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**VIA OVERNIGHT DELIVERY**

November 14, 2011

**RECEIVED**

NOV 15 2011

**PUBLIC SERVICE  
COMMISSION**

Mr. Jeff Derouen  
Executive Director  
Kentucky Public Service Commission  
211 Sower Boulevard, P.O. Box 615  
Frankfort, Kentucky 40602-0615

**Re:** *Case No. 2011-*  
*The Application of Duke Energy Kentucky, Inc. For The Annual Cost Recovery Filing for Demand Side Management*

Dear Mr. Derouen:

Enclosed please find an original and twelve copies of *The Application of Duke Energy Kentucky, Inc. For The Annual Cost Recovery Filing for Demand Side Management* for filing in the above referenced matter.

Please date-stamp the two copies of the letter and the filing and return to me in the enclosed envelope.

Sincerely,

Kristen Cocanougher

cc: Larry Cook  
Richard Raff  
Florence W. Tandy  
Carl Melcher

**BEFORE THE  
KENTUCKY PUBLIC SERVICE COMMISSION**

In The Matter Of: )  
 )  
THE ANNUAL COST RECOVERY FILING ) CASE NO. 2011-\_\_\_\_\_  
FOR DEMAND SIDE MANAGEMENT BY )  
DUKE ENERGY KENTUCKY, INC. )

**FILING OF THE ANNUAL STATUS REPORT, ADJUSTMENT OF THE DSM COST  
RECOVERY MECHANISM WITH FILING OF THE AMENDED TARIFF SHEETS FOR  
GAS RIDER DSMR (SEVENTH REVISED SHEET NO. 62) AND ELECTRIC RIDER  
DSMR (SEVENTH REVISED SHEET NO. 78)**

Now comes Duke Energy Kentucky, Inc. (Duke Energy Kentucky or the Company) with the consensus of the Residential Collaborative and the Commercial and Industrial Collaborative, and pursuant to this Commission's November 4, 2004 Order in Case No. 2003-00367, February 14, 2005, Order in Case No. 2004-00389, April 4, 2006, Order in Case No. 2005-00402, May 15, 2007, Order in Case No. 2006-00426, May 14, 2008, Order in Case No. 2007-00369, May 12, 2009, Order in Case No. 2008-00473, March 22, 2010, Order in Case No. 2009-00444, and June 7, 2011, Order in Case No. 2010-00445 hereby files the annual status report and proposes an adjustment to the 2010 Demand Side Management (DSM) Cost Recovery Riders (Application). The Applicant is Duke Energy Kentucky, having a principal place of business at 139 East Fourth Street, Cincinnati, Ohio 45202.<sup>1</sup>

On October 17, 2011, the Residential Collaborative and the Commercial and Industrial Collaborative met to review the 2010 DSM Application. The Residential Collaborative members in attendance were: Jennifer Hans (Kentucky Attorney General's Office), Jock Pitts (People Working Cooperatively), Jennifer Belisle (Northern Kentucky Community Action Commission), Laura

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<sup>1</sup> Applicant's Kentucky business office address is Duke Energy Envision Center, 4580 Olympic Boulevard, Erlanger, Kentucky, 41018.

Pleiman (Boone County), Lauren Copeland (Brighton Center), Carl Melcher (Northern Kentucky Legal Aid), Karen Reagor (Kentucky NEED Project), Lee Colten (Department of Energy Development and Independence), Paul Brooks (Department of Energy Development and Independence), Chris Jones (Greater Cincinnati Energy Alliance) and Tim Duff and Trisha Haemmerle (Duke Energy). The Commercial & Industrial Collaborative members in attendance were: Jennifer Hans (Kentucky Attorney General's Office), Jock Pitts (People Working Cooperatively), Karen Reagor (Kentucky NEED Project), Carol Cornell (Northern Kentucky University Small Business Development), Daniele Longo (Northern Kentucky Chamber of Commerce), Paul Brooks (Department of Energy Development and Independence), Lee Colten (Department of Energy Development and Independence) and Tim Duff and Trisha Haemmerle (Duke Energy).

With the exception of the Kentucky Attorney General's Office, which will indicate its opinion at a later date, the members of both the Residential Collaborative and the Commercial & Industrial Collaborative agreed with this Application. Unless otherwise stated, the Residential Collaborative and the Commercial & Industrial Collaborative are jointly referred to herein as "Collaborative."

In addition to filing the annual status report, Duke Energy Kentucky and the Collaborative respectfully request a modification of Duke Energy Kentucky's DSM Riders to reflect the reconciliation of planned and actual expenditures, lost revenues, and shared savings. For this filing, Duke Energy Kentucky will be using results of recent impact evaluation studies to provide estimates of lost revenues and shared savings. In a prior filing, the Company requested Commission approval to continue the existing programs under the current DSM model until such time as the Commission approves the new programs proposed in its application under the save-a-

watt model in Case No. 2008-00495 or until December 31, 2012. On January 30, 2010, the Commission approved Duke Energy Kentucky's request to Voluntarily Dismiss, Without Prejudice, its then pending save-a-watt Application. The Commission approved the Company's request to continue its existing programs through December 31, 2012, by Order Dated March 22, 2010, in Case No. 2009-00444.

## **I. INTRODUCTION**

### **A. Background**

On December 17, 2002, the Commission issued its Order in Case No. 2002-00358 approving Duke Energy Kentucky's plan to continue the following DSM programs: Residential Conservation and Energy Education, Residential Home Energy House Call, and Residential Comprehensive Energy Education for a three-year period ending December 31, 2005; to continue to fund the expansion and improvement of existing programs and the development of new programs; and to implement a revised low-income home energy assistance program as a pilot through May 31, 2004. These programs were extended through 2009 by the April 4, 2006, Order in Case No. 2005-00402. The Commission, in its November 30, 2003, Order in Case No. 2003-00367, also approved the implementation of Power Manager, a residential direct load control program, through 2007. The Commission's April 4, 2006, Order in Case No. 2005-00402 authorized the Personalized Energy Report (PER) program as a pilot program. The Commission's May 14, 2008, Order in Case No. 2007-00369 approved the Company's Power Manager program through 2012 and approved the PER program for recovery of lost revenues and shared savings. The Commission's March 22, 2010, Order in Case No. 2009-00444 approved continuation of all programs through December 31, 2012. Finally, the Commission's June 7, 2011, Order in Case No. 2010-00445 approved 1) continuation of existing DSM programs as previously approved through

December 31, 2012, 2) the Company's request to increase the budget for Program Administration, Development & Evaluation by \$60,000 to conduct the necessary evaluations in accordance with International Performance Measurement and Verification Protocol and 3) revised DSM surcharge factors. In addition, the Commission approved the request to implement the Residential Smart \$aver® program with an expiration of December 31, 2012 that aligns it with the expiration of the other DSM programs.

