Summary Report

Annual Summary of M&V Activities for Duke Energy's Energy Efficiency Programs in North Carolina

Prepared for
Duke Energy

139 East Fourth Street
Cincinnati, OH 45201

March 7, 2012

Submitted by
TecMarket Works
165 West Netherwood Road
2nd Floor, Suite A
Oregon, Wisconsin 53575
(608) 835-8855

TABLE OF CONTENTS

About This Summary Report

This report presents the results of all M&V activities that were completed between March 15, 2011 and March 7, 2012, and a summary of evaluation activities that are in progress for Duke Energy's energy efficiency programs in North Carolina.

For evaluations that have been completed, a summary of findings is presented. For evaluations that are currently in progress, a summary of the status of the evaluation along with the expected delivery of the draft report is provided. Planned evaluations are presented with the tasks and timeline for the evaluation.

Completed Evaluations

This section presents the key findings and recommendations for all evaluations completed between March 15, 2011 and March 7, 2012.

2010 Personalized Energy Report Program Impact Evaluation (Exhibit A)

The evaluation report was finalized on November 15, 2011, and is filed as "**Exhibit A – Carolinas - PER and OHEC - Final Impact Evaluation Report - Nov 15 2011**".

Key Findings and Recommendations

This section presents the key findings and recommendations identified through this evaluation. Table 1 presents the estimated overall impacts of both the Personalized Energy Report (PER) and the online version (OHEC).

Table 1: Estimated Overall Impacts from Billing Analysis

	Gross Savings	Net Savings
Per Participant Annual Savings		
kW	0.041	0.035
kWh	378	321
Therms	0.152	0.129

The kWh impacts in this table are from the statistical analysis of participants' monthly electricity billing data. Since the billing data cannot provide estimates of either demand (kW) or gas (therms) savings as well as the net to gross ratio, these impact estimates were based upon the engineering analysis impacts, adjusted by the ratio of the overall kWh savings between the billing analysis and the engineering analysis (0.85%). The engineering analysis also provides insight into impacts by measures (the billing analysis only produces an overall number). Therefore, while the overall result is driven by the billing analysis, an engineering analysis is required as well, so both approaches will be discussed in the report.

Significant Impact Evaluation Findings

- Both the written and online aspects of the program result in statistically significant savings.
- The online survey results in significantly higher savings than the paper version, confirming that online survey takers have higher installation rates than participants who filled out the paper survey.
- The billing data results for the both the paper and online components are larger than the engineering estimate, which may be due to differences between the survey sample and the population on recommended measure uptake. However, for PER®, the confidence interval about the estimate from the billing analysis contains the engineering estimate, so the observed difference between them is not statistically significant.
- CFLs make up 94% of total program savings.

- On average, the 13-watt CFL replaced a 59-watt load; the 20-watt CFL replaced a 73-watt load.

Free Ridership and Spillover

Free ridership was calculated for CFLs distributed to customers who filled out a Personalized Energy Report® survey. The level of free ridership was determined by using the responses to two questions in the survey (found in Appendix B: Participant Survey Instrument). Respondents were asked if they had any CFLs installed in their home prior to completing the Personalized Energy Report® survey, and, if so, how many. The amount of pre-installed CFLs determined the level of free ridership applied to energy savings according to Table 2 below.

Table 2. Free Ridership Factors for Energy Efficiency Kit CFLs

Did you have any CFLs installed before you completed your PER® survey?	If yes, how many?	% Free Ridership
No	n/a	0%
Yes	1 to 3	0%
	4 to 6	25%
	7 to 9	50%
	10 to 12	75%
	More than 12	100%

The percentages of survey respondents in each range of free ridership for pre-installed CFLs are presented in Figure 1 below. These percentages multiplied by the free ridership levels are then presented in Table 3 to arrive at the unadjusted free ridership for CFLs in the Personalized Energy Report® programs. These numbers amount to an unadjusted free ridership of 17.0% in North Carolina and 13.4% percent in South Carolina. There are total of 113 responses in North Carolina and 52 responses in South Carolina for these questions, therefore the weighted average of these percentages gives an unadjusted system freeridership of 15.9% for the Carolinas.

Level of Discounting for Biases

The self-selection bias discount factor for all measures for PER is 29.9%. This is also the full discount for all recommendations. The false response bias discount factor, applied only to CFLs, is 17%. The total discount to CFLs, including freeridership, is then 50.7%. The combined program-wide freeridership and bias adjustment for the engineering estimates is 44.5%. The billing analysis is free of these biases and uses only the 15.9% freeridership adjustment applied only to CFLs. The program-wide adjustment for the billing analysis is 15%. Detailed tables can be seen in Appendix F: DSMore Table.

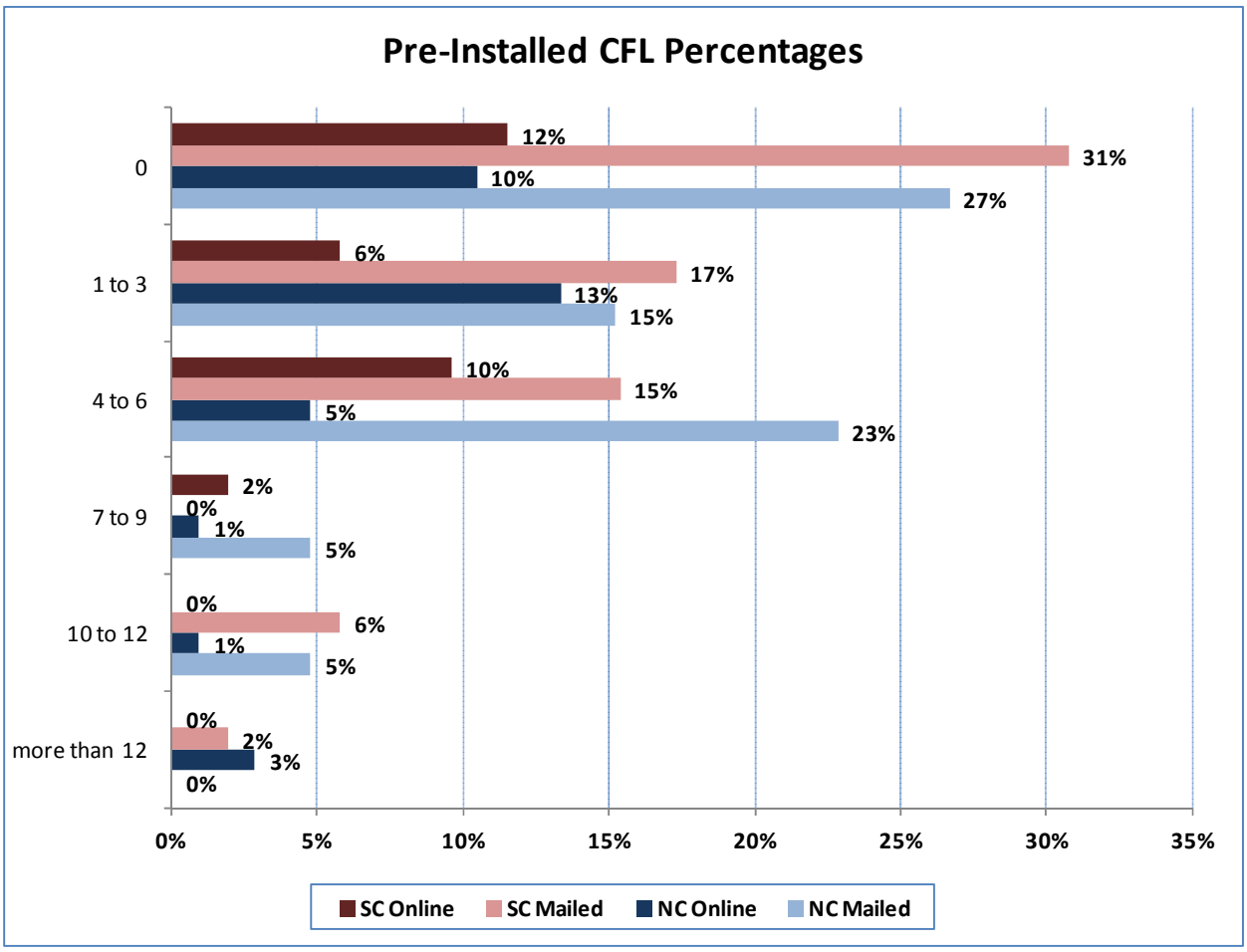

Figure 1. Percentage of Respondents by number of CFLs pre-installed

Table 3. Free Ridership in North and South Carolina

State	Type	Pre-installed CFL range	Percentage in range	Free ridership Level	Free ridership
NC	Mailed	0 to 3	41.9%	0	0%
		4 to 6	22.9%	25	5.7%
		7 to 9	4.8%	50	2.4%
		10 to 12	4.8%	75	3.6%
		More than 12	0%	100	0%
	Online	0 to 3	23.8%	0	0%
		4 to 6	4.8%	25	1.2%
		7 to 9	1.0%	50	0.5%
		10 to 12	1.0%	75	0.7%
		More than 12	2.9%	100	2.9%
Sum of NC Free Ridership					**17.0%**
SC	Mailed	0 to 3	48.1%	0	0%
		4 to 6	15.4%	25	3.8%
		7 to 9	0%	50	0%
		10 to 12	5.8%	75	4.3%
		More than 12	1.9%	100	1.9%
	Online	0 to 3	17.3%	0	0%
		4 to 6	9.6%	25	2.4%

		7 to 9	1.9%	50	1.0%
		10 to 12	0%	75	0%
		More than 12	0%	100	0%
Sum of SC Free Ridership					**13.4%**

Impact Estimates for Personalized Energy Report® Recommendations

The participants of the Personalized Energy Report® Program each received a customized report with specific recommendations for improvements to their home that would increase their home's energy efficiency. In this report, we present the recommendations as they were reported to us by the random sample of 157 participants contacted during the telephone survey. We first asked them what, if any, improvements they had made to their home. We then ask if this was a recommendation that was in the Personalized Energy Report® (PER®). If they said yes (it was in the Personalized Energy Report®), we ask how influential the recommendation in the report was to their decision to install the item on a scale of 1 to 10.

Savings were calculated using engineering algorithms that can be found in Appendix C: Impact Algorithms. Self-selection bias and false response bias are then factored in to calculate the final estimated net impact for engineering estimates only.

Recommendations

- As part of ongoing research related to program marketing effectiveness, Duke Energy has been exploring whether some programs are gateways that potentiate other offers. Research on follow on offer uptake for PER® indicates that customers that first participate in PER® are approximately twice as likely to respond to an offer to participate in Power Manager® as compared to those that did not first participate in PER®. The reverse correlation does appear strong. This suggests that customers participating in PER® should be offered additional opportunities to participate. Perhaps especially in simple offers like Power Manager®. Duke Energy's research on this type of offer progression focuses on the 2009 period, as eventually the universe of participants that *first* received PER® and *then* a Power Manager® offer is reduced, as the total number of Power Manager® offers mailed increases over time. It may be that the ability to migrate customers through programming experiences, e.g. PER® to Power Manager® could drive additional value for Duke Energy, by keeping customers engaged and continuing to offer relevant programming. It may be that engagement programming like PER® drives additional dividends beyond the measurement year. Here for example follow on Demand Response program offer uptake was described. In light of the need to find new ways to get more participation to meet ramping goals, Duke Energy should consider exploring whether this gateway effect exists for other programming types.

2010 Personalized Energy Report Process Evaluation (Exhibit B)

The evaluation report was finalized on July 14, 2011, and is filed as " **Exhibit B - Carolinas - PER and OHEC - Final Process Evaluation Report - July 14 2011**".

Significant Process Evaluation Findings

- The overall participant satisfaction with the program is high at 9.4 on a one-to-ten scale.

- The kit mean satisfaction rating is the lowest of all the satisfaction ratings in the program at 8.4. Respondents stating problems with the kit all referenced the quality of the CFLs. Several respondents said the kit CFLs were too dim, too easily broken, or took too long to warm up.

- The free six pack of CFLs is the most referenced (38% and 40%) primary motivator for participation in the program in North and South Carolina while the desire to save energy was the second-most often referenced primary motivating factor at 35% in North Carolina and 21% in South Carolina.

- Sixty-six participants in North Carolina (63%) and thirty participants in South Carolina (58%) indicated they had at least one pre-installed CFL in their home prior to taking part in the Personalized Energy Report® program. In addition, 15% of respondents in North Carolina and 10% of respondents in South Carolina indicated that they had more than six CFLs installed prior to taking part in the program.

- As part of ongoing research related to program marketing effectiveness, Duke Energy has been exploring whether some programs are gateways that potentiate other offers. Research on follow on offer uptake for PER® indicates that customers that first participate in PER® are approximately twice as likely to respond to an offer to participate in Power Manager® as compared to those that did not first participate in PER®. The reverse correlation does appear strong. This suggests that customers participating in PER® should be offered additional opportunities to participate, especially in simple offers like Power Manager®. Duke Energy's research on this type of offer progression focuses on the 2009 period. Eventually the universe of participants that *first* received PER® and *then* a Power Manager® offer will decline, as the total number of Power Manager® offers mailed increases over time. It may be that the ability to migrate customers through programming experiences, e.g. PER® to Power Manager®, could drive additional value for Duke Energy, by keeping customers engaged and continuing to offer relevant programming.

Recommendations

- Consider increasing the Personalized Energy Report's® ability to provide reports that are more customized to Duke Energy's customers. While the current energy efficiency tips in the Personalized Energy Report® are accurate, they border on being generic and are not focused on the specific needs of the customer receiving them. Tips that are directly tied to customer responses and tuned to local climates and trends are likely to be better heeded.
- Streamline program delivery by consolidating operations within the same vendor whenever possible. This allows easier management for Duke Energy and greater accountability from the vendor for program operations.
- Review areas of overlap between Duke Energy's residential energy report programs: PER®/OHEC (Online Home Energy Calculator) vs. HEHC (Home Energy House Call) vs. HECR (Home Energy Comparison Report). The current number of slightly different residential energy report offerings risk confusing customers who may participate in one residential program and then not know whether they could or should participate in another. Duke Energy needs to make clear if there are different benefits of each program to the customer. It is also critical for Duke Energy to provide consistent messaging and energy tips, in order for Duke Energy to retain its role as the trusted source for energy efficiency information.
- Verify CFL installations and track cross-program participation. Consider increasing the variety of specialty CFLs included in the program offer and tracking the ratio of CFLs to lighting fixtures in residential homes. The two types of CFLs being offered through Duke Energy residential programs are the 13w and 20w medium screw base lamps. These CFLs typically only fit into a few fixtures within a residence, leaving many fixtures that use inefficient bulbs. If more specialty CFLs are offered, the proportion of CFLs to lighting fixtures will increase. This can help maintain high installation rates, and decrease the risk that CFLs will be stockpiled or stored by customers.

