews revealed only one such case in which an actor became ill and could only do one performance instead of two. The issue was communicated to the appropriate contact at the school immediately. The second performance for the day at that particular school was canceled and most of the students that were to attend the second performance were able to attend the first. The school staff was completely satisfied with the communication from NTC, indicating that "these things happen and they handled it very well; we were happy we could still get them to come and perform at our school."

Summary

TecMarket Works agrees with the visited schools that this is a well-run program that offers valuable energy-efficiency related lessons to the children and an opportunity for the students' families to receive the energy efficiency kit.

Participant Survey Results: Duke Energy Customers

Survey invitations were sent to the participating students' families that live in Duke Energy's territory in Ohio and ordered an energy efficiency kit. Participants returned a total of 119 surveys from two groups of respondents:

- Group A: 83 surveys[17] were completed by participants that received the energy efficiency kit for Duke Energy customers.
- Group B: 36 surveys were completed by participants that received the Non-Duke Energy customer energy efficiency kit because they did not live in Duke Energy's service territory.

The responses to the surveys are provided below. Group A and Group B are reported separately.

Use of the K12 Duke Energy Kit Measures

CFLs

Table 4 below shows responses to the questions about the 13-watt CFL. Nine out of ten respondents (90.4% or 75 out of 83) installed the 13-watt CFL, and three-quarters of these installations (73.3% or 55 out of 75) replaced working bulbs. Most of these installations (66.7% or 50 out of 75) replaced a 45 to 70-watt bulb with the 13-watt CFL, and the replacement was done on lights that were used 3-4 hours per day on average.

Table 4. Frequency of Installation: 13-watt CFL

	Ohio Kits (n)	Ohio Kits (%)
Installed 13w bulb		
Yes	75	90.4%
No, but plan to	1	1.2%
No, do not plan to	1	1.2%
Don't Know/Blank	6	7.2%
Wattage of bulb removed		**Percent of Those Using the Item**
Less than 44w	10	13.3%
45-70w	50	66.7%
71-99w	11	14.7%
Greater than 100w	4	5.3%
Functionality of bulb removed		
CFL replaced working bulb	55	73.3%
CFL replaced bulb that was not working (or empty socket)	19	25.3%
Don't know	1	1.3%
Hours of use per day		
<1	6	8.0%

[17] Five of the 83 respondents in Ohio indicated that they did not have young children in the household, including at least one who said she was a teacher at a school involved with the program. However, all respondents surveyed did send away for the kit, so their energy efficiency actions are deemed to have been influenced by the K12 program.

1-2	17	22.7%
3-4	37	49.3%
5-10	15	20.0%
11-12	-	0%
13-24	-	0%

On average, the 75 Duke Energy customers who installed the 13-watt CFL rated their satisfaction with this kit item at 8.70 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Fourteen of 77 respondents (18.2%) who installed the 13-watt CFL reported their satisfaction with the bulb at a "7" or less on a 10-point scale. The reasons for these lower levels of satisfaction are listed below.

- Not bright enough (n=7, ratings "4," "5" and 5 respondents rating "7")
- Bulbs wear out too soon (n=2, ratings "1" and "7")
- Do not like quality/color of light (n=1, rating "7")
- Takes too long to come on (n=1, rating "6")
- Do not like quality/color of light and takes too long to come on (n=1, rating "3")
- Don't know/not specified (n=2, ratings "5" and "7")

Table 5 summarizes the responses to questions about the 18-watt CFL, which was installed by more than three-quarters of respondents (78.3% or 65 out of 83). Three-quarters of the installed 18-watt CFLs (75.4% or 49 out of 65) replaced working bulbs. Just over half of the 18-watt CFLs that were installed (53.8% or 35 out of 65) replaced bulbs of over 70 watts, and the average usage of the lights these bulbs were installed in was 3-4 hours per day.

Table 5. Frequency of Installation: 18-watt CFL

	Ohio Kits (n)	Ohio Kits (%)
Installed 18w bulb		
Yes	65	78.3%
No, but plan to	8	9.6%
No, do not plan to	2	2.4%
No, not sure if will	1	1.2%
Don't Know/Blank	7	8.4%
Wattage of bulb removed		**Percent of Those Using the Item**
Less than 44w	4	6.2%
45-70w	26	40.0%
71-99w	21	32.3%
Greater than 100w	14	21.5%
Functionality of bulb removed		
CFL replaced working bulb	49	75.4%
CFL replaced bulb that was not working (or empty socket)	15	23.1%
Don't know	1	1.5%
Hours of use per day		
<1	4	6.2%
1-2	13	20.0%
3-4	31	47.7%
5-10	17	26.2%
11-12	-	0%

13-24	-	0%

On average, the 65 Duke Energy customers who installed the 18-watt CFL rated their satisfaction with this kit item at 9.00 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Seven of 65 respondents (10.8%) who installed the 18-watt CFL reported their satisfaction with the bulb at a "7" or less on a 10-point scale. The reasons for these lower levels of satisfaction are listed below.

- Takes too long to come on (n=3, ratings "6," "7" and "7")
- Not bright enough (n=2, both ratings "7")
- Do not like quality/color of light (n=1, rating "4")
- Don't know/not specified (n=1, rating "5")

Uninstalling CFLs and Purchasing Additional CFLs
Six respondents (9.2% of 65[18]) reported that they have removed at least one of the CFLs they installed. The stated reasons for removing the bulbs are listed below; in half of these cases (3 out of 6), it was because the CFL burned out.

- Bulb burned out already (n=3)
- Bulb is too bright (n=1)
- Do not like quality/color of light (n=1)
- Bulb was not working properly (n=1)

Twenty-eight of the respondents who installed either of the kit-provided CFLs (36.4% of 77) have purchased additional CFLs since receiving the kit, with those 28 respondents indicating that they have purchased an average of 5.9 additional CFLs per household (ranging from 2 bulbs to 15 bulbs). Of the six respondents who did not install either kit-provided CFL, none purchased any additional CFLs after participating in the program.

CFL Freeridership and Spillover for Duke Energy Customers
TecMarket Works utilized two questions from the participant survey to estimate CFL freeridership. The first question asked survey respondents whether or not they had installed CFLs prior to participating in the program, and if so, how many they had installed. The second question asked respondents if they had planned on buying any CFLs before participating in the program.

Quantities of pre-installed CFLs range from 2 to 35 among the 78.3% (65 out of 83) of Duke Energy customers who indicated having pre-installed CFLs.

Freeridership ratios based on survey responses are assigned using a Bass curve based on diffusion of innovation product adoption concepts. Zero pre-installed CFLs correspond to an assigned freeridership score of zero percent, and fourteen or more CFLs correspond to a

[18] In addition to six respondents who did not install any kit-provided CFLs and who were not asked this question, twelve respondents who installed the 13-watt CFL but not the 18-watt CFL, were not asked this question either. Sixty-three of the sixty five respondents who were asked this question installed both CFLs.

freeridership level of 100 percent. This allows higher credit for savings to participants with the lowest pre-existing use of CFLs and lower savings to those with a history of CFLs. The inflection point of the curve is seven CFLs, which is the typical level of CFL penetration among these participants. A graph of this curve is shown in Figure 4, with the corresponding freeridership levels by CFL count shown in Table 6. This approach to estimating freeridership is consistent with the field of product adoption and diffusion research and represents a standard approach within the field of product adoption research. It also recognizes that the more CFLs a home has, the less likely the addition of new Duke Energy CFLs will have an impact on product adoption and use behaviors.

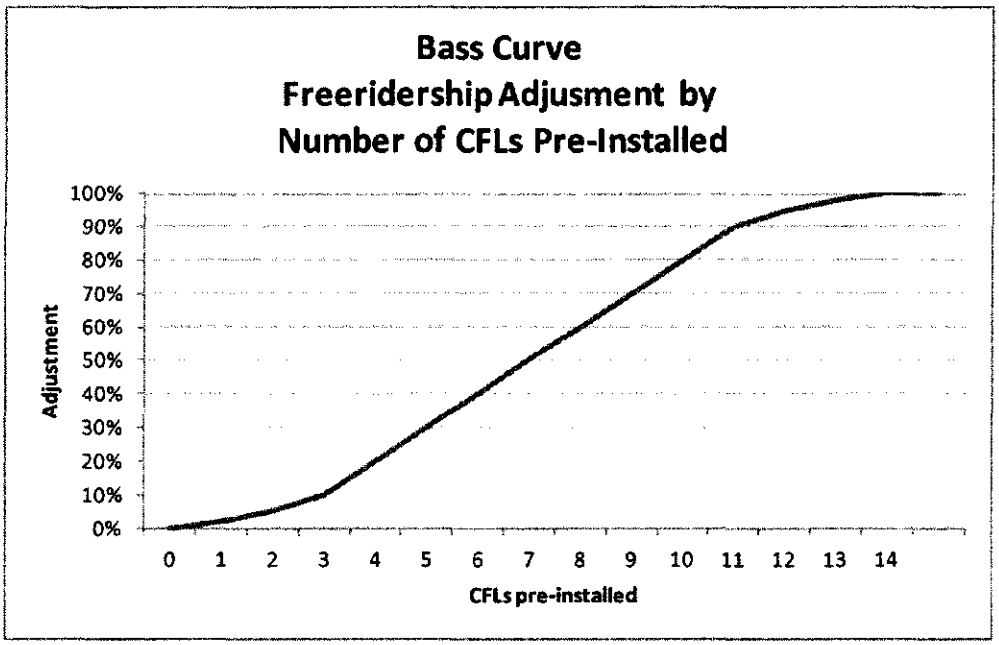


Figure 4. Bass Curve Freeridership Adjustment by Number of CFLs Pre-Installed

Table 6. CFL Freeridership Adjustment Determined by S Curve

Number of CFLs pre-installed	Freeridership Pre-installation adjustment factor	Number of customers with number of pre-installed CFLs
0	0%	13
1	2%	0
2	5%	3
3	10%	8
4	20%	11
5	30%	10
6	40%	8
7	50%	0
8	60%	8
9	70%	1
10	80%	6
11	90%	1

12	95%	2
13	98%	1
14 or more	100%	5

In addition to the pre-installation adjustment factor, TecMarket Works applied a freeridership multiplier based on whether or not respondents indicated they had planned on purchasing the measure (CFLs) before receiving the K12 energy efficiency kit. These multipliers are shown in Table 7.

Table 7. Freeridership Multiplier Based on Measure Purchasing Plans

Did you plan on purchasing <measure> before receiving the K12 kit?	Freeridership multiplier
Yes	1.25 (result cannot exceed 100%) (reduces program savings)
Maybe	1
Don't Know	1
No	0.25 (results cannot be lower than 0%) (increases program savings)
No, already installed in all possible places	Automatic 100% freeridership score

To calculate the spillover effect for CFLs in this program, TecMarket Works assigned spillover scores based on responses to three questions, as seen in Table 8. Combinations of responses that are not listed in this table are assigned 0% spillover.[19]

Table 8. Spillover Factors for CFLs

Did you have any CFLs installed before the program?	Were you planning on buying <additional> CFLs before the program?	Have you purchased any CFLs since the program?	% Spillover
yes	no	yes	75
yes	maybe	yes	25
yes	don't know	yes	75
no	yes	yes	50
no	no	yes	100
no	maybe	yes	50
no	don't know	yes	100
don't know	yes	yes	25
don't know	no	yes	100
don't know	maybe	yes	50

The results of the freerider and spillover analysis will be presented in the energy impact report to be submitted under separate cover.

[19] If a respondent was assigned 100% freeridership, then they are automatically assigned 0% spillover.

Low-Flow Showerhead

Nearly half of the kit recipients (45.8% or 38 out of 83) said that they had installed the low-flow showerhead, and another 13.3% (11 out of 83) say they plan to install it in the future. Most (71.1% or 27 out of 38) who installed the showerhead also used the Teflon tape. A little over a third of those who installed the showerhead (36.8% or 14 out of 38) say that it decreased the flow of water compared to their previous showerhead.

Table 9. Frequency of Installation: Low-Flow Showerhead

	Ohio Kits (n)	Ohio Kits (%)
Installed low-flow showerhead		
Yes	38	45.8%
No, but plan to	11	13.3%
No, do not plan to	14	16.9%
No, not sure if will	20	24.1%
Don't Know/Blank	-	0%
Showers Taken Per Week		**Percent of Those Using the Item**
0-4	3	7.9%
5-10	14	36.8%
11-15	8	21.1%
16-20	3	7.9%
21+	10	26.3%
Flow of Water after install		
Less than old showerhead	14	36.8%
About the same	19	50.0%
More than old showerhead	5	13.2%
Used the Teflon tape		
Yes	27	71.1%
No	10	26.3%
Don't Know	1	2.6%

Only one of the respondents who installed the showerhead (2.6% of 38) indicated they had difficulty with the installation (quote: "*It was difficult for me to get the old showerhead off.*").

On average, the 38 Duke Energy customers who installed the low-flow showerhead rated their satisfaction with this kit item at 8.82 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Six of the 38 participants (15.8%) who installed the low-flow showerhead rated their satisfaction with the item a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Water pressure is too low (n=2, both ratings "7")
- Takes too long to wash/rinse (n=2, ratings "4" and "6")
- Water pressure is too low and takes too long to wash/rinse (n=1, rating "7")
- Preferred old showerhead (n=1, rating "7")

Low-flow Showerhead Freeridership and Spillover for Duke Energy Customers
For low-flow showerheads, faucet aerators and insulator gaskets, TecMarket Works utilized three questions from the participant survey to estimate freeridership and spillover for low-flow showerheads. The first question asked survey respondents whether or not they had installed low-flow showerheads prior to participating in the program, and if so, how many they had installed. The second question asked respondents if they had planned on buying any low flow showerheads before participating in the program. The third question asked if they had purchased any additional showerheads since participating in the program.

The three questions and the level of freeridership and/or spillover that was applied to the energy savings are presented in Table 10 below, using the low-flow showerhead as an example measure. All other possible combinations of answers to the series of questions resulted in 0% freeridership and 0% spillover (not shown in table).

Table 10. Freeridership and Spillover Factors for Energy Efficiency Kit Measures

Did you have any low-flow showerheads installed before you got the kit?	Were you planning on buying <additional> low-flow showerheads before you got the kit?	Have you purchased any low-flow showerheads since you got the kit?	% Free-ridership	% Spillover
yes	yes	yes	100	
yes	yes	no	100	
yes	no	yes		75
no	no	yes		100
no	yes	no	50	
no	yes	yes	50	50
don't know	yes	yes	75	25
don't know	yes	no	50	
don't know	no	yes		100
yes	already installed in all available sockets	yes	100	
yes	already installed in all available sockets	no	100	
yes	already installed in all available sockets	don't know	100	
don't know	maybe	yes	25	50
yes	maybe	yes		25
yes	maybe	no	25	
no	maybe	yes		50
yes	don't know	yes		75
no	don't know	yes		100
yes	yes	don't know	100	
don't know	yes	don't know	50	
no	yes	don't know	50	

Applying the scores from Table 10 to participants' responses to questions about low-flow showerheads yields the overall freeridership and spillover scores for this measure.

Ten of the 38 respondents (26.3%) who installed the low-flow showerhead indicated that they already had a low-flow showerhead installed in their home before receiving the K12 kit. Two of

these ten respondents (20.0%) indicated that they had not been planning to purchase or use another low-flow showerhead before receiving the kit (but did not have low-flow showerheads installed in every shower). The other eight survey respondents (80.0% of 10) who indicated they had pre-installed low-flow showerheads either already intended to install more before the program, or else already had them in every shower.

Twenty-eight respondents (73.7% of the 38 who installed the kit-provided showerhead) indicated that they had not previously installed a low-flow showerhead before participating in the program.

None of the customers who installed the kit-provided showerhead were uncertain about whether they previously had low-flow showerheads installed.

Two of the 38 respondents (5.3%) who installed the low-flow showerhead provided with the kit indicated that they have purchased additional showerheads since participating in the program. Two of the 45 respondents (4.4%) who did not install the kit-provided showerhead have also purchased low-flow showerheads since participating in the program. The four respondents who purchased showerheads after the program purchased one showerhead apiece.

The results of the freerider and spillover analysis will be presented in the energy impact report to be submitted under separate cover.

Faucet Aerators

Table 11 indicates that 34.9% of Duke Customers (29 out of 83) installed the kit-provided bathroom faucet aerator, and Table 12 show a 43.4% (36 out of 83) installation rate for the kitchen faucet aerator. Though customers are slightly less likely to have installed either of the two faucet aerators than the low-flow showerhead included in the K12 kit, a larger percentage of surveyed respondents say they still intend to install the bathroom (38.6% or 32 out of 83) and kitchen aerators (32.5% or 27 out of 83) in the future.

Table 11. Frequency of Installation: Bathroom Faucet Aerator

	Ohio Kits (n)	Ohio Kits (%)
Installed the bathroom aerator		
Yes	29	34.9%
No, but plan to	32	38.6%
No, do not plan to	22	26.5%
Don't Know/Blank	-	0%
Replaced an aerator that was already installed		**Percent of Those Using the Item**
Yes	10	34.5%
No	19	65.5%
Don't Know	-	0%
Estimate of water flow		**Percent of Those Replacing**
Less than the old aerator	5	50.0%
About the same as the old aerator	5	50.0%
More than the old aerator	-	0%

All 29 respondents (100% of 29) who installed the bathroom aerator said that it was easy to install, and none (0% of 29) said it was difficult.

On average, the 29 Duke Energy customers who installed the bathroom aerator rated their satisfaction with this kit item at 9.14 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Three of the 29 participants (10.3%) who installed the bathroom aerator rated their satisfaction with the item a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Water comes out too hard (n=1, rating "5")
- Takes too long to wash/rinse (n=1, rating "6")
- Don't know/not specified (n=1, rating "7")

Table 12. Frequency of Installation: Kitchen Faucet Aerator

	Ohio Kits (n)	Ohio Kits (%)
Installed the kitchen aerator		
Yes	36	43.4%
No, but plan to	27	32.5%
No, do not plan to	20	24.1%
Don't Know/Blank	-	0%
Replaced an aerator that was already installed		**Percent of Those Using the Item**
Yes	13	36.1%
No	23	63.9%
Don't Know	-	0%
Estimate of water flow		**Percent of Those Replacing**
Less than the old aerator	7	53.8%
About the same as the old aerator	6	46.2%
More than the old aerator	-	0%

None of the customers who installed the kitchen aerator (0 out of 36) indicated that it was difficult to install.

On average, the 36 Duke Energy customers who installed the kitchen aerator rated their satisfaction with this kit item at 9.11 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Three of the 36 participants (8.3%) who installed the kitchen aerator rated their satisfaction with the item a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Water pressure is too low (n=2, ratings "5" and "6")
- Takes too long to wash/rinse (n=1, rating "6")

Faucet Aerator Freeridership and Spillover for Duke Energy Customers
TecMarket Works utilized three questions from the participant survey to estimate freeridership for faucet aerators. The first question asked survey respondents whether or not they had installed any faucet aerators prior to participating in the program, and if so, how many they had installed. The second question asked respondents if they had planned on buying any faucet aerators before

participating in the program. The third question asked if they had purchased any additional aerators since participating in the program.

The three questions and the level of freeridership and/or spillover that was applied to the energy savings are the same as those used previously in Table 10. Applying the scores from this table to participants' responses to questions about faucet aerators yields the overall freeridership and spillover scores for this measure.