This filing specifically addresses the requirements in prior Commission Orders: November 20, 2003, Order in Case No. 2003-00367, February 14, 2005, Order in Case 2004-00389, April 4, 2006, Order in Case No. 2005-00402, May 15, 2007, Order in Case No. 2006-00426, and May 14, 2008, Order in Case No. 2007-00369 and March 22, 2010, in Case No. 2009-00444. In addition, this filing is being made consistent with the Commission's September 18, 2007, Order in Case 2007-00369 granting Duke Energy Kentucky's request to file annual DSM applications no later than November 15. In the status and reconciliation portion of this report, expenses are reported for the period July 1, 2010 through June 30, 2011.

In Case No. 2009-00444, Duke Energy Kentucky was granted an Order approving continuation of the Company's existing DSM portfolio of programs until the earlier of Commission approval of the Company's application in Case No. 2008-495 or December 31, 2012.

Duke Energy Kentucky also requests an Order in this proceeding approving the proposed adjustments to the DSM rider.

## **B. Definitions**

For the purposes of this Application, the following terms will have the meanings established in the Principles of Agreement, Demand Side Management (Exhibit 1 to the Application in Case No. 95-312, dated July 15, 1995):

- 1) “**DSM Revenue Requirements**” shall mean the revenue requirements associated with all Program Costs, Administrative Costs, Lost Revenues (less fuel savings), and the Shareholder Incentive.
- 2) “**Collaborative**” shall mean the Duke Energy Kentucky DSM Collaborative, which was established by the Signatories and other parties separately from this process.
- 3) “**Program Costs**” shall mean the costs incurred for planning, developing, implementing, monitoring and evaluating the DSM programs described in Section XI of the Principles of Agreement, Demand Side Management (pp. 11-19) and the DSM programs that have been approved by the Collaborative.
- 4) “**Administrative Costs**” shall mean the costs incurred by or on behalf of the collaborative process and that are approved by the Collaborative, including, but not limited to, costs for consultants, employees and administrative expenses.
- 5) “**Lost Revenues**” shall have the meaning in Section IV of the Principles of Agreement, Demand Side Management.
- 6) “**Shareholder Incentive**” shall have the meaning in Section IV of the Principles of Agreement, Demand Side Management.
- 7) “**DSM Cost Recovery Mechanism**” shall have the meaning in Section IV of the Principles of Agreement, Demand Side Management.
- 8) “**Voucher**” shall mean the credit receipt the customer receives from a social service agency. The voucher can be used by the customer as a partial payment toward the utility bill.

## II. STATUS OF CURRENT DSM PROGRAMS

Duke Energy Kentucky currently offers the following programs, the costs of which are

recoverable through the DSM Cost Recovery Rider mechanism approved by the Commission in prior proceedings.

- Program 1: Residential Conservation and Energy Education
- Program 2: Residential Home Energy House Call
- Program 3: Residential Comprehensive Energy Education Program (NEED)
- Program 4: Program Administration, Development & Evaluation Funds
- Program 5: Payment Plus
- Program 6: Power Manager
- Program 7: Energy Star Products
- Program 8: Energy Efficiency Website
- Program 9: Personalized Energy Report (PER)®
- Program 10: C&I High Efficiency Incentive (for Businesses and Schools)
- Program 11: PowerShare®
- Program 12: Residential Smart \$aver®

Under the current DSM Agreement and prior Commission Orders, all of these programs will remain in effect through December 31, 2012.

This section of the Application provides a brief description of each current program, a review of the current status of each program, and information on any changes that may have been made to the programs. The following table provides a brief summary of the load impacts achieved and level of participation obtained during this filing period. Starting in 2011, any program that has customer installed (time of sale) compact fluorescent light bulbs (CFLs) included had a change in impact due to the implementation of the results received in Ohio/Kentucky for these types of CFLs. These programs are the Personalized Energy Report

(PER)<sup>®</sup>, Energy Efficient Website and Energy Star Products.

Summary of Load Impacts July 2010 Through June 2011			
<b>Residential Programs</b>	<b>Incremental Participation</b>	<b>Load Impacts Net of Free Riders***</b>	
		<b>kWh</b>	<b>kW</b>
Home Energy House Call	511	201,399	35.3
Energy Efficient Website	167	59,822	14.4
Energy Star Products*	13,712	615,403	127.9
Low Income Program	234	145,782	40.1
Refrigerator Replacement	76	82,612	19.9
Personalized Energy Report	3,381	1,233,586	298.9
Power Manager**	9,527	-	10,138.2
NEED	155	18,025	1.5
Residential Smart \$aver	-	-	-
Total Residential	27,763	2,356,629	10,676.2
<b>Non-Residential Programs</b>	<b>Incremental Participation</b>	<b>Load Impacts Net of Free Riders***</b>	
		<b>kWh</b>	<b>kW</b>
C&I Lighting	19,656	4,487,685	982.5
C&I HVAC	5,738	605,935	235.7
C&I Motors	111	275,954	60.5
C&I Other	32	53,158	9.5
Custom Incentive Schools	-	-	-
Power Share	12	-	12,957.2
Total Non-Residential	25,549	5,422,732	14,245.4
Total	53,312	7,779,361	24,921.6

\*Energy Star Products is number of bulbs not participants.  
\*\*Cumulative number of controlled devices installed  
\*\*\*Impacts are without losses

Results of the current cost-effectiveness test results for each of the programs are provided in Appendix A.

### **Program 1: Residential Conservation and Energy Education**

The Residential Conservation and Energy Education program is designed to help the Company's income-qualified customers reduce their energy consumption and lower their energy cost. This program specifically focuses on LIHEAP (Low Income Home Energy Assistance Program) customers that meet the income qualification level (*i.e.*, income below 150% of the federal poverty level). This program uses the LIHEAP intake process as well as other

community outreach initiatives to improve participation. The program provides direct installation of weatherization and energy-efficiency measures and educates Duke Energy Kentucky's income-qualified customers about their energy usage and other opportunities to reduce energy consumption and lower their costs. The program has provided weatherization services to 251 homes in 2000; 283 in 2001; 203 in 2002; 252 in 2003; 252 in 2004; 130 in 2005; 232 in 2006; 252 in 2007; 265 in 2008; 222 in 2009 and 199 in 2010. For the fiscal year 2011<sup>2</sup>, 234 homes were weatherized.