2010 Home Energy House Call Process and Impact (Exhibit C)

This evaluation report was finalized on June 13, 2011. The full report is filed as "**Exhibit C - Carolinas - HEHC - Final Process and Impact Evaluation Report - June 13 2011**".

Summary of Findings

Energy Savings

A billing analysis was conducted to estimate the energy savings from the program. The billing analysis relies upon a statistical analysis of actual customer-billed electricity consumption before and after participation in the Home Energy House Call (HEHC) program to estimate the impact for kit and recommended measures from the audit. The billing analysis used consumption data from HEHC participants in North Carolina (5,321 customers) and South Carolina (1,859 customers)[1] that participated between November of 2008 and July of 2010. A panel model specification was used that analyzed the monthly billed energy use across time and participants. The model included terms to control for the effect of weather on usage, 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). The estimated impacts are included in Appendix C: Estimated Model, and a summary of the results are shown below:

	Total
Savings (kWh/yr)	901
T-value	10.39
R-Square	61%
Sample Size (overall model)	293,338 observations (14,001 homes)

The kW and therm savings in Table 4 below were estimated based on the responses to the customer survey regarding what they installed, scaled by the overall population estimate of kWh presented above. Estimates for the free-ridership and spillover were also based on the customer survey, and are discussed in detail later in the report.

[1] Ohio HEHC participant consumption data points (n=6821) were also included in the billing analysis.

Table 4. Summary Table: HEHC Gross Savings and Net Adjustments

Metric	Result
Number of Program Participants	7,180 from Nov. 2008 to July 2010
Gross kW per participant	.105
Gross kWh per participant	901
Gross therms per participant	18.4
Free-ridership rate	• CFLs: 48.3% • Showerheads: 0.6% • Faucet Aerators: 0.6% • Weather-stripping: 12.8% • Outlet Gaskets: 0.8%
Spillover rate	• CFLs: 6.8% • Showerheads: 1.2% • Faucet Aerators: 0.0% • Weather-stripping: 4.6% • Outlet Gaskets: 9.7%
On-site inspection adjustment	• CFLs: 20.7% • Showerheads: 3.0% • Faucet Aerators: 1.0% • Weather-stripping: 7.0% • Outlet Gaskets: 4.0%
Net Adjustments to be applied to Gross values	• CFLs: 43.8% • Showerheads: 97.6% • Faucet Aerators: 98.4% • Weather-stripping: 84.8% • Outlet Gaskets: 104.5%
Total Weighted Adjustments	• kW: 70.8% • kWh: 62.6% • therms: 100.7%
Net kW per participant	.074
Net kWh per participant	564
Net therms per participant	18.5
Measure Life	• CFLs: 5 years • Showerheads: 10 years • Faucet Aerators: 10 years • Weather-stripping: 5 years • Outlet Gaskets: 20 years • Overall Measure Life: 7 years****
Cost-effectiveness for DSMore	

*kW, kWh, and therm savings per participant include both kit items and audit recommendations
**Free-ridership and spillover rates are derived from analysis of participant survey data
***On-site inspection eliminates the need for false response and self-selection bias adjustments
****Overall measure life is a weighted average derived from the effective useful life of the individual kit items. The weights were assigned based on each item's contribution to gross kWh savings.

Customer Satisfaction

Based on 103 surveys done of a random sample of 2,418 participants in North and South Carolina that participated between June of 2009 and January of 2010, the customers' satisfaction with the program is very high with an overall satisfaction score of 9.2 on a 10-point scale. This is a very high level of satisfaction for an energy efficiency program and reflects well on the program and the program's sponsor. They were satisfied with the audit (9.0 out of 10) and with the energy efficiency starter kit (9.3 out of 10).

Motivating Factors

The primary factor was a desire to reduce energy costs with 79 participants (76.7%) indicating it as a factor and 54 (52.4%) indicating it was the most important factor motivating them to participate in the program. Receiving an energy audit was the second-most cited motivating factor.

What Customers Like Most and Least

Customers were most pleased with the free audit and energy-saving kits. The most common area noted for improvement was the need for a follow-up audit and more intensive energy-saving options for participants who had already met all recommendations in the Home Energy House Call audit. These results indicate that customers want to go beyond the typical approaches to energy savings and are looking for other options.

Recommendations

- While customer satisfaction for the audit and kit items is high, many customers expressed a desire for more far-reaching energy-saving options than those presented in the audit. A subset of customers (near 10%) wants to further reduce their energy use and is looking for help to identify any and all approaches for accomplishing their objectives. This indicates that there may be a number of customers who want to go to the next level of energy efficiency and move into the more costly and deeper savings options. One-quarter of the survey participants had already been considering an energy audit before joining the program, and following the audit, 10% requested more information in the form of follow-up services to help identify additional energy saving opportunities. This suggests the Home Energy House Call program has potential for engaging customers who are interested in saving activities that are beyond the low to no-cost savings of the audit report. Duke Energy has an opportunity to capture additional savings from these participants through expanded and coordinated services. In considering these services, Duke Energy should not be limited to only those services that pass a traditional cost effectiveness test, but rather develop services so that the incentives are structured for the individual to make the net savings achieved cost effective. For these additional measures and support needs, the incentives may not need to be as high as 50% of the incremental cost as some of Duke Energy's other programs. For example, if customers need new windows, the incentive can be structured so that the savings are cost effective for that measure.

- Information gathered during the Home Energy House Call audit can be used to identify prospective participants who may benefit from Duke Energy's other energy efficiency programs. This would allow Duke Energy to target promotions and outreach to those who may be more likely to participate in other programs. If the auditors are not currently doing so, the auditors could also present information about other relevant programs during the audit and explain how these could help customers accomplish their energy savings objectives. The home audit is an expensive and unique channel for communicating directly with a homeowner who has already identified themselves as being interested in energy efficiency. Auditors do urge customers to go online to find out about other Duke Energy programs. However, asking customers to go on the Duke Energy website to search for information themselves may incur an information cost. Duke Energy should take advantage of this opportunity to remove that cost and make it easier for the customer to plan future energy efficiency steps. Program auditors need to be representatives of not just the audit, but all approaches by which savings can be achieved.

- Duke Energy should proactively help customers identify higher-cost measures that would have more impact. Past evaluations of the HEHC that was implemented by Duke Energy in Ohio found that customers that have participated in the HEHC do adopt more expensive recommendations such as insulation upgrades. Better promotion of higher-impact measures would allow Duke Energy to contribute to the customer's understanding of energy efficient actions they could take now and later, particularly since customers are not eligible for another Home Energy House Call audit for three years.

- RECOMMENDATION: With the permission of the customer, auditors should remove the old incandescent light bulbs from the customer's home and dispose of them. This would decrease any chance that customers might remove the CFLs and put back the old incandescent light bulbs.

- RECOMMENDATION: Share participant data from other programs that offer free CFLs so that the HEHC participants are not automatically eligible for the additional 12 CFLs if they had previously received a set from another program. This will allow Duke Energy to achieve higher installation rates across their portfolio of programs and achieve greater cost effectiveness from CFL measures.

- RECOMMENDATION: If the regulatory agency allows gas savings to be claimed by the gas utilities, Duke Energy should explore the idea of collaborating with the gas companies to share costs and capture gas savings.

- RECOMMENDATION: Duke Energy should consider tracking customer participation across programs. This would allow Duke Energy to determine whether HEHC might have influenced participants to subsequently participate in other rebate programs. If the referral mechanism is not producing sufficient participation in other Duke Energy energy efficiency programs, consider approaches to increase the effectiveness of the referral mechanism.

- RECOMMENDATION: Duke Energy or its evaluation contractor should schedule an evaluation survey of a sample of HEHC customers to determine their adoption 1 to 2 yrs after participation to identify longer-term savings. This would allow Duke Energy to obtain better longitudinal information about customer actions that might not be captured by annual program evaluations, and better estimate longer-term energy savings.

- RECOMMENDATION: Duke Energy should explore the idea of marketing the HEHC as a limited-time offer within the areas targeted for upcoming service by the auditors. This may increase the perceived scarcity and thus value of the audit, and also would enable audits to be completed within a geographical region before moving operations to another region, increasing cost effectiveness.

- RECOMMENDATION: Duke Energy should help customers prioritize the audit recommendations. Auditors should spend more time finding out what barriers customers might have to the higher savings items so that they might try to address those barriers in a face-to-face conversation with cost effective offers. The HEHC provides a very rare and expensive opportunity for Duke Energy's agents to communicate directly with their customers. Duke Energy should consider using this opportunity to encourage customers to discuss their specific questions and concerns with the auditors with the specific goal of being able to achieve additional savings. Duke Energy should also consider what other unique opportunities might be available through this channel of communication and see how it might best be leveraged. The HEHC should be considered to be much more than just a "live" version of a survey, but should recommend all ways that the customer can save energy and offer incentives on those measures to speed their implementation. For example, if they see that siding or windows are needed, it would be an opportunity to offer underlayment insulation or more efficient windows. Incentives can be calculated to be cost effective.

2010 K12 Curriculum Process and Impact (Exhibit D)

This evaluation report was finalized on November 17, 2011. The full report is filed as "**Exhibit D - Carolinas - K12 - Final Impact and Process Evaluation Report - Nov 17 2011**".

Summary of Findings and Recommendations

An overview of the key findings and recommendations identified through this evaluation is presented below.

There were 8,385 student family participants in the K12 program from June 2009 to April 2010, 6,006 in North Carolina and 2,379 in South Carolina. Table 5 and Table 6 below present the average number of kits distributed by participating teacher, school, and school district. For this program period, there were 113 school districts with participating schools. In these 113 school districts, 850 schools had a total of 1,857 teachers that participated in the K12 program. The average number of kits distributed per participating teacher was 3.3 in North Carolina and 2.9 in South Carolina.

Of the 8,385 kits distributed, 2,503 kits (29.9%) were sent to Non-Duke Energy customers in the Carolinas.[2] These kits contained fewer items, as described in the above text box. Note that these numbers represent the number of Duke Energy customers that completed the survey and requested kits between April 27, 2009 and June 7, 2010, not actual kit distribution. The number of kits sent would be slightly lower because Duke Energy did not send kits to customers that have received energy efficiency kits through other Duke Energy programs.

Table 5. Distribution of Energy Efficiency Kits in North Carolina

Jurisdiction: NC	Average Number of Kits Requested by Non-Duke Energy Customers	Average Number of Kits Requested by Duke Energy Customers	Total Kits Requested	Range of Number of Kits, Duke Energy and Non-Duke Energy Customers
School District (n=74)	21.9	58.1	6006	0-491
School (n=624)	2.6	7.0		0-145
Teacher (n=1,324)	1.2	3.3		0-35

Table 6. Distribution of Energy Efficiency Kits in South Carolina

Jurisdiction: SC	Average Number of Kits Requested by Non-Duke Energy Customers	Average Number of Kits Requested by Duke Energy Customers	Total Kits Requested	Range of Number of Kits, Duke Energy and Non-Duke Energy Customers
School District (n=39)	21.4	38.1	2379	0-644
School (n-226)	3.8	6.7		0-169

[2] 1,646 out of 6,006 (27.4%) kits went to Non-Duke Energy customers in North Carolina.
857 out of 2,379 (36.0%) kits went to Non-Duke Energy customers in South Carolina.

Teacher	(n=533)	1.6	2.9		0-45

Evaluation Contractor's Recommendations for Duke Energy to Consider

The following program recommendations are provided by TecMarket Works, the independent evaluation contactor. The recommendations are provided to allow Duke Energy to review them with the program manager and the lead administrator so that each recommendation can be accepted, rejected or modified according to the best judgment of the program design professionals.

1. **Develop a coordinated school targeting and entry-contact strategy that takes advantage of all effective market development efforts to reach newly targeted schools.** For most schools targeted by the program, successful entry into the school is based on Scholastic's market presence and history serving schools, and their reputation as a curriculum builder. This is the primary market development theory regarding why delivering the program through organizations like Scholastic is the preferred approach. It builds on existing relationships and service history. That is, the program delivery success hinges on Scholastic's presence and reputation as a high-quality training support organization to the schools targeted by the program. However, teacher interviews suggest that for some schools, Duke Energy's Business Relations Manager (BRM) relationship with the schools can also be a "door opener" and may, in some circumstances, provide a more effective access route to the school administrators who need to approve the program for their schools. In addition, Duke Energy has other relationships that can be used to gain support. For example, the Duke Energy Foundation has contacts with school administrators and teachers and provides supportive funding to many schools. They also take part in school board activities and support educational development in the state via a number of efforts. For some schools, entry into the school can be expedited by leveraging Duke Energy' existing relationship through their BRMs[3] or through Duke Energy's extended community relations. These relationships and organizations can be considered when developing a school district contact strategy. This strategy can employ a phased approach for gaining access to new schools so that the support for the program is present and the administrators are receptive enough that they can push the push the program within their schools.

2. **Select program assessment metrics carefully when evaluating second year program energy savings.** Because the second program year will be implemented with several design changes as well as different fielding approaches compared to the first year, it will be important to understand the relationship between program operations and success (energy savings). Duke Energy and Scholastic should consider developing a set of performance metrics that help track the effects of the program to the operational components that deliver that success. One approach would be to develop several metrics and assess the success of the program across these multiple metrics so that the assessment

[3] BRM: Business Relations Managers, sometimes knows as the customer representatives

focuses on savings achieved but also for delivery effectiveness. Such metrics can include savings per teacher, savings per school, savings per district, installations per teacher, surveys and return cards returned per teacher/school/district, students reached per month, etc. These performance metrics can then be compared with the program's operational procedures to identify changes that increase effectiveness and those that do not.

3. **Train program team members on the methodology that is used to calculate energy savings.** All team members should be made to understand that the energy savings are estimated by extrapolating the data from the measures reported on the BRC to the entire population. The requirement to achieve a at least a 20% rate of BRC returns stems from the need to minimize self-selection bias by drawing a sample from a wide range of households, not just those households that might already be more receptive to energy efficiency. This better understanding may allow program team members to find other ways of increasing the representativeness of the sample without resorting to high BRC return incentives. See next recommendation as an example.

4. **Consider other methods of decreasing response bias by increasing representativeness of the BRC sample.** The survey and BRC returns that the program is experiencing at this time should be considered the minimum level of acceptance for those teachers who have adopted the program for their classrooms. Surveys and BRC returns should be much higher. We see no reason why surveys and BRC return rates should not be provided by 50% of the students and their parents if it were presented as a homework assignment. Methods should be developed for increasing the BRC response rates. For example, playing upon known methodologies for multi-student partnership efforts, such as randomly divided into pairs and every pair could be asked to make a commitment to have at least one student return the BRC from each pair and the other report to the class the measures installed. The random pairing of students would decrease response bias by encouraging responses from students who tend not to respond.