Seventeen of the 44 respondents who installed either or both of the kitchen or bathroom faucet aerators (38.6%) indicated that they already had at least one aerator already installed in their home before receiving the K12 kit. Six of these 17 respondents (35.3%) indicated that they had not been planning to install another aerator before receiving the K12 kit (not including those who already have aerators installed on all faucets). Two participants (11.8% of 17) with aerators already installed responded "maybe" to the question about their intention to install further measures in the absence of the program. The other nine survey respondents (52.9% of 17) who had aerators previously installed already intended to install more aerators before receiving the kit, or already have aerators installed on all their faucets.

Twenty-six of the 44 respondents (59.1%) who indicated that they had used at least one of the kit-provided aerators did not have any faucet aerators previously installed.

One respondent (2.3% of 44) who installed a kit-provided aerator did not know if they had any previously installed aerators, and did not know if they would have installed any in the absence of the program.

Three respondents who did not have any aerators installed before installing the kit-provided aerators purchased additional aerators after participating in the program. These three respondents all installed both faucet aerators from the kit, and purchased a combined total of four additional aerators after the program. None of the respondents who already had faucet aerators installed purchased additional aerators, nor did any of the respondents who did not install one or both kit-provided aerators make any additional purchases.

The results of the freerider and spillover analysis will be presented in the energy impact report to be submitted under separate cover.

Outlet and Switch Gaskets

Nearly half of kit recipients (45.8% or 38 out of 83) installed the outlet and switch gaskets, and another quarter (26.5% or 22 out of 83) say they intend to but have not done so yet. The kit provided 12 gaskets in total, and on average these respondents installed about 7 per household -- but unfortunately half of them were installed on interior walls where they do not provide any energy savings.

Table 13. Frequency of Installation: Outlet Gaskets

	Ohio Kits (n)	Ohio Kits (%)
Installed the gaskets		
Yes	38	45.8%

No, but plan to	22	26.5%
No, do not plan to	8	9.6%
No, not sure if will	12	14.5%
Don't Know	3	3.6%
Number installed interior wall		**Percent of Those Using the Item**
0	9	23.7%
1-2	10	26.3%
3-5	9	23.7%
6-8	5	13.2%
9-12	4	10.5%
Don't Know	1	2.6%
Average number of gaskets installed on interior walls: 3.5 per household		
Number installed exterior wall		**Percent of Those Using the Item**
0	10	26.3%
1-2	11	28.9%
3-5	7	18.4%
6-8	3	7.9%
9-12	6	15.8%
Don't Know	1	2.6%
Average number of gaskets installed on exterior walls: 3.5 per household		

On average, the 38 Duke Energy customers who installed outlet gaskets rated their satisfaction with this kit item at 9.00 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Three of the 38 participants (7.9%) who installed the outlet gaskets rated their satisfaction with the items a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Haven't noticed any difference/no benefits (n=3, ratings "5," "6" and "7")

Gasket Freeridership and Spillover for Duke Energy Customers
TecMarket Works utilized three questions from the participant survey to estimate freeridership for outlet gasket insulators. The first question asked survey respondents whether or not they had installed outlet gaskets prior to participating in the program, and if so, how many they had installed. The second question asked respondents if they had planned on buying any gaskets before participating in the program. The third question asked if they had purchased any additional gaskets since participating in the program.

The three questions and the level of freeridership and/or spillover that was applied to the energy savings are the same as those used previously in Table 10. Applying the scores from this table to participants' responses to questions about gasket insulators yields the overall freeridership and spillover scores for this measure.

Fourteen of the 38 respondents who installed outlet or switch gaskets (36.8%) indicated that they already had gaskets installed in their home before receiving the K12 kit. Nine of these respondents (64.3% of 14) indicated that they had not been planning to purchase or use more gaskets before receiving the K12 kit (but did not have gaskets installed in all available outlets or switches). The other five survey respondents (35.7% of 14) who indicated they had pre-installed

gaskets either already intended to install more gaskets before the program, or already have gaskets installed on all outlets.

Twenty-four respondents (63.2%) who used at least one of the kit-provided aerators indicated that they did not previously have any gaskets installed.

None of the respondents who used the kit-provided gasket insulators was unsure of whether they previously had any gaskets installed.

Three respondents who did not have any gaskets installed before the program purchased a combined total of 14 additional gaskets (averaging 4.7 apiece) after participating in the program and installing the kit-provided gaskets. There was also one respondent who already had gaskets installed before the program, who installed the kit-provided gaskets, and also purchased six additional gaskets after the program. None of the respondents who didn't install the kit-provided gaskets purchased additional gaskets after the program.

The results of the freerider and spillover analysis will be presented in the energy impact report to be submitted under separate cover.

Water Flow Meter Bag

Only about one in four kit recipients (27.7% or 23 out of 83) used the water flow meter bag, though another one in four (24.1% or 20 out of 83) say they still intend to but have not done it yet. Only four respondents (17.4% of 23 respondents who used the item) decreased the rate of flow of their water after using the water flow meter bag (three respondents adjusted GPM down only on their shower, while one adjusted GPM down on their shower as well as their kitchen and bathroom faucets). Thus the overall rate of respondents decreasing the GPM on at least one faucet due to this program was 4.8% (4 out of 83).

Table 14. Frequency of Use: Water Flow Meter Bag

	Ohio Kits (n)	Ohio Kits (%)
Used the Water Meter Bag		
Yes	23	27.7%
No, but plan to	20	24.1%
No, do not plan to	13	15.7%
No, not sure if will	25	30.1%
Don't Know	2	2.4%
Tested in Shower		**Percent of Those Using the Item**
Hot Water	1	4.3%
Cold Water	4	17.4%
Both	11	47.8%
Adjusted GPM down	4	17.4%
Tested in Kitchen		
Hot Water	1	4.3%
Cold Water	4	17.4%
Both	5	21.7%

Adjusted GPM down	1	4.3%
Tested in Bathroom		
Hot Water	-	0%
Cold Water	1	4.3%
Both	2	8.7%
Adjusted GPM down	1	4.3%
Tested in Utility Sink		
Hot Water	-	0%
Cold Water	-	0%
Both	1	4.3%
Adjusted GPM down	-	0%
Tested in Other Area		
Hot Water	-	0%
Cold Water	-	0%
Both	-	0%
Adjusted GPM down	-	0%

On average, the 23 Duke Energy customers who used the water flow meter bag rated their satisfaction with this kit item at 7.73 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Seven of the 23 participants (30.4%) who used the water flow meter bag rated their satisfaction with the items a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Couldn't figure it out/didn't see the point (n=3, ratings "1," "7" and "7")
- Haven't noticed any difference/no benefits (n=2, both ratings "5")
- Don't know/not specified (n=2, ratings "5" and "7")

Water Temperature Gauge Card

Fewer than half of respondents surveyed (42.4% or 35 out of 83) used the water temperature gauge card that was included with the kit, while another 19.3% (16 out of 83) say they intend to but have not done so yet. Of those that did use it, the median and most common temperature reading was 120 degrees. Only two of those that used the card (5.7% of 35) had their water temperature set at 150 degrees or higher, and 11 respondents (31.4% of 35) lowered the temperature setting on their water heater after using the item.

Table 15. Frequency of Use: Water Temperature Gauge Card

	Ohio Kits (n)	Ohio Kits (%)
Used the Water Temperature Card		
Yes	35	42.2%
No, but plan to	16	19.3%
No, do not plan to	11	13.3%
No, not sure if will	19	22.9%
Don't Know	2	2.4%
Initial Temperature Reading		**Percent of Those Using the Item**
Under 120	9	25.7%
120	11	31.4%
130	8	22.9%
140	5	14.3%

150+	2	5.7%
Adjusted Water Temperature		
Yes	11	31.4%
No	23	65.7%
Don't Know	1	2.9%

The initial and adjusted water temperature readings for those who made an adjustment after using the gauge card are shown in Table 16. Ten of the eleven respondents who adjusted their water temperature turned the temperature down by at least 10 degrees (shown by counts in green cells), up to a maximum downward adjustment of more than 30 degrees in the case of one respondent. Only one participant in the survey made an adjustment of less than 10 degrees (shown in white cells), while none of the participants reported turning up their water temperature by 10 degrees or more (shown in red cells).

Table 16. Temperature Adjustments after Using Water Temperature Gauge Card

Counts per cell (N)	Initial temp 120 or less	Initial temp 120	Initial temp 130	Initial temp 140	Initial temp 150 or more
Adjusted temp 120 or less	-	-	3	-	-
Adjusted temp 120	-	1	2	2	1
Adjusted temp 130	-	-	-	2	-
Adjusted temp 140	-	-	-	-	-
Adjusted temp 150 or more	-	-	-	-	-

Overall, 12.0% of participants surveyed (10 out of 83) turned their water down by 10 degrees or more based on their participation in this program.

On average, the 35 Duke Energy customers who used the water temperature gauge card rated their satisfaction with this kit item at 9.20 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Only two of the 35 participants (5.7%) who used the water temperature gauge card rated their satisfaction with the items a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Not sure it was accurate (n=1, rating "7")
- Don't know/not specified (n=1, rating "7")

LED Night Light

The night light is one of the more popular items with 74.7% (62 out of 83) of survey respondents using it. However, only 43.5% (27 out of 62) of those using this item used it in place of another night light.

Table 17. Frequency of Use: LED Night Light

	Ohio Kits (n)	Ohio Kits (%)
Using the Night Light		
Yes	62	74.7%
No, but plan to	6	7.2%

No, do not plan to	9	10.8%
No, not sure if will	3	3.6%
Don't Know	3	3.6%
Installed		**Percent of Those Using the Item**
In a previously empty outlet	34	54.8%
Replaced another light	27	43.5%
Don't Know/Blank	1	1.6%

On average, the 62 Duke Energy customers who used the night light rated their satisfaction with this kit item at 9.16 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 20). Six of the 62 participants (9.7%) who used the night light rated their satisfaction with the items a "7" or lower on a 10-point scale. The stated reasons for their low satisfaction are listed below.

- Not bright enough (n=3, ratings "4," "5," "7")
- Too sensitive/not sensitive enough (n=2, ratings "4" and "7")
- It broke (n=1, rating "1")

DOE Energy Savers Booklet

Table 18 indicates that about two-thirds of respondents (67.5% or 56 out of 83) read the DOE booklet that was included in the kit, and three-quarters of those who read the booklet (75.0% or 42 out of 56) read it and discussed it with their families.

Table 18. Frequency of Use: DOE Energy Savers Booklet

	Ohio Kits (n)	**Ohio Kits** (%)
Read the Booklet		
Yes	56	67.5%
No but will	26	31.3%
Don't Know	1	1.2%
Read the Booklet and Discussed with Family		**Percent of Those Using the Item**
Yes	42	75.0%
No but will	11	19.6%
Don't Know	3	5.4%

On average, the 56 Duke Energy customers who read the booklet rated the information provided by this kit item at 8.79 on a 10-point scale (ratings for all kit items can be found in Table 20). Nine out of 56 (16.1%) customers who read the booklet rated the information provided at a "7" or lower on 10-point scale.

Table 19 shows actions taken, and intentions for future actions, based on the advice in the DOE Energy Savers booklet.

Table 19. Actions Based on Advice in DOE Energy Savers Booklet

	Ohio Kits (n)	**Ohio Kits** (% of 56 respondents who read the booklet)

Purchased and installed high efficiency equipment based on booklet's advice	8	14.3%
Insulation and air leaks		
Already taken action	21	37.5%
Intend to take action	18	32.1%
Heating and cooling system		
Already taken action	36	64.3%
Intend to take action	5	8.9%
Water heating		
Already taken action	24	42.9%
Intend to take action	11	19.6%
Windows		
Already taken action	21	37.5%
Intend to take action	13	23.2%
Lighting		
Already taken action	46	82.1%
Intend to take action	4	7.1%
Appliances		
Already taken action	33	58.9%
Intend to take action	6	10.7%
Home Office		
Already taken action	21	37.5%
Intend to take action	7	12.5%
Home Electronics		
Already taken action	34	60.7%
Intend to take action	9	16.1%
Driving / car maintenance		
Already taken action	30	53.6%
Intend to take action	4	7.1%
Renewable energy		
Already taken action	23	41.1%
Intend to take action	17	30.4%

One in seven respondents who read the Energy Savers booklet (14.3% or 8 out of 56) say they have already purchased and installed high efficiency equipment based on the booklet's recommendation. The items installed are listed below:

- Refrigerators (n=3)
- Refrigerator, dishwasher and clothes washer (n=1)
- HVAC system upgrade, clothes washer and dryer (n=1)
- Clothes washer (n=1)
- Telephone system (n=1)
- Not specified (n=1)

In terms of other actions already taken based on the booklet's advice, the most common areas are lighting (82.1% or 46 out of 56 who read the booklet), heating and cooling systems (64.3%), home electronics (60.7%), appliances (58.9%) and automobiles (53.6%). The areas in which actions were least likely to have been taken were insulation and air leaks (37.5%), windows (37.5%) and home offices (37.5%).

The highest levels of intention for future actions inspired by the booklet are in the areas of insulation and air leaks (32.1%), renewable energy (30.4%) and windows (23.2%).

Finally, respondents were asked if they had taken any other actions influenced by the DOE Energy Savers booklet. The verbatim responses of the three respondents who had additional comments are listed below:

- *"Be aware of how the cooling system of the house is working, and using the programmable thermostat."*
- *"Unplug electronics, lamps, microwave, etc. when not using."*
- *"I already did a lot and was already planning on it. The items I did not need I gave to the neighbors to use."*

Satisfaction with Kit Items

Respondents indicated a high level of satisfaction with the kit items, as seen in Table 20 and Figure 5. Satisfaction scores were highest (median score 10 out of 10) for the water temperature card (mean 9.20), night light (mean 9.16) bathroom aerators (mean 9.14) and kitchen aerators (mean 9.11). Weighting the mean scores of each of the kit items provides a mean score of 8.90 for the kit as a whole.

Table 20. Satisfaction Ratings for Duke Energy Customer Kit Items

	Count	Minimum Score	Maximum Score	Mean Score	Median Score
13-watt CFL	74	1	10	8.70	9
18-watt CFL	65	4	10	9.00	9
low flow showerhead	38	4	10	8.82	9
kitchen aerator	36	5	10	9.11	10
bathroom aerator	29	5	10	9.14	10
switch and outlet gaskets	38	5	10	9.00	9
water flow meter bag	22	1	10	7.73	8
water temp card	35	7	10	9.20	10
night light	62	1	10	9.16	10
Booklet (rating "how informative")	56	1	10	8.79	9

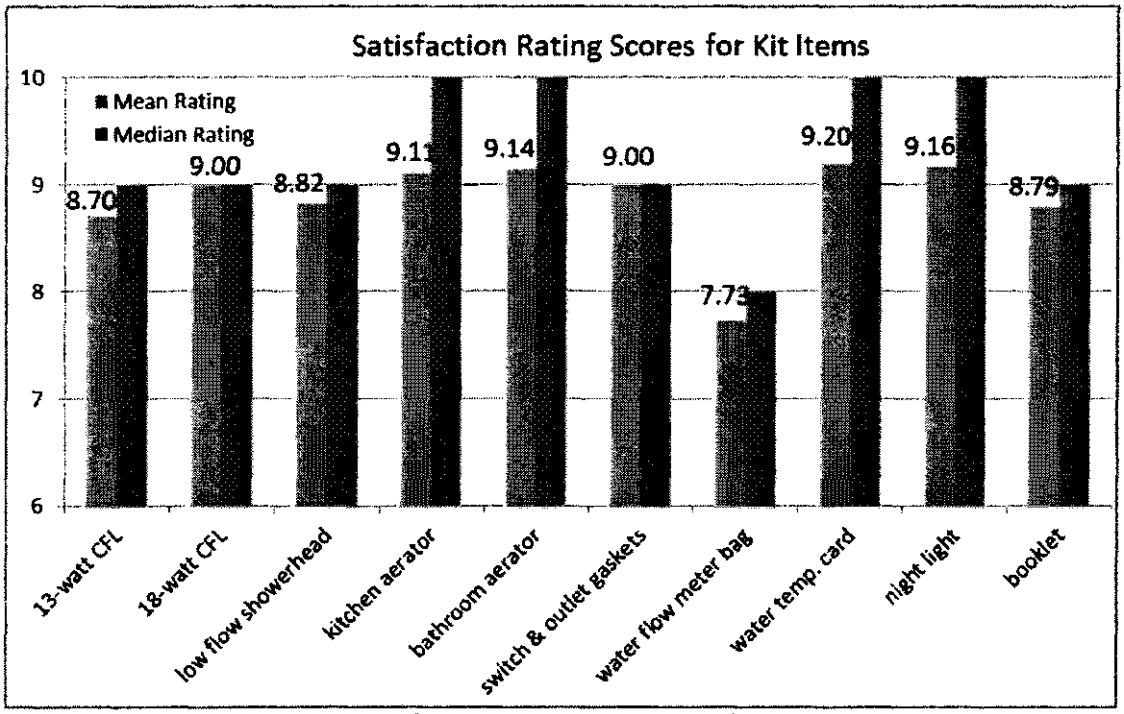


Figure 5. Mean and Median Satisfaction Rating Scores For Kit Items

Overall Satisfaction with the Program

Respondents in Ohio were asked to rate their overall satisfaction with Duke Energy's "Energized Guyz" program using a 5-point Likert scale, shown in Table 22. Seven out of ten respondents (71.1% or 59 out of 83) said they were "very satisfied" (highest possible rating), while only one in twenty respondents were not satisfied (4.8% or 4 out of 83 combined "neither satisfied nor dissatisfied," "somewhat dissatisfied" and "very dissatisfied").

Table 21. Satisfaction Ratings with the Program, and Reasons for Ratings

	Ohio Kits (n)	Ohio Kits (%)
Very Satisfied With Program	59	71.1%
Somewhat Satisfied With Program	20	24.1%
Neither Satisfied Nor Dissatisfied	3	3.6%
Somewhat Dissatisfied With Program	1	1.2%
Very Dissatisfied	-	0%

Table 22 lists respondents' stated reasons for their satisfaction ratings. The most common reasons why participants said they were "very satisfied" with the program have to do with the information and education provided (mentioned by 37.2% or 22 out of 59), the usefulness of the kit items (25.4% or 15 out of 59) and that the program was exciting, fun and/or motivating (22.0% or 13 out of 59). Conserving energy and environmental concerns (15.3% or 9 out of 59) and saving money on bills (10.2% or 6 out of 59) were mentioned less frequently.

The most common reason why participants said they were only "somewhat satisfied" was that not all items in the kit were practical or installable (25.0% or 5 out of 20). Other complaints about the program raised by these respondents include not needing it because they are already doing the energy efficiency measures recommended (10.0% or 2 out of 20), receiving a broken item in the kit (10.0% or 2 out of 20) and not being able to use all of the kit items due to being a renter (5.0% or 1 out of 20). Theses respondents were about half as likely to mention the information and education provided (20.0% or 4 out of 20, significantly less than for "very satisfied" respondents at $p<.10$ level using student's t-test) and much less likely to mention useful items in the kit (5.0% or 1 out of 20, significantly less than for "very satisfied" respondents at $p<.05$ using student's t-test) or that the program was fun, motivating and/or exciting (5.0% or 1 out of 20, significantly less than for "very satisfied" respondents at $p<.05$ using student's t-test). However, conserving energy and the environment (15.0% or 3 out of 20) was mentioned at about the same rate for "somewhat" and "very" satisfied respondents.

Among the four respondents (4.8% of 83) who were not satisfied with the program, one who was "somewhat dissatisfied" said that receiving the kit took too long, and one who was "neither satisfied nor dissatisfied" said they hadn't actually used any kit items yet. The other two non-satisfied respondents did not offer a reason for their lower ratings. None of these respondents mentioned anything positive about the program.