The program is structured so that the homes needing the most work, and having the highest energy use per square foot, receive the most funding. The program accomplishes this by placing each home into one of two "Tiers." The tiering process allows the agencies to be cost effective while spending the limited budgets where there is the most significant potential for savings. For each home in Tier 2, the field auditor uses the National Energy Audit Tool (NEAT) to determine which specific measures are cost effective for that home. The specific services provided within each Tier are described below.

The tier structure is defined as follows:

	Therm / square foot	kWh use/ square foot	Investment Allowed
Tier 1	0 < 1 therm / ft <sup>2</sup>	0 < 7 kWh / ft <sup>2</sup>	Up to \$600
Tier 2	1 + therms / ft <sup>2</sup>	7 + kWh / ft <sup>2</sup>	All SIR* $\geq$ 1.5 up to \$4K

\*SIR = Savings - Investment Ratio

### **Tier One Services**

Tier 1 services are provided to customers by Duke Energy Kentucky, through its subcontractors. Customers are considered Tier 1, if they use less than 1 therm per square foot per year or less than 7 kWh per square foot per year based on the last year of usage (weather

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<sup>2</sup> July 1, 2010 to June 30, 2011.

adjusted) of Company supplied fuels. Square footage of the dwelling is based on conditioned space only, whether occupied or unoccupied. It does not include unconditioned or semi-conditioned space (non-heated basements). The total program dollars allowed per home for Tier One services is \$600.00 per home.

Tier One services are as follows:

- Furnace Tune-up & Cleaning
- Furnace replacement if investment in repair over \$500
- Venting check & repair
- Water Heater Wrap
- Pipe Wrap
- Waterbed mattress covers
- Cleaning of refrigerator coils
- Cleaning of dryer vents
- Compact Fluorescent Light (CFL) Bulbs
- Low-flow shower heads and aerators
- Weather-stripping doors & windows
- Limited structural corrections that affect health, safety, and energy up to \$100
- Energy Education

## **Tier Two Services**

Duke Energy Kentucky will provide Tier Two services to a customer if they use at least 1 therm or at least 7 kWh per square foot per year based on the last year of usage of Duke Energy Kentucky-supplied fuels.

Tier Two services are as follows:

- Tier One services plus:
- Additional cost-effective measures (with SIR  $\geq$  1.5) based upon the results of the NEAT audit. Through the NEAT audit, the utility can determine if energy saving measures pay for themselves over the life of the measure as determined by a standard heat loss/economic calculation (NEAT audit) utilizing the cost of gas and electric as provided by Duke Energy Kentucky. Such items can include but are not limited to attic insulation, wall insulation, crawl space insulation, floor insulation and sill box insulation. Safety measures applying to the installed technologies can be included within the scope of work considered in the NEAT audit as long as the SIR is greater than 1.5 including the safety changes.

Regardless of placement in a specific tier, Duke Energy Kentucky provides energy education to all customers in the program.

To increase the cost-effectiveness of this program and to provide more savings and bill control for the customer, the Collaborative and Duke Energy Kentucky proposed in the September 27, 2002, filing in Case No. 2002-00358, and subsequently received approval to expand this program, to include refrigerators as a qualified measure in owner-occupied homes. Refrigerators consume a large amount of electricity within the home, and the program impacts have been updated to reflect current energy savings and refrigerator replacements. To determine replacement, the program weatherization provider performs a two-hour meter test of the existing refrigerator unit. If it is a high-energy consuming refrigerator, as determined by this test, the unit is replaced. The program replaces about half of the units tested. Replacing with a new Energy Star qualified refrigerator, which uses approximately 400 kWh, results in an overall savings to the average customer typically in excess of 1,000 kWh per year.

Refrigerators tested and replaced:

- 2003 = 116 tested and 47 replaced
- 2004 = 163 tested and 73 replaced
- 2005 = 115 tested and 39 replaced
- 2006 = 116 tested and 52 replaced
- 2007 = 136 tested and 72 replaced
- 2008 = 173 tested and 85 replaced
- 2009 = 153 tested and 66 replaced
- 2010 = 167 tested and 92 replaced
- 2011 = 112 tested and 76 replaced

The existing refrigerator being replaced is removed from the home and destroyed in an environmentally appropriate manner to assure that the units are not used as a second refrigerator in the home or do not end up in the secondary appliance market.

Evaluation Findings: Duke Energy Kentucky conducted a process evaluation for the program as shown in Appendix C.

### **Program 2: Residential Home Energy House Call**

The Home Energy House Call (HEHC) program is administered by Duke Energy Kentucky contractor Wisconsin Energy Conservation Corporation, Inc. (WECC). WECC has been administering and implementing programs for over 30 years. It is one of the largest program operators in the region. WECC's knowledge of home energy audits comes from years of experience administering weatherization programs for income eligible customers. The programs are implemented through subcontractor Thermo-Scan Inspections (TSI), located in Carmel, Indiana. TSI has been in the business of providing a wide array of inspection services

for commercial and industrial businesses, municipalities, contractors and homeowners to identify, repair and protect homes, buildings, equipment and structures from moisture, leaks, corrosion and inefficient energy usage since 1980. Together, WECC and TSI provide the administration, marketing, staff, tracking, systems, logistics, training, customer service, scheduling and technical support required to support Duke Energy Kentucky's HEHC program. The HEHC program provides a comprehensive walk through in-home analysis by a Building Performance Institute (BPI) Building Analyst certified home energy specialist to identify energy savings opportunities in homes. The energy specialist analyzes the total home energy usage, checks the home for air infiltration, examines insulation levels in different areas of the home, and checks appliances and heating/cooling systems. A comprehensive report specific to the customer's home and energy usage is then provided to the customer at the time of the audit. The report focuses on the building envelope improvements as well as low-cost and no-cost improvements to save energy. At the time of the home audit, the customer receives a kit containing several energy saving measures at no cost. The measures include a low-flow showerhead, kitchen faucet aerator, bathroom aerator, outlet gaskets, and two 13 watt compact fluorescent bulbs, and one 20 watt compact fluorescent bulb. The auditors will offer to install these measures, if approved by the customer, so the customer can begin savings immediately on their electric bill, and to help insure proper installation and use.