5. **Work with neighboring utilities to share credit of achieving energy savings.** In a time when energy efficiency and carbon reduction is of increasing importance, growing numbers of states have school energy efficiency programs that overlap geographical regions. While it is important to understand an individual program's achievements for the purpose of improving program operations and program design, utilities should be given energy savings credit for contributing to overall energy supplies in their states and their market transformation efforts to achieve an energy supply objective. A case made to the regulatory agencies for sharing credit would be strengthened by coordination between neighboring utilities. However, splitting individual students within a single class to receive different levels of support based on the location of their parents homes can be expected to substantially decrease cost effectiveness by driving up costs per in-territory student and lower savings by not including all students. We recommend working with the Commission to resolve this issue to: a) count all savings regardless of territory, or b) exclude this program from a cost effectiveness requirement and allow recovery of all costs and incentives as a condition of implementation, or 3) determine if the program can be made cost effective through continued improvements such that it can become cost effective by counting only the savings from homes in Duke Energy's territory, or d)

consider terminating the program. We specifically recommend that Duke Energy work with the Commission to allow savings from schools operating in multiple utility territories to be credited to the sponsoring utility so that territorial issues do not impact program energy credits or act to erode the apparent cost effectiveness of the program. Base the argument on the fact that it is the energy supplies of the state that are the focus of the legislation and or regulatory policy behind cost effective energy supplies provided to the energy consuming population of the state. If this is not successful, examine the cost effectiveness of the program based on Duke Energy's territory savings and determine if the program is cost effective, can be made cost effective, can be exempted from contributing to a cost effective portfolio, or if it should be terminated.

6. **Continue to explore new program operations, enrollment, and marketing strategies to increase program cost effectiveness.** Duke Energy is working with Scholastic to test new approaches for improving the design and operations of this program. We compliment Duke Energy and Scholastic for their continued efforts to improve the program and encourage the continuation of this improvement approach. For example, in the Carolinas, Duke Energy is considering a new school strategy that does not require in-person visits. For this strategy, DVD presentations are being considered as a way to market to schools that are geographically hard to reach, making personal visits expensive. In assessing this strategy Duke Energy and Scholastic should continue to explore whether DVD is an effective presentation tool for serving as a replacement for in-person program enrollment visits. If this strategy is effective in the Carolinas, consider using this approach in Ohio as well.

   In addition, there is some concern on the part of Scholastic that mass marketing efforts are not permitted. Scholastic, on the other hand, recommends the use of local mass marketing efforts to develop positive community support for the program prior to contacting administrators and teachers during the enrollment phase. These options should be tested to determine what actions are worth perusing on a program basis. However, these efforts have to be considered within a cost effectiveness framework for the program as a whole within the portfolio. If the program cannot be made cost effective, it makes little sense to spend additional dollars building public support for a program that will not continue as a part of the portfolio. We recommend that both Duke Energy and Scholastic explore these and other options to build a program that is both cost effective and that uses an approach that improves response, participation and energy savings to become more cost effective over time.

7. **Review how many 3rd and 4th Grade classes the targeted schools have so that schools receive the appropriate number of teacher kits.** The number of 3rd and 4th grade classrooms was over-estimated in the 2009-2010 program year, resulting in too many kits being sent to the teachers. This was not reported as an issue in the current evaluation, and the average number of kits per school dropped from 11 in 2009 to 7.6 kits in 2010. This issue has likely been resolved as of this report, though further inquiries should be performed to ensure that the appropriate number of teacher kits are being distributed to the schools.

Teacher-Provided Recommendations for Duke Energy To Consider

In addition to the recommendations provided by the evaluation contractor, several teachers provided recommendations that can be considered by the program design professionals. TecMarket Works presents these recommendations from the interviewed teachers from both the Ohio program and the assessment of the program in the Carolinas so that ideas expressed across both states are considered within each state. However, we do not elevate these recommendations to be included with the recommendations from the evaluation contactor. The evaluation contractor recommendations are those that TecMarket Works suggest be implemented into the program (above). The teacher recommendations are provided without judgment as to their appropriateness for the K12 program. These including the following:

- Increase the level of educational and results-related program promotions (flyers, brochures, school examples, etc.) provided to the teachers and school administrators in time to be effectively used.
- Update the program materials to today's standards by adding a multi-media element such as a DVD video or online class activities.
- Develop and incorporate a day-to-day educational/activities planner to stretch the impact of the activities out over several days
- Add a more flexible incentive for teachers to make the effort worthwhile to the teachers who are responsible for success; the incentive can be cash for the class, class activities, or credits for class supplies or other incentives valued by teachers.
- Redesign the website to make it more user-friendly for students and teachers
- Add more online content for students to access at home that would focus on increasing key behaviors and measure installations.
- Develop a simple game for the students to play with their family that would reinforce the behaviors needed and the installation of measures. Distribute it with the kit.
- Develop a song that students can sing in the class or at home that sends a behavior and use message.
- Develop a downloadable application for smartphones that parents and children could use together to track their savings.
- Include a component in which the students write a report of the use of the kit items and have the program incent the report to make it attractive to students and teachers.

Teacher Comments

The teachers also provided additional comments on the program and its operations. These comments are summarized below.

- "The packet of materials was great. Children love being able to touch and hold things."
- "The lessons were brought down to the right level for my class, and "The Magic School Bus" holds a high level of interest for children."

- "The prepaid envelopes were great. We didn't have those last year and I think it made a real difference."
- "The materials need to be designed specifically for the children who are to be exposed to them. The lines of type in some of the materials are still too small."
- "Bring out the integration between the Magic School Bus story and the curriculum's focus and the program's objectives so that they directly support each other."
- "Add more multimedia elements – online, songs, videos, presentations."
- "Need to more effectively structure the program's focus and materials so that it integrates smoothly with the school curriculum that we must follow as well as state standards."

Student Family Surveys (Business Reply Cards, or BRCs)

One hundred sixty-two (162) families that live in Duke Energy's service territory in the Carolinas returned the BRC. The survey asked the families about what kit items they used and their satisfaction with the items. The most commonly installed items with over 80% installation rates were the kit's 13-watt and 20-watt CFLs and the night light. Respondents also indicated their highest levels of satisfaction with the CFLs, as presented in the table below.

	Percent Installed or Used	Mean Satisfaction Score
13-watt CFL	88.9%	8.8
20-watt CFL	82.7%	8.9
night light	81.5%	8.5
booklet	75.3%	8.5
low flow showerhead	70.4%	8.5
kitchen aerator	61.7%	8.5
bathroom aerator	56.2%	
switch and outlet gaskets	53.1%	8.3
water temp card	49.4%	8.4
water flow meter bag	19.8%	7.6

Impact Findings

Table 3 presents the per customer kWh savings associated with the K12 program. These results are obtained based on the results of the billing data analysis. Since the billing analysis uses actual energy usage to estimate impacts, and is the entire population of Duke Energy participants, it was deemed that this is a more accurate estimate of the program impact than the estimate from in the engineering analysis.

Table 7. Energy savings associated with the K12 program

	kWh	t-value
Per Participant Annual Savings (Gross)	249.2	6.00
Per Participant Annual Savings (Net)	205.2	6.00

The kWh impacts in Table 7 are from the statistical analysis of participants' monthly electricity billing data. Since the billing data cannot provide insight into impacts by measure, these impact

estimates were based upon the engineering analysis impacts, adjusted by the ratio of the overall kWh savings between the billing analysis and the engineering analysis (23%). The engineering analysis also provides the net to gross ratio. Therefore, while the overall result is driven by the billing analysis, an engineering analysis is also required. Both approaches are discussed in the report.

2010 Power Manager Process and Impact (Exhibit E)

This evaluation report was finalized on September 2, 2011. The full report is filed as "**Exhibit E - Carolinas - Power Manager - Final Process and Impact Evaluation Report - Sept 2 2011**".

Summary of Findings

Customer Satisfaction

- Satisfaction with the Power Manager program is high with over 70 percent of the survey respondents rating their satisfaction at a 9 or 10 on a 10-point scale for all program aspects: Overall program, program enrollment, and program information.

Motivating Factors

- More than half (61.8%) of the surveyed North Carolina participants were able to recall any benefits promoted by the program. In South Carolina, 53.5% were able to recall at least one benefit promoted by the program. The surveyed participants that did recall program benefits were able to provide 63 benefits that they recalled being promoted by the program. Of the 63 benefits recalled by these participants, 75% of them mentioned money either by recalling the bill credits or financial incentives for participating in the Power Manager program.

- Most participants rate environmental issues as important or very important to them. However, a small number of them (about 7%) are a member of an organization with an environmental mission.

- More than half of the participants in both states do not know when control events occur, or even notice the bill credits on their bill. However, the bill credits are the most commonly cited reason for their participation in the program.

Recommendations

- **Process Recommendation**: Bring on additional staff to help answer phone calls and email during events, and to assist with the administrative needs. Although the interviewees state that Duke Energy's management is aware of the need for more staffing, it is worth emphasizing this need. Demand response programs usually only a have a few opportunities each year in which they are visible to the customer and it is critical to ensure that program operations run efficiently in the eyes of the participant during those times, and that all customer concerns during events are addressed promptly. While the Power Manager® team has succeeded with their existing staffing, interviewees express concern that their ability to respond to customer concerns during events may affect their ability to provide technical oversight of the event once it's initiated.

- **Process Recommendation:** Events may be called for economic or emergency reasons. In the Carolinas, the Duke Energy's System Operations Group determines emergency

situations. Duke Energy's RED determines when economic events are called. Economic events are to prevent the market's energy cost fluctuations from negatively affecting customers. In program planning, continue to balance the number of economic events with the possibility of emergency events. Duke Energy also needs to carefully balance customer satisfaction with both emergency and economic events. Where emergency events increase, customer dissatisfaction needs to be mitigated through increased communication, and possible media coverage.

- **Process Recommendation**: Consider leapfrogging the Cannon switch technology in favor of a switch that allows two-way communication, or one that can be integrated with a Smart Grid. Switch upgrades are underway and will be completed in two or more years, but Duke Energy program staff is aware that in that time, the upgraded switches themselves may be outdated as state-of-the-art developments continue to occur with equipment or Smart Grid infrastructure. Duke Energy staff has expressed a need for two-way communications in order to achieve effective program management and savings acquisition.

- **Impact Recommendation**: A potential alternative approach for future impact evaluations is to use the data from the M&V and the operability sample to directly estimate impacts via statistical models. This data can be used to develop a statistical model that estimates the actual load impacts during previous events as well as the providing and estimated of peak weather impacts. In spirit, this approach is similar to the duty cycle approach, but the impact estimates are obtained directly from observed data, rather than simulated from data on non-event days.

2010 Smart $aver CFL Process and Impact (Exhibit F)

This evaluation report was finalized on February 15, 2011 and revised on April 26, 2011. The full report is filed as "**Exhibit F - Carolinas - Smart $aver CFL - Final Process and Impact Evaluation Report - Revised April 26 2011**".

Findings

1. Duke Energy's CFL coupons are very popular with retailers, boosting sales 500 to 1,000 percent over typical sales, in some cases causing stores to move product from non-Duke Energy territories, providing substitutions and extending expiration dates for offers. This is a substantial increase in sales and reflects well on Duke Energy and on their marketing efforts and promotional initiatives. Duke Energy managers report large movements of CFLs in all Duke Energy territory stores carrying the GE brand with retailers reporting sales as fast as they can stock the covered bulbs.

2. Discount coupons are recently experiencing diminishing returns as far as reaching new customers to redeem the price reduction the coupons. Strategies are now being implemented to reach non-coupon users. Additional targeting and motivational appeals at younger and more mobile customers who are less likely to redeem coupons is needed if the use of discount coupons is maintained to increase redemption from this group. However, Duke Energy has moved to a no cost coupon for a free 6 pack of CFLs that has increased sales of CFLs to the point where the market is having trouble stocking bulbs and retailers are asking for advance notice of coupon distribution to enable them to have enough stock in the stores. Duke Energy managers report that redemption rates are running between 20% and 25% compared to about 3% with the price reduction coupons.

3. The strategy of using individual customer-coded coupons allows Duke Energy to focus on accurately tracking customer purchases rather than reconciling participation and sales counts with retailers. The move to customer-specific coupons also allow Duke Energy to move away from a store-focus program to a customer-targeted program, a more efficient method of operation that can expand and contract as needed by including or not including customers in direct mail targeting. The method also allows for strategic geo-expansion of the program by targeting more areas rather than increasing coordination with specific stores. This also allows Duke Energy the flexibility of moving between a discount coupon and a free bulb coupon to match the energy and cost effectiveness goals. This method has also allowed Duke Energy to identify a few (less than 10) customers who have copied the coupon in order to obtain more than the maximum number of free bulbs.

4. Home Depot (for example) did not carry the partnered brand resulting in a large CFL retailer not being allowed to participate in the program. The manufacturers' coupon was successful in acquiring cooperation with other specific retailers, such as an expansion into Wal-Mart. Since the coupon campaign, Duke Energy has also allowed customers to acquire the CFLs over the web if they cannot or are unable to go to one of the retail outlets, increasing exposure and adoption rates. In the web process Duke Energy can validate the potential participant's status as a Duke Energy customer and verify that they are eligible for the CFLs. This allows Duke Energy to mail only the number of bulbs that

the customer is eligible to receive (up to 15 bulbs) by using a real-time database verification to see if they have redeemed a coupon in the past.

5. Retailers report that the coupons significantly affect sales and a discontinuation of the program would result in much fewer CFLs purchased as well as a significantly lower focus on CFL sales by the retailer.

6. Retailers report they need additional lead time to acquire additional stock because of the higher sales volumes that have occurred after Duke Energy's coupons were distributed. This is a problem growing out of the success of the effort. That is, the effort was successful enough that the retailers report needing extra time to obtain inventory from their non-Duke Energy territory stores to support the increased sales. Also, because of the increased demand and the strong customer acceptance, retailers report that coupons should have longer duration periods to allow them to not expire so quickly and allow participants more time to redeem their coupons. GE reported sending out 1.5 million postcards to Duke Energy's customers to let them know that they could still redeem their coupons after the expiration date to compensate for lack of stock. To be fair to Duke Energy, it should be noted that the program had advised retailers to stock more bulbs than they would have normally needed. However, few of the retailers took this action.

7. CFL coupons were far and away the primary driver for participants to purchase CFLs, and more than 40 % of coupon redeemers indicated that they would have purchased zero CFLs if the Duke Energy coupon had not been available.

8. While CFL coupons are driving spillover to more CFL purchases, the coupons are having only a small effect on simultaneous purchases of other energy efficiency technologies such as insulation and weather stripping.