Table 22. Satisfaction Ratings with the Program, and Reasons for Ratings

	Ohio Kits (n)	Ohio Kits (%)
Very Satisfied With Program	59	71.1%
Reason for being "very satisfied"		**Percentage of "very satisfied" respondents**
Useful information / education	22	37.3%
Useful items in kit	15	25.4%
Exciting / fun / motivating	13	22.0%
Conserving energy / environment	9	15.3%
Saving money on bills	6	10.2%
Program & kit were free	3	5.1%
Already doing this / don't need kit items	2	3.4%
Shared items with friends / family	1	1.7%
Not all items are practical / installable	1	1.7%
Don't Know / nothing specific	17	28.8%
Somewhat Satisfied With Program	20	24.1%
Reason for being "somewhat satisfied"		**Percentage of "somewhat satisfied" respondents**
Not all items are practical / installable	5	25.0%
Useful information / education	4	20.0%
Conserving energy / environment	3	15.0%
Received broken item in kit	2	10.0%
Shared items with friends / family	2	10.0%
Already doing this / don't need kit items	2	10.0%
Saving money on bills	1	5.0%
Useful items in kit	1	5.0%
Exciting / fun / motivating	1	5.0%
Renter, don't have authority to use some of these items	1	5.0%

Don't Know / nothing specific	6	30.0%
Neither Satisfied Nor Dissatisfied	3	3.6%
Reason for being "neither satisfied nor dissatisfied"		**Percentage of "neither satisfied nor dissatisfied" respondents**
Haven't used any items yet	1	33.3%
Don't Know / nothing specific	2	66.7%
Somewhat Dissatisfied With Program	1	1.2%
Reason for being "somewhat dissatisfied"		**Percentage of "somewhat dissatisfied" respondents**
Took too long to receive the kit	1	100%
Very Dissatisfied	-	0%

Note: reasons for ratings may total to more than 100% due to respondents offering multiple reasons.

To give a fuller flavor of Duke Customers' overall impression of the K12 program, their verbatim final comments as to their overall satisfaction with the program are listed below:

- *"A lot of different ways to save energy and money."*
- *"A lot of the items weren't necessary in our home, or they would have replaced a similar item already installed."*
- *"Because it helped our Grandma to go save and get the energy kit too."*
- *"Because it worked."*
- *"Could not use all the items as they did not fit the faucets or the wall covers. Could not replace these because I do not own house only rent."*
- *"Entertaining and informative."*
- *"Everything I have used so far works well."*
- *"Everything in it would be helpful for the average household. In our house some of these measures were already in place."*
- *"Everything in the kit was helpful and informative."*
- *"Good information and education for kids and parents."*
- *"Great items to receive free."*
- *"Great program for free and very informative."*
- *"Happy with products."*
- *"Haven't time to use the products yet."*
- *"Help the kids to save more energy since they really are the ones neglecting turning off the lights or the TV."*
- *"Helps the kids understand that our everyday uses are not free."*
- *"I appreciate the dedication to saving energy and think everyone in the community needs to be aware and participate in conservation."*

- *"I liked it. I gave the gaskets to someone who had an older drafty place to try to help them out. The bathroom aerator didn't fit. The CFL light is not very bright but getting used to it."*
- *"I liked that it reinforced what we teach our kids about energy savings."*
- *"I loved getting the free stuff!"*
- *"I loved it!"*
- *"I think it was a great program. We are slowly renovating and using energy saving items as we go. I think we all would like to save energy but don't always know what to do. Education is the best way. For our kids, they thought it was fun but they learned a lot too. It has them thinking before they turn on lights and water. When kids are educated and then get to go home and tell their parents, it makes them feel more grown up. They felt this program made them feel more adult. It has them thinking about solar panels, etc. When we see energy efficient things at the store, they talk about them and when they see solar panels on homes, at the zoo, etc., they talk about them. They never cared before. But now, they have information that is helpful. As a parent, it is nice to see their wheels turning and not always be on them to turn off the lights, turn off the water, etc."*
- *"I think overall, the information was good...if someone wasn't already energy conscious. We had already installed CFLs in all lamps."*
- *"I was not aware of some of the things available in the kit and believe they are helpful in conserving energy."*
- *"I was very satisfied with all the products."*
- *"I wouldn't have done any of this probably if it weren't for the kit."*
- *"It called attention to items I hadn't previously considered."*
- *"It has helped to keep our home energy rates low and we are not wasting energy."*
- *"It helped cut down on energy use."*
- *"It helped out somewhat."*
- *"It is very informative and had a lot of things in the kit that were very helpful."*
- *"It was very informative and also aided in the start of conserving energy."*
- *"Learned new energy saving tips."*
- *"My child enjoyed and learned."*
- *"My kids had fun being educated about energy saving."*
- *"My son was so excited that he installed it himself around the house."*
- *"Not everything is practical."*
- *"One light bulb was broken. Other items are not easy to install."*
- *"One of my light bulbs was broken in the box."*

- *"Some of the items are worthwhile. At my skill level it seemed childish to me. But may be informative to others."*
- *"The changes have made a difference with my energy bill."*
- *"The kids really enjoyed the program and took the information home with them. The materials are informative and it's a great starter kit. Simple conservation is something we've done for a long time, but we normally don't invest in new equipment until something needs to be replaced. The tips about what to look for will come in handy at that time."*
- *"The products were very helpful in cutting down costs."*
- *"The program not only educates the kids about the need to conserve energy but also gets them excited about helping install the items they receive in their kit."*
- *"The program was very informative to all of the participants."*
- *"The show that they put on was very entertaining and the kids really enjoyed it."*
- *"The students were really excited about the program and I know that they learned a lot and were able to inform their families on what they had learned."*
- *"Took 6 months to receive it."*
- *"Very informative and gave me ideas of what needs to be done."*
- *"Very informative!"*
- *"Very informative, all items were utilized with the exception of the night light which did not work, and the bathroom sink water saver which dramatically cut down the flow of water."*
- *"Very useful items and help me to be more energy conscious."*
- *"Was awesome info!"*
- *"We learned a lot and I definitely think our electric and water bills have decreased because of it."*
- *"We learned energy saving tips. The tools we received were easy to install and work effectively."*
- *"We talked about this material for months!"*

Parent-Child Discussion Topics

Duke Energy customers were asked a series of questions about what topics they discussed with their children after they participated in the program. Table 23 indicates that roughly three quarters of participants surveyed discussed saving energy (73.5% or 61 out of 83) and saving water (74.7%), as well as how to achieve this by turning off lights and appliances (79.5%) and turning off water (74.7%), though only half (51.8%) discussed fixing leaky faucets. The NTC production of "Energized Guyz" was also frequently mentioned (by 63.9% or 53 out of 83),

though renewable energy (44.6%) and CFLs (37.3%) were only discussed by a minority of parents and children.

Table 23. Topics Discussed With Children After Participating in the Program

	Ohio Kits (n)	Ohio Kits (%)
Turn lights and appliances off when not in use	66	79.5%
Turning off the water when it is not being used	62	74.7%
Saving water	62	74.7%
Saving energy	61	73.5%
NTC performance	53	63.9%
Fixing leaky faucets	43	51.8%
Renewable energy	37	44.6%
CFLs	31	37.3%

Duke Energy customers were asked if they had discussed anything else with their children after participating in the program. Table 24 indicates that four-fifths of respondents had nothing more to volunteer (68 or 81.9% of 83), and among those that did no topics emerged as dominating conversations. The only topics discussed in more than one household were the children's insistence on sending away for and using the kit (3.6% or 3 out of 83) and the program as a whole being enjoyable (2.4% or 2 out of 83).

Table 24. Additional Topics Discussed With Children After Participating in the Program

	Ohio Kits (n)	Ohio Kits (%)
Insisted on sending for kit/using kit	3	3.6%
Program was fun/enjoyable	2	2.4%
Enjoyed performance/performers/characters	1	1.2%
Leaks/drafts/insulation/closing doors & windows	1	1.2%
Changing lights	1	1.2%
Recycling	1	1.2%
Saving money	1	1.2%
Entering a contest	1	1.2%
No kids in school or teacher	5	6.0%
Nothing/don't know/not specified	68	81.9%

The table above totals to more than 83 responses because respondents could give multiple responses.

Duke Energy customers were asked a series of questions about what topics they discussed with their children after they participated in the program. Table 25 indicates that 79.5% of respondents (66 out of 83) feel they are more educated about energy efficiency after participating in the program, and 67.5% (56 out of 83) say they are more concerned about energy efficiency after the program. However, 91.6% (76 out of 83) also say they were already concerned about energy efficiency before the program.

Table 25. Perceived Educational Value of the Program

	Ohio Kits (n)	Ohio Kits (%)
Is your household more or less educated about		

energy efficiency since receiving the kit?		
Yes, we are more educated	66	79.5%
There is no change in our education	17	20.5%
No, we are less educated	-	0%
Before receiving the kit . . .		
Never been concerned about energy efficiency	7	8.4%
Always concerned about energy efficiency	76	91.6%
Since receiving the kit, is your household . . .		
More concerned about energy efficiency	56	67.5%
There is no change in our concern	27	32.5%
Less concerned about energy efficiency	-	0%

Kits Sent to Non-Duke Energy Customers

Invitations to participate in this online survey were also sent to Non-Duke Energy customers in Ohio, and 36 surveys were completed. Non-Duke Energy customers that participated in the K12 program received a kit with the following items:

- 13-watt CFL
- 8 Outlet gasket insulators
- Bag for testing water flow
- Water temperature card
- DOE booklet

Use of the K12 Non-Duke Energy Kit Measures

CFL

The CFL included in the K12 kit was installed by 88.9% (32 out of 36) of the Non-Duke Energy respondents. Table 26 below shows a summary of the responses to the questions about the 13-watt CFL. Most of the kit recipients (75.0% or 24 out of 32) replaced a 45 to 70-watt bulb with the 13-watt CFL, and in most cases (65.6% or 21 out of 32) replaced a bulb that was still functional. The median and most common amount of usage for the light where the CFL bulb was installed was 3-4 hours per day on average.

Table 26. Frequency of Installation: 13-watt CFL

	Ohio Kits (n)	Ohio Kits (%)
Installed 13w bulb		
Yes	32	88.9%
No, but plan to	2	5.6%
No, not sure if will	1	2.8%
Don't Know	1	2.8%
Wattage of bulb removed		**Percent of Those Using the Item**
Less than 44w	1	3.1%
45-70w	24	75.0%
71-99w	3	9.4%
Greater than 100w	4	12.5%
Functionality of bulb removed		
CFL replaced working bulb	21	65.6%
CFL replaced bulb that was *not working (or empty socket)*	11	34.4%
Don't know	-	0%
Hours of use per day		
<1	2	6.3%
1-2	5	15.6%
3-4	14	43.8%
5-10	9	28.1%
11-12	1	3.1%
13-24	1	3.1%

The mean satisfaction rating for the 32 non-customers who installed the CFL was 8.09 (satisfaction ratings for all non-customer kit items can be found in Table 31). Nine of 32 (28.1%) non-Duke Energy customers surveyed who installed the 13-watt CFL rated their satisfaction with the bulb at "7" or lower on a 10-point scale. The reasons for these lower levels of satisfaction are listed below.

- Not bright enough (n=4, ratings "3," "5," "6" and "6")
- Do not like quality/color of light (n=3, ratings "5," "6" and "7")
- Bulb shape/poor fit (n=1, rating "5")
- Don't know/not specified (n=1, rating "7")

Purchasing Additional CFLs
Eight respondents who installed the kit-provided bulb (25.0% of 32) have purchased additional CFLs since receiving the kit, with those eight respondents indicating that they have purchased an average of an additional 3.75 CFLs per household. There was also one respondent who did not install the kit-provided CFL, but said they have purchased two CFLs since receiving the kit.

Previous Use of CFLs
Twenty-six of the non-Duke Energy customers (72.2% of 36) indicated that they had at least one CFL installed in their homes previous to receiving the K12 kit. These families report that they had from one to twenty CFLs installed in their homes, with the average reported number of previously installed CFLs being 7.0 per household.

Fourteen of these respondents (38.9% of 36) indicated that they were definitely planning on purchasing CFLs before receiving the kit, and another nine (25.0% of 36) were possibly planning on buying CFLs. Three of the non-Duke Energy customers (8.3% of 36) indicated that they had not planned on purchasing more CFLs because they already have CFLs installed in all of their household's sockets.

Outlet Gaskets Insulators

Thirteen non-Duke Customers surveyed (36.1% of 36) installed the outlet insulating gaskets. The kit provided 8 gaskets in total, but unfortunately slightly more than half of those used were installed on interior walls where they do not provide any energy savings.

Table 27. Frequency of Installation: Outlet Gaskets

	Ohio Kits (n)	Ohio Kits (%)
Installed the gaskets		
Yes	13	36.1%
No, but plan to	10	27.8%
No, do not plan to	7	19.4%
No, not sure if will	4	11.1%
Don't Know	2	5.6%
Number installed interior wall		**Percent of Those Using the Item**
0	4	30.8%
1-2	3	23.1%
3-5	5	38.5%

6-8	1	7.7%
Don't Know	-	0%
Average number of gaskets installed on interior walls: 2.4 per household		
Number installed exterior wall		
0	5	38.5%
1-2	5	38.5%
3-5	1	7.7%
6-8	2	15.4%
Don't Know	-	0%
Average number of gaskets installed on exterior walls: 2.0 per household		

The mean satisfaction rating for the 13 non-customers who installed gaskets was 8.69 (satisfaction ratings for all non-customer kit items can be found in Table 31). Three of thirteen (23.1%) non-Duke Energy customers surveyed who installed the gasket insulators rated their satisfaction with the bulb at "7" or lower on a 10-point scale. The reasons for these lower levels of satisfaction are listed below.

- Haven't noticed any difference/no benefits (n=2, ratings "6" and "7")
- Older home, difficult to make it fit (n=1, rating "7")

Purchasing Additional Gaskets
None of the non-Duke Energy customers surveyed (0 out of 36) reported that they have purchased additional outlet gaskets since participating in the program.

Previous Use of Gaskets
Three (23.1%) of the thirteen respondents who installed gasket insulators indicated that they already had at least one gasket insulator installed in their home before receiving the K12 kit. Four (17.4%) of the 23 respondents that did not install any kit-provided gaskets also indicated that they already had some gaskets installed (though only one of these respondents, or 4.3% of 23, said they already had gasket insulators on every outlet in their home).

Of the three respondents who installed the kit-provided gaskets though they already had other gaskets installed, none said they were definitely planning to install more gaskets before receiving the kit, while two said they might ("maybe") have been planning to install gaskets before receiving the kit. The third of these respondents said they definitely were not planning to install any more gaskets before receiving the kit. Among the other ten respondents who installed the kit-provided gaskets (but who did not previously have any gaskets installed), none said they were considering installing gasket insulators before the kit arrived.

Among the 23 respondents who did not install the kit-provided gaskets, only three (13.0%) said they might be planning to install them before receiving the kit ("maybe") – and none of these three respondents previously had any gaskets installed. None of these 23 respondents said they were definitely planning to install gasket insulators before receiving the kit.

Water Flow Meter Bag

Only 22.2% (8 out of 36) respondents used the water flow meter bag, though another 30.6% (11 out of 36) say they intend to use it. Only one respondent (12.5% of 8 who used the item, or 2.8% of all 36 non-customers surveyed) adjusted the GPM down on their shower, and none adjusted the GPM on any other faucets.

Table 28. Frequency of Use: Water Flow Meter Bag

	Ohio Kits (n)	Ohio Kits (%)
Used the Water Meter Bag		
Yes	8	22.2%
No, but plan to	11	30.6%
No, do not plan to	7	19.4%
No, not sure if will	9	25.0%
Don't Know/blank	1	2.8%
Tested in Shower		**Percent of Those Using the Item**
Hot Water	-	0%
Cold Water	2	25.0%
Both	5	62.5%
Adjusted GPM down	1	12.5%
Tested in Kitchen		
Hot Water	-	0%
Cold Water	-	0%
Both	2	25.0%
Adjusted GPM down	-	0%
Tested in Bathroom		
Hot Water	-	0%
Cold Water	-	0%
Both	1	12.5%
Adjusted GPM down	-	0%
Tested in Utility Sink		
Hot Water	-	0%
Cold Water	-	0%
Both	-	0%
Adjusted GPM down	-	0%

The mean satisfaction rating for the 8 non-customers who used the water meter bag was 7.88 (satisfaction ratings for all non-customer kit items can be found in Table 31). Three of eight (37.5%) non-Duke Energy customers surveyed who used the water flow meter bag rated their satisfaction with the bulb at "7" or lower on a 10-point scale. The reasons for these lower levels of satisfaction are listed below.

- Using item is awkward/messy/not easy (n=2, ratings "3" and "6")
- Don't know/not specified (n=1, rating "6")

DOE Energy Savers Booklet

Four out of five non-customers (80.6% or 29 out of 36) read the DOE Energy Savers Booklet, and three-quarters of those who did (75.9% or 22 out of 29) discussed it with their families.

Table 29. Frequency of Use: DOE Energy Savers Booklet

	Ohio Kits (n)	Ohio Kits (%)
Read the Booklet		
Yes	29	80.6%
No but will	6	16.7%
Don't Know/blank	1	2.8%
Read the Booklet and Discussed with Family		**Percent of Those Using the Item**
Yes	22	75.9%
No but will	7	24.1%
Don't Know/blank	-	0%

Non-Duke Energy customers were asked to rate how informative they found the Energy Savers booklet on a 10-point scale; the mean rating of the 29 non-customers who read the booklet was 8.24 (ratings for all non-customer kit items can be found in Table 31). Nine out of 29 (31.0%) non-customers who read the booklet rated the information provided at a "7" or lower on 10-point scale.

Further Actions Inspired by DOE Energy Savers Booklet

About one in seven non-Duke Energy customers who read the Energy Savers booklet say they have installed high efficiency equipment based on the booklet's advice (13.8% or 4 out of 29), as seen in Table 30. The equipment purchased and installed by these four respondents is listed below:

- Clothes washer (n=1)
- Water heater (n=1)
- Microwave (n=1)
- Did not specify (n=1)

Table 30. Actions Based on Advice in DOE Energy Savers Booklet

	Ohio Kits (n)	Ohio Kits (% of 29 respondents who read the booklet)
Purchased and installed high efficiency equipment based on booklet's advice	4	13.8%
Insulation and air leaks		
Already taken action	10	34.5%
Intend to take action	11	37.9%
Heating and cooling system		
Already taken action	16	55.2%
Intend to take action	9	31.0%

Water heating		
Already taken action	7	24.1%
Intend to take action	10	34.5%
Windows		
Already taken action	14	48.3%
Intend to take action	6	20.7%
Lighting		
Already taken action	24	82.8%
Intend to take action	2	6.9%
Appliances		
Already taken action	10	34.5%
Intend to take action	3	10.3%
Home Office		
Already taken action	9	31.0%
Intend to take action	5	17.2%
Home Electronics		
Already taken action	16	55.2%
Intend to take action	4	13.8%
Driving / car maintenance		
Already taken action	12	41.4%
Intend to take action	4	13.8%
Renewable energy		
Already taken action	12	41.4%
Intend to take action	5	17.2%

Among other actions recommended by the booklet, the most commonly done involve lighting (by 82.8% or 24 out of 29), heating and cooling systems (55.2%), home electronics (55.2%), and windows (48.3%). The actions respondents are most likely to say they intend to do in the future (but have not done yet) involve insulation and air leaks (37.9%), water heating (34.5%), and heating and cooling systems (31.0%).