For the period of July 1, 2010 through June 30, 2011, a total of 511 audits were completed in Kentucky. During this filing period, direct mail brochures were mailed to customers in an effort to acquire the proposed participation for this program process.

The auditors carry laptop computers on-site and can enter the data collected into the software directly, eliminating error from third party interpretation, and also allowing a customer to view their energy audit information immediately on site.

### **Program 3: Residential Comprehensive Energy Education**

The Residential Comprehensive Energy Education program is operated under subcontract by the National Energy Education Development (NEED). Launched in 1980, NEED promotes student understanding of the scientific, economic, and environmental impacts of energy. The program is currently available in 50 states, and the U.S. territories. NEED operates on a limited basis internationally. The program has provided comprehensive information on all energy sources and issues, with an emphasis on efficiency and conservation in both the residential and institutional market. State standards based Energy curriculum and hands-on kits, emphasizing inquiry science and the application of energy knowledge, are provided to teachers for use in their classrooms. Teachers can utilize the kits and curriculum over many years. In addition, Home Energy Efficiency Kits are delivered to families to install energy efficiency measures and to record energy savings. All students that participated in the curriculum are eligible for the Home Energy Efficiency kits. Energy Workshops are designed to provide educators (teaching grades K-12) with the content knowledge and process skills to return to their classrooms and communities, energize and educate their students, provide outreach to families and conduct energy education programs that assist families in implementing behavioral changes that reduce energy consumption.

The Kentucky NEED Project has been active in the Commonwealth's schools for 15 years. Kentucky NEED delivers curriculum, teacher training, and school support services to local schools. In addition, Kentucky NEED manages the overall implementation for the Duke

Energy Kentucky program and works with individual schools, teachers, and students to gain the maximum impact for the program. Kentucky NEED has received numerous accolades for its support of energy efficiency and conservation in local schools, for its support of Energy Star's Change the World Campaign, and for the integration of a student/family approach to conservation education.

Kentucky NEED's partnership with the Kentucky Department for Energy Development and Independence (DEDI) has expanded to include funds to hire four regional energy education coordinators to assist with the facilitation of energy programming and the development of student energy teams across the Commonwealth. The coordinator for Northern Kentucky works with schools, teachers and students requesting energy education and curriculum integration assistance. The DEDI partnership continues to promote high performance school construction and the implementation of low cost measures as a foundation for larger projects offering greater cost savings. The program addresses: (1) building energy efficiency improvements through retrofits financed by use of energy saving performance contracts (ESPC) and improved new construction; (2) school transportation practices; (3) educational programs; (4) procurement practices; and (5) linkages between school facilities and activities within the surrounding community. This program is now called Kentucky High Performance Sustainable Schools Program and the training programs for it are supported by Kentucky NEED. This program expanded the partnership to include KEEPS (KY Energy Efficiency Program for Schools) and Kentucky School Plant Management Association (KSPMA). These workshops focused more on energy saving operations and maintenance opportunities that included establishing school energy teams consisting of maintenance/custodial staff, teacher advisor(s) and student energy teams. The student teams are encouraged to focus their efforts on developing an energy plan for their

schools to encourage energy saving behaviors by all members of the school community. In July of 2010, a fifth partner joined the team. DEDI provided funding for the Kentucky School Energy Managers Project (SEMP), which provides support for school districts to hire energy managers. Kentucky NEED works closely with the energy managers across the state to assist in the development of student energy teams and integration of energy curriculum that addresses energy behaviors in their schools.

To improve and better document the energy savings associated with the program, a new survey instrument was added in 2004 for use in the classroom and Saving Energy at Home and School Kit, which serves as a companion to the Home Energy Efficiency Kits delivered to families in the Duke Energy Kentucky service area. A curriculum was developed, piloted, improved with teacher feedback, and delivered to schools participating in the Duke Energy sponsored program. In addition to the curriculum content delivered, the program includes household surveys that allow teachers to encourage, and families to implement, in-home adoption of energy efficiency measures. Data collected from the home survey is collected and provided to Duke Energy annually. The data have shown that the measures included in the Home Energy Efficiency Kits are being installed and utilized. The Home Energy Efficiency Kits include CFL bulbs, low-flow shower heads, faucet aerators, water temperature gauge, outlet insulation pads, and a flow meter bag. During the 2010-11 school year, 155 kits were distributed.

In partnership with DEDI, NEED continues to promote school participation in ENERGY STAR's Change the World, Start with Energy Star campaign. To support, recognize and encourage student energy leadership, Kentucky NEED hosts the annual Kentucky NEED Youth Awards for Energy Achievement in Washington, D.C., honoring teams of students who have

successfully planned and facilitated energy projects in their schools and communities. During the 2010-2011 academic year, 52 projects were submitted from Kentucky to participate in the National Youth Awards Ceremony. Eleven of the 52 were submitted from Northern Kentucky, and of the 11 student projects, 4 student groups received state level awards and 2 received national level awards. Each year, NEED selects a state program that has shown extraordinary growth and success throughout the academic year. In the 2010-2011 school year, Kentucky NEED Project received the national honor. Upon receipt of the honor, 7 Northern Kentucky educators registered for the NEED National Training conference in July 2011. We look forward to their participation in the 2011 – 2012 school year.

#### **Program 4: Program Administration, Development & Evaluation**

This program is responsible for designing, implementing and capturing costs related to the administration, evaluation and support of the Collaborative and Duke Energy Kentucky's overall DSM effort. Program development funds are utilized for the redesign of programs and for the development of new programs, or program enhancements, such as the refrigerator replacement portion of the Residential Conservation and Energy Education program. Evaluation funds are used for cost effectiveness analysis and evaluation, impact evaluation and process evaluation of program activities, such as those included as appendices to this filing and the reports provided in past filings. Going forward, funds will be used to again monitor, evaluate and analyze these programs to improve cost effectiveness and program design. Therefore, Duke Energy Kentucky expects, and has planned for, the continuation of funding for this program to cover evaluation study costs for the current year's activities as well as future evaluations. Duke Energy Kentucky strives to optimize and balance the use of these program funds so that program development and redesign continues, that all programs are analyzed every year for cost

effectiveness, and that programs are generally afforded the opportunity for a full scale impact evaluation and energy savings assessment once every two to three years. Duke Energy Kentucky believes that it is unnecessary to spend funds on impact evaluations every year for all programs, but also understands that all programs must undergo impact evaluation scrutiny and review at least once every two to three years.