9. Of the CFLs redeemed with coupons, 90% in North Carolina and 84% in South Carolina were reported to be installed and operating in sockets at the time of the survey.

10. Prior use of CFLs had no bearing on CFL program satisfaction ratings of CFL redeemers or self-reported likelihood of redeemers purchasing CFLs in the future, however those redeemers who experienced any bulb failure or removed at least one CFL because of light quality had a lower overall satisfaction rating with CFLs.

11. Prior use did have an effect on forward-looking confidence in CFLs with more new adopters than previous adopters finding they were much more confident in CFLs after participating in the program.

12. CFL forward-looking buying and installation habits are similar for new and previous adopters

Energy Savings Summary

Gross Energy Savings Calculations

Past evaluations have indicated that self-reported hours of use tend to over-estimate estimated savings by over-estimating typical hours of use. As a result, in order to reliably estimate energy impacts, it was necessary to use the results of the logger study that recorded the actual hours of use. This allowed the impact estimate to be based on the measured hours of use, times the difference in wattage between the lamp replaced and the lamp installed, as reported by the participants. From this calculation there is a gross yearly energy savings of 46.9 kWh per lamp in North Carolina and 40.3 kWh per lamp in South Carolina.

Free Riders and Free Drivers

From the survey results, it was determined that 19% of CFL purchases made were due to free riders[4], while 32% of purchases made were due to free drivers[5] for a net-to-gross adjustment factor of 107% excluding additional market effects caused by the program beyond the participant purchases[6].

Total Program Net Energy Savings Calculations

Program impacts are presented in the Impact Evaluation Summary Table below.

Table 8. Impact Evaluation Summary Table

Metric	North Carolina	South Carolina
Total lamps redeemed	1,619,990	490,670
ISR	0.9053	0.9102
Gross kWh per lamp redeemed	42.4265	36.6900
Gross kW per lamp redeemed	0.0445513	0.0378810
Coincidence Factor	0.123	0.123
Gross Coincident kW per lamp redeemed	0.0055	0.0047
Total Gross Program MWh Savings	68,731	18,003
Total Gross Program kW Savings	72,173	18,587
Total Gross Program Coincident kW Savings	8,877	2,286
Free rider adjustment	0.81	0.81
Spillover adjustment	1.32	1.32
Net to gross ratio including spillover	1.07	1.07
Total Net Program MWh Savings (free riders only)	55,672	14,582
Total Net Program kW Savings (free riders only)	58,460	15,056
Total Net Program Coincident kW Savings (free riders only)	7,191	1,852
Net kWh per lamp redeemed (free riders only) (A)	34.37	29.72

[4] Free rider: someone who would have taken the same action without the program's influence.
[5] Free driver: someone who takes additional actions as a result of the influence of the program.
[6] As retailers focus on stocking and displaying more CFL products as a result of the program's marketing push, additional sales are generated by non-participating shoppers. This study excludes the savings acquired by non-participating customers as a result of the way in which the program influenced total CFL sales.

Net kW per lamp redeemed (free riders only)	0.0361	0.0307
Net Coincident kW per lamp redeemed (free riders only)	0.0044	0.0038
Total Net Program MWh Savings (free riders plus spillover)	73,542	19,263
Total Net Program kW Savings (free riders plus spillover)	77,225	19,888
Total Net Program Coincident kW Savings (free riders plus spillover)	9,499	2,446
Net kWh per lamp redeemed (free riders plus spillover) (B)	45.40	39.26
Net kW per lamp redeemed (free riders plus spillover)	0.0477	0.0405
Net Coincident kW per lamp redeemed (free riders plus spillover)	0.0059	0.0050
Measure life	5	5
Lifetime net MWh savings (free riders only)	278,359	72,911
Lifetime net MWh savings (free riders plus spillover)	367,708	96,314

(A): Net kWh per lamp redeemed, for the free riders only, is calculated using the total net program MWh savings (free riders only) divided by the total lamps redeemed.
(B): Net kWh per lamp redeemed, including both free riders and spillover, is calculated using the total net program MWh savings (free riders plus spillover) divided by the total lamps redeemed.

* While the advertised expected life of the installed CFLs is greater (10 years), recent research in California has indicated that CFL bulbs installed in typical rooms have switching behaviors that erode about half the advertized effective useful life. The adjustment approach for reducing the effective useful life to 5 years is presented in Appendix E: Effective Useful Life Adjustment Factor for Installed CFLs.

Recommendations

TecMarket Works and Building Metrics offer the following recommendations for the Smart $aver® CFL Program.

1. Consider conducting light logger studies at different times of the year to observe the daylength effect. Doing the logging studies over the equinox removes the daylength effect from the logger data. However, if Duke Energy would like to study the magnitude of the daylength effect, the evaluation team will need to design an experiment that would require logging at different times of the year. Doing so will involve much larger samples and a longer timeframe than what was needed for this or previous studies, so this should be considered carefully given the budget and timeline expansions needed if Duke Energy would like to explore this effect in future evaluations.

2. Link light logger installations unambiguously to self-reported hours of use data.

3. Continue use of targeted marketing efforts to identify customers most likely to purchase CFLs during the specific promotion or campaign. 2008 targeted messaging analysis shows that targeting messages to customers based on likelihood of adoption is successful in providing lift to populations that were not as likely to purchase CFLs. (Note: during the drafting of this report Duke Energy has continued testing motivational message content and redemption rates and reports that they have narrowed the messaging to energy and environmental appeals that experience the higher adoption and redemption

rates and have moved to the use of free product coupons that together are substantially increasing redemption rates for CFLs.)

4. Savings for typical CFL bulbs may decrease over the long term as more customers adopt CFLs and continue to install bulbs in lower use sockets and fixtures. Recognizing the need to cost-effectively distribute CFLs, Duke Energy designed a tracking system to mitigate over-distribution of traditional CFLs. Consider transitioning the CFL program to incorporate other types of CFL offers, such as specialty bulbs (candelabras, torchieres, outdoor, etc.), LEDs, and other emerging technologies as they become cost effective. (Evaluation Review Follow-Up Note: Duke Energy reports that they are currently examining the inclusion of specialty bulbs to understand their potential with both past CFL redeemers and previous purchasers of CFLs as well as approaches for reaching new customers with specialty bulb appeals and offers. In addition, TecMarket Works is currently assessing the market for CFLs and will address the potential for specialty bulbs in the CFL potentials report to be delivered in April 2011. Duke Energy also reports that CFL adoption has increased due to offering web and phone-based ordering platforms where CFLs can be shipped directly to the customer's home as soon as they are ordered. Duke Energy customers can check eligibility and request CFLs by accessing a unique URL or OLS (Online Services) or by calling a toll-free number.

5. Consider incorporating a market effects study to identify ways to transition the program moving forward as traditional incandescents are phased out in the coming years, as shown in Table 9 below.

Table 9. EISA Schedule for General Service Incandescent[7]

Current Wattage	Rated Lumen Ranges	Maximum Rated Wattage	Minimum Rated Lifetime	Effective Date (Manufactured on or after)
100	1490-2600	72	1,000 hours	1/1/2012
75	1050-1489	53	1,000 hours	1/1/2013
60	750-1049	43	1,000 hours	1/1/2014
40	310-749	29	1,000 hours	1/1/2014

6. Consider coupling CFL efforts with other energy saving measures and/or programs. Customers did not buy many other energy efficiency items in addition to the CFLs when making their CFL purchases. Program managers could leverage both redeemer and non redeemers' awareness of ENERGY STAR to incorporate other energy saving items and/or encourage customers take other energy saving actions at the same time they are purchasing CFLs. Coupon redeemers purchased other energy saving measures (caulking, weather stripping, low-flow showerhead) in small quantities and might be interested in other simple energy saving measures if they were co-marketed with a CFL offer. Both redeemers and non redeemers may be interested in such measures as ENERGY STAR appliances, or other Duke Energy programs offering energy efficient measures such as

[7] Source: http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/lighting_legislation_fact_sheet_03_13_08.pdf

HVAC or home audits. (Evaluation Review Follow-Up Note: Duke Energy reports that they have already started coordinating program services to include multi-product appeals and exposure in their small business programs, the Home Energy House Call program, neighborhood canvassing, and are considering other programs that can act as aggregation efforts to expose customers to multiple measures.)

7. Non coupon redeemers are generally not influenced by receiving Duke Energy coupons to purchase CFLs elsewhere, however, the price of CFLs is a factor for these customers. Consider additional marketing strategies for these customers that incorporate the Duke Energy reduced price of CFLs, recommendations of friends and family, and other types of advertising appeals. These customers were more influenced by in-store advertising than the coupon redeemers, so other types of offers for CFL savings, such as point of purchase offers, may appeal to these customers. (Evaluation Review Follow-Up Note: Duke Energy reports that they have started these efforts with property management programs, business reply cards and web campaigns.)

2009 Low Income Process (Exhibit G)

This evaluation report was finalized on September 22, 2010, but inadvertently omitted from the Annual Summary of M&V Activities dated March 15, 2011. The full report is filed as "**Exhibit G - Carolinas - Low Income CFLs - Final Process Evaluation Report - September 20 2010**".

Summary of Findings

This Executive Summary provides an overview of the key findings identified through this evaluation.

Significant Process Evaluation Findings

- Duke Energy is not meeting its participation goals for the Low Income CFL Program. Duke Energy would like to increase participation and the subsequent Save-A-Watt (SAW) impacts through the Low Income CFL Program or other Low Income Programs. However, operational pressures, limited staff, low operating budgets, increased service demand from low income service agencies, and ARRA fund compliance will continue to limit participation achieved through the agencies.

- Agencies serving low income clients in North and South Carolina have varying levels of capacity available. Some agencies do not have the time and/or staff resources to take the time to go through the Portal's survey with their clients, and could not identify a way for Duke Energy to help them with this problem outside of Duke Energy staff being present in the waiting rooms to offer the survey. Other agencies could likely increase the number of Energy Efficiency Surveys completed if they were provided with printed client motivation materials, such as posters to put up in the agency and printed surveys that can be mailed in by the client.

- While several agencies do not have the time to use the Portal, all of the visited agencies were very satisfied with availability and operations of the Portal, and the web-based method for submitting the Energy Efficiency Survey results. None of the visiting agencies had serious issues with the Portal.

- Many of the agency staff providing the low income services are not seeing or not reading the Duke Energy e-mail "encouragement" marketing efforts aimed at promoting the use of the Portal and the distribution of the CFLs via the survey approach.

Recommendations

The following recommendations are based on interviews with staff in low income agency offices and with the program manager at Duke Energy.

- **Issue 1:** Duke Energy is currently offering only one of the three planned low income programs in North and South Carolina, the CFL Program. The Weatherization and Refrigerator Replacement Programs have not been launched.

Duke Energy has not launched these two low income programs because there are large pools of unspent federal funds for weatherization services currently available from the American Recovery and Reinvestment Act. Service agencies are under pressure to spend these funds over the next two years and spending goals are behind federal objectives for rapid deployment of federal weatherization services. Duke Energy does not want to compete against the federal government for limited implementation services or complicate the operations of the low income and/or weatherization agencies with dual funding streams, dual approved measure lists, dual reporting requirements and different weatherization program goals.

Recommendation 1: Instead of delaying the launch of these programs indefinitely, Duke Energy should contact the low income agencies and investigate ways that Duke Energy can provide their low income customers with measures and services to reduce their energy consumption without causing the low income agencies unnecessary operational difficulties. For example, Duke Energy can fund measures that are cost effective, while federal funds can be spent on longer lasting, less cost effective measures. However, finding weatherization service providers who are receptive to this dual funding, dual measure assessment approach may be difficult until the agencies can catch up with their federal spending objectives and energy goals. As ARRA funds available to the service providers near exhaustion, Duke Energy will find that these agencies will need to find additional funding streams or terminate hired staff. Over the next 12-16 months Duke Energy will find local service agencies becoming more interested in providing services funded by Duke Energy. However, at this time agencies are focused on spending the ARRA dollars and finding enough staff and clients to meet their spending goals. Agencies not affiliated with ARRA (weatherization, state energy programs, and block grant initiatives) and the traditional federal weatherization initiatives remain prime targets for negotiating service agreements for their clients to the extent that these clients are not serviced by other weatherization providers.

- **Issue 2**: The $1 to cover the increased costs and time needed to complete the survey is, in most cases, not enough to cover costs.

  Recommendation 2: An increase in submitted surveys would require either higher payments to be made by Duke Energy or an alternative incentive structure, combined with marketing material support for the agencies. In addition, many agencies that do provide the surveys are not aware of ever receiving a Duke Energy incentive check for their efforts since the checks are sent to a different office in their organization. Thus, the people conducting the surveys with their clients are often not aware that their agency benefits from that effort. To most agencies, the only known incentive offered for participation in the Low Income CFL program is the free 12-pack of CFLs mailed to the low income client. Duke Energy should examine the incentive and marketing support operations to determine if there is enough cost-effectiveness in the initiative to provide marketing support and agency compensation to cover costs and help reach survey completion objectives.

- **Issue 3**: Not all of the low income service agencies are interested in offering the survey.

  Recommendation 3: Each of the offices that have access to the Portal should be asked if they would like to offer the surveys to their clients in exchange for an incentive from Duke Energy. Market the financial support to customers and agencies by sending a Duke Energy speaker to events geared to low income service providers that includes talking point slides to managers at agency offices so that support comes from both top down and bottom up.

  If the low income agency is interested in participating and providing the surveys to its clients:

  - Encourage participating offices to make the Energy Efficiency Survey a part of their client intake process.
  - Posters marketing the survey and free CFLs (and their energy and bill savings benefits) for their waiting areas should be considered by Duke Energy.
  - Paper copies of the surveys should be provided by Duke Energy for the case workers and for the clients to take home in case they do not have or do not know their account number. Postage paid envelopes were suggested, but other offices have said that they are not necessary as most clients are willing to pay for postage to get the free CFLs, or will bring the survey back to the office during their next visit.
  - Encourage the low income agency offices to distribute paper copies of the survey throughout all offices that serve low income clients.

  If the office is not interested in providing the Energy Efficiency Survey to their clients, there is no need to send paper copies of the survey or promotional materials. If an office does not want to offer the Energy Efficiency Survey, it is likely because they do not have the time and staff resources to administer the survey or they have a low percentage of clients that live within Duke Energy's service territory. Therefore, survey and promotional materials will likely be discarded and may negatively affect the relationship between that office and Duke Energy.

- **Issue 4**: Agency staff are not always reading the emails from Duke Energy, so they may not be aware of program changes, issues, etc.