As a follow-up question, non-customers were asked if they have taken any other actions inspired by the booklets which were not previously asked about. One respondent (3.4% of 29 who read the booklet) volunteered that they had installed low-flow showerheads.

Satisfaction with Kit Items

Respondents indicate a high level of satisfaction with the kit items (for the DOE booklet, the satisfaction question was worded in terms of "how informative" rather than "how satisfied"). Mean satisfaction scores were highest (8.69 out of 10) with the outlet gaskets, and lowest for the water flow meter bag (7.88 out of 10). Weighting the mean scores of each of the kit items provides a mean score of 8.22 for the kit as a whole.

Table 31. Satisfaction Ratings For non-Duke Energy Customer Kit Items

	Count	Minimum Score	Maximum Score	Mean Score	Median Score
13-watt CFL	32	3	10	8.09	8
Outlet gaskets	13	6	10	8.69	9
Water flow meter bag	8	3	10	7.88	9

Booklet (rating "how informative")	29	5	10	8.24	9

Respondents' General Comments

The survey provided an area for non-Duke Energy customers to add their thoughts about the program. Eleven respondents provided comments which are listed below:

- "*A positive program. Useful in discussion with students.*"
- "*Helpful.*"
- "*I think it is a great idea. Thank you.*"
- "*I think it is good to educate the kids.*"
- "*I think this is a wonderful program that offers free materials and tips for homeowners. Thank you!*"
- "*Nice program. Keep it up. Something, can't remember what, was missing from the package. I'll take another look and let you know.*"
- "*The program at school was excellent and we are scheduling 'The Energized Guyz' for next month. Getting the kit was a nice perk – thanks.*"
- "*Thought the show that was put on was entertaining & informative for the kids. The energy kit was an added bonus. Every little bit saved, helps.*"
- "*We have already implemented several energy-saving ideas. We have upgraded windows, exterior doors, a new high efficiency heating/air conditioning system, basement caulking, solar security lights (along walks), new water heater (through Butler Rural program), peak alert controls on water heater and new heating/cooling system, and plan to add more attic insulation this fall. We appreciate the kit you sent. The more you can learn about saving money, the better off we are as consumers. Conservation is not new to us; we have been doing it all of our adult life. We don't need the Federal Government to teach us about common sense and saving money. They don't know how!*"
- "*Wonderful learning tool for the whole family.*"

Net to Gross Analysis

Net to gross figures are applied to the engineering estimates only and not used to estimate program or per participant net savings. The billing analysis does not require a net to gross adjustment because it provides gross savings less freerider impacts directly as a result of the analysis approach employed (quasi-experimental design). This information is provides for management consideration only as it applies to how products and services are being adopted and used in the market. These adjustments are already embedded in the program and per-participant energy savings presented from the billing analysis approach.

Showerhead, Aerator and Gasket Freeridership and Spillover for Duke Energy Customers

Freeridership and spillover were calculated for each set of measures in the K12 Energy Efficiency Kit. For low-flow showerheads, faucet aerators and insulator gaskets, the level of freeridership was determined by using the responses to three questions in the survey (found in Appendix B: Participant Survey Instruments). The three questions and the level of freeridership and/or spillover that was applied to the energy savings are presented in Table 8 below, using the low-flow showerhead as an example measure. All other possible combinations of answers to the series of questions resulted in 0% freeridership and 0% spillover (not shown in table).

Table 32. Freeridership and Spillover Factors for Energy Efficiency Kit Measures

24h: Did you have any low-flow showerheads installed before you got the kit?	24i: Were you planning on buying <additional> low-flow showerheads before you got the kit?	24j: Have you purchased any low-flow showerheads since you got the kit?	% Free-ridership	% Spillover
yes	yes	yes	100	
yes	yes	no	100	
yes	no	yes		75
no	no	yes		100
no	yes	no	50	
no	yes	yes	50	50
don't know	yes	yes	75	25
don't know	yes	no	50	
don't know	no	yes		100
yes	already installed in all available sockets	yes	100	
yes	already installed in all available sockets	no	100	
yes	already installed in all available sockets	don't know	100	
don't know	maybe	yes	25	50
yes	maybe	yes		25
yes	maybe	no	25	
no	maybe	yes		50
yes	don't know	yes		75
no	don't know	yes		100
yes	yes	don't know	100	
don't know	yes	don't know	50	
no	yes	don't know	50	

Applying the scores from Table 8 to participants' responses to questions about low-flow showerheads, faucet aerators (combined) and gasket insulators (combined) yields the overall freeridership and spillover scores for each measure, shown in Table 33.

Table 33. Freeridership and Spillover for Showerheads, Aerators and Gaskets

Measure (N=number of kit installations)	Number of participants with free-ridership	Number of participants with spillover	Free-ridership percentage	Spillover Percentage
Low-flow showerhead (N=38)	14	2	28.9%	3.9%
Faucet aerators (N=44)	12	3	22.7%	6.8%
Gaskets insulators (N=38)	7	3	15.8%	6.6%

CFL Freeridership for Duke Energy Customers

TecMarket Works utilized two questions from the student family survey to estimate CFL freeridership. The first question asked survey respondents whether or not they had installed CFLs prior to participating in the program, and if so, how many they had installed. The second question asked respondents if they had planned on buying any CFLs before participating in the program.

Quantities of pre-installed CFLs range from 2 to 35 among the 83.1% (64 out of 77) of Duke Energy customers who installed the kit-provided CFLs and indicated that they also had CFLs previously installed.

Freeridership ratios for each customer are based on survey responses and are assigned using a Bass curve based on diffusion of innovation product adoption concepts. Zero pre-installed CFLs correspond to an assigned freeridership score of zero percent, and fourteen or more CFLs correspond to a freeridership level of 100 percent. This allows higher credit for savings to participants with the lowest pre-existing use of CFLs and lower savings to those with a history of CFLs. The curve reflects the condition that if a customer has never used a CFL in the past, they are not historic CFL users and all CFLs they acquire through the program are net energy bulbs. That is, all the energy savings from those bulbs are net savings that would not have occurred without the program. Likewise, if a customer has already purchased and installed 14 or more bulbs, they are committed CFL users and the program's bulbs are providing no net energy savings. These customers are all freeriders. Between these two extremes are people who are at various levels within the Bass adoption process. These customers are assigned NTG ratios in accordance with the degree of pre-program behaviors. This distributes very little savings to the customers who are already using CFLs in many of their fixtures, but who have not fully converted to CFL use in most fixtures. Likewise the Bass curve provides higher levels of NTG savings (but not full savings) to those customers who have tried a few CFLs or who have partially adopted their use. Both of these adoption concepts represent the dominate theories with the product adoption literature and provide similar results within a net energy impact analysis framework. In this analysis the inflection point of the Bass curve is seven CFLs, which is the typical level of CFL penetration among these participants. This inflection point means that there is little impact on net energy savings if the adoption process is faster or slower than projected in a typical Bass curve. That is, a shorter adoption period will give more savings to people with less

than average adoption rates, but less savings to those with longer adoption periods, which act cancel each other and provide the same net analysis results. Thus, we are confident that this net analysis represents a reliable method of crediting net program impacts for multiple adoption products such as light bulbs.

A graph of this curve is shown in Figure 4, with the corresponding freeridership levels by CFL count shown in Table 6. This approach to estimating freeridership is consistent with the field of product adoption and diffusion research and represents a standard approach within the field of product adoption research. It also recognizes that the more CFLs a home has, the less likely the addition of new Duke Energy CFLs will have an impact on product adoption and use behaviors.

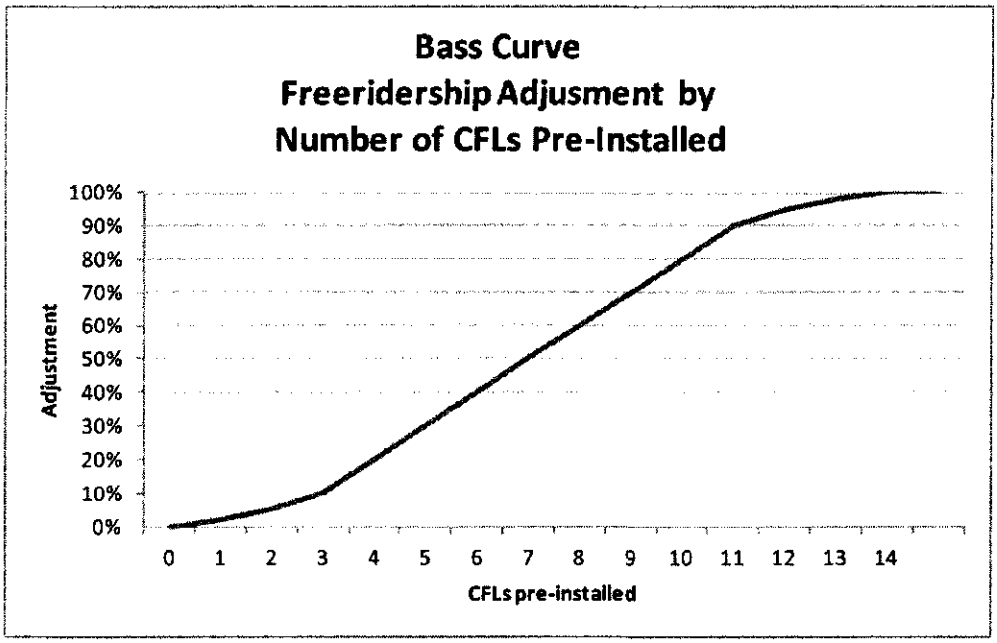


Figure 6. Bass Curve Freeridership Adjustment by Number of CFLs Pre-Installed

Table 34. CFL Freeridership Adjustment Determined by S Curve

Number of CFLs pre-installed	Freeridership Pre-installation adjustment factor	Number of customers with number of pre-installed CFLs
0	0%	13
1	2%	0
2	5%	3
3	10%	8
4	20%	11
5	30%	10
6	40%	8
7	50%	0
8	60%	8
9	70%	1
10	80%	6

11	90%	1
12	95%	2
13	98%	1
14 or more	100%	5

In addition to the pre-installation adjustment factor, TecMarket Works applied a freeridership multiplier based on whether or not respondents indicated they had planned on purchasing the measure (CFLs) before receiving the K12 energy efficiency kit. These multipliers are shown in Table 7.

Table 35. Freeridership Multiplier Based on Measure Purchasing Plans

Did you plan on purchasing <measure> before receiving the K12 kit?	Freeridership multiplier
Yes	1.25 (result cannot exceed 100%) (reduces program savings)
Maybe	1
Don't Know	1
No	0.25 (results cannot be lower than 0%) (increases program savings)
No, already installed in all possible places	Automatic 100% freeridership score

Combining Table 34 with Table 35 produces Table 36.

Table 36. Number of Participants Cross-Referenced by Freeridership Adjustment and Multiplier

Number of CFLs pre-installed	Freeridership Pre-installation adjustment factor	Number of Participants per Freeridership Multiplier				
		1.25	1	0.25	Automatic 0%	Automatic 100%
0 (N=13)	0%	NA	NA	NA	13	
1 (N=0)	2%					
2 (N=3)	5%	3				
3 (N=8)	10%	5	2	1		
4 (N=11)	20%	7	3			1
5 (N=10)	30%	5	2	1		2
6 (N=8)	40%	6	2			
7 (N=0)	50%					
8 (N=8)	60%	4	1	2		1
9 (N=1)	70%	1				
10 (N=6)	80%	5				1
11 (N=1)	90%					1
12 (N=2)	95%	2				
13 (N=1)	98%					1
14 or more (N=5)	100%	1				4

TecMarket Works then multiplied the freeridership adjustment factor by the freeridership multiplier for each survey respondent. An average of the resulting freeridership percentage across all 77 respondents produced an average freeridership level of 43.5%.

This level of freeridership is higher than what we have seen in the past from these types of programs and reflects the movement of the market toward higher levels of CFL use over time. While the program is doing an excellent job of getting these CFLs in the sockets of customers who do not typically use high levels of CFLs without the program, it is becoming clear that Duke Energy will need to carefully monitor the CFL use market for the various types of targeted customer segments on which the program focuses and determine the point at which net savings will fall below cost effective program expenditures. TecMarket Works does not project when or if this condition will be experienced by different types of programs because net to gross analysis is not a technology factor, but rather is a target market adoption purchase behavior factor. Thus the value of a freeridership estimates is a program targeting metric rather than a technology metric or building code metric. Effective program targeting is established through the marketing, outreach and implementation design consideration, rather than the technology being pushed by a program.

CFL Spillover

The level of spillover for CFL bulbs was computed using the same factor scores found in Table 8, and the result is shown in Table 37.

Table 37. Freeridership and Spillover for CFL Bulbs

Measure (N=number of kit installations)	Number of participants with freeridership	Number of participants with spillover	Freeridership percentage (computed using Bass curve)	Spillover Percentage
CFL bulbs (N=77)	64	11	43.5%	7.1%

Impact Estimates: Billing Analysis

This section of the report presents the results of a billing analysis conducted over the participants in the K-12 program in Ohio. Billing data was obtained for all participants in the K-12 program between September, 2011 and August, 2012 and that had accounts with Duke Energy. After processing, there were a total of 7,279 usable accounts[20]. A panel model was used to determine program impacts, where the dependent variable was daily electricity consumption from September 2010 to August, 2012. The results of the billing analysis are presented in Table 38.

Table 38. Estimated Ohio K-12 Impacts: Billing Analysis

	kWh	t-value
Per Participant Annual Savings (Net)	237	3.44

This table shows that the K-12 program produced statistically significant savings for participants in Ohio. The variance between the engineering estimates and the billing analysis can be explained by customer behavioral and psychological effects that are not accounted for in the engineering analysis. These effects include survey biases such as customers' inability to accurately estimate operating hours and imperfect recall regarding the wattage of the incandescent lamps replaced.

For this analysis, data were available both across households (i.e., cross-sectional) and over time (i.e., time-series). With this type of data, known as "panel" data, it becomes possible to control, simultaneously, for differences across households as well as differences across periods in time through the use of a "fixed-effects" panel model specification that provides net savings estimates that are already adjusted for freeridership and participant spillover that occurs during the analysis period. The approach does not include the program induced savings that are associated with short and longer term non-participant spillover or market effects. As a result, these savings should be considered conservative for an estimate actual achieved savings. The fixed-effect refers to the model specification aspect that differences across homes that do not vary over the estimation period (such as square footage, heating system, etc.) can be explained, in large part, by customer-specific intercept terms that capture the net change in consumption due to the program, controlling for other factors that do change with time (e.g., the weather). The model does control for what would have been done without the program within the participants' homes.

Because the consumption data in the panel model includes months before and after the installation of measures through the program, the period of program participation (or the participation window) may be defined specifically for each customer. This feature of the panel model allows for the pre-installation months of consumption to effectively act as the comparison group for post-participation months. In addition, this model specification, unlike annual pre/post-participation models such as annual change models, does not require a full year of post-participation data. Effectively, the participant becomes their own comparison group, thus eliminating the need for a non-participant comparison or control group. We know the exact

[20] In order to maximize the use of the data, a single model was estimated over all states (Ohio, North Carolina and South Carolina). Therefore, the actual sample size in the model included 7,279 households in Ohio; 21,230 in North Carolina and 7,990 in South Carolina for a total sample size of 36,499 households.

month of participation in the program for each participant, and are able to construct customer specific models that measure the change in usage consumption immediately before and after the date of program participation, controlling for weather and customer characteristics such as other Duke offers.

The fixed effects model can be viewed as a type of differencing model in which all characteristics of the home, which (1) are independent of time and (2) determine the level of energy consumption, are captured within the customer-specific constant terms. In other words, differences in customer characteristics that cause variation in the level of energy consumption, such as building size and structure, are captured by constant terms representing each unique household.

Algebraically, the fixed-effect panel data model is described as follows:

$$y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it},$$

where:

- y_{it} = energy consumption for home i during month t
- α_i = constant term for site i
- β = vector of coefficients
- x = vector of variables that represent factors causing changes in energy consumption for home i during month t (i.e., weather and participation)
- ε = error term for home i during month t.

With this specification, the only information necessary for estimation is those factors that vary month to month for each customer, and that will affect energy use, which effectively are weather conditions and program participation. Other non-measurable factors can be captured through the use of monthly indicator variables (e.g., to capture the effect of potentially seasonal energy loads).

The effect of the K-12 program is captured by including a variable which is equal to one for all months after the household participated in the program. The coefficient on this variable is the savings associated with the program. In order to account for differences in billing days, the usage was normalized by days in the billing cycle. The estimated electric model is presented in Table 39[21].

Table 39. Estimated Savings Model – dependent variable is Net daily kWh usage, September 2010 through August 2012 (savings are negative)

[21] As stated previously, a single model was estimated over participants in all states. Thus, this table presents the impacts for the Carolinas in addition to the impacts for Ohio.

Independent Variable	Coefficient (daily kWh)	Equivalent Percentage (%)	t-value
K-12 participation – Ohio	-0.65	1.5%	-3.44
K-12 participation – Carolinas	-0.646	1.3%	-6.34
Sample Size	597,215 observations (36,497 homes)		
R-Squared	74%		

Note that in this table, the dependent variable is the daily energy use. To derive the net annual kWh savings, the coefficient in the table was multiplied by 365 to give the 237.2 kWh/year savings estimate. The equivalent percentage is calculated as the coefficient (daily kWh) divided by average pre-program usage of each state. Equivalent percentage saving of OH is calculated as 0.65 divided by OH average pre-program usage of 44.2 kWh /day. Equivalent percentage saving of Carolinas is calculated as 0.646 divided by Carolinas average pre-program usage of 47.9 kWh / day. The complete estimate model, showing the weather and time factors, is presented in Appendix H: Impact Algorithms.

Impact Estimates: Engineering Analysis

Savings values in this section are not official and are provided only for program's management information and their use to better understand the per measure adoption and use characteristics. The net savings claimed by this program should be taken from the billing analysis results. These engineering estimates provide, for the billing analysis, a ratio of coincident kW reduction to kWh savings as it is incapable of analyzing kW. Additionally, the engineering estimates offer insight into individual measure contributions to overall savings.

Table 40 shows the estimated energy savings per unit distributed to Duke Energy customers adjusted downward for the ISR and accounting for the freeridership and spillover percentages computed from participants' survey responses. CFL savings also incorporate the self-reporting bias applied to the hours of use.

Table 40. Duke Energy Kit Savings: kWh and Coincident kW per Unit Distributed

Metric	13W CFL	18W CFL	Low-flow showerhead	Faucet Aerators	Outlet Gaskets	Hot Water TempCard	Night Light	Entire Kit
Units	Bulb	Bulb	Showerhead	Aerator	Gasket	Change	Light	Kit
Amount Distributed*	83	83	83	166	996	83	83	83
In Service Rate	91.2%	84.3%	45.8%	25.3%	12.9%	13.3%	74.7%	
Gross kW per unit	0.00568	0.00626	0.00661	0.00004	0.00017	0.00073	0.0000003	0.02138
Gross kWh per unit	42.87	47.82	60.30	3.11	0.48	6.40	4.60	173.95
Freeridership rate	43.5%	43.5%	28.9%	22.7%	15.8%	0.0%	0.0%	
Spillover rate	7.1%	7.1%	3.9%	6.8%	6.6%	0.0%	0.0%	
NTG ratio	60.5%	60.5%	73.9%	82.6%	89.8%	100.0%	100.0%	69.4%
Net kW per unit	0.00344	0.00379	0.00488	0.00003	0.00015	0.00073	0.0000003	0.01294
Net kWh per unit	25.94	28.93	44.55	2.57	0.43	6.40	4.60	120.71
Measure Life (years)[8]	5	5	10	10	20	3	8	**7
EUL net kWh per unit	129.72	144.67	445.46	25.71	8.57	19.20	36.83	845.00

*This is the amount distributed to the online survey sample population of Duke Energy customers (n=83 kits).
**Overall measure life is a weighted average derived from the effective useful lives of the individual kit items. The weights were assigned based on each item's contribution to gross kWh savings.