### **Program 5: Payment Plus**

The Payment Plus program was designed to impact participants' behavior (*e.g.*, encourages utility bill payment and reducing arrearages) and to generate energy conservation impacts. The program was extended by the Commission's Order in Case No. 2004-00389 to include both the early participants and new participants each year.

The program has three parts:

1. Energy & Budget Counseling – to help customers understand how to control their energy usage and how to manage their household bills, a combined education/counseling approach is used.
2. Weatherization – to increase the energy efficiency in customers' homes, participants are required to have their homes weatherized as part of the normal Residential Conservation and Energy Education (low-income weatherization) program unless weatherized in past program years.
3. Bill Assistance – to provide an incentive for these customers to participate in the education and weatherization, and to help them get control of their bills, payment assistance credits are provided to each customer when they complete the other aspects of the program. The credits are: \$200 for participating in the EE counseling, \$150 for participating in the budgeting counseling, and \$150 for participating in the

Residential Conservation and Energy Education program. If all of the requirements are completed, a household could receive up to a total of \$500. This allows for approximately 200 homes to participate per year as some customers do not complete all three steps or have already had the weatherization completed prior to the program.

This program is offered over six winter months per year, starting in August. Customers are tracked and the energy savings are evaluated to determine if customer energy consumption dropped, and whether changes in bill paying habits have occurred. Previous participants' energy savings have been evaluated and compared to a control group of customers with similar arrearages and incomes. This analysis is the longest-running impact and process evaluation in the country looking at both energy savings and arrearages from a single program. From this analysis, there is long-term evidence that the program is effective at reducing energy usage and arrearages. Copies of the evaluation report were included in the 2006 filing. Given the positive evaluation results, the Collaborative proposed and the Commission approved in May 2007 continuation of the program at a cost of \$150,000 per year through 2009; this was extended through December 31, 2012, in Case No. 2009-00444. Follow-up educational reinforcement took place for all participants beginning in the fall of 2007. For the filing period beginning in the fall of 2010, 141 participants attended energy education counseling, 129 participants attended budget counseling and 42 participant homes have been weatherized. Scores for this program will be updated upon completion of the next impact evaluation. Weatherization load impacts and program costs for the participants were included in the Residential Conservation and Energy Education program.

#### **Program 6: Power Manager**

The purpose of the Power Manager program is to reduce demand by controlling

residential air conditioning usage during periods of peak demand, high wholesale price conditions and/or generation emergency conditions during the summer months. It is available to residential customers with central air conditioning. Duke Energy Kentucky attaches a load control device to the outdoor unit of a customer's air conditioner. This enables Duke Energy Kentucky to cycle the customer's air conditioner off and on under appropriate conditions.

Customers participating in this program receive a one-time enrollment incentive and a bill credit for each Power Manager event. Customers who select Option A, which cycles their air conditioner to achieve a 1 kW reduction in load, receive a \$25 credit at installation. Customers selecting Option B, which cycles their air conditioner to achieve a 1.5 kW load reduction, receive a \$35 credit at installation. For both options, a Variable Daily Event Incentive based upon marginal costs is also provided for each cycling event.

The load control devices have built-in safe guards to prevent the "short cycling" of the air-conditioning system. The air-conditioning system will always run the minimum amount of time required by the manufacturer. The cycling simply causes the air-conditioning system to run less, which is no different than what it does on milder days. Additionally, the indoor fan will continue to run and circulate air during the cycling event.

Given our supply position in Kentucky, the Company did not actively promote Power Manager to our customers during the July 2010 through June 2011 fiscal year. Without directly marketing the program, 93 additional customers enrolled in Power Manager during the past fiscal year. However, through attrition, the net number of devices installed and available for an event declined by 265 devices. Although the number of devices declined during this period, our device replacement efforts have led to a net 1.3 MW increase in load reduction capability over the same

twelve month period. For the new participants and replacements of existing load control devices, we continue to use Cannon load control devices manufactured by Cooper Power Systems.

During the past fiscal year we shifted from quality control testing and replacement of Corporate Systems Engineering (CSE) devices, to a total replacement project of these older Power Manager devices. In doing so, we will achieve higher operability and load reduction impacts, and realize cost savings by reducing the systems and hardware needed to support two switch types.

Ongoing measurement and verification is conducted through a sample of Power Manager customers with switches that record hourly run-time of the air conditioner unit and with load research interval meters that measure the household kWh usage in 15-minute intervals. Operability studies are also used to measure the performance of Power Manager load control devices in Kentucky. In addition, Duke Energy Kentucky has reviewed the statistical sampling requirements of PJM Interconnection for demand response resources of this type. Moving forward into 2012, no changes will be needed to these studies since they meet all the PJM requirements.

Evaluation Findings: Duke Energy Kentucky conducted a process evaluation for the program as shown in Appendix D.

### **Program 7: ENERGY STAR Products**

As approved in Order 2004-00389, the ENERGY STAR Products program provides incentives and market support through manufacturer and retailer partners to build market share and usage of ENERGY STAR products, particularly CFLs. Incentives to buyers, along with educational materials, stimulate demand for the products, and make it easier for partners to participate. The program encourages residential customers to purchase specified ENERGY

STAR technologies at local retail stores.

Price continues to be the primary market barrier to CFL adoption. While the average price of CFLs has dropped, the cost of a CFL is generally much higher than traditional incandescent alternatives (*e.g.*, \$2.00 vs. \$0.75). This cost difference is more exaggerated for specialty CFLs such as “can lights,” 3-way bulbs and outdoor lights.

In the spring of 2011, Duke Energy Kentucky partnered with GE to offer customers a discount coupon. Mailing discount coupons to customers’ homes allowed Duke Energy Kentucky to reach customers who had not previously participated in CFL promotions.

The GE campaign kicked-off on April 18, 2011, with coupons valid through June 15, 2011. The campaign’s goal was to encourage more customers to participate by providing a coupon that could be redeemed at multiple retailers, further expanding the program’s reach. Working closely with our manufacturing partner, GE, Duke Energy Kentucky offered an ‘\$8 off’ coupon good towards the purchase of one six-pack of GE Energy Smart 13-watt bulbs, the most popular package available at all participating retailers.

Three versions of the offer were mailed. Each version targeted specific customer segments with messaging that would resonate with that segment. For younger customers and more financially secure customers, the offer stressed energy bill savings and environmental benefits. For the more budget conscious customers, the offer stressed saving now and continued savings after the bulbs are installed. The third offer targeted those customer segments that have been slow to adopt new lighting technology. This offer compared CFLs to other technologies that have changed such as high definition TVs, Smartphones and E-book readers.