  Recommendation 4: Continue other approaches in addition to e-mail marketing to the service providers. Continue direct marketing of the program to service agencies via personal visits and "sales calls" and move away from relying on the use of e-mail promotional efforts as the primary "encouragement" approach or specifically target those efforts at the staff that provide the interaction-based service with the client. Consider hard-copy mailings or "encouragement" pieces, direct telephone calls with provider agency staff, personal visits with provider agencies, and alternative incentive mechanisms that cover the cost of providing the service. Consider the use of spiffs or bonus rewards to staff who submit a targeted number of surveys.

- **Issue 5**: The Energy Efficiency Survey is collecting demographic and home profile data that should be incorporated into analyses, such as insights into Low Income customers, cross selling, target market modeling, and marketing message testing being performed by Duke Energy. However, this data is not being analyzed at this time.

  Recommendation 5: The data collected through the Energy Efficiency Survey should be incorporated into analyses being performed by Duke Energy to identify the best products and services for Duke Energy's low income customers and to identify homes that have the highest energy savings potential. Data should be integrated in the same database systems (accessed via SQL Server) as home profile data being collected through other Duke Energy programs such as Personalized Energy Report, Online Audit, and Home Energy Comparison Report Pilot.

- **Issue 6:** Duke Energy has recently rolled out a new IVR (Interactive Voice Response) and web-based CFL program that does not include a survey but allows the customer to click a button for a free CFL. This presents a possibility for program overlap as low income customers may obtain the free CFL without completing the Energy Efficiency Survey, or in addition to completing the Energy Efficiency Survey and obtaining the 12 free CFLs. Another potential point of overlap is in the targeted reach of the Home Energy Comparison Reports (HECR), where approximately 10% of HECR customers meet the poverty level requirement.

  Recommendation 6: Duke Energy should monitor for program overlap between these programs. TecMarket Works does not expect there to be significant overlap between the Low Income and IVR programs unless there's a process in place that sends the low income customer to the IVR web program for the free CFL. Significant levels of overlap are not expected because low income customers are less likely to explore non-low-income services on their energy provider's website. However, it's possible that these multiple points of potential contact through these multiple programs could provide additional synergy and savings beyond what the programs deliver independently. Duke Energy should track this possible effect and consider how to best attribute programmatic savings.

2009 Residential Smart $aver Process (Exhibit H)

This evaluation report was finalized on October 3, 2011 and revised on November 21, 2011. The full report is filed as "**Exhibit H - Carolinas - Residential Smart $aver - Final Process Evaluation Report - revised Nov 21 2011**".

Significant Process Evaluation Findings

- The overall participant satisfaction with the program is high at 8.9 on a one-to-ten scale.
- Surveyed program participants cited general advertising and increased incentive as the two most effective ways to increase participation in the Residential Smart $aver® program.
- The majority (64%) of surveyed participants indicated that they were replacing equipment that had failed or was very near the end of its effective useful life.
- The trade allies would like to have the residential program application process available using a Web browser. This would make the program operate more smoothly for both Duke Energy staff and the Residential Smart $aver® partnering trade allies and would speed accessibility to the participation process and eliminate problems with obtaining or printing hard-copy application forms and transmitting them via fax or scanned email.
- The trade allies would like an increase in collaborative marketing between Duke Energy and the trade allies to raise awareness of the program. To achieve this they suggested that Duke Energy provide more literature on the program directly to their customers, to the trade allies, and to provide co-branded (between Duke Energy and the specific trade ally) literature to customers using contact lists supplied by individual trade allies.
- All trade allies considered the Residential Smart $aver® program an essential sales tool for energy efficient equipment.

Recommendations

- **Early retirement marketing and incentives**: Consider providing incentives for early retirement of equipment that are below existing federal levels. This would enable Duke Energy to continue to improve the penetration of high efficiency HVAC equipment while the HVAC technology advances further beyond existing federal standards. The costs of documenting and verifying early retirement measures are higher than just documenting purchases of higher efficiency equipment. However, because existing federal standards have recently increased, the program management acknowledges that the current Residential Smart $aver® incentives may not be enough to overcome the costs of obtaining higher-than-federal standard efficiencies.
- **Program Management Response:** Residential Smart Saver Program Management believes that the ability to offer an equipment financing option is vital to an early replacement program. Program Management will continue to evaluate the early

retirement market as well as an equipment financing option in an effort to provide incentives to customers who choose to retire their HVAC systems before the end of its useful life. Program Management will also evaluate the value of early retirement as evidenced within the evaluation report (Approx. 31% of units had remaining useful life - 3.9 years on average) and will determine if further incentives would be cost effective.

- **Increased budget allocations**: Consider requesting higher levels of energy efficiency spending from the Commission to help meet program demand, thereby increasing energy savings without harming other programs in the portfolio.

- **Program Management Response:** Program Management is currently evaluating the addition of related measures to the Smart $aver Program. Upon identifying additional measures Program Management will present the desired measures to the Commission. At that time, Program Management will also revise Smart Saver participation and costs estimates and request an appropriate amount of dollars required to manage the program adequately and without harming other programs within the portfolio.

- **Test new technologies:** Consider test piloting the addition of the WECC recommended technologies starting with incentive levels that provide cost effective energy savings from those technologies. These include package heat pump units and mini-split ductless HVAC systems.

- **Program Management Response:** Duke Energy continues to evaluate the ductless AC systems and notes that they are an energy efficient product. The Smart Saver program currently incentives only 'whole-house' systems which generally excludes this technology. Additionally, Duke Energy will continue to evaluate all types of electric water heaters for incorporation into the Smart Saver Program.

2011 Power Manager Process (Exhibit I)

This evaluation report was finalized on November 14, 2011. The full report is filed as "**Exhibit I - Carolinas - Power Manager - Final Process Evaluation Report - Nov 14 2011**".

Summary of Findings

Customer Satisfaction

- Satisfaction with the Power Manager® program is high with over half of the survey respondents in both states rating their satisfaction at 9 or 10 on a 10-point scale for all program aspects including overall program satisfaction, as well as satisfaction with program enrollment, and program information.

Motivating Factors

- Three-quarters of the full participant survey respondents (n=49 in North Carolina and N=59 in South Carolina) were able to recall at least one benefit promoted by the program. In addition, the surveyed participants that recalled program benefits were able to provide 147 benefits (1.4 each) they recalled being promoted by the program. Of the 147 benefits recalled by these participants, 65% of them mentioned financial benefits either by recalling the bill credits or financial incentives for participating in the Power Manager® program.

- Most participants rate environmental issues as important or very important to their participation. About 6 percent of respondents in North Carolina and 8 percent of respondents in South Carolina are members of an organization with an environmental mission.

- Many (50% in North Carolina and 59% in South Carolina) of the participants do not recall whether control events occurred since they joined the program. Ninety-three percent of participants across both states did not notice the bill credits on their bill.

- Financial benefit is the most commonly recalled benefit (65% in both states) of the program as well as the most cited reason (58.6% in North Carolina and 66.1% in South Carolina) for participation.

Survey Findings

- The majority of participants (55% in both states) that are at home during a Power Manager activation event, experienced no change in comfort during the event.

- Ten percent of participants, who indicated that they were at home during an event, stated that they had noticed no Power Manager activation had occurred in the past seven days. Forty percent of event participants indicated they had noticed an activation, and 50 percent were unsure of whether an activation had occurred or not.

- Thirty percent of participants across both states contacted after a hot day without a Power Manager event stated that they thought an activation event had occurred in the past seven days even though no event had actually occurred. Twenty percent of these "non-event" participants were correct in thinking that no Power Manager activation had occurred, and 50 percent were unsure of whether an activation had occurred or not.

- The age of air conditioner appears to be the most influential driver of perceived comfort change during a Power Manager activation.

- Two participants (5.7%) in South Carolina who experienced a change in comfort during a Power Manager control event reported using auxiliary or room air conditioners to compensate for the reduced cooling capacity of the central air conditioner during an event. Additionally, 31% reported using a fan during the control events to help maintain comfort levels, while 37% of the respondents report using a fan during non-event hot days during typical control time frames.

- Customers are comfortable in their home with their air conditioners on, and do not experience any significant change in comfort regardless of if there is a control event or not, or the degree of external temperature. There is no evidence of any correlation between high temperature (or heat index) and changes in comfort on days with Power Manager events.

Recommendations

- Consider using Home Energy House Call and Residential Smart $aver® as a lead generation tools for new Power Manager enrollees so that participants in these programs have the opportunity to learn about and request participation in Power Manager. During these efforts, HEHC audits can examine the AC unit and determine if it is a good candidate for Power Manager before informing customers. Likewise, Residential Smart $aver can serve as a lead tool by forwarding rebate information for new AC units to Power Manager marketing managers. These managers can then have contact information identifying customers who are predisposed to want to take energy efficiency actions in their home.

- If Duke Energy is interested in determining whether a new customer has the capacity to reduce by 1.3 kW, Duke Energy should consider having the installation technician gather additional information about the customer's AC units at the time of the switch installation and set participation conditions based on their housing observations. For homes with "smart-meters", Duke Energy could establish assessment algorithms that test the load swings during hot periods and establish a 1.3kW participation threshold.

2010-2011 Energy Solutions @ Home Report Process (Exhibit J)

This evaluation report was finalized on July 26, 2011. The full report is filed as "**Exhibit J - SC - Energy Solutions @ Home - Final Process Evaluation Report - July 26 2011**".

Summary of Findings

The key findings of this evaluation are presented below.

1. The most-cited reason for non-participation in the ES@H program was the feeling that the customer already does enough in their home to save energy and participation in a program is not needed.

2. Participants at all levels of the program are following through and installing measures recommended in the phone and in-home audit. This suggests the program is influential, causing measures to be taken at all levels of participant involvement.

3. The primary motivating factor that drove participation decisions for the ES@H was the drive to reduce energy costs.

4. The primary barriers to participation in the in-home audit were a reluctance to pay the initial $50 fee as well as a perception held by the phone audit participants that the phone audit had given them enough to do without an in-home audit. Forty percent of phone audit participants felt the phone audit was influential in their decision to NOT schedule an in-home audit.

5. Satisfaction with the program is high at all participation levels. Satisfaction with Duke Energy is high for all survey respondents, participants and non-participants.

6. The freeridership rate for the in-home audit and subsequent installations is estimated to be below 20 percent.

7. Due to low program participation, gas heat customers were subsequently allowed to participate in the ES@H program. This may have negatively affected the program's cost-effectiveness.

8. The program is not as successful as anticipated at having participants move through the participation process. Fewer than one dozen out of 113 participants (less than 10%) have progressed through all the stages of the ES@H pilot, ending with the installation of one or more of the recommended measures.

Summary of Recommendations

1. Duke Energy should evaluate the cost effectiveness of the program by factoring out the costs of serving gas heat customers. This would allow Duke Energy to make a more

realistic estimate of what a full-scale program would cost, relative to electric savings and gas savings independently and together.

2. Future marketing approaches, when possible, should target customers already interested in improving their homes' efficiency. Additionally, marketing approaches that counter the perception that the customer has already done enough to save energy should be considered.

3. Continue to use sub-goals at each stage of customer participation to separately gauge the success of each component. This allows Duke Energy to develop a more granular understanding of which components should be used in the design of future programs.

4. Duke Energy should consider the costs versus benefits of using community-based marketing (linking up with community groups to distribute and share materials) to advertise future implementations of the ES@H delivery mechanism.

2010 Non-Residential Smart $aver Prescriptive Report Process and Impact (Exhibit K)

This evaluation report was finalized on February 26, 2011 and filed in E7 Sub 979 of March 2011, then revised on June 16, 2011. The full revised report is filed as "**Exhibit K - Carolinas - Non Res Smart $aver Prescriptive - Final Process and Impact Evaluation Report - revised June 16 2011**".

Significant Process Evaluation Findings

- The trade allies and commercial customers would like to have the prescriptive program application process available online. This would make the program operate more smoothly for both Duke Energy staff and the Smart $aver® partnering trade allies and would speed accessibility to the participation process and eliminate problems with obtaining hard-copy application forms and transmitting them via fax.

- The trade allies would like an increase in collaborative marketing between Duke Energy and the trade allies to raise awareness of the program. To achieve this they suggested that Duke Energy provide more literature on the program to the trade allies and to a list of targeted contacts supplied by trade allies. Several trade allies also would like to see Duke Energy initiate a preferred vendor program for the Non-Residential Smart $aver® Program.

Significant Impact Evaluation Findings

- Even though these algorithms are not the source of record for program impact calculations, the measure savings algorithms in the third-party program tracking database contain errors. Program accomplishments should be tracked using measure counts from the program tracking database and unit energy savings from program design calculations contained within DSMore until the errors can be corrected. Duke Energy was aware of this problem, and steps will be taken to correct this issue.

- Customer self-reported fixture watts for new and replaced fixtures are inconsistently reported and proving to be unreliable. We suggest removing this information from the applications to reduce customer burden.

- Energy and demand savings realization rates for kWh and kW for high bay lighting were very close to 1.0, indicating the program planning estimates provide a good indication of average high bay lighting participant savings.

A summary of the impact findings is presented in the standardized Duke Energy Program Impact Metrics Tables below. Table ES-3 presents total fixtures across both states as well as weighted averages for the “per fixture” savings metrics. North and South Carolina are weighted at 65% and 35% respectively. This distribution reflects the quantity of fixtures in each state as compared to the total from both.