Table 41. Non-Duke Energy Kit Savings: kWh and Coincident kW per Unit Distributed

Metric	13W CFL	Outlet Gaskets	***Hot Water TempCard	Entire kit
Units	Bulb	Gasket	Change	Kit
Amount Distributed*	36	288	36	36
In Service Rate	90.3%	8.9%	13.3%	
Gross kW per unit	0.00616	0.00012	0.00073	0.00782
Gross kWh per unit	61.59	0.33	6.40	70.61
Freeridership rate	43.5%	15.8%	0.0%	
Spillover rate	7.1%	6.6%	0.0%	
NTG ratio	60.5%	89.8%	100.0%	65.2%
Net kW per unit	0.00373	0.00010	0.00073	0.00510
Net kWh per unit	37.27	0.29	6.40	46.02
Measure Life (years)[8]	5	20	3	5
EUL net kWh per unit	186.34	5.88	19.20	230.11

*This is the amount distributed to the online survey sample population of non-Duke Energy customers (n=36 kits).
**Overall measure life is a weighted average derived from the effective useful lives of the individual kit items. The weights were assigned based on each item's contribution to gross kWh savings.

***Non-Duke Energy customers were not surveyed about the hot water tempcard. Behaviors are assumed to mirror Duke Energy customers.

Survey Data

Participants were asked how many of the measures distributed through Duke Energy's EE for Schools program they had installed. Additional, more specific information was collected for each measure, including the type and wattage of the bulb that the CFLs replaced, the average hours per day that they are in use, and the average number of showers taken per week using the low-flow showerhead. Duke Energy conducted the online survey with a random sample of 119 participants from Ohio between August 18 and September 19, 2012, 83 Duke Energy customers and 36 non-Duke Energy customers. The compilation of this data is presented in Table 42 in its unadjusted form; that is before the self-reporting bias is applied to the CFLs' hours of use. The adjusted values appear in Table 45.

Table 42. Duke Energy Customers: Unadjusted Survey Data

Measure	Number of Installations	Average Wattage/GPM of Unit Removed	Average Daily Hours of Use/Showers per week
13W CFL	75	62	5.33
18W CFL	65	72	4.90
Low-flow showerhead	38	3.1	9.58
Faucet aerators*	42	2.2	
Outlet gaskets**	128.5		
Hot water tempcard***	11	Average 16 degree change	
Night light	62	2.21	24

*Only aerators that did not replace an existing aerator are counted
**Only outlet gaskets installed in exterior walls are counted
***Only participants that both used the card and made a change are counted

Impact Estimates

CFLs

The Energy Efficiency Starter Kit distributed to Duke Energy customers included one 13-watt CFL and one 18-watt CFL. A total of 166 CFLs were given to Duke Energy customers that participated in the online survey, 83 each of the 13-watt and 18-watt CFLs. Impact estimates associated with these CFLs can be seen in Table 43. The kit distributed to non-Duke Energy customers contained only one 13-watt CFL. A total of 36 13-watt CFLs were given to non-Duke Energy customers that participated in the online survey. Impact estimates associated with these CFLs can be seen in Table 44.

Table 43. Savings Estimates per CFL Distributed to Duke Energy Customers

Bulb Type	Number Distributed	In Service Rate	Average Wattage of Bulb Removed	Average Adjusted Daily Hours of Use	Gross kWh per Bulb	Gross kW per Bulb	Net kWh per Bulb	Net kW per Bulb
13-watt	83	91.2%	62	2.66	42.87	0.0057	25.94	0.00344
18-watt	83	84.3%	72	2.92	47.82	0.0063	28.93	0.00379

Table 44. Savings Estimates per CFL Distributed to Non-Duke Energy Customers

Bulb Type	Number Distributed	In Service Rate	Average Wattage of Bulb Removed	Average Adjusted Daily Hours of Use	Gross kWh per Bulb	Gross kW per Bulb	Net kWh per Bulb	Net kW per Bulb
13-watt	36	90.3%	66	3.56	61.59	0.0062	37.27	0.00373

In Service Rate (ISR) Calculation

Survey participants were asked to report whether or not they used the CFLs in the energy efficiency kit. Respondents were also asked if they had subsequently removed any of the CFLs provided by the program. Their responses indicate that 3.61% of the CFLs that were initially installed have since been uninstalled. This percentage has been subtracted from the first year ISR.

Using 18-watt CFLs as an example, a total of 83 bulbs were distributed to survey participants in the energy efficiency kits. Respondents reported that 65 of them were used, a first year ISR of 78.3%. Subtracting the aforementioned 3.61% of bulbs removed from use yields a first year ISR of 74.7%. The ISR is calculated to be 84.3% using the following formula:

$$\text{ISR} = \text{first year ISR} + (43\% * \text{remainder}) = \mathbf{74.7\% + (43\% * 22.3\%) = 84.3\%}$$

The remainder is the percentage of bulbs that are not installed in the first year (100% - 74.7% = 25.3%) less 3% for the 97% lifetime ISR[22]. In this case, the remainder is 22.3%. The 43% represents the percentage of the remainder that will replace an incandescent bulb rather than a CFL[23].

Self-Reporting Bias

Previous CFL studies that have included both customer surveys and lighting loggers have shown that, comparing customers' self-reported hours of operation to the actual hours of operation, customers responding to the survey overestimated their lighting usage by 27%[24]. As this study did not employ lighting loggers, there is no data with which to make a comparison for this program specifically. Consequently, the self-reported hours of use obtained from the survey were reduced by the 27% established through the collection of data from previous programs. This bias applies to CFLs only.

Table 45 shows the average of the unadjusted hours of use values along with the updated average values after the self-reporting bias is applied for both Duke Energy and non-Duke Energy

[22] As established in the Nexus Market Research, RLW Analytics, and GDS Associates study, dated January 20, 2009: "New England Residential Lighting Markdown Impact Evaluation".
[23] As established in the Nexus Market Research, RLW Analytics, dated October 2004: "Impact Evaluation of the Massachusetts, Rhode Island, and Vermont 2003 Residential Lighting Programs", table 6-4 where 24 out of 56 respondents indicated that they did not purchase the CFLs as spares.
[24] TecMarket Works and Building Metrics. "Duke Residential Smart $aver® CFL Program in North Carolina and South Carolina". February 15, 2011. Pg. 35.

customers. The final value for the average daily hours of use for a Duke Energy customer is 2.66 and 2.92 for 13-watt and18-watt CFLs respectively. For non-Duke Energy customers, the final value for the average daily house of use is 3.56.

Table 45. Adjusted Average Daily Hours of Use

Adjustment	Magnitude of Adjustment	Average Daily Hours of Use (13-watt Duke)	Average Daily Hours of Use (18-watt Duke)	Average Daily Hours of Use (13-watt Non-Duke)
Unadjusted	N/A	3.65	3.99	4.88
Self-Reporting Bias	27%	2.66	2.92	3.56

Low-Flow Showerhead

Each energy efficiency kit distributed to a Duke Energy customer contained one low-flow showerhead. Low-flow showerheads were not provided to non-Duke Energy customers. Out of the 83 heads distributed to survey participants, 45.8%, or 38, were installed. This information can be seen in Table 46 along with gross and net savings estimates per unit distributed. Approximately 26% of households in Ohio use electric water heaters. This measure produces zero kW or kWh savings in households that use gas water heaters.

Table 46. Savings Estimates per Showerhead Distributed

Number Distributed	In Service Rate	Average Showers per Week	Electric Water Heating	Gross kWh per Head	Gross kW per Head	Net kWh per Head	Net kW per Head
83	45.8%	12.61	26%	60.30	0.00661	44.55	0.00488

Faucet Aerators

One kitchen and one bathroom faucet aerator were given out in each kit that was distributed to a Duke Energy customer. Faucet aerators were not provided to non-Duke Energy customers. Out of the 166 aerators distributed to survey participants, 25.3%, or 42, were installed. This information can be seen in Table 47 along with gross and net savings estimates per unit distributed. This figure includes only those aerators that were installed on faucets that did not already have one. Aerators that replaced an existing aerator are ascribed zero savings. Approximately 26% of households in Ohio use electric water heaters. This measure produces zero kW or kWh savings in households that use gas water heaters.

Table 47. Savings Estimates per Aerator Distributed

Number Distributed	In Service Rate	Electric Water Heating	Gross kWh per Aerator	Gross kW per Aerator	Net kWh per Aerator	Net kW per Aerator
166	25.3%	26%	3.11	0.00004	2.57	0.00003

Outlet and Switch Gaskets

Four kitchen and eight outlet gaskets were given out in each kit that was distributed to a Duke Energy customer. Non-Duke Energy customers were provided only with the eight outlet gaskets. Out of the 996 gaskets distributed to Duke Energy survey participants, 12.9%, or 128.5, were

installed. This information can be seen in Table 48 along with gross and net savings estimates per unit distributed. This figure includes only those gaskets that were installed in exterior walls. Gaskets installed in interior walls are ascribed zero savings. The same information is presented in Table 49 for non-Duke Energy customers.

Table 48. Savings Estimates per Gasket Distributed to Duke Energy Customers

Number Distributed	In Service Rate	Gross kWh per Gasket	Gross kW per Gasket	Net kWh per Gasket	Net kW per Gasket
996	12.9%	0.48	0.00017	0.43	0.00015

Table 49. Savings Estimates per Gasket Distributed to Non-Duke Energy Customers

Number Distributed	In Service Rate	Gross kWh per Gasket	Gross kW per Gasket	Net kWh per Gasket	Net kW per Gasket
288	8.9%	0.33	0.00012	0.29	0.00010

Hot Water TempCard

Each energy efficiency kit, for both Duke Energy and non-Duke Energy customers, contained one hot water tempcard. Non-Duke Energy customers were not surveyed about the hot water tempcard. All behavioral data collected from the Duke Energy customer survey has been mirrored to the non-Duke Energy customer participants. Therefore, savings per unit distributed is identical for both populations. Out of the 83 cards distributed to Duke Energy survey participants, 13.3%, or 11 people, both used the card and made a change to their water temperature based on what they learned. The average change was -16 degrees Fahrenheit. This information can be seen in Table 50 along with gross and net savings estimates per unit distributed. The net-to-gross ratio for this measure is 1.0, so gross and net savings are equivalent.

Table 50. Savings Estimates per Hot Water TempCard Distributed

Amount Distributed	In Service Rate	Average Temperature Adjustment (°F)	Gross and Net kWh per Card	Gross and Net kW per Card
83	13.3%	-16	6.40	0.00073

Night Light

Out of the 83 Duke Energy participants, 74.7%, or 62, installed the night light. Night lights were not provided to non-Duke Energy customers. A majority of these installations, however, were new installations. That is they did not replace an existing light. This is reflected in the average wattage of a replaced unit where such installations are considered zeroes. While the base unit wattage is five watts, the average replaced wattage after factoring in new installations drops to 2.21 watts. Table 51 shows this information along with gross and net savings estimates per unit distributed. The net-to-gross ratio for this measure is 1.0, so gross and net savings are equivalent.

Table 51. Savings Estimates per Night Light Distributed

Number Distributed	In Service Rate	Average Wattage Light Removed	Average Daily Hours of Use Base	Average Daily Hours of Use EE	Gross and Net kWh per Light	Gross and Net kW per Light
83	74.7%	2.21	8	24	4.60	0.0000003

The base unit wattage and average daily hours of use, along with the coincidence factor were taken from the *FES-L6a LED and Specialty Lighting-Residential* workpaper. Values for these metrics can be seen in Appendix H: Impact Algorithms.

Lifetime Kit Impacts

Figure 7 shows the estimated energy impacts over the lifetime of the kit measures. The graph's shape can be roughly described as having three distinct plateaus. The small drop in kWh savings seen after three years in the first plateau occurs at the end of the effective useful life of the hot water tempcard. The steep drop off seen at year five from the first to the second plateau occurs at the end of the effective useful life of the CFLs. At this point, no further savings is accrued from those measures, however, because behavior taken is the best predictor of future actions, it is very likely that these savings continue well beyond these estimates as participants continue to use a lower hot water temperature and burnt out bulbs are replaced with additional CFLs. Again, our approach of counting savings for the actions taken directly as a result of the program, without adding market effects savings, provides a conservative estimate of savings. Since CFLs are the single largest contributor to overall electrical program savings, there is a significant drop in savings as the installed units burn out at the end of their EUL.

The small drop in the second plateau occurs at eight years, the end of the effective useful life of the night light. The second plateau ends at the ten year mark, when the low-flow showerheads reach the end of their effective useful lives. A smaller drop off occurs at the end of the effective useful life of the faucet aerators and the low-flow showerheads. The third and final plateau begins at year eleven. From year eleven onward, the savings is comprised of outlet gaskets exclusively.

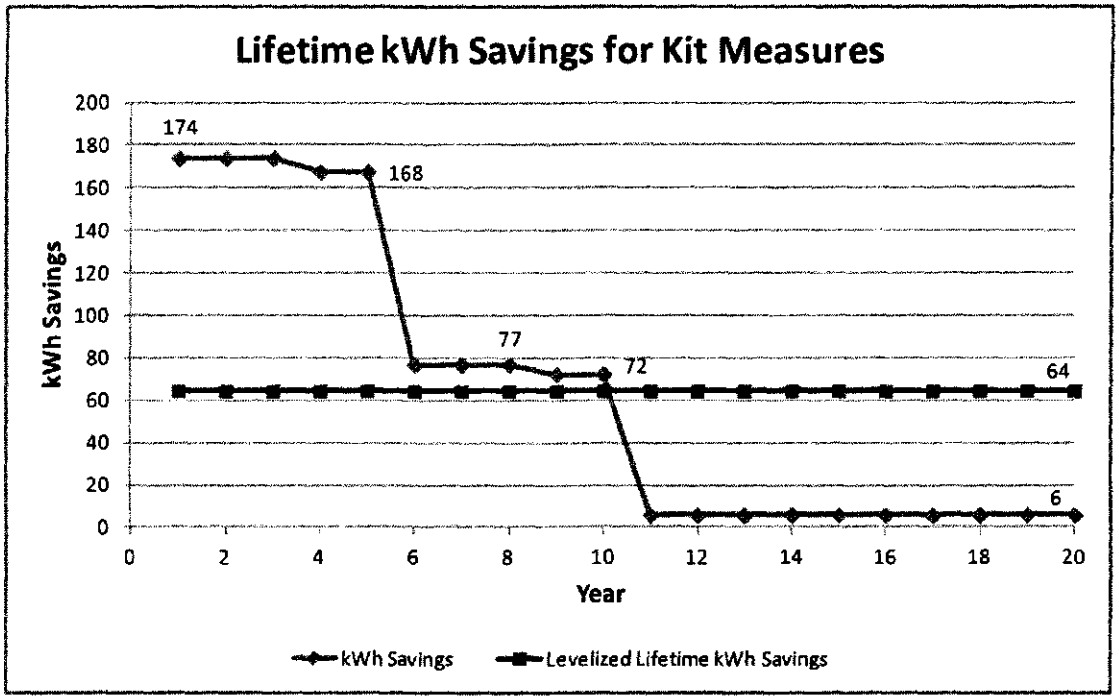


Figure 7. Lifetime kWh Savings of Kit Measures

Total Program Savings Extrapolation

There were a total of 3,692 Duke Energy and 1,378 non-Duke Energy participants that each received an energy efficiency kit from November 3, 2011 through March 31, 2012. This information is presented in Table 52. Multiplying the count for each measure by the savings/unit for that measure from Table 40 and Table 41 produces the total annual program kW and kWh savings. Again, the engineering savings estimations exclude audit recommendations which are included in the billing analysis approach for estimating net savings.

Table 52. Total Program Gross Savings Extrapolation

Customer	Measure	Count	Gross kWh	Gross kW
Duke Energy	Kit	3,692	642,223	78.9
Non-Duke Energy	Kit	1,378	97,301	10.8

Appendix A: Management Interview Instrument

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the NTC program. We'll talk about the NTC 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 operations as well as 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. I want to assure you that the information you share with me will be kept confidential; 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 you wish to share, please warn me and we can discuss how best to include that information in the report.

The interview will take about an hour to complete. Do you have any questions for me before we begin?

(1) Program Background and Objectives (15 min)

1. Please describe your role and scope of responsibility in detail.
2. How long have you been involved with the program?
3. Have there been any recent changes been made to your duties since you started?
    a. If YES, please tell us what changes were made and why they were made. What are the results of the change?
4. In your own words, please describe the Program's objectives. (e.g. enrollment, energy savings, non-energy benefits)
5. Of the program objectives you mentioned earlier, do you feel any of them will be particularly easy to meet, and why?
6. Which program objectives, if any, do you feel will be relatively difficult to meet, and why?

7. Are there any objectives you feel should be revised prior to the end of this program cycle? If yes, why?

(2) Rebates (15 min)

8. Describe your quality control and process for tracking participants and other program data.

9. Do you believe that the program currently offers rebates on enough energy efficient products to meet your customers' needs?

    a. If not, what products would you like to add? Are these currently being considered?

10. Is the program offering enough of an incentive to motivate your customers to participate?

    a. If not, what do you think should be changed, and why?

(1) Improvements (10 min)

11. Are you currently considering any changes to the program's design or implementation?

    a. What are the changes?

    b. What is the process for deciding whether or not to make these changes?

12. 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?

13. 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?

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

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

15. What area needs the most improvement, if any?

    a. (If not mentioned before) What would you suggest can be done to improve this?

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

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

Appendix B: Participant Survey Instruments

Duke Customer Survey:

Duke Customer Survey

Non-Duke Customer Survey:

Non-Duke Customer Survey

Appendix C: Request Form

The National Theatre for Children

PROGRAM REQUEST FORM
Elementary Schools

Mail, fax or e-mail your response to:
The National Theatre for Children
2733 Park Avenue, Minneapolis, MN 55407
Fax: 877-270-2734
Email: jtrones@nationaltheatre.com

PROGRAM NAME: ***The Energized Guyz***
BROUGHT TO YOU BY: **Duke Energy**

NTC WILL BE IN YOUR AREA: Mon, Nov. 7 through Fri, Dec. 16, 2011
AND Tue, Jan. 17 through Fri, Mar. 16, 2012

Days you prefer: _____ (1st choice) _____ (2nd choice) _____ (3rd choice)

Times of day you prefer: _____ (1st choice) _____ (2nd choice) _____ (3rd choice)

Number of assemblies preferred: _____

School start time: _____ School dismissal time: _____ Lunch hours: _____

Number of K-2 students: _____ Number of 3-6 students: _____ Number of teachers: _____

Please note any dates or days, your school **CANNOT** be scheduled during the offered dates (include holidays, vacations, In service days, conferences, testing, etc.)_____

Contact Information: (please print)

_____
Primary contact and title — email

_____
Alternate contact and title — email

_____
School name — Area code and phone number — Fax number

_____
School street address — City — State — Zip Code

To receive information from The National Theatre for Children via e-mail regarding news or information of interest, please e-mail optin@nationaltheatre.com. We will not share, sell, or otherwise distribute your personal information.

Appendix D: Letter to School Principal

Duke Energy.