Besides giving customers an incentive to purchase the bulbs, the offer also provided key educational information. It directed customers to install the bulbs in the areas of the home that

would see the most potential energy and cost savings. It also encouraged recycling of expired bulbs. The educational component of the offer reinforced the money-off coupon by pointing out the real-world benefits to the consumer.

Evaluation Findings: Duke Energy conducted a process and impact evaluation for the CFLs as shown in Appendix E and Appendix F. The impacts apply to Personalized Energy Report (PER)<sup>®</sup>, Energy Efficient Website, and Energy Star Products.

#### **Program 8: Energy Efficiency Website, On-line Energy Assessment**

As approved in Order 2004-00389, Duke Energy Kentucky is authorized to offer opportunities for customers to assess their energy usage and obtain recommendations for more efficient use of energy in their homes at the Duke Energy Kentucky website. This Kentucky program fits suitably into our new multi-state program design now referred to as our Residential Energy Assessment Program.

Duke Energy Kentucky customers visiting their Online Services account at duke-energy.com are encouraged to take a short Energy Efficiency survey (EE survey). Participants receive an immediate, online, printable Energy Efficiency report (EE report) and are also sent a free package of six CFLs. The customized online EE report gives the customer information on the home's energy usage, providing the customer energy tips and information regarding how they use energy and what simple, low cost/no cost measures can be undertaken to lower their energy bill. The report also contains information on month-to-month comparisons of energy usage, a trend chart showing usage of electric by kWh by month, a disaggregation of how the customer uses electricity in the most important appliances, and customized energy tips based on the customer's answers to questions in the survey.

After several months of revising the Duke Energy Kentucky website to include new

content from our energy efficiency website vendor, ACLARA™, the online EE Survey and free CFL offer was rolled out to Duke Energy Kentucky customers in March of 2010. From March through June 2010, 314 Duke Energy Kentucky customers completed the online EE Survey and received a pack of six CFLs. During the filing period of July 2010 – June 2011, 167 customers completed the survey and received a pack of six CFLs.

Participants in this program respond to an online offer that appears when they visit their Online Services account. The offer shows up for any Online Services customer who has not yet participated in this program. It should be noted that another Duke Energy program called the Personalized Energy Report (PER)® is similar, but involves a mailed offer instead of an online offer (see Program 9).

In July 2011, Duke Energy Kentucky discontinued distributing the free six CFLs to avoid confusing this offer with the Energy Star Product promotion. Duke Energy Kentucky will reinstitute the distribution of the six free CFLs if response rates to the On-line Energy Assessment program decline.

Evaluation Findings: Duke Energy conducted a process and impact evaluation for the CFLs as shown in Appendix E. The impacts apply to Personalized Energy Report (PER)®, Energy Efficient Website, and Energy Star Products.

#### **Program 9: Personalized Energy Report (PER)®**

The PER program provides Duke Energy Kentucky customers with a customized Energy Efficiency report aimed at helping them better manage their energy costs. This is similar to the online EE Survey and CFL offer described in Program 8, except that this program utilizes a mailed offer for those who do not have computer access or choose not to use the online programs. The EE report and six CFLs are mailed to those customers who mail in a completed

survey.

This program targets single family residential customers in the Duke Energy Kentucky market that have not received measures through the Home Energy House Call home audit or Residential Conservation & Energy Education programs within the last three years. Duke Energy Kentucky has been working with ACLARA™ software to coordinate the customer's energy efficiency experiences between the online offer, described under the Online Energy Assessment program above, and this mailed version, or "paper" offer. (Marketing activities under this program were suspended in 2008 and 2009 pending the reorganization and harmonization of the website with the new vendor ACLARA™. The PER® program was implemented for Kentucky customers in May 2010.)

To receive the paper version of the EE report (*i.e.*, the PER®), a customer completes an EE survey that generates the PER®. The EE survey stimulates the customer to think about how they use energy, and then the mailed report provides them with tools and information to lower their energy costs. The program commences with a letter to the customer, offering the PER® if they would return the enclosed short energy survey about their home. The survey asks very simple questions such as age of home, number of occupants, types of fuel used to cool, heat, and cook. Once the survey is returned, the information is used to generate a customized PER®. The PER® contains the same information as the EE survey described under the Online Energy Assessment program above, but is mailed to the home instead of viewed online. To lower mailing costs, customers who receive the mailed survey and PER® offer are encouraged to visit Duke Energy Kentucky's website instead and fill in the same survey online instead of returning the paper survey and waiting for the mailed PER® report. The online report is immediately available in a printable format. The online option saves costs in the long run, and provides a

source for customers to reprint their report, if desired. All participants also receive a free package of six CFLs.

The Kentucky PER® offer was mailed to 53,000 customers on May 25, 2010. Results for this campaign will be divided into two reporting periods. For the previous period of July 2009 through June 2010, there were 7,010 participants. Since July 1, 2010 there have been an additional 3,381 participants for a campaign total of 10,391.

Evaluation Findings: Duke Energy conducted a process and impact evaluation for the CFLs as shown in Appendix E. The impacts apply to Personalized Energy Report (PER)®, Energy Efficient Website, and Energy Star Products.

#### **Program 10: C&I High Efficiency Incentive (Business and Schools)**

The Commission's Order in Case No. 2004-00389 approved a program for Duke Energy Kentucky to provide incentives to small commercial and industrial customers to install high efficiency equipment in applications involving new construction, retrofit, and/or replacement of failed equipment. The approval included a portfolio of nearly 100 lighting, HVAC, Motors/Pumps/VFDs, Process equipment, Food Services equipment and Energy Star Commercial clothes washers.

Program operations began in October of 2005. However, the portfolio was downsized to some degree until a similar expanded program was approved in either Indiana or Ohio to gain efficiencies in administration costs. Results in the first nine months of program rollout were beyond expectation. Thirty-six applications were processed totaling \$313,350 in incentives. Duke Energy Kentucky attributed this to a pent-up demand in the marketplace and the installation of the High Bay T-8 and T-5 lighting fixtures. In response to the market, the following adjustments were made to the program in order to serve more customers and remain

cost effective:

- Incentives for T-8, T-5 and High Bay fixtures were no longer eligible in a “new construction” application, only retrofit applications. The new construction market was utilizing these technologies as the standard so incentives were no longer necessary.
- The incentive levels for T-8 High Bay and T-5 High Output High Bay fixtures were adjusted to align with price changes in the market.
- A cap of \$50,000 per facility per calendar year was implemented in an effort to serve more customers.
- A reservation system was instituted during the proposal stage to ensure that customers will receive their incentives once the project is complete.