Table ES-1 Program Impact Metrics Summary for North Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	23,600 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.098
High Bay 3L T-5 High Output	0.148
High Bay 4L T-5 High Output	0.307
High Bay 6L T-5 High Output	0.147
High Bay 8L T-5 High Output	0.498
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.197
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.318
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.214
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	578
High Bay 3L T-5 High Output	867
High Bay 4L T-5 High Output	1,799
High Bay 6L T-5 High Output	859
High Bay 8L T-5 High Output	2,924
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1,157
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,863
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1,253
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.069
High Bay 3L T-5 High Output	0.104
High Bay 4L T-5 High Output	0.215
High Bay 6L T-5 High Output	0.103
High Bay 8L T-5 High Output	0.349
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.138
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.223
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.150
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	405
High Bay 3L T-5 High Output	607
High Bay 4L T-5 High Output	1,259
High Bay 6L T-5 High Output	601
High Bay 8L T-5 High Output	2,047
High Bay Fluorescent 4 Lamp (F32 Watt T8)	810
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,304
High Bay Fluorescent 8 Lamp (F32 Watt T8)	877
Net therms per fixture	N/A
Measure Life	10

Table ES-2 Program Impact Metrics Summary for South Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	12,615 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.088

Metric	Result
High Bay 3L T-5 High Output	0.132
High Bay 4L T-5 High Output	0.274
High Bay 6L T-5 High Output	0.131
High Bay 8L T-5 High Output	0.446
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.176
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.284
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.191
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	530
High Bay 3L T-5 High Output	795
High Bay 4L T-5 High Output	1,650
High Bay 6L T-5 High Output	788
High Bay 8L T-5 High Output	2,681
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1,060
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,709
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1,149
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.062
High Bay 3L T-5 High Output	0.092
High Bay 4L T-5 High Output	0.192
High Bay 6L T-5 High Output	0.092
High Bay 8L T-5 High Output	0.312
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.123
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.199
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.134
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	371
High Bay 3L T-5 High Output	557
High Bay 4L T-5 High Output	1,155
High Bay 6L T-5 High Output	552
High Bay 8L T-5 High Output	1,877
High Bay Fluorescent 4 Lamp (F32 Watt T8)	742
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,196
High Bay Fluorescent 8 Lamp (F32 Watt T8)	804
Net therms per fixture	N/A
Measure Life	10

Table ES-3 Program Impact Metrics Summary for North and South Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	36,215 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.095
High Bay 3L T-5 High Output	0.143
High Bay 4L T-5 High Output	0.296
High Bay 6L T-5 High Output	0.141
High Bay 8L T-5 High Output	0.481

Metric	Result
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.190
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.306
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.206
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	561
High Bay 3L T-5 High Output	843
High Bay 4L T-5 High Output	1748
High Bay 6L T-5 High Output	835
High Bay 8L T-5 High Output	2842
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1124
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1811
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1218
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.067
High Bay 3L T-5 High Output	0.100
High Bay 4L T-5 High Output	0.207
High Bay 6L T-5 High Output	0.099
High Bay 8L T-5 High Output	0.337
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.133
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.214
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.144
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	393
High Bay 3L T-5 High Output	590
High Bay 4L T-5 High Output	1,224
High Bay 6L T-5 High Output	585
High Bay 8L T-5 High Output	1,989
High Bay Fluorescent 4 Lamp (F32 Watt T8)	787
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,268
High Bay Fluorescent 8 Lamp (F32 Watt T8)	853
Net therms per fixture	N/A
Measure Life	10

Recommendations

1. Evaluate the usefulness of a possible training webinar. Consider recording a webinar for future web access. A webinar may prove to be a benefit only if it is offered live, with a live question and answer period.

2. Explore the effectiveness of email and electronic campaigns and survey trade allies to determine the frequency with which they prefer to be contacted. Reports from the field suggest that trade allies may prefer the less-expensive email campaigns over mailed materials. This may allow the Non Res Smart $aver® to have a broader reach at a lower cost.

3. Duke Energy should consider the feasibility of providing more case studies on customers who have implemented energy efficiency projects using high-priority high-impact measures in program materials provided to trade allies for them to share with their customers. Duke Energy may wish to include case studies on customers from several market segments. If built correctly, such case studies would increase the understanding of the Smart $aver® program by customers in different market segments because they would have examples to which they can relate, lowering the perceived risk and uncertainty for new participants.

4. Duke Energy should explore the feasibility of developing a coordinated marketing campaign for one market segment, implementing it as a pilot, and evaluating its effectiveness. A small pilot would allow Duke Energy to assess whether targeting marketing to one segment would be a more effective approach for future program efforts.

5. Duke Energy and WECC should jointly share and discuss their technology selection processes. This would allow both parties to better provide feedback in order to make accurate estimates of market activity. This would also allow both Duke Energy and WECC to explain, if the trade allies ask, why certain technologies are not included.

6. WECC should provide timely feedback to Duke Energy about whether they believe the projected market activity levels provided by Duke Energy are realistic, based upon WECC's experience in the field. This would allow Duke Energy to use WECC's direct experience in the field to relay any upcoming customer purchasing trends.

7. If poor economic conditions are expected to impact customers' ability to take on retrofit projects, and if there is enough spread among the energy efficiency levels of equipment available to make offering multiple levels of efficiency a viable option, Duke Energy should assess whether it is feasible to test a tiered prescriptive program that would allow customers to still install energy efficient technologies when the highest efficiency models are priced out of their current means. However, Duke Energy should not trade off higher levels of free ridership in exchange for increased participation in a program that achieves lower levels of energy savings. It is possible that cost per achieved net kWh would be increased under such an offer depending on how the market would respond.

8. Explore whether it is feasible to create marketing and outreach campaigns that focus on lifecycle costs. This may allow customers to look beyond consideration about a measure's capital cost and its incentive, and understand the energy savings that would be delivered over the measure's effective useful life.

9. Make the template for itemizing invoices available online. This guidance would allow trade allies and customers to send in more accurate applications that would be rejected less frequently and could be processed more quickly and cost effectively, without WECC needing to contact applicants for missing information.

10. Duke Energy should consider conducting usability studies and satisfaction surveys of the online application process. This may allow Duke Energy to quantify any reduction in application speed and any increase in customer satisfaction with the application process.

11. Duke Energy should consider the feasibility of designing, implementing, and evaluating a pilot program to help <500 kW customers to prioritize energy efficient projects. This may allow more Duke Energy customers to achieve greater savings by providing them with a more complete picture of their energy efficiency options.

12. Duke Energy should consider the potential benefits of increased market segment penetration if marketing were structured to specifically focus on barriers for a particular key market segment. Duke Energy may want to do this by identifying one high priority market and conducting a characterization study about that market. Duke Energy might then identify that market's specific barriers to participation and develop a logic model that specifies a strategic approach toward overcoming those barriers. Duke Energy can then evaluate the effectiveness of the approach at the end of the program cycle. This would allow Duke Energy to see if they would be able to successfully drive greater activity in a particular segment if there arose a need for doing so in the future.

2010 Non-Residential Energy Assessments Report Process and Impact (Exhibit L)

This evaluation report was finalized on October 24, 2011. The full report is filed as "**Exhibit L - Carolinas - Non-Res Energy Assessment - Final Process and Impact Evaluation Report - Oct 24 2011**".

Program Operations: Recommendations

1. RECOMMENDATION: The Non-Residential Energy Assessments Program (EAP) should work with the Account Managers to develop clear criteria for identifying prospective participants for the Smart $aver® program based upon segmentation of past Smart $aver® participants. An analysis of what projects and measures were of interest to past Smart $aver® participants in each industry sector would allow Account Managers to make suggestions of similar projects to prospective participants in the same sector. This would allow the budget for the EAP to be directed to those customers who are more likely to take action.
2. RECOMMENDATION: Track the conversion rate (i.e. percentage of EAP participants who adopt EAP recommendations through subsequent Smart $aver® projects) and identify those Account Managers who are more successful at actively converting EAP participants into Smart Saver® participants. These Account Managers may have developed successful strategies that could be shared with other Account Managers to help them increase Duke Energy's overall conversion rates from EAP to Smart $aver®.
3. RECOMMENDATION: The results from the survey of participants indicates that customers are looking for a more comprehensive, more investigative assessment that focuses on new items that they are not already considering. The next evaluation of this program should include a more focused effort on understanding what participants expect to see from the service and the quality of the services expected. That assessment should also focus on understanding the customer's needs associated with short term versus long term recommendations and in terms of electric-only versus more comprehensive sustainability recommendations. While the primary objective is to help customers identify projects that can be implemented under the Smart $aver® program, the overall credibility of energy efficiency-related recommendations may be enhanced by including recommendations that present a more comprehensive approach to reducing operating costs. Depending upon the survey results, Duke Energy may also elect to design additional assessment offerings, such as a "zero net energy assessment" or other high savings assessments (not just those recommendations that are cost effective for Duke Energy) for those customers who are motivated to achieve deep energy savings. This would help maintain Duke Energy's standing as the customers' primary partner in meeting all their energy needs, including any need to explore sustainable energy options for their company.
4. RECOMMENDATION: Tailor the report to provide recommendations that are targeted to the specific needs of different commercial market segments. This will allow Duke Energy to show customers that their needs are understood, and that the assessment report's recommendations are customized especially for them. Duke Energy can begin to

develop these targeted recommendations by first asking Account Managers to identify a few key market sectors that they believe have the greatest untapped potential for energy savings. Duke Energy can survey the Smart $aver® participants and non-participants within those sectors to determine their needs, wants, barriers to participation, and how well the Smart $aver® program addresses those. If Duke Energy has not already done so, we recommend that Duke Energy also conduct market characterization studies for those sectors to see what the mid- to long-term energy-use related trends are for that market, and also to aid in their conversations with the customers about the projects with longer paybacks. Information from the surveys and any market characterization studies can also be used to build case studies that will help other customers understand the process and benefits of participating in Smart $aver®.

5. RECOMMENDATION: The next evaluation should also look deeper into the value associated with providing recommendations for low-cost and no-cost savings in addition to the Energy Assessment recommendations for projects. Likewise, the evaluation should conduct some contingency analyses of a broader set of recommendations-adoption data to determine whether adopting low-cost and no-cost recommendations affect the adoption of Smart $aver®-eligible measures. In a parallel study, the assessment should investigate whether there are any corollary benefits to including low-cost and no-cost recommendations. For example, excluding low-cost and no-cost recommendations may inadvertently emphasize the greater expense of the Smart $aver®-eligible measures, and thus increase the perceived first-cost barriers to becoming more energy efficient.
6. RECOMMENDATION: EAP should use the program's follow up activities to obtain immediate feedback on the usefulness of the assessment reports. This may allow a better leveraging of resources. Additionally, if Account Managers are conducting the follow up feedback, the program's Smart $aver® objectives and services can be kept at the forefront of customer interactions.
7. RECOMMENDATION: Develop the program website so that it is easy to find on the web, has a clear presentation of the services offered and the service approach, and an easy to use web-based enrollment process.
8. RECOMMENDATION: Design the assessment to formally provide low-cost and no-cost recommendations to customers and incorporate estimates of the impact of these actions, when implemented into the tally of energy saved credited to Duke Energy (and other utilities) as a result of the program. The low-cost and no-cost savings may not be eligible for cost recovery, but it is important to document the full value of the EAP, whether officially credited or not. This will allow Duke Energy to make decisions with a more comprehensive knowledge of how each energy efficiency program interacts with the other programs in Duke Energy's energy efficiency portfolio.

Implementation Rates: Key Findings

1. **Many Recommendations are Accepted and Used:** Fifteen facilities; including thirteen receiving offsite assessments, and two receiving onsite assessments, were provided with a total of 94 recommendations:

- The overall implementation rate for all recommended measures was 16.8%.
- 49.5% of the recommendations were rejected by the customer and will not be implemented.
- 11.6% of recommended measures were installed prior to receiving the report
- 12.6% of recommended measures are planned for the future

2. **Participants Take Action Rapidly:** Of the recommendations that were implemented prior to the independent evaluation survey, 64% were completed within six months of receiving the report. 50% were completed immediately upon receipt of the recommendation or within the following 30 days.

3. **Economy and Corporate Conditions Slow Measure Installations:** Corporate economic conditions and the firm's current financial status together represent the most common reasons provided for a recommended measure not being implemented. These two reasons are similar in that they deal with the firm's financial condition within the economies in which they operate. As a result, measures with long payback periods and/or excessive upfront capital costs become the measures cited most often as those that cannot be implemented.

Program Satisfaction: Key Findings

1. **Satisfaction scores show room for improvement:** Participants gave the three highest satisfaction scores to "Ease of Requesting Assessment," "Convenience of Scheduling Report" and "Clarity and Ease of Understanding Report" which received satisfaction ratings of 8.5 or higher on a ten point scale. However, no category had an average score of more than 8.8, and two categories ("Length of Time to Receive Assessment" and "Practicality of the Recommendations Provided") were given ratings of seven or less more than 50% of the time.

2. **Assessment report delays and practicality of report are concerns:** Five participants noted that they encountered delays in receiving their assessment. The briefest delay mentioned was two weeks. Eight of fifteen participants rated the overall practicality of the report at less than eight, and one participant stated that he implemented zero recommendations directly as a result of the lack of practicality.

Engineering Impact Estimates: Key Findings

There were a total of 201 customers in the Carolinas that received an energy assessment. Fifteen of the 201 customers were interviewed for this evaluation. Of the 15 interviewed, 7 were able to verify the actions implemented as a result of the assessment report[8]. The energy saving measures taken by these seven customers as a result of the program provide gross annual savings

[8] Because the primary purpose of this study is the process evaluation, the sample of customers interviewed is too small for programmatic energy impacts to be estimated. However, the impact analysis provides a sample of the types of projects and the level of energy savings than can be expected from those customers who take the recommended actions.

of 8,663,381 kWh, -23,904 MMBtu, and reduction of peak load by 882 kW. A breakdown of the savings by customer can be seen in Table 10.

Table 10. Program Savings Estimate Breakdown by Customer (Excludes Smart $aver® Incentives)*

Customer	kWh	kW	MMBtu
Customer One	764,422	72.7	-2,140
Customer Two*	0	0.0	0
Customer Three	4,159	0.0	0
Customer Four	8,779	4.5	-25
Customer Five	64,696	0.0	0
Customer Six	11,777	0	0
Customer Seven	45,492	0.0	0
TOTAL	**899,324**	**77.1**	**-2,165**

*Customer Two completed a lighting retrofit, achieving gross annual savings of 7,764,057 kWh and reducing peak load by 805 kW. The retrofit was advised through the Energy Assessment program, but facilitated by the Prescriptive Smart $aver® program, through which this customer received a rebate for both the fixtures and the accompanying occupancy sensors. All savings achieved by this customer has been attributed to the Prescriptive Smart $aver® program and is therefore not counted toward the Energy Assessment's total savings represented in Table 10.

Table 11 shows all of the measures that contribute to program savings and the number of customers that implemented them. The table also details gross savings as well as per unit savings broken down by measure.

Table 11. Summary of Program Savings by Measure

Measure	Participation Count	Ex Ante Per unit kWh impact	Ex Ante Per unit kW impact	Gross Ex Ante kWh Savings	Gross Ex Ante kW Savings
Lighting: Metal Halide to HO T8	2	1,634	0.156	764,910	73.13
Lighting: Metal Halide to T5 and Occupancy Sensors	1	2,810	0.291	7,764,057	804.7
Exhaust Hood Fan Controls	1	4,159	0.000	4,159	0.000
Lighting: Hg Vapor to T8	1	63.77	0.061	446.4	0.425
Lighting: T12 to T8	1	326.8	0.150	7,844	3.590
Compressed Air System Repair and Maintenance Program	1	64,696	0.000	64,696	0.000
Control System for Tenter Frame Exhaust	1	11,777	0.000	11,777	0.000
Compressed Air System Leak Check Program	1	45,492	0.000	45,492	0.000

2010 Non-Residential Smart $aver Custom Report Process (Exhibit M)

This evaluation report was finalized on August 12, 2011. The full report is filed as "**Exhibit M - Carolinas - Non-Res Smart $aver Custom - Final Process Evaluation Report - Aug 12 2011**".