ENERGY EFFICIENCY IN SCHOOLS

Duke Energy
EC42A / 526 South Church St.
Charlotte, NC 28202

Dear Educator:

Duke Energy is committed to helping educate young people about our main product—electricity, and how to use energy resources wisely.

That's why we are thrilled to offer at **NO COST** to your school a live theatrical production focusing on *using energy wisely, designed for students in kindergarten through sixth grade!*

The program—***The Energized Guyz*** —features a zany cast of characters, including the energy villain Dr. Maybe, energy-wise guys Cape Cod and Tech Guy, and energy hero extraordinaire, Nikki Neutron. Together, they will have your students rolling in the aisles as they deliver important messages about energy efficiency and green energy decisions that will make the world a better place for us all.

The Energized Guyz is performed by professional actors from **The National Theatre for Children.** Based in Minneapolis, Minnesota, this organization specializes in writing and performing educational programs for children nationwide using simple sets and audience participation.

Here are the details:

Who:	K-6th grade students in Duke Energy's service territory. Individual presentations are tailored for K-2 and 3-6 grade audiences.
What:	25-minute live theatre show, classroom & family activity books for each student, *comprehensive teacher guides, and classroom & hallway posters.*
Where:	*YOUR SCHOOL—the gym, cafeteria, assembly area or wherever a maximum of 350* students can be comfortably seated on the floor. (Because of their small sets The National Theatre for Children actors can go just about anywhere!)
When:	Fall 2011 during regular school hours. (See enclosed Request Form concerning available dates for your location.)
Why:	To teach the importance of energy efficiency through a fun experience.
How:	To arrange for a performance at your school, please complete and return the enclosed Request Form via mail or FAX to the number on your request form.

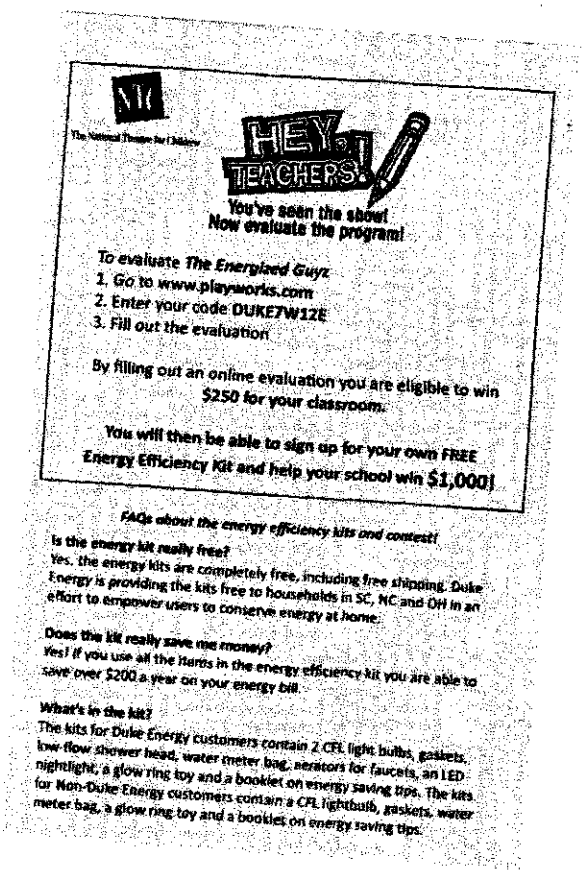
If you have questions, or would like to schedule by phone, please call The National Theatre for Children at 1-800-858-3999, ext. 1. Scheduling is on a first-come, first-served basis and calendars are limited — schedule *The Energized Guyz* for your school today!

Sincerely,

L Palmer

Lindsey Palmer
Program Manager

Appendix E: Teacher Survey and Instruction Flyer



HEY TEACHERS!

You've seen the show!
Now evaluate the program!

To evaluate The Energized Guyz
1. Go to www.playworks.com
2. Enter your code DUKE7W12E
3. Fill out the evaluation

By filling out an online evaluation you are eligible to win $250 for your classroom.

You will then be able to sign up for your own FREE Energy Efficiency Kit and help your school win $1,000!

FAQs about the energy efficiency kits and contest!

Is the energy kit really free?
Yes, the energy kits are completely free, including free shipping. Duke Energy is providing the kits free to households in SC, NC and OH in an effort to empower users to conserve energy at home.

Does the kit really save me money?
Yes! If you use all the items in the energy efficiency kit you are able to save over $200 a year on your energy bill.

What's in the kit?
The kits for Duke Energy customers contain 2 CFL light bulbs, gaskets, low-flow shower head, water meter bag, aerators for faucets, an LED nightlight, a glow ring toy and a booklet on energy saving tips. The kits for Non-Duke Energy customers contain a CFL lightbulb, gaskets, water meter bag, a glow ring toy and a booklet on energy saving tips.

How can I get a kit?
There are three ways to sign up for a free energy kit:
1. Online at **MyEnergyKit.org**
2. Calling toll-free at **1-855-38MYKIT** (1-855-386-9548)
3. Filling out the **postage-paid form** found in *The Energized Guyz* workbooks given out at your school.

Can I get a kit if I am not a Duke Energy customer?
Yes, residents in SC, NC and OH may receive a kit.

Will I be asked to buy anything if I sign up for a kit?
No. You will not be asked to buy anything. The kits are completely free and your personal information is kept private.

Who can sign up for a free kit?
Everyone in the school community can sign-up for a kit too, including teachers, staff, custodians, cafeteria workers, counselors, substitute teachers, student teachers, coaches, family members, friends and neighbors!

Is there a Spanish version of the sign-up form?
Yes, on the website MyEnergyKit.org there is also a form completely in Spanish.

My school has a small enrollment. Can we still win the contest?
Absolutely! The contest winners will be decided by the highest percentage of kits requested per school. This way all schools of varying sizes are on an even playing field. One school in each state will win! To be eligible, schools need a minimum of 50 kit sign-ups.

How can I keep track of my school's progress and number of kits in the contest?
NTC will contact you with updates on your school's progress throughout the school year. You can also call 1-855-38MYKIT to find out your school's progress.

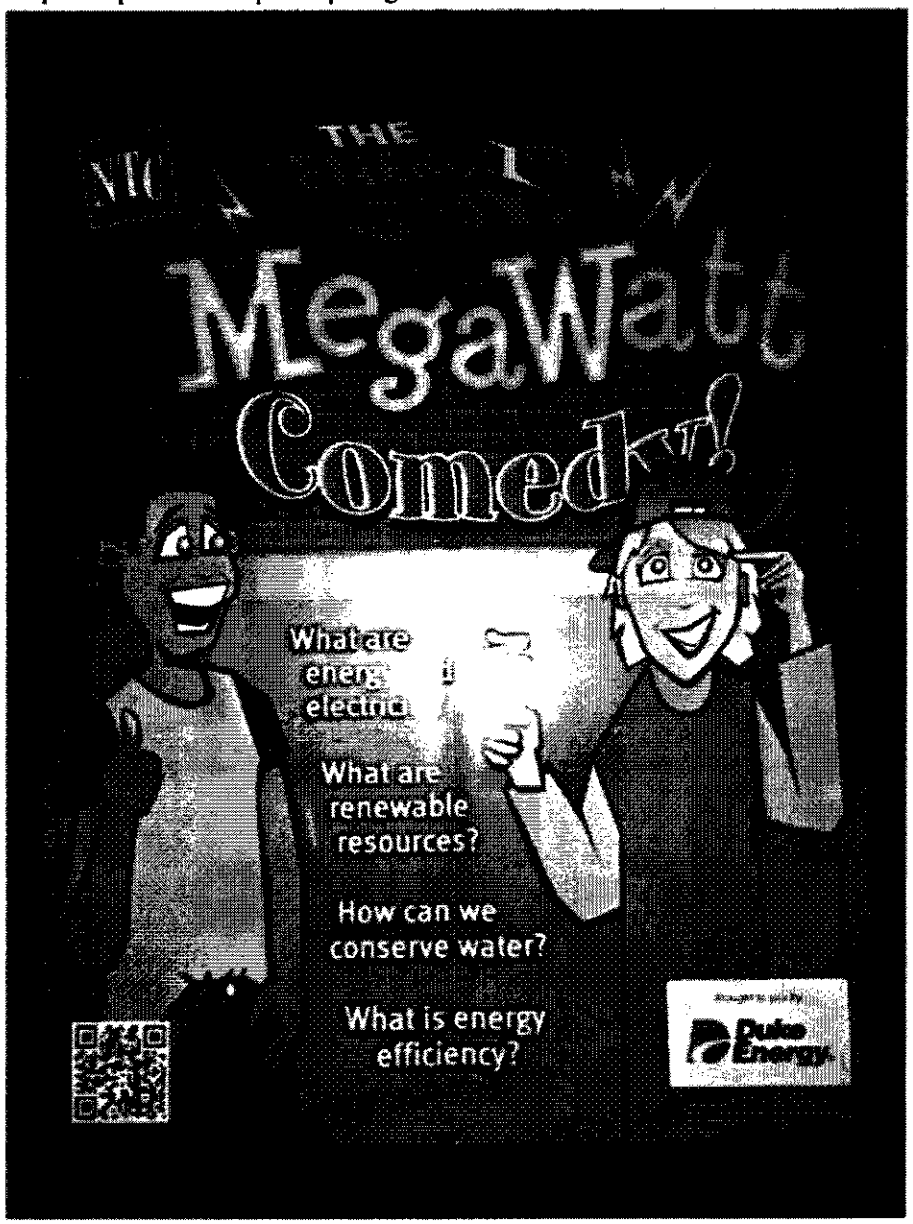
Can my extended family and friends sign up for kits to help my school win?
As long as your extended family and friends live in NC, SC and OH, they can help your school win. Make sure they type in your school name or write it on the form when they sign-up so your school gets credit for their kit.

More FAQs can be found on MyEnergyKit.org

Appendix F: Program Materials

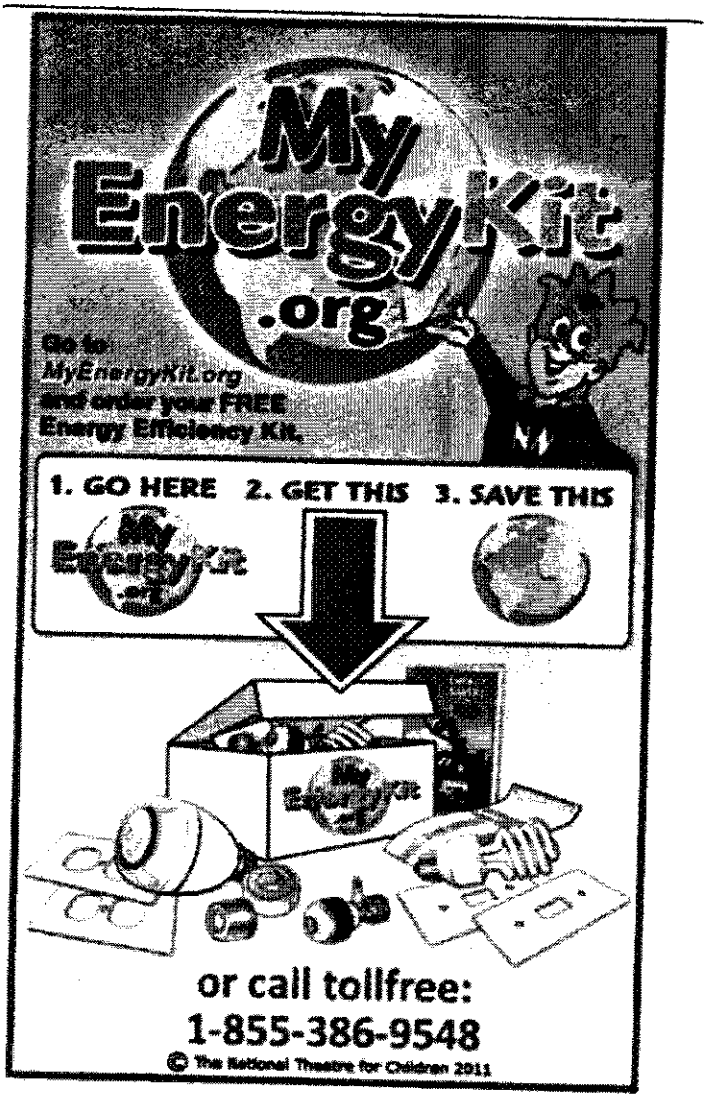
The poster provided to the participating elementary schools:

The poster provided to participating middle schools:



The front of the trading card provided to elementary students:

The back of the trading card provided to elementary students:



Appendix G: Household Characteristics and Demographics

GROUP A: DUKE CUSTOMERS (N=83)

In what type of building do you live?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single-family home, detached construction	67	80.7	80.7	80.7
	Single family home, factory manufactured/modular	2	2.4	2.4	83.1
	Single family, mobile home	2	2.4	2.4	85.5
	Row House (shared or common exterior wall with another house	1	1.2	1.2	86.7
	Two or Three family attached residence - traditional structure	3	3.6	3.6	90.4
	Apartment (4 + families) - traditional structure	4	4.8	4.8	95.2
	Condominium - traditional structure	2	2.4	2.4	97.6
	Other	1	1.2	1.2	98.8
	Don't Know	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

What year was your residence built?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1959 and before	27	32.5	32.5	32.5
	1960 - 1979	19	22.9	22.9	55.4
	1980 - 1989	5	6.0	6.0	61.4
	1990 - 1997	10	12.0	12.0	73.5
	1998 - 2000	4	4.8	4.8	78.3
	2001 - 2007	14	16.9	16.9	95.2
	2008 - present	2	2.4	2.4	97.6
	Don't Know	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

How many rooms are in your home (excluding bathrooms, but including finished basements)?

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	1 - 3	3	3.6	3.6	3.6
	4	4	4.8	4.8	8.4
	5	9	10.8	10.8	19.3
	6	17	20.5	20.5	39.8
	7	17	20.5	20.5	60.2
	8	11	13.3	13.3	73.5
	9	10	12.0	12.0	85.5
	10+	11	13.3	13.3	98.8
	Don't Know / Not Sure	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Which of the following best describes your home's heating system?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	1	1.2	1.2	1.2
	Central forced air furnace	65	78.3	78.3	79.5
	Electric Baseboard	3	3.6	3.6	83.1
	Heat Pump	5	6.0	6.0	89.2
	Geothermal Heat Pump	2	2.4	2.4	91.6
	hot water/steam/boiler/radiator	3	3.6	3.6	95.2
	wood burning	1	1.2	1.2	96.4
	propane	1	1.2	1.2	97.6
	oil	1	1.2	1.2	98.8
	Don't know	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Do you use one or more of the following to cool your home? (Select all that apply)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None, do not cool the home	3	3.6	3.6	3.6
	Heat pump for cooling	4	4.8	4.8	8.4
	Central air conditioning	68	81.9	81.9	90.4
	Through the wall or window air conditioning unit	4	4.8	4.8	95.2
	Geothermal Heat pump	1	1.2	1.2	96.4
	Oil heat	1	1.2	1.2	97.6
	fans	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

How many window-unit or "through the wall" air conditioner(s) do you use?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	69	83.1	83.1	83.1
	1	6	7.2	7.2	90.4
	2	3	3.6	3.6	94.0
	3	3	3.6	3.6	97.6
	4	1	1.2	1.2	98.8
	8 or more	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each system: Primary Heating System Fuel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electricity	23	27.7	27.7	27.7
	Natural Gas	49	59.0	59.0	86.7
	Oil	4	4.8	4.8	91.6
	Propane	5	6.0	6.0	97.6
	None / Do Not Have	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each system: Secondary Heating System Fuel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electricity	15	18.1	18.1	18.1
	Natural Gas	5	6.0	6.0	24.1
	Oil	1	1.2	1.2	25.3
	Propane	3	3.6	3.6	28.9
	Other	2	2.4	2.4	31.3
	None / Do Not Have	57	68.7	68.7	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each system: Cooling System

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electricity	74	89.2	89.2	89.2
	Natural Gas	5	6.0	6.0	95.2
	None / Do Not Have	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each system: Water Heater

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electricity	39	47.0	47.0	47.0
	Natural Gas	41	49.4	49.4	96.4
	Propane	2	2.4	2.4	98.8
	None / Do Not Have	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Please estimate the age of each of the following systems in your home: Heating System

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 4 years	18	21.7	21.7	21.7
	5 - 9 years	24	28.9	28.9	50.6
	10 - 14 years	20	24.1	24.1	74.7
	15 - 19 years	11	13.3	13.3	88.0
	20+ years	8	9.6	9.6	97.6
	Do not have	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

Please estimate the age of each of the following systems in your home: Cooling System

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 4 years	18	21.7	21.7	21.7
	5 - 9 years	22	26.5	26.5	48.2
	10 - 14 years	26	31.3	31.3	79.5
	15 - 19 years	10	12.0	12.0	91.6
	20+ years	3	3.6	3.6	95.2
	Do not have	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please estimate the age of each of the following systems in your home: Water Heater

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 4 years	25	30.1	30.1	30.1
	5 - 9 years	29	34.9	34.9	65.1
	10 - 14 years	16	19.3	19.3	84.3
	15 - 19 years	8	9.6	9.6	94.0
	20+ years	3	3.6	3.6	97.6
	Do not have	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Electricity Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	24	28.9	28.9	28.9
	Checked	59	71.1	71.1	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Electricity Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	19	22.9	22.9	22.9
	Checked	64	77.1	77.1	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Electricity Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	16	19.3	19.3	19.3
	Checked	67	80.7	80.7	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Natural Gas Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	67	80.7	80.7	80.7
	Checked	16	19.3	19.3	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Natural Gas Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	69	83.1	83.1	83.1
	Checked	14	16.9	16.9	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Natural Gas Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	70	84.3	84.3	84.3
	Checked	13	15.7	15.7	100.0

	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Oil Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	83	100.0	100.0	100.0

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Oil Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	83	100.0	100.0	100.0

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Oil Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	82	98.8	98.8	98.8
	Checked	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Propane Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	79	95.2	95.2	95.2
	Checked	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Propane Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	79	95.2	95.2	95.2
	Checked	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Propane Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	81	97.6	97.6	97.6
	Checked	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Other Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	83	100.0	100.0	100.0

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Other Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	83	100.0	100.0	100.0

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Other Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	82	98.8	98.8	98.8
	Checked	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Do Not Have Indoor Cooktop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	79	95.2	95.2	95.2
	Checked	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Do Not Have Indoor Oven

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	82	98.8	98.8	98.8
	Checked	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Please select the fuel used for each appliance: (Select all fuels that apply per appliance) Do Not Have Clothes Dryer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unchecked	80	96.4	96.4	96.4
	Checked	3	3.6	3.6	100.0
	Total	83	100.0	100.0	

About how many square feet of living space are in your home? (Do not include garages or other unheated areas) Note: A 10-foot by 12 foot room is 120 square feet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 500	1	1.2	1.2	1.2

	500 - 999	3	3.6	3.6	4.8
	1000 - 1499	23	27.7	27.7	32.5
	1500 - 1999	13	15.7	15.7	48.2
	2000 - 2499	11	13.3	13.3	61.4
	2500 - 2999	8	9.6	9.6	71.1
	3000 - 3499	4	4.8	4.8	75.9
	3500 - 3999	4	4.8	4.8	80.7
	Don't Know	16	19.3	19.3	100.0
	Total	83	100.0	100.0	

Do you own or rent your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Own	70	84.3	84.3	84.3
	Rent	13	15.7	15.7	100.0
	Total	83	100.0	100.0	

How many levels are in your home (not including your basement)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One	26	31.3	31.3	31.3
	Two	50	60.2	60.2	91.6
	Three	7	8.4	8.4	100.0
	Total	83	100.0	100.0	