In April of 2007, the program funds had been exhausted again and Duke Energy Kentucky had to carryover \$81,248 in incentives for customers until the new fiscal year budget became available. On May 15, 2007, the Commission approved Duke Energy Kentucky’s application to increase funding 100%, with an additional \$451,885 for a Kentucky Schools program.

Duke Energy Kentucky continues to contract with WECC to provide the back office support for implementation of this program. This program is jointly implemented with the Duke Energy Indiana, Duke Energy Ohio, and Duke Energy Carolinas territories to reduce administrative costs and leverage promotion. WECC, located in Madison, Wisconsin, has over 30 years experience in delivering programs similar to this. They have an office in the Midwest and are able to support Duke Energy programs in this region. The primary delivery of the program is through the existing market channels, equipment providers and contractors. WECC had an existing network of relationships with Vendors and Trade Ally organizations in Duke

Energy Kentucky's service territory that have helped promote the sale of energy efficient equipment during these difficult economic times.

During the reporting period July 2009 through June 2010, the Kentucky Smart \$aver® program continued to be successful. Eighty customers received \$411,606 in incentives.

During the current reporting period of July 2010 through June 2011, the Kentucky Smart \$aver® program provided incentives totaling \$311,129 to approximately 83 customers.

### **Schools: Assessments, Prescriptive and Custom Efforts**

The Schools program, approved on May 15, 2007, provides schools funding for facility assessments, custom and prescriptive measures rebates and EE education from the NEED organization.

Duke Energy Kentucky Schools Custom Program was well-received. It provided an additional funding source for EE measures that are not included in Duke Energy Kentucky's portfolio of Prescriptive Incentives. The program helped motivate additional custom EE projects within schools.

Between July 2010 and June 2011, Duke Energy provided energy assessments for four school facilities. The recommended measures and potential incentives are under review by the customer. In addition, seven school districts received Prescriptive incentives totaling \$63,940.

Upon receiving a Custom Incentive application, Duke Energy Kentucky reviews the application and performs a technical evaluation as necessary to validate energy savings. Measures submitted by the customer are then modeled in DSMore® to determine an acceptable incentive that ensures cost effectiveness to the program overall, given the energy savings, and improves a customer's payback to move them to invest in energy efficiency. Evaluation follow-up and review includes application review, site visits and/or onsite metering and verification of

baseline energy consumption, customer interviews, and/or use of loggers/sub-meters. As use of Custom Incentives increases, Duke Energy Kentucky will evaluate applications and determine if additional measures can be included in the Prescriptive Incentives program. Including measures that repeatedly arise in Custom Incentive applications in the Prescriptive Incentives makes planning and applying for measure incentives easier for customers. Although no custom applications were received for July 2010 through June 2011, Duke Energy program management has had discussions with K-12 school districts about proposed projects.

### **Program 11: PowerShare®**

PowerShare® is the brand name given to Duke Energy Kentucky's Peak Load Management Program (Rider PLM, Peak Load Management Program KY.P.S.C. Electric No. 2, Sheet No. 77). The PLM Program is voluntary and offers customers the opportunity to reduce their electric costs by managing their electric usage during the Company's peak load periods. Customers and the Company will enter into a service agreement under this Rider, specifying the terms and conditions under which the customer agrees to reduce usage. There are two product options offered for PowerShare® - CallOption® and QuoteOption®:

- CallOption®
  - A customer served under a CallOption® product agrees, upon notification by the Company, to reduce its demand.
  - Each time the Company exercises its option under the agreement, the Company will provide the customer a credit for the energy reduced.
  - There are two types of events.
    - Economic events are primarily implemented to capture savings for customers and not necessarily for reliability concerns. Participants are

not required to curtail during economic events. However, if participants do not curtail, they must pay a market based price for the energy not curtailed. This is called “buy through energy.”

- Emergency events are implemented due to reliability concerns.
  - Participants are required to curtail during emergency events.
- If available, the customer may elect to buy through the reduction at a market-based price. The buy through option is not always available as specified in the PowerShare® Agreements. During Midwest Independent System Operator, Inc. (Midwest ISO) declared emergency events or PJM Interconnection declared emergency events as appropriate, customers are not provided the option to buy through.
- In addition to the energy credit, customers on the CallOption® will receive an option premium credit.
- For the 2010/11 PowerShare® program associated with the fiscal year of this filing, there were three different enrollment choices for customers to select between. All three choices require curtailment availability for up to five emergency events per Midwest ISO requirements for capacity participation. (Note that for the 2011/2012 PowerShare® program, exposure to 10 emergency events are needed to be consistent with PJM Interconnection capacity requirements.) Economic events vary among the choices. Customers can select exposures of zero, five, or ten economic events.
- Only customers able to provide a minimum of 100 kW load response qualify for CallOption®.

- QuoteOption®
  - Under the QuoteOption® products, the customer and the Company agree that when the average wholesale market price for energy during the notification period is greater than a pre-determined strike price, the Company may notify the customer of a QuoteOption® event and provide a Price Quote to the customer for each event hour.
  - The customer will decide whether to reduce demand during the event period. If they decide to do so, the customer will notify the Company and provide an estimate of the customer's projected load reduction.
  - Each time the Company exercises the option, the Company will provide the participating customer who reduces load an energy credit.
  - There is no option premium for the QuoteOption® product since customer load reductions are voluntary.
  - Only customers able to provide a minimum of 100 kW load response qualify for QuoteOption®.

Rider PLM was approved pursuant as part of the settlement agreement in Case No. 2006-00172. In the Commission's Order in Case No. 2006-00426, approval was given to include the PowerShare® program within the DSM programs.

#### **PowerShare® 2010-2011 Summary**

Duke Energy Kentucky's customer participation goal for 2010 was to retain all customers that currently participate and to promote customer migration to the CallOption® program. As seen in the table below, QuoteOption® participation decreased this year. Due to a switch in system vendors, it became necessary for QuoteOption® customers to enroll in the Energy Profiler

Online product. This product carries a small monthly fee. The small monthly fee is the primary reason customers left the program.

The table below compares account participation levels for 2009 and 2010, as well as MWs enrolled in the program. The MW values are Duke Energy Kentucky's estimate of the curtailment capability across the summer of 2010.

<b>Kentucky PowerShare® Participation Update</b>						
<b>Enrolled Customers</b>						
CallOption®			QuoteOption®			
<u>2009</u>	<u>2010</u>	<u>Change</u>	<u>2009</u>	<u>2010</u>	<u>Change</u>	
<b>10</b>	<b>12</b>	<b>2</b>	<b>33</b>	<b>23</b>	<b>-10</b>	
<b>Summer Curtailment Capability (MWs)*</b>						
CallOption®			QuoteOption®			
<u>2009</u>	<u>2010</u>	<u>Change</u>	<u>2009</u>	<u>2010</u>	<u>Change</u>	
<b>12.2</b>	<b>13.6</b>	<b>1.4</b>	<b>6.1</b>	<b>6.3</b>	<b>0.2</b>	

\*Capability for QuoteOption® is 80% of enrolled load curtailment estimate

CallOption® numbers reported are adjusted for losses

(Note that Duke Energy Kentucky has signed 18 contracts for the 2011/2012 PowerShare® CallOption® program with an estimated 26 MWs of Midwest ISO registered Load Modifying Resource capacity for July/August, 2011. Measured and verified MW values for the

summer of 2011 will be available and presented in next year's update filing. The values in the PowerShare® tables are the same as those included in last year's filing. Duke Energy Kentucky has synchronized the update information and the participation and event tables with the update period. In past years, the most recent participation information has been provided for the PowerShare® program. While this information represented the most current status of the program, it does not align with the fiscal year reflected in this update filing.)

During the summer of 2010, there were five CallOption® events and no QuoteOption® events. All CallOption® events were economic events. There were no CallOption® emergency events. The table below summarizes event participation.<sup>3</sup>

Duke Energy Kentucky - PowerShare® CallOption® Economic Events						
Summer 2010 Activity						
Date	Event Hours	Participants	Participants Reducing Load Partially or Fully	Average Hourly Load Reduction Available Before Losses	Average Hourly Load Reduction - Before Losses	Average Hourly Load Reduction - After Losses
7/7/2010	Noon to 8 PM	12	6	15.4	2.7	2.8
7/23/2010	Noon to 8 PM	12	9	15.4	1.1	1.2
8/10/2010	Noon to 8 PM	12	7	16.6	1.7	1.8
8/12/2010	Noon to 8 PM	12	5	16.5	1.1	1.1
8/13/2010	Noon to 8 PM	12	5	16.1	1.6	1.7

<sup>3</sup> "PowerShare® CallOption® participants are presented with the option to "buy-through" economic events since system reliability is not a concern during economic events. As can be seen in the table, several customers took full advantage or partial advantage of this option given that actual curtailment amounts are less than the available amounts. For energy consumed under this buy-through option, customers pay a market based price for energy. Buy-through is not available during emergency events."

(Note that for the summer of 2011 through August, 7 CallOption® events and 1 QuoteOption® event have been called. All of these events were economic events. Information on these events will be available and presented in next year's update filing.)

For PowerShare® 2010/2011, there were several significant changes implemented as anticipated last year. These changes included:

- An earlier start to the enrollment period to accommodate Duke Energy Kentucky and Midwest ISO requirements;
- The new CallOption® 0/5 added to customer participation choices; and
- Annual testing requirements for participants using a generator as the source of their load curtailment.

For PowerShare® 2011/2012, Duke Energy Kentucky has changed several parameters of the program (e.g., number of emergency events and notification time related to emergency events) as referenced above to comply with PJM Interconnection requirements. It should be noted that Duke Energy Kentucky will transition from Midwest ISO to PJM Interconnection starting on January 1, 2012.

Evaluation Findings: Duke Energy Kentucky conducted a process evaluation for the program as shown in Appendix G.

### **Program 12: Residential Smart \$aver®**

The purpose of the Residential Smart \$aver® Program is to offer customers a variety of energy conservation measures designed to increase energy efficiency in their residential dwellings. This Program utilizes a network of contractors to encourage the installation of high efficiency equipment and the implementation of energy efficient home improvements.

Equipment and services to be incentivized include:

- Installation of high efficiency air conditioning (AC) and heat pump (HP) systems
- Performance of AC and HP tune-up maintenance services
- Implementation of attic insulation and air sealing services
- Implementation of duct sealing services

The Residential Smart \$aver® Program received approval in the Commission's June 7, 2011 order in Case No. 2010-00445 and was subsequently launched into the market on August 15, 2011. Due to an ongoing vendor selection process, Duke Energy Kentucky is currently only offering incentives for the installation of the high efficiency AC and HP systems. Once the vendor selection process has completed incentives for the additional products and services will be offered to residential Kentucky customers.

Duke Energy Kentucky currently contracts with WECC to provide the back office support for implementation of this program. These AC and HP installation services are jointly implemented with the Duke Energy Indiana, Duke Energy Ohio, and Duke Energy Carolinas territories to reduce administrative costs and leverage promotion. WECC has substantial experience in delivering programs similar to this, including administering the Program throughout other Duke Energy territories since 2008. They have an office in the Midwest and are able to support Duke Energy programs in this region. WECC had an existing network of relationships with Vendors and Trade Ally organizations in Duke Energy Kentucky's service territory that have helped promote participation in the early stage of the Program.

Smart \$aver® Program Management has also remained in contact with the Kentucky Home Performance (KYHP) program management. Both programs remain committed to working collaboratively and leveraging program resources where appropriate to increase customer program awareness and provide customers greater incentives for completing energy

efficiency upgrades in their homes.

### **III. CALCULATION OF THE 2011 DSM COST RECOVERY MECHANISM**

The reconciliation of the DSM rider involves a comparison of projected vs. actual program expenses, lost revenues, and shared savings as well as inclusion of the prior year's reconciliation. The actual cost of residential and non-residential program expenditures, lost revenues, and shared savings for this reporting period was \$5.14 million. The projected level of expenditures was \$6.97 million. Economic conditions have negatively impacted customer participation for programs that require an investment or longer-term commitment from the customer. The Residential Smart \$aver® program was not approved until June 2011; as such, the program was not launched into the Kentucky residential market during the 2010 – 2011 fiscal year. On August 15, 2011, Duke Energy Kentucky launched a portion of the program (HVAC installation) into the market and has been paying incentives for the installation of qualifying equipment since that time. Duke Energy Kentucky is currently completing the vendor selection process for the program and plans to launch the remaining measures into the market during the first quarter of