Significant Process Evaluation Findings

Duke Energy's Smart $aver® Custom program is playing an important role in helping non-residential customers to implement projects using measures not in the Smart $aver® Prescriptive program. The program is also being marketed very well, through a network of dealers and distributors, as well as through Duke Energy's account managers. While all customers appreciate that Duke Energy offers a Custom program, they are only moderately satisfied with the program. Two areas where customers express less satisfaction are in the application's difficulty and in the time for application review. Duke Energy's Smart $aver® Custom program managers are well aware of the challenges facing their program, and have already taken steps to address them. Smaller customers find that the application is difficult if the applicant does not have a technical or engineering background. Duke Energy's program managers report that the time to review larger project applications is only marginally greater than the time to review smaller project applications. They also report that while the program's overall success depends critically on those larger projects, they are expending the majority of their resources on reviewing the smaller applications. As it is right now, the Smart $aver® Custom program may have reached a point of equilibrium, with the difficulty of the application process serving to reduce the number of applications from the smaller projects.

Recommendations

1. Duke Energy should decide what size projects (in terms of energy savings) the Custom program should target. Duke Energy program managers have expressed a greater need to encourage larger projects, in order to increase program effectiveness. Duke Energy may determine that it is not cost prohibitive to provide technical support for all the "onesie, twosie" projects. Whether or not Duke Energy decides to support projects of all sizes, making an explicit decision one way or the other may allow Duke Energy to allocate their resources and outreach more efficiently.
2. If Duke Energy decides to continue to encourage customers with smaller projects to apply, Duke Energy should find a way to provide technical support to qualified unassigned customers who are filling out their own applications. Alternately, Duke Energy may also want to consider temporarily assigning those customers to a Duke Energy representative, or temporarily requesting technical assistance from WECC to meet those unassigned customers' needs. This would allow those smaller customers to receive the assistance they say they need.
3. Duke Energy should also consider managing all customers' expectations for the amount of work involved in filling out an application, and perhaps provide data on what types of projects had been approved in the past. This may allow customers to make more informed choices on whether it is worthwhile for them to undertake the work of applying.

Low Income Memo on Freeridership (Exhibit N)

This evaluation memo was sent on August 12, 2011. The full memo is filed as "**Exhibit N - Low Income Program Freeridership - Memo - July 11 2011**". The summary of the memo is below, with supporting documentation included in Exhibit N.

Typically low income evaluation studies indicate zero to very low freeridership levels for CFLs.

Studies have found that low-income households do not typically purchase CFLs but tend to acquire the ones they have via utility programs, social programs, low-income support efforts, and promotional giveaways. The price of a CFL is still substantially higher than standard bulbs and represents a cost barrier for low income populations.

As a result, the NTG ratio used for low-income programs is typically around 1.0, suggesting few freeriders associated with energy program acquired CFLs.

2009 Residential Smart $aver Impact (Exhibit O)

This evaluation report was finalized on January 27, 2012 . The full report is filed as "**Exhibit O - Carolinas - Residential Smart $aver - Final Impact Evaluation Report – Jan 27 2012**".

Significant Impact Evaluation Findings[9]

Table 12 presents the gross unit kWh and kW savings per ton associated with the Residential Smart $aver program. These results are obtained based on a model which uses the results of the engineering analysis within a statistical billing data analysis (the SAE approach).

Table 12. Energy Savings Per Ton Associated with the Residential Smart $aver Program in the Carolinas

Asheville NC

Measure	Gross Energy and Demand Savings Per Ton		
	kWh/ton	kW/ton	Therm/ton
AC_seer14	222	0.110	-5
AC_seer15	270	0.120	-6
AC_seer16	285	0.090	-6
AC_seer17	305	0.120	-6
Hp_seer14	399	0.100	0
Hp_seer15	372	0.130	0
Hp_seer16	422	0.167	0
Hp_seer17	245	0.170	0
Hp_seer18	447	0.180	0

Charlotte NC

Measure	Gross Energy and Demand Savings Per Ton		
	kWh/ton	kW/ton	Therm/ton
AC_seer14	244	0.150	-4
AC_seer15	301	0.140	-4
AC_seer16	335	0.110	-5

[9] Because the price of the program-covered equipment is presented to the customer after the dealer has already deducted the Duke Energy incentive from their sales price, the customer is typically not aware that the price being quoted is a function of the application of the Duke Energy rebate. Under these conditions, the customers' self-reported impacts of the program's incentive are not able to be estimated by the customer making the purchase. As a result, TecMarket Works considers the results of the freerider assessment within the participant survey to be unreliable for the purposes of estimating net energy impacts. For the purposes of the impact evaluation, TecMarket Works sets the program-level freeridership at the mid-point of the values estimated by the interviewed dealers. That value is 27.5%. As a result of this estimate, TecMarket Works finds that 72.5% of the units sold were caused by or substantially caused by the Duke Energy program and would not have been sold without the program's influence.

Measure	Gross Energy and Demand Savings Per Ton		
	kWh/ton	kW/ton	Therm/ton
AC_seer17	366	0.140	-5
Hp_seer14	343	0.170	0
Hp_seer15	361	0.160	0
Hp_seer16	427	0.190	0
Hp_seer17	314	0.200	0
Hp_seer18	442	0.200	0

Greenville SC

Measure	Gross Energy and Demand Savings Per Ton		
	kWh/ton	kW/ton	Therm/ton
AC_seer14	238	0.110	-4
AC_seer15	290	0.120	-4
AC_seer16	319	0.110	-6
AC_seer17	345	0.140	-6
Hp_seer14	367	0.100	0
Hp_seer15	366	0.140	0
Hp_seer16	429	0.180	0
Hp_seer17	284	0.180	0
Hp_seer18	448	0.190	0

Program participation by HVAC system type, size, SEER, and location were applied to the savings per ton estimates from Table 12 above to compute the program savings, as shown in Table 13.

Table 13. Summary of Program Savings by Measure

Measure	Participation Count	Gross Ex Post kWh Savings	Gross Ex Post kW Savings	Gross Ex Post kWh Savings per unit	Gross Ex Post kW Savings per unit
Air conditioner	6,086	5,053,612	2,149	830	0.353
Heat Pump	13,256	13,220,103	5,821	997	0.439

- The electronically commutated (EC) motors required by the program caused very little change in occupant behavior relative to supply fan usage. Large increases in supply fan operating hours after system installation were not observed. The proportion of fan systems operating continuously decreased slightly after system installation.

- The EC motors provided substantial savings in fan power consumption, on the order of 46%.
- Future evaluation monitoring should also include sites from North and South Carolina if monitoring resources can be provided to this effort. The monitoring should capture fan, compressor and strip heat energy to provide full unit heating and cooling data for model development and calibration.
- Engineering modeling revealed energy and demand savings that are not proportional to the difference in SEER. The SEER, which is based on a standardized laboratory test, is not a reliable predictor of annual energy consumption under the more realistic operating conditions included in the building energy simulation models. Higher SEER air conditioners and heat pumps typically rely on multiple compressors to improve part-load performance, but may not provide proportional improvements in full-load efficiency. The results seen in this evaluation are consistent with results in other states.
- The billing analysis indicates that the participants realized 67% and 56% of the savings estimated by the engineering analysis for air conditioners and heat pumps, respectively. The air conditioner results are consistent with results for the Smart $aver program in other Duke Energy jurisdictions. Heat pumps system monitoring, as described above, is recommended to improve the engineering estimates of heat pump savings in the Carolinas.
- Participating dealers should record the make and model number of the replaced air conditioner and provide an assessment of the condition of the unit as part of the rebate application process. These data will allow the evaluation team to improve the estimate of the early replacement baseline efficiency.

Recommendation

- Duke Energy may wish to consider conducting an economic impact evaluation of key Duke Energy programs, including the Smart $aver Program, as previous studies suggest that job related impacts of energy efficiency programs may be substantial. Previous studies conducted on the economic impacts associated with energy efficiency programs show impacts in four job creation categories. These include: 1) Jobs created by helping businesses become more profitable by lowering their cost of operations, making them more competitive; 2) Lowering the energy cost of living for customers that increases their disposable income, which in turn supports jobs driven by expenditures other than energy; 3) Dollars spent more locally on non-energy expenditures keeps more dollars in the state being re-spent through the local economy creating more in-state jobs; and 4) Greater spending within non-energy economic streams leads to increased manufacturing, distribution and sales that require additional jobs to support consumer demand. Evaluations that assess economic effects of programs allow policy makers to understand a fuller range of program impacts. These evaluations can be conducted using secondary data (research conducted by others and applied to the Duke Energy programs) or use primary research depending on the reliability needs associated with the study findings.

Non-Residential Lighting Additional Lighting Measure Impact Memo (Exhibit P)

This evaluation memo was sent on December 29, 2011. The full memo is filed as "**Exhibit P - Carolinas - Evaluated Savings for 3 Lamp High Bay Fixture - Memo - Dec 29 2011**" and provides an update to the evaluated savings for High-Bay fixtures in the Non-Residential Smart $aver® Prescriptive program as implemented in North and South Carolina.

Non-Residential VFD Measure Impact Memo (Exhibit Q)

This evaluation memo was sent on February 2, 2012. The full memo is filed as "**Exhibit Q - Carolinas - Non-Residential Smart $aver - VFD Update Memo - Feb 2 2012**" and provides an update to the VFD component of the Non-Residential Smart $aver® Prescriptive program evaluation.

Current Evaluation Activities

Energy Efficiency Education Program for Schools

This evaluation is currently in progress. Process evaluation activities began, with onsite activities being conducted in March of 2012. Please see "Planned Evaluation Activities" for tasks and timeline.

Residential Energy Assessments: PER

This evaluation is currently being planned. Please see "Planned Evaluation Activities" for tasks and timeline.

Residential Energy Assessments: HEHC

This evaluation is currently being planned. Please see "Planned Evaluation Activities" for tasks and timeline.

Residential Retrofit Pilot

This evaluation is currently in progress. Process evaluation activities in the Carolinas indicate low participation in program which modifies the evaluation approach originally proposed for this program. Impacts will be reviewed using engineering estimates and no on-site visits. Contractor records will be reviewed to identify the work that was done. Engineering estimates will be developed for each of the measures. These estimates will be applied to each participant according to the type and quantity of the measures installed.

Residential Smart $aver: HVAC

This evaluation is currently being planned. Please see "Planned Evaluation Activities" for tasks and timeline.

Residential Smart $aver: CFLs

This evaluation is currently in progress. Process evaluation activities began, with participant surveys currently being fielded. Please see "Planned Evaluation Activities" for tasks and timeline.

Residential Smart $aver: Property Manager CFLs

This evaluation is currently in progress. Process evaluation activities began, with management and participant survey instruments currently being developed. Please see "Planned Evaluation Activities" for tasks and timeline.

Smart $aver for Non-Residential Customers - Prescriptive Lighting (Other)

This evaluation is currently in progress. Impact evaluation sample selection is in progress. Please see "Planned Evaluation Activities" for tasks and timeline.

Smart $aver for Non-Residential Customers - Prescriptive VFDs

This evaluation is currently being planned. Please see "Planned Evaluation Activities" for tasks and timeline.

Smart $aver for Non-Residential Customers - Custom

This evaluation is currently in progress. Impact evaluation sample selection is in progress. Please see "Planned Evaluation Activities" for tasks and timeline.

Smart Energy Now "Envision Charlotte"

This evaluation is currently in progress. Please see "Planned Evaluation Activities" for tasks and timeline.

Planned Evaluation Activities

Appliance Recycling

The program process evaluation will include program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, recall, and satisfaction. The impact evaluation will include an engineering analysis that will incorporate on-site field studies.

	EM&V for NC Proposed Appliance Recycling Program	This program is pending approval, therefore the expected start date is tentative.						
	Expected Start Date*:							
	3/1/2012							
	Months After Program Implementation-->	4	6	8	10	12	14	16
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis				
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis			
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis			
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis			
Process	Analysis and Early Feedback				Analysis			
Process	Process Evaluation Report						Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14	16
Impact	Selective monitoring (may not be performed if valid data collected through Process Eval).			Pre/post monitoring of whole HVAC systems. These data will be used to inform the DOE-2 simulation models				
Impact	In Situ Site visits			In situ metering assessment to determine the energy consumption of 140 appliances collected from the home (70 refrigerators and 70 freezers)	Duke staff will conduct site visits at a sample of sites to verify unit installation and gather building characteristics data.			
Impact	Data Cleaning				Data from process evaluations and On site will be analyzed and prepared for the engineering analysis.			
Impact	Engineering Estimates				Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models.			
Impact	Impact Evaluation Report						Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	3/1/2012						
	* Equipment installed, and enough participation for statistically significant results							

MyHER (formerly HECR)

The program process evaluation will include program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, recall, and satisfaction. The impact evaluation will include a billing analysis.

	EM&V for NC My Home Energy Report	This program is pending approval, therefore the expected start date is tentative.							
	Expected Start Date:								
	5/1/2012								
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis				
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis				
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Billing Analysis						A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.		
Impact	**Impact Evaluation Report**							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	6/1/2013							

Energy Efficiency Education Program for Schools

The process evaluation will include program manager, implementer, school administrator, and teacher interviews to assess program operations, and student family surveys to assess program awareness, satisfaction, and compliance with installations and recommendations. The impact evaluation will consist of engineering estimates and billing analysis.

	EM&V for NC Energy Efficiency Education Program for Schools								
					Please note: This program has a later start date than previously planned for because of the changes in the program. (changing from Scholastic's teacher kits and curriculum to NTC's presentations) The later date was set to allow time for program bidding, implementer selection, and program development				
	Expected Start Date*: 11/1/2011								
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process	Student Family Surveys		Instrument Development	Conduct Surveys	Analysis				
Process	Interview Program Vendors	Instrument Development	Conduct Surveys with NTC, Teachers, and School Administrators	Analysis					
Process	Review of NTC Presentation	On-Site Review	Analysis						
Process	Analysis and Early Feedback			Memo					
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Engineering Estimates				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.				
Impact	Billing Analysis					A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.			
Impact	**Impact Evaluation Report**							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	9/1/2012							

Low Income EE and Weatherization

The process evaluation will include program manager and CAP staff interviews to assess program operations, and participant surveys to assess program satisfaction. The impact evaluation will consist of a billing analysis and engineering estimates.

	EM&V for NC Low Income EE and Weatherization	Schedule to be determined by modified program launch date.							
	Expected Start Date*: 3/1/2012								
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis				
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis				
Process	Interview Program Vendors and CAP agencies		Instrument Development	Conduct Surveys	Analysis				
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Data Cleaning				Data from process evaluations will be analyzed and prepared for the engineering analysis.				
Impact	Engineering				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.				
Impact	Billing Analysis						A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.		
Impact	Impact Evaluation Report							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts								

* Equipment installed, and enough participation for statistically significant results

Low Income Neighborhood

The process evaluation will include program manager and CAP staff interviews to assess program operations, and participant surveys to assess program satisfaction. The impact evaluation methodology will be determined after program participation levels are gauged approximately six months after program implementation.