Does your home have a heated or unheated basement?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Heated	50	60.2	60.2	60.2
	Unheated	15	18.1	18.1	78.3
	No basement	18	21.7	21.7	100.0
	Total	83	100.0	100.0	

Does your home have an attic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	63	75.9	75.9	75.9
	No	20	24.1	24.1	100.0
	Total	83	100.0	100.0	

Are your central air/heat ducts located in the attic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	14.5	14.5	14.5
	No	58	69.9	69.9	84.3
	Not Applicable	13	15.7	15.7	100.0
	Total	83	100.0	100.0	

Does your house have cold drafts in the winter?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	35	42.2	42.2	42.2
	No	48	57.8	57.8	100.0
	Total	83	100.0	100.0	

Does your house have sweaty windows in the winter?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	26.5	26.5	26.5
	No	61	73.5	73.5	100.0
	Total	83	100.0	100.0	

Do you notice uneven temperatures between the rooms in your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	69.9	69.9	69.9
	No	25	30.1	30.1	100.0
	Total	83	100.0	100.0	

Does your heating system keep your home comfortable in winter?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	70	84.3	84.3	84.3
	No	10	12.0	12.0	96.4
	Do not have	3	3.6	3.6	100.0
	Total	83	100.0	100.0	

Does your cooling system keep your home comfortable in summer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	68	81.9	81.9	81.9

	No	11	13.3	13.3	95.2
	Do not have	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Do you have a programmable thermostat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	54	65.1	65.1	65.1
	No	29	34.9	34.9	100.0
	Total	83	100.0	100.0	

What temperature is your thermostat set to on a typical summer weekday afternoon ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 69 o	1	1.2	1.2	1.2
	69 o - 72 o	27	32.5	32.5	33.7
	73 o - 78 o	45	54.2	54.2	88.0
	Greater than 78 o	6	7.2	7.2	95.2
	Off	2	2.4	2.4	97.6
	Don't Know	1	1.2	1.2	98.8
	Do not have	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

What temperature is your thermostat set to on a typical winter weekday afternoon ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 67 o	8	9.6	9.6	9.6
	67 o - 70 o	39	47.0	47.0	56.6
	71 o - 73 o	21	25.3	25.3	81.9
	74 o - 77 o	12	14.5	14.5	96.4
	Don't Know	3	3.6	3.6	100.0
	Total	83	100.0	100.0	

Do you have a swimming pool or spa?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	14.5	14.5	14.5
	No	71	85.5	85.5	100.0
	Total	83	100.0	100.0	

Would a two-degree increase in the summer afternoon temperature in your home affect your comfort?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	14	16.9	16.9	16.9
	Slightly	47	56.6	56.6	73.5
	Moderately	14	16.9	16.9	90.4
	Greatly	8	9.6	9.6	100.0
	Total	83	100.0	100.0	

How many people live in this home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	7.2	7.2	7.2
	2	9	10.8	10.8	18.1
	3	16	19.3	19.3	37.3
	4	25	30.1	30.1	67.5
	5	15	18.1	18.1	85.5
	6	7	8.4	8.4	94.0
	7	2	2.4	2.4	96.4
	8 or more	3	3.6	3.6	100.0
	Total	83	100.0	100.0	

How many persons are usually home on a weekday afternoon?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	15	18.1	18.1	18.1
	1	22	26.5	26.5	44.6
	2	19	22.9	22.9	67.5
	3	13	15.7	15.7	83.1
	4	6	7.2	7.2	90.4
	5	4	4.8	4.8	95.2
	7	1	1.2	1.2	96.4
	8 or more	3	3.6	3.6	100.0
	Total	83	100.0	100.0	

Are you planning on making any large purchases to improve energy efficiency in the next 3 years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	21.7	21.7	21.7
	No	35	42.2	42.2	63.9

Nor sure	30	36.1	36.1	100.0
Total	83	100.0	100.0	

What is your age group?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 34	14	16.9	16.9	16.9
	35 - 49	43	51.8	51.8	68.7
	50 - 59	9	10.8	10.8	79.5
	60 - 64	5	6.0	6.0	85.5
	65 - 74	6	7.2	7.2	92.8
	Over 74	2	2.4	2.4	95.2
	Prefer not to answer	4	4.8	4.8	100.0
	Total	83	100.0	100.0	

Please select your total annual household income:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under $15,000	2	2.4	2.4	2.4
	$15,000 - $29,999	9	10.8	10.8	13.3
	$30,000 - $49,999	16	19.3	19.3	32.5
	$50,000 - $74,999	20	24.1	24.1	56.6
	$75,000 - $100,000	9	10.8	10.8	67.5
	Over $100,000	9	10.8	10.8	78.3
	Prefer not to answer	18	21.7	21.7	100.0
	Total	83	100.0	100.0	

SCHOOL COUNTY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	6.0	6.0	6.0
	Brown	1	1.2	1.2	7.2
	Butler	15	18.1	18.1	25.3
	Clermont	12	14.5	14.5	39.8
	Hamilton	35	42.2	42.2	81.9
	Warren	15	18.1	18.1	100.0
	Total	83	100.0	100.0	

SCHOOL DISTRICT NAME

	Frequency	Percent	Valid Percent	Cumulative Percent

		5	6.0	6.0	6.0
	Archdiocese Cincinnati Ed Off	9	10.8	10.8	16.9
	Batavia Local School District	1	1.2	1.2	18.1
	Bethel-Tate Local School Dist	1	1.2	1.2	19.3
	Cincinnati City Sch District	5	6.0	6.0	25.3
	Cincinnati Hills CHRN Academy	1	1.2	1.2	26.5
	Clermont Northeastern Local SD	2	2.4	2.4	28.9
	County Office Placeholder	1	1.2	1.2	30.1
	Eastern Local School District	1	1.2	1.2	31.3
	Fairfield City School Dist	6	7.2	7.2	38.6
	Forest Hills Local School Dist	1	1.2	1.2	39.8
	Franklin City School District	1	1.2	1.2	41.0
	Goshen Local School District	1	1.2	1.2	42.2
	Kings Local School District	1	1.2	1.2	43.4
	Lakota Local School District	4	4.8	4.8	48.2
	Lebanon Christian School	1	1.2	1.2	49.4
	Lebanon City School District	2	2.4	2.4	51.8
	Little Miami Local School Dist	4	4.8	4.8	56.6
Valid	Lockland School District	1	1.2	1.2	57.8
	Madeira City School District	1	1.2	1.2	59.0
	Mason City School District	6	7.2	7.2	66.3
	Milford Exempted Village SD	1	1.2	1.2	67.5
	Mt Healthy City School Dist	1	1.2	1.2	68.7
	New Miami Local School Dist	2	2.4	2.4	71.1
	New Richmond Exempted VLG SD	3	3.6	3.6	74.7
	North College Hill City SD	1	1.2	1.2	75.9
	Northwest Local School Dist	3	3.6	3.6	79.5
	Oak Hills Local School Dist	1	1.2	1.2	80.7
	Princeton City School District	1	1.2	1.2	81.9
	Reading Cmty School Dist	1	1.2	1.2	83.1
	Ross Local School District	3	3.6	3.6	86.7
	Southwest Local School Dist	3	3.6	3.6	90.4
	St Bernard-Elmwood Place Schs	1	1.2	1.2	91.6
	Sycamore Cmty School District	2	2.4	2.4	94.0
	Three Rivers Local School Dist	1	1.2	1.2	95.2
	West Clermont Local Sch Dist	1	1.2	1.2	96.4
	Williamsburg Local School Dist	1	1.2	1.2	97.6

	Winton Woods City School Dist	2	2.4	2.4	100.0
	Total	83	100.0	100.0	

SCHOOL NAME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Academy of World Languages	1	1.2	1.2	1.2
	Batavia Middle School	1	1.2	1.2	2.4
	Bowman Primary School	2	2.4	2.4	4.8
	Bridgetown Middle School	1	1.2	1.2	6.0
	Central Academy	1	1.2	1.2	7.2
	Central Community Elem School	1	1.2	1.2	8.4
	Cherokee Elementary School	2	2.4	2.4	10.8
	Cheviot Elementary School	2	2.4	2.4	13.3
	Cincinnati Hills CHRN Academy	1	1.2	1.2	14.5
	Clermont Northeastern Elem Sch	1	1.2	1.2	15.7
	Clermont Northeastern Mid Sch	1	1.2	1.2	16.9
	Ebon C Hill Intermediate Sch	1	1.2	1.2	18.1
	Evendale Elementary School	1	1.2	1.2	19.3
	Fairfield Intermediate School	6	7.2	7.2	26.5
	Fairview-Clifton German School	2	2.4	2.4	28.9
	Felicity Franklin	1	1.2	1.2	30.1
	Freedom Elementary School	1	1.2	1.2	31.3
	Harrison Elementary School	1	1.2	1.2	32.5
	Horizon Science Acad-Cincinnati	1	1.2	1.2	33.7
	Hunter Elementary School	1	1.2	1.2	34.9
	J F Burns Elementary School	1	1.2	1.2	36.1
	Lebanon Christian School	1	1.2	1.2	37.3
	Liberty Early Childhood School	1	1.2	1.2	38.6
	Little Miami Intermediate Sch	2	2.4	2.4	41.0
	Little Miami Junior High School	1	1.2	1.2	42.2
	Lockland Elementary School	1	1.2	1.2	43.4
	Madeira Elementary School	1	1.2	1.2	44.6
	Marr Cook Elementary School	1	1.2	1.2	45.8
	Mason Early Childhood Center	1	1.2	1.2	47.0
	Mason Intermediate School	2	2.4	2.4	49.4
	Meadowview Elementary School	1	1.2	1.2	50.6
	Merwin Elementary School	1	1.2	1.2	51.8

Monroe Elementary School	2	2.4	2.4	54.2
Morgan Elementary School	3	3.6	3.6	57.8
N/A	1	1.2	1.2	59.0
New Miami Elementary School	2	2.4	2.4	61.4
New Richmond Elementary School	1	1.2	1.2	62.7
North College Hill Mid School	1	1.2	1.2	63.9
North Elementary School	1	1.2	1.2	65.1
Oakdale Elementary School	1	1.2	1.2	66.3
Pleasant Run Middle School	2	2.4	2.4	68.7
Prince of Peace Catholic Sch	1	1.2	1.2	69.9
Russellville Elementary School	1	1.2	1.2	71.1
Salem Township Elementary Sch	1	1.2	1.2	72.3
Sherwood Elementary School	1	1.2	1.2	73.5
St Aloysius-On-The-Ohio School	1	1.2	1.2	74.7
St Bernard Elementary School	1	1.2	1.2	75.9
St Francis DeSales School	1	1.2	1.2	77.1
St Ignatius School	3	3.6	3.6	80.7
St James The Greater School	2	2.4	2.4	83.1
St Louis School	1	1.2	1.2	84.3
St William School	1	1.2	1.2	85.5
Sycamore Junior High School	2	2.4	2.4	88.0
Three Rivers Middle School	1	1.2	1.2	89.2
Weigel Elementary School	1	1.2	1.2	90.4
Western Row Elementary School	3	3.6	3.6	94.0
Whitewater Valley Elem School	2	2.4	2.4	96.4
Williamsburg Elementary School	1	1.2	1.2	97.6
Winton Woods Middle School	2	2.4	2.4	100.0
Total	83	100.0	100.0	

SCHOOL TYPE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.6	3.6	3.6
	Private	12	14.5	14.5	18.1
	Public	68	81.9	81.9	100.0
	Total	83	100.0	100.0	

GRADE BAND

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	14.5	14.5	14.5
	2	11	13.3	13.3	27.7
	3	7	8.4	8.4	36.1
	4	13	15.7	15.7	51.8
	5	12	14.5	14.5	66.3
	6	6	7.2	7.2	73.5
	7	6	7.2	7.2	80.7
	K	5	6.0	6.0	86.7
	N/A	11	13.3	13.3	100.0
	Total	83	100.0	100.0	

GROUP B: NON-DUKE CUSTOMERS (N=36)

SCHOOL COUNTY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		8	22.2	22.2	22.2
	Brown	1	2.8	2.8	25.0
	Butler	10	27.8	27.8	52.8
	Clermont	2	5.6	5.6	58.3
	Clinton	1	2.8	2.8	61.1
	Hamilton	9	25.0	25.0	86.1
	Montgomery	2	5.6	5.6	91.7
	Warren	3	8.3	8.3	100.0
	Total	36	100.0	100.0	

SCHOOL DISTRICT NAME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		8	22.2	22.2	22.2
	Archdiocese Cincinnati Ed Off	8	22.2	22.2	44.4
	Clinton-Massie Local Sch Dist	1	2.8	2.8	47.2
	County Office Placeholder	1	2.8	2.8	50.0

	Eastern Local School District	1	2.8	2.8	52.8
	Fairfield City School Dist	2	5.6	5.6	58.3
	Goshen Local School District	1	2.8	2.8	61.1
	Hamilton City School District	1	2.8	2.8	63.9
	Immanuel Lutheran School	1	2.8	2.8	66.7
	Indian Hill Exempted VLG SD	1	2.8	2.8	69.4
	Mariemont City School District	1	2.8	2.8	72.2
	Mason City School District	3	8.3	8.3	80.6
	Miamisburg City School Dist	1	2.8	2.8	83.3
	Princeton City School District	1	2.8	2.8	86.1
	Reading Cmty School Dist	1	2.8	2.8	88.9
	Southwest Local School Dist	1	2.8	2.8	91.7
	Talawanda School District	1	2.8	2.8	94.4
	Valley View Local School Dist	1	2.8	2.8	97.2
	Williamsburg Local School Dist	1	2.8	2.8	100.0
	Total	36	100.0	100.0	

SCHOOL NAME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bogan Elementary School	1	2.8	2.8	2.8
	Central Community Elem School	1	2.8	2.8	5.6
	Clinton-Massie Elementary Sch	1	2.8	2.8	8.3
	Dover	1	2.8	2.8	11.1
	Fairfield East Elem School	1	2.8	2.8	13.9
	Fairfield Intermediate School	1	2.8	2.8	16.7
	Heritage Hill Elem School	1	2.8	2.8	19.4
	Horizon Science Acad-Cincinnati	1	2.8	2.8	22.2
	Immanuel Lutheran School	1	2.8	2.8	25.0
	Indian Hill Middle School	1	2.8	2.8	27.8
	Jane Chance Elementary School	1	2.8	2.8	30.6
	Marr Cook Elementary School	1	2.8	2.8	33.3
	Mason Early Childhood Center	2	5.6	5.6	38.9
	Mcguffy	1	2.8	2.8	41.7
	N/A	2	5.6	5.6	47.2
	Newton Falls	1	2.8	2.8	50.0
	Our Lady of Victory School	1	2.8	2.8	52.8
	Parkview Elementary School	1	2.8	2.8	55.6

R L Stevenson		1	2.8	2.8	58.3
Riverview Elementary School		1	2.8	2.8	61.1
Sardinia Elementary School		1	2.8	2.8	63.9
St Ann Catholic School		2	5.6	5.6	69.4
St Francis DeSales School		1	2.8	2.8	72.2
St Joseph Consolidated School		3	8.3	8.3	80.6
St Nicholas Academy		1	2.8	2.8	83.3
Terrace Park Elementary School		1	2.8	2.8	86.1
Valley View Primary School		1	2.8	2.8	88.9
WALTON		1	2.8	2.8	91.7
Western Row Elementary School		1	2.8	2.8	94.4
Whitewater Valley Elem School		1	2.8	2.8	97.2
Williamsburg Elementary School		1	2.8	2.8	100.0
Total		36	100.0	100.0	

SCHOOL TYPE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		7	19.4	19.4	19.4
	Private	9	25.0	25.0	44.4
	Public	20	55.6	55.6	100.0
	Total	36	100.0	100.0	

GRADE BAND

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	19.4	19.4	19.4
	2	6	16.7	16.7	36.1
	3	6	16.7	16.7	52.8
	4	2	5.6	5.6	58.3
	5	2	5.6	5.6	63.9
	6	2	5.6	5.6	69.4
	7	1	2.8	2.8	72.2
	K	3	8.3	8.3	80.6
	N/A	7	19.4	19.4	100.0
	Total	36	100.0	100.0	

Appendix H: Impact Algorithms

CFLs

General Algorithm

Gross Summer Coincident Demand Savings

$$\Delta kW = ISR \times units \times \left[\frac{Watts_{base} - Watts_{ee}}{1000}\right] \times CF \times (1 + HVAC_d)$$

Gross Annual Energy Savings

$$\Delta kWh = ISR \times units \times \left[\frac{(Watts \times HOU)_{base} - (Watts \times HOU)_{ee}}{1000}\right] \times 365 \times (1 + HVAC_c)$$

where:

ΔkW	= gross coincident demand savings
ΔkWh	= gross annual energy savings
units	= number of units installed under the program
$Watts_{ee}$	= connected load of energy-efficient unit
$Watts_{base}$	= connected (nameplate) load of baseline unit(s) displaced
HOU	= Mean daily hours of use (based on connected load)
CF	= coincidence factor = 0.11
$HVAC_c$	= HVAC system interaction factor for annual electricity consumption = -0.0058
$HVAC_d$	= HVAC system interaction factor for demand = 0.167

$HVAC_c$ - the HVAC interaction factor for annual energy consumption depends on the HVAC system, heating fuel type, and location. The HVAC interaction factors for annual energy consumption were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The weights were determined through appliance saturation data from the Home Profile Database supplied by Duke Energy.

Covington, KY

Heating Fuel	Heating System	Cooling System	Weight	HVACc	HVACd
Other	Any except Heat Pump	Any except Heat Pump	0.0029	0.079	0.17
		None	0.0002	0	0
Any	Heat Pump	Heat Pump	0.0760	-0.16	0.17
Gas	Central Furnace	None	0.0111	0	0
Propane		Room/Window	0.7571	0.079	0.17
Oil		Central AC		0.079	0.17

Electricity	Electric baseboard/ central furnace	None	0.0046	-0.45	0
		Room/Window	0.1433	-0.36	0.17
		Central AC		-0.36	0.17
N one	None	Any	0.0049	0	0.17
Total Weighted Mean			1	-0.0058	0.167

$HVAC_d$ - the HVAC interaction factor for demand depends on the cooling system type. The HVAC interaction factors for summer peak demand were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix.