	EM&V for NC Low Income Neighborhood	This program is pending approval, therefore the expected start date is tentative.					
	Expected Start Date*:						
	3/1/2012						
	Months After Program Implementation-->	4	6	8	10	12	14
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis			
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis		
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis		
Process	Interview Program Vendors and CAP agencies	Instrument Development	Conduct Surveys	Analysis			
Process	Analysis and Early Feedback			Memo			
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14
Impact	The impact evaluation for the Low Income Neighborhood program will be developed after program participation is gauged at a minimum of 6 months following program administration. With sufficienct participants, a billing analysis will be conducted where energy usage for each customer will be analyzed before and after their participation to determine if they have decreased their energy consumption as a result of their participation. If participation is lower than expected, savings estimates based on engineering algorithms and participant surveys can be conducted.		Gauge program participation and determine methodology				
Impact	Impact Evaluation Report						
	Effective Date of Impacts						
	* Equipment installed, and enough participation for statistically significant results						

Non-Residential Energy Assessments

The 2011 process evaluation will include program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, satisfaction, and compliance with recommendations. The impact evaluation will include engineering estimates and billing analysis.

EM&V for NC Non-Residential Energy Assessments								
Expected Start Date: 1/1/2012								
Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process: Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process: Participant Surveys		Instrument Development	Conduct Surveys	Analysis				
Process: Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact: Engineering Estimates				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys.				
Impact: Billing Analysis						A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.		
Impact Evaluation Report							Final Report	Duke reviews and addresses report recommendations
Effective Date of Impacts								

Power Manager

The process evaluation, if conducted, will consist of participant surveys within three days of control events to assess program awareness and satisfaction. The impact evaluation includes operability and A/C cycling studies.

EM&V for NC Power Manager — There is no need to conduct a process evaluation in 2012, but Recency surveys may occur.

Expected Start Date*: 2/1/2012

Months After Program Implementation-->	4	6	8	10	12	14
Participant Recency Surveys (as needed)	Instrument Development	Conduct Surveys	Conduct Surveys	Analysis		
Process Evaluation Report (as needed)					Final Report	Duke reviews and addresses report recommendations

* Equipment installed, and enough participation for statistically significant results

EM&V for NC Power Manager

Expected Start Date*: 2/1/2012

Impact	Months After Program Implementation-->	4	6	8	10	12	14	16
	Operability Studies (as needed)		field work begins					
	A/C Cycling Study (as needed)		field work begins					
	Impact Analysis				Duke Energy will conduct impact estimates. Time-series framework to estimate baseline energy usage. The interval data will be analyzed to estimate load reductions during control events.			
	Impact Analysis Review					TMW Review of Impact Estimates in Impact Report		
	Impact Analysis Report						Final Report	Duke reviews and addresses any memo recommendations
	Effective Date of Impacts							

* Equipment installed, and enough participation for statistically significant results

PowerShare

The process evaluation will not be conducted in 2012. The impact evaluation will be conducted by Duke Energy and reviewed by the evaluation team.

EM&V for NC PowerShare		A process evaluation will not be done in 2012.						
Expected Start Date*: 1/1/2012								
Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Impact Analysis Review						Duke Energy will conduct impact estimates		
	Impact Analysis Report							Final Report	Duke reviews and addresses any memo recommendations
	Effective Date of Impacts								

* Equipment installed, and enough participation for statistically significant results

Residential Energy Assessments: PER

The process evaluation will include program manager and implementer interviews to assess program operations, and participant surveys to assess program satisfaction. The impact evaluation will consist of a billing analysis and engineering estimates.

	EM&V for NC Residential Energy Assessments: PER							
	Expected Start Date: 11/1/2011							
	Months After Program Implementation-->	4	6	8	10	12	14	16
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis				
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis			
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis			
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations	
	Months After Program Implementation-->	4	6	8	10	12	14	16
Impact	Engineering Estimates				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.			
Impact	Billing Analysis				A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.			
Impact	**Impact Evaluation Report**						Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	7/1/2012						

Residential Energy Assessments: HEHC

The process evaluation will include program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness and satisfaction. The impact evaluation will consist of a billing analysis and engineering estimates.

	EM&V for NC Residential Energy Assessments: HEHC							
	Expected Start Date: 11/1/2011							
	Months After Program Implementation-->	4	6	8	10	12	14	16
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis				
Process	Participant Surveys	Instrument Development	Conduct Surveys	Conduct Surveys	Analysis			
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis			
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations	
	Months After Program Implementation-->	4	6	8	10	12	14	16
Impact	Engineering Estimates				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.			
Impact	Billing Analysis				A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.			
Impact	**Impact Evaluation Report**						Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	6/1/2012						

Residential Smart $aver: HVAC

The process evaluation will include program manager and implementer interviews to assess program operations, participant surveys to assess program awareness, satisfaction, equipment replacement, and end-use persistence. The impact evaluation will include a billing analysis, and an engineering walk through, short term monitoring, building simulation modeling as appropriate.

&V for NC Residential Smart $aver: HVAC									
Expected Start Date*:									
7/1/2011									
Months After Program Implementation-->	4	6	8	10	12	14	16	18	20
Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis						
Participant Surveys		Instrument Development	Conduct Surveys	Analysis					
Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis					
Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis					
Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations			
Months After Program Implementation-->	4	6	8	10	12	14	16	18	20
Selective monitoring					Pre/post monitoring of whole HVAC systems. These data will be used to inform the DOE-2 simulation models.				
Site visits					Duke staff will conduct site visits at a sample of sites to verify unit installation and gather building characteristics data.				
Data Cleaning						Monitored data from whole HVAC systems will be analyzed and prepared for the engineering analysis.			
Engineering Estimates						Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models representing a range of building ages and operating modes.			
Building Simulation Modeling						The calibrated DOE-2 simulation models will be run using long term average weather data for Charlotte, NC			
Billing Analysis							A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.		
Impact Evaluation Report								Final Report	Duke reviews and addresses report recommendations
Effective Date of Impacts	9/1/2012								
* Equipment installed, and enough participation for statistically significant results									

Residential Smart $aver: Additional Measures

The process evaluation will include program manager and implementer interviews to assess program operations, participant surveys to assess program awareness, satisfaction, equipment replacement, and end-use persistence. The impact evaluation will include a billing analysis, and an engineering walk through, short term monitoring, building simulation modeling as appropriate.

	EM&V for NC Proposed Residential Smart $aver: Additional Measures	This program is pending approval, therefore the expected start date is tentative.							
	Expected Start Date*: 3/1/2012								
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis				
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis				
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis				
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Selective monitoring					Pre/post monitoring of whole HVAC systems. These data will be used to inform the DOE-2 simulation models			
Impact	Site visits					Duke staff will conduct site visits at a sample of sites to verify unit installation and gather building characteristics data.			
Impact	Data Cleaning						Monitored data from whole HVAC systems will be analyzed and prepared for the engineering analysis.		
Impact	Engineering Estimates						Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models representing a range of building ages and operating modes.		
Impact	Building Simulation Modeling						The calibrated DOE-2 simulation models will be run using long term average weather data for Charlotte, NC		
Impact	Billing Analysis							A statistical billing analysis of program participants will be conducted and compared to the engineering estimates.	
Impact	Impact Evaluation Report							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts								
	* Equipment installed, and enough participation for statistically significant results								

Residential Smart $aver: CFLs

The process evaluation includes program manager and implementer interviews to assess program operations, and participant and nonparticipant surveys to assess program awareness, satisfaction, and use/storage of CFLs. The impact evaluation will consist of an engineering analysis.

EM&V for NC Residential Smart $aver: CFLs							
	Expected Start Date*:						
	6/29/2011						
	Months After Program Implementation-->	4	6	8	10	12	14
Process	Interview Program Managers and Implementers	Instrument Development		Conduct Interviews	Analysis		
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis		
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis		
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis		
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14
Impact	Engineering Estimates				Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.		
Impact	Impact Evaluation Report					Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	5/1/2011					
	* Equipment installed, and enough participation for statistically significant results						

Residential Smart $aver: Property Manager CFLs

The process evaluation includes program manager, implementer interviews to assess program operations, and property manager and occupant surveys to assess program awareness, satisfaction, and use/storage of CFLs. The impact evaluation will consist of an engineering analysis.

EM&V for NC Residential Smart $aver: Property Manager CFLs								
	Expected Start Date*:							
	8/31/2011							
	Months After Program Implementation-->	4	6	8	10	12	14	16
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis				
Process	Participant Surveys	Instrument Development		Conduct Surveys	Analysis			
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis			
Process	Interview Program Vendors (property managers)		Instrument Development	Conduct Surveys	Analysis			
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations	
	Months After Program Implementation-->	4	6	8	10	12	14	16
Impact	Engineering Estimates				Logger Study and Program Manager tracking data collection	Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per participant based on self-reported efficiency actions will be calculated.		
Impact	Impact Evaluation Report						Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts							
	* Equipment installed, and enough participation for statistically significant results							

Smart $aver for Non-Residential Customers - Prescriptive Lighting

The process evaluation includes program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, satisfaction, equipment replacement, and end-use persistence. The impact evaluation includes short term monitoring and engineering estimations.

	EM&V for NC Non-Residential Smart $aver Prescriptive Lighting						
	Expected Start Date*:						
	6/29/2011						
	Months After Program Implementation-->	4	6	8	10	12	14
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis			
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis		
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis		
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis		
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14
Impact	Selective monitoring (may not be performed if valid data collected through Process Eval).			Pre/post monitoring of whole HVAC systems (need HVAC and VFDs). These data will be used to inform the DOE-2 simulation models			
Impact	Data Cleaning			Data from process evaluations and On site will be analyzed and prepared for the engineering analysis.			
Impact	Engineering Estimates			WECC database review	Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models.		
Impact	Impact Evaluation Report					Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	6/1/2011					
	* Equipment installed, and enough participation for statistically significant results						

Smart $aver for Non-Residential Customers - Prescriptive VFDs

The process evaluation includes program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, satisfaction, equipment replacement, and end-use persistence. The impact evaluation includes short term monitoring and engineering estimations.

EM&V for NC Non-Residential Smart $aver Prescriptive VFDs

Expected Start Date*:
5/29/2012

	Months After Program Implementation-->	4	6	8	10	12	14	16
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis				
	Participant Surveys		Instrument Development	Conduct Surveys	Analysis			
	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis			
	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis			
	Process Evaluation Report						Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14	16
Impact	Selective monitoring (may not be performed if valid data collected through Process Eval).			Pre/post monitoring of whole HVAC systems (need HVAC and VFDs). These data will be used to inform the DOE-2 simulation models				
	Data Cleaning			Data from process evaluations and On site will be analyzed and prepared for the engineering analysis.				
	Engineering Estimates			WECC database review	Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models.			
	Impact Evaluation Report						Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	1/1/2013						

* Equipment installed, and enough participation for statistically significant results

Smart $aver for Non-Residential Customers - Custom

The process evaluation includes program manager and implementer interviews to assess program operations, and participant surveys to assess program awareness, satisfaction, and equipment replacement, and end-use persistence. The impact evaluation will include selective, short term monitoring and building simulation modeling as appropriate.[10]

EM&V for NC Non-Residential Smart $aver Custom

	Expected Start Date*: 10/29/2011								
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Program Managers and Implementers	Instrument Development	Conduct Interviews	Analysis					
Process	Participant Surveys		Instrument Development	Conduct Surveys	Analysis				
Process	Non-Participant Surveys (as needed)		Instrument Development	Conduct Surveys	Analysis				
Process	Interview Program Vendors		Instrument Development	Conduct Surveys	Analysis				
Process	Process Evaluation Report					Final Report	Duke reviews and addresses report recommendations		
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Selective monitoring (may not be performed if valid data collected through Process Eval).			Pre/post monitoring of whole HVAC systems. These data will be used to inform the DOE-2 simulation models					
Impact	Data Cleaning			Data from process evaluations and On site will be analyzed and prepared for the engineering analysis.					
Impact	Engineering Estimates					Building characteristics data from the verification surveys, and the data from the monitoring sample will be used to develop and calibrate a series of prototypical DOE-2 models.			
Impact	Impact Evaluation Report							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts	2/1/2012							

* Equipment installed, and enough participation for statistically significant results

[10] This schedule has been modified since the March 2011 summary. Extending the data collection and analysis period allows the team to get a more complete sample of participants in the last year of program operation. The 2012 sample frame will include as many 2012 sites as is practical (while allowing enough time for the M&V to complete in time for the final report). Also, samples drawn to date specifically excluded Smart Building Advantage participants, as these sites were planned to be analyzed separately. The 2012 sample will include SBA participants in the sample frame.

Smart Energy Now "Envision Charlotte"

The process evaluation will focus on assessing the design and implementation approach for the program in order to make recommendations for changes that can be expected to improve the impacts from or operational efficiency of the program. The impact evaluation will examine the savings associated with the behavior changes made by program participants and the savings achieved by coordination with the Smart $aver Prescriptive and Custom rebate programs. Further details can be found in Exhibit 3.

EM&V for NC Smart Energy Now: Envision Charlotte
Expected Start Date*: 10/28/2011

	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Process	Interview Managers, Implementers, Stakeholders	Instrument Development	Conduct Interviews	Analysis		Analysis	Analysis		
Process	Participant Surveys	Instrument Development	Conduct Surveys and Observations of interactions with lobby displays	Conduct Surveys	Conduct Surveys and Analysis	Conduct Intercept Surveys and Analysis	Analysis		
Process	Non-Participant Surveys (as needed)	Instrument Development	Conduct Surveys and Analysis	Conduct Surveys and Analysis	Conduct Surveys and Analysis	Analysis	Analysis		
Process	Interview Program Vendors (building managers)	Instrument Development	Conduct Surveys	Conduct Surveys	Conduct Surveys	Analysis	Analysis		
Process	Spillover Effects Analysis			Analysis	Analysis				
Process	Process Evaluation Report							Final Report	Duke reviews and addresses report recommendations
	Months After Program Implementation-->	4	6	8	10	12	14	16	18
Impact	Sample Selection and Program Cross-matching			Coordinate with Non-Residential Smart $aver Custom and Prescriptive programs for rebated savings sample.					
Impact	Engineering Estimates				Analysis	Engineering estimates of savings will be developed for efficiency actions identified through the participant surveys. Average savings per building based on self-reported efficiency actions will be calculated.			
Impact	Impact Evaluation Report							Final Report	Duke reviews and addresses report recommendations
	Effective Date of Impacts								

* Equipment installed, and enough participation for statistically significant results