Outlet and Switch Gaskets

Gross Summer Coincident Demand Savings

$\Delta kW_S = units \times (\Delta cfm/unit) \times (kW / cfm) \times DF_S \times CF_S$

Gross Annual Energy Savings

$\Delta kWh = units \times (\Delta cfm/unit) \times (kWh / cfm)$

$\Delta therm = units \times (\Delta cfm / unit) \times (therm / cfm)$

where:

ΔkW	= gross coincident demand savings
ΔkWh	= gross annual energy savings
units	= number of buildings sealed under the program
Δcfm/unit	= unit infiltration airflow rate (ft^3/min) reduction for each measure
DF	= demand diversity factor = 0.8
CF	= coincidence factor = 1.0
kW/cfm	= demand savings per unit cfm reduction
kWh/cfm	= electricity savings per unit cfm reduction
therm/cfm	= gas savings per unit cfm reduction

Unit cfm savings per measure

The cfm reductions for each measure were estimated from equivalent leakage area (ELA) change data taken from the ASHRAE Handbook of Fundamentals (ASHRAE, 2001). The equivalent leakage area changes were converted to infiltration rate changes using the Sherman-Grimsrud equation:

$$Q = ELA \times \sqrt{A \times \Delta T + B \times v^2}$$

where:

A = stack coefficient ($ft^3/min\text{-}in^{4}\text{-}°F$)
= 0.015 for one-story house

ΔT = average indoor/outdoor temperature difference over the time interval of interest (°F)

B = wind coefficient ($ft^3/min\text{-}in^4\text{-}mph^2$)
= 0.0065 (moderate shielding)

v = average wind speed over the time interval of interest measured at a local weather station at a height of 20 ft (mph)

The location specific data are shown below:

Location	Average outdoor temp	Average indoor/outdoor temp difference	Average wind speed (mph)	Specific infiltration rate (cfm/in^2)
Covington	33	35	22	1.92

Measure ELA impact and cfm reductions are as follows:

Measure	Unit	ELA change (in^2/unit)	ΔCfm/unit (KY)
Outlet gaskets	Each	0.357	0.69

Unit energy and demand savings

The energy and peak demand impacts of reducing infiltration rates were calculated from infiltration rate parametric studies conducted using the DOE-2 residential building prototype models, as described at the end of this Appendix. The savings per cfm reduction by heating and cooling system type are shown below:

Heating Fuel	Heating System	Cooling System	kWh/cfm	kW/cfm
Other	Any except Heat Pump	Any except Heat Pump	1.14	0.00000
Any	Heat Pump	Heat Pump	12.85	0.00248
Gas Propane Oil	Central Furnace	None	0	0
		Room/Window	1.14	0.00000
		Central AC	1.14	0.00000
	Other	None	0	0
		Room/Window	1.14	0.00000
		Central AC	1.14	0.00000
Electricity	Central furnace	None	23.27	0.01238
		Room/Window	23.84	0.01485
		Central AC	23.84	0.01485
	Electric	None	23.27	0.01238

	baseboard	Room/Window	23.84	0.01485
		Central AC	23.84	0.01485
	Other	None	23.27	0.01238
		Room/Window	23.84	0.01485
		Central AC	23.84	0.01485

Low-Flow Showerhead

Gross Summer Coincident Demand Savings

$$\Delta kW_S = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{3413_s} \times DF_s \times CF_s$$

Gross Annual Energy Savings

$$\Delta kWh = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{3413} \times 365$$

$$\Delta therm = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{\eta_{waterheater}} \times \frac{365}{100000}$$

where:

ΔkW	= gross coincident demand savings
ΔkWh	= gross annual energy savings
units	= number of units installed under the program
GPD_{base}	= daily hot water consumption before installation
GPD_{ee}	= daily hot water consumption after flow reducing measure installation
ΔT	= average difference between entering cold water temperature and the shower use temperature
DF	= demand diversity factor for electric water heating
CF	= coincidence factor
8.33	= conversion factor (Btu/gal-°F)
3413	= conversion factor (Btu/kWh)
24	= conversion factor (hr/day)
365	= conversion factor (days/yr)
100000	= conversion factor (Btu/therm)

Showerhead

GPD_{base} = showers/week / 7 x 3.1 gpm x 5 minutes/shower

GPD_{ee} = showers/week / 7 x 1.5 gpm x 5 minutes/shower

ΔT

City	Average cold water temperature	Shower use temperature	Average ΔT
Covington	53.9°F	100°F	46.1°F

Water heater efficiency

Combustion efficiency for residential gas water heater = 0.70

Demand diversity factor = 0.1

Coincidence factor = 0.4

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for the residential water heating end-use in a summer peaking utility.

Faucet Aerators

This measure used the Efficiency Vermont deemed savings (Efficiency Vermont, 2003) adjusted for entering water temperature:

Demand Savings
$\Delta kW = 0.0171\ kW \times \Delta T / \Delta T_{VT} \times DF \times CF$

Energy Savings
$\Delta kWh_i = 57\ kWh \times \Delta T / \Delta T_{VT}$
$\Delta therms = 2.0 \times \Delta T / \Delta T_{VT\,i}$

City	Average cold water temperature	Hot water use temperature	Average ΔT
Covington	53.9°F	100°F	46.1°F
Burlington VT	44.5	100°F	55.5

Demand diversity factor = 0.1

Coincidence factor = 0.4

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for the residential water heating end-use in a summer peaking utility.

Water Temperature Card

Gross Summer Coincident Demand Savings

ΔkW_S =

$$\text{units} \times \frac{(UA_{base} - UA_{ee}) \times \Delta T_s}{3413} \times DF_s \times CF_s$$

Gross Annual Energy Savings

$$\Delta kWh = \text{units} \times \frac{(UA_{base} - UA_{ee}) \times \overline{\Delta T}}{3413} \times 8760$$

where:

ΔkW = gross coincident demand savings
ΔkWh = gross annual energy savings
units = number of water heaters installed under the program
UA_{base} = overall heat transfer coefficient of base water heater (Btu/hr-°F) =4.6817
UA_{ee} = overall heat transfer coefficient of improved water heater (Btu/hr-°F) =1.9217
ΔT = temperature difference between the tank and the ambient air (°F)
DF = demand diversity factor
CF = coincidence factor
3413 = conversion factor (Btu/kWh)
8760 = conversion factor (hr/yr)
100000 = conversion factor (Btu/therm)
$\eta_{waterheater}$ = water heater efficiency

Water heater tank UA

Water heater size (gal)	Electric		Gas	
	UAbase	UAee	UAbase	UAee
30	3.84	1.69	4.21	1.76
50	4.67	1.83	5.13	1.91
60	4.13	2.06	4.54	2.14

75	5.00	2.42	5.50	2.52
80+	5.72	2.53	6.28	2.64

ΔT = 140°F water setpoint temp – 65°F room temp = 75°F

DF = 1.0
CF= 1.0
$\eta_{waterheater}$ = 0.7

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential water heaters meeting standby losses.

Night Lights

$Watts_{ee}$ = 0.03
$Watts_{base}$ = 5
HOUee = 24
HOUbase = 8

CF = 0.0001
HVACc = -0.0058
HVACd = 0.167

ΔkWh = units x ($Watts_{base}$ * HOUbase – $Watts_{ee}$ * HOUee) / 1000 x 365 * (1+HVACc)
ΔkW = units x (Wattsbase – Wattsee) /1000 x CF * (1+HVACd)

The Wattsbase, HOUbase, and CF were taken from the *FES-L6a LED and Specialty Lighting-Residential* workpaper.

Prototypical Building Model Description

The impact analysis for many of the HVAC related measures are based on DOE-2.2 simulations of a set of prototypical residential buildings. The prototypical simulation models were derived from the residential building prototypes used in the California Database for Energy Efficiency Resources (DEER) study (Itron, 2005), with adjustments make for local building practices and climate. The prototype "model" in fact contains 4 separate residential buildings; 2 one-story and 2 two-story buildings. The each version of the 1 story and 2 story buildings are identical except for the orientation, which is shifted by 90 degrees. The selection of these 4 buildings is designed to give a reasonable mean response of buildings of different design and orientation to the impact of energy efficiency measures. A sketch of the residential prototype buildings is shown in Figure 8.

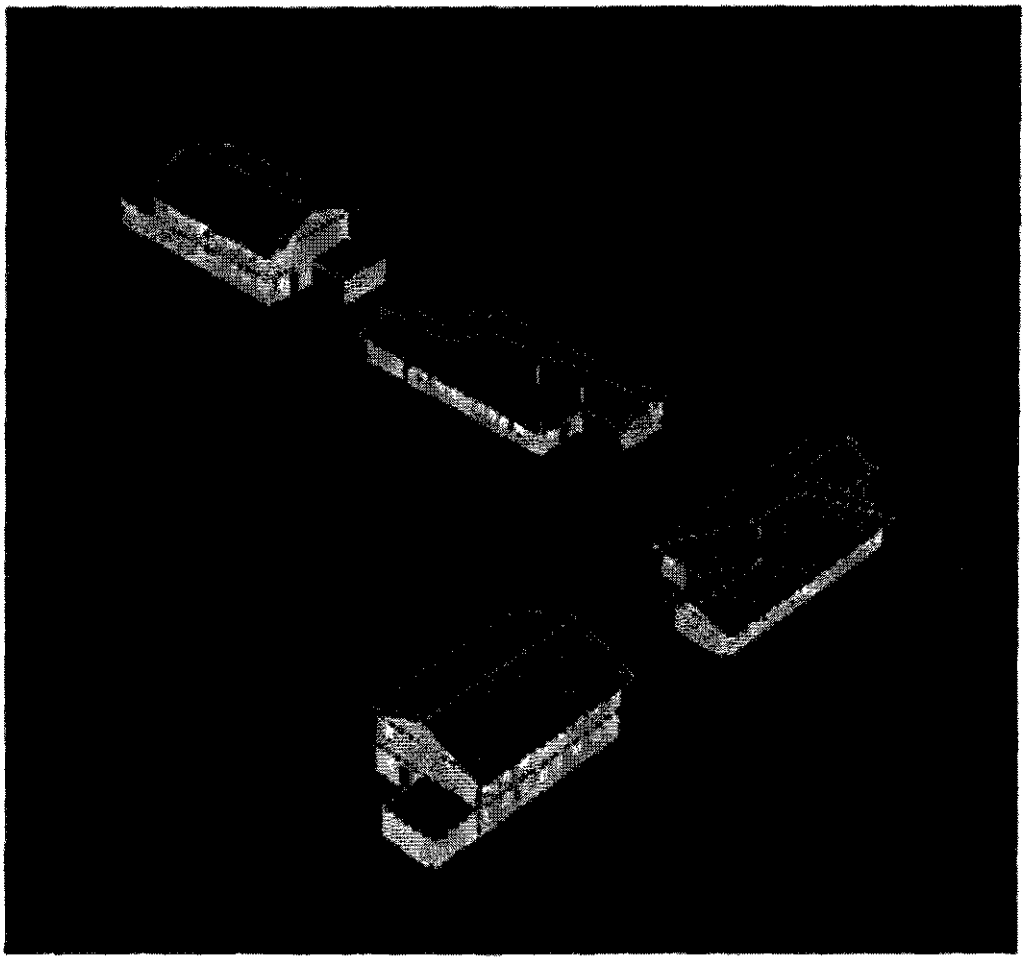


Figure 8. Computer Rendering of Residential Building Prototype Model

The general characteristics of the residential building prototype model are summarized below:

Residential Building Prototype Description

Characteristic	Value
Conditioned floor area	1 story house: 1465 SF 2 story house: 2930 SF
Wall construction and R-value	Wood frame with siding, R-11
Roof construction and R-value	Wood frame with asphalt shingles, R-19
Glazing type	Single pane clear
Lighting and appliance power density	0.51 W/SF mean
HVAC system type	Packaged single zone AC or heat pump
HVAC system size	Based on peak load with 20% oversizing. Mean 640 SF/ton
HVAC system efficiency	SEER = 8.5
Thermostat setpoints	Heating: 70°F with setback to 60°F Cooling: 75°F with setup to 80°F

Characteristic	Value
Duct location	Attic (unconditioned space)
Duct surface area	Single story house: 390 SF supply, 72 SF return Two story house: 505 SF supply, 290 SF return
Duct insulation	Uninsulated
Duct leakage	26%; evenly distributed between supply and return
Cooling season	Covington – April 27th to October 12th
Natural ventilation	Allowed during cooling season when cooling setpoint exceeded and outdoor temperature < 65°F. 3 air changes per hour

References

Itron, 2005. "2004-2005 Database for Energy Efficiency Resources (DEER) Update Study, Final Report," Itron, Inc., J.J. Hirsch and Associates, Synergy Consulting, and Quantum Consulting. December, 2005. Available at http://eega.cpuc.ca.gov/deer

Appendix I: Estimated Statistical Model

Number of Observations Read 597232
Number of Observations Used 597215

Dependent Variable: kwhd

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	36552	278162463.2	7610.0	42.99	<.0001
Error	560662	99251210.5	177.0		
Corrected Total	597214	377413673.6			

R-Square	Coeff Var	Root MSE	kwhd Mean
0.737023	29.19946	13.30508	45.56617

Source	DF	Type I SS	Mean Square	F Value	Pr > F
acct_id	36497	226475378.4	6205.3	35.05	<.0001
yearmonth*state	42	50793893.2	1209378.4	6831.68	<.0001
avg_temp*premstate	3	705888.9	235296.3	1329.17	<.0001
avg_humi*premstate	3	154542.6	51514.2	291.00	<.0001
HEHC	1	212.4	212.4	1.20	0.2733
PER	1	3643.4	3643.4	20.58	<.0001
LowInc	1	395.2	395.2	2.23	0.1351
SS	1	18760.0	18760.0	105.97	<.0001
CFL	1	535.7	535.7	3.03	0.0819
part*state	2	9213.1	4606.6	26.02	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
yearmonth*state	42	37254203.81	887004.85	5010.62	<.0001
avg_temp*premstate	3	539186.18	179728.73	1015.27	<.0001
avg_humi*premstate	3	154928.30	51642.77	291.73	<.0001
HEHC	1	189.35	189.35	1.07	0.3010
PER	1	3604.65	3604.65	20.36	<.0001
LowInc	1	399.24	399.24	2.26	0.1332
SS	1	18731.67	18731.67	105.81	<.0001
CFL	1	500.58	500.58	2.83	0.0926
part*state	2	9213.13	4606.57	26.02	<.0001

Parameter			Estimate	Standard Error	t Value	Pr > |t|
yearmonth*state	201010	OH	8.848918	9.653526	0.92	0.3593
yearmonth*state	201011	OH	-26.8365	9.657353	-2.78	0.0055
yearmonth*state	201012	OH	-23.8305	9.665848	-2.47	0.0137
yearmonth*state	201101	OH	-17.1092	9.673437	-1.77	0.0769
yearmonth*state	201102	Carolina	14.90816	0.442001	33.73	<.0001
yearmonth*state	201102	OH	0.221421	0.759482	0.29	0.7706
yearmonth*state	201103	Carolina	-5.07392	0.377985	-13.42	<.0001
yearmonth*state	201103	OH	-8.55015	0.605761	-14.11	<.0001

yearmonth*state		201104	Carolina	-10.7392	0.286299	-37.51	<.0001
yearmonth*state		201104	OH	-15.4134	0.494516	-31.17	<.0001
yearmonth*state		201105	Carolina	-13.7401	0.219655	-62.55	<.0001
yearmonth*state		201105	OH	-17.8747	0.389633	-45.88	<.0001
yearmonth*state		201106	Carolina	-1.66328	0.196765	-8.45	<.0001
yearmonth*state		201106	OH	-7.06547	0.341439	-20.69	<.0001
yearmonth*state		201107	Carolina	4.222143	0.196617	21.47	<.0001
yearmonth*state		201107	OH	0.906266	0.342405	2.65	0.0081
yearmonth*state		201108	Carolina	8.450564	0.201456	41.95	<.0001
yearmonth*state		201108	OH	11.23771	0.35257	31.87	<.0001
yearmonth*state		201109	Carolina	-1.64002	0.191112	-8.58	<.0001
yearmonth*state		201109	OH	-3.79566	0.337632	-11.24	<.0001
yearmonth*state		201110	Carolina	-13.2573	0.207335	-63.94	<.0001
yearmonth*state		201110	OH	-17.3686	0.377473	-46.01	<.0001
yearmonth*state		201111	Carolina	-9.15328	0.262489	-34.87	<.0001
yearmonth*state		201111	OH	-16.6972	0.444965	-37.52	<.0001
yearmonth*state		201112	Carolina	-1.23942	0.284664	-4.35	<.0001
yearmonth*state		201112	OH	-9.34439	0.518209	-18.03	<.0001
yearmonth*state		201201	Carolina	6.117962	0.318128	19.23	<.0001
yearmonth*state		201201	OH	13.81801	0.589907	23.42	<.0001
yearmonth*state		201202	Carolina	4.276666	0.319351	13.39	<.0001
yearmonth*state		201202	OH	-3.45697	0.588742	-5.87	<.0001
yearmonth*state		201203	Carolina	-4.804	0.276687	-17.36	<.0001
yearmonth*state		201203	OH	-10.2919	0.497634	-20.68	<.0001
yearmonth*state		201204	Carolina	-15.2302	0.218548	-69.69	<.0001
yearmonth*state		201204	OH	-18.7674	0.377451	-49.72	<.0001
yearmonth*state		201205	Carolina	-11.2122	0.183785	-61.01	<.0001
yearmonth*state		201205	OH	-16.1013	0.333677	-48.25	<.0001
yearmonth*state		201206	Carolina	-6.37043	0.162415	-39.22	<.0001
yearmonth*state		201206	OH	-7.94024	0.286963	-27.67	<.0001
yearmonth*state		201207	Carolina	4.252702	0.167524	25.39	<.0001
yearmonth*state		201207	OH	6.723126	0.304679	22.07	<.0001
yearmonth*state		201208	Carolina	5.287277	0.1488	35.53	<.0001
yearmonth*state		201208	OH	6.428205	0.279652	22.99	<.0001
avg_temp*premstate	NC			0.277307	0.008599	32.25	<.0001
avg_temp*premstate	OH			0.071776	0.014158	5.07	<.0001
avg_temp*premstate	SC			0.434798	0.009129	47.63	<.0001
avg_humi*premstate	NC			-0.22591	0.008218	-27.49	<.0001
avg_humi*premstate	OH			-0.11002	0.014782	-7.44	<.0001
avg_humi*premstate	SC			-0.03141	0.011422	-2.75	0.006
HEHC				-1.03577	1.001495	-1.03	0.301

PER		2.392527	0.530203	4.51	<.0001
LowInc		-2.24866	1.497345	-1.5	0.1332
SS		-4.65227	0.452266	-10.29	<.0001
CFL		-0.12483	0.074231	-1.68	0.0926
part*state	Carolina	-0.64638	0.101958	-6.34	<.0001
part*state	OH	-0.6504	0.188908	-3.44	0.0006

Appendix J: Participant Counts

This appendix presents the counts of participants and non-participants in each month. The first row is always the last month before the first participant, such that for Ohio the first participant showed up in September 2011 with the first row started in August 2011. The last row is the last month of billing data included in the billing analysis, and it may not be the last month of participation cut-off for this analysis. For example the cut-off month for is August 2012 whereas the billing data goes through September 2012 such that the last couple month with non-participant count being zero.

state	yearmonth	Participant_count	Non_participant_count
OH	201108	0	6753
	201109	2	6802
	201110	2	6892
	201111	2	6719
	201112	2	7040
	201201	1534	5576
	201202	1973	5178
	201203	3852	3426
	201204	5692	1179
	201205	6647	438
	201206	6857	103
	201207	6876	35
	201208	6824	2
	201209	3614	0

Appendix K: DSMore Table

Impacts ⇨ / Technology ⇩	Product code	State	EM&V gross savings (kWh/unit)	EM&V gross kW (customer peak/unit)	EM&V gross kW (coincident peak/unit)	Unit of measure	Combined spillover less freeridership adjustment	EM&V net savings (kWh/unit)	EM&V net kW (customer peak/unit)	EM&V net kW (coincident peak/unit)	EM&V load shape (yes/no)	EUL (whole number)
EE for Schools		Ohio	237	0.2436	0.0268	home		237	0.2436	0.0268	no	7
Program wide		Ohio	237	0.2436	0.0268	home		237	0.2436	0.0268	no	7

*The evaluation methodology provided net savings only. By design, gross savings are excluded from this methodological approach. The controlled quasi-experimental

**There is no Freeridership value provided in this table due to the evaluation methodology employed

Appendix L: Required Savings Tables

The required table showing measure-level participation counts and savings is below.

Measure	Participation Count	Verified Per unit kWh impact	Verified Per unit kW impact	Gross Verified kWh Savings	Gross Verified kW Savings
EE for Schools Participating Household	7,279	237	0.0268	1,725,123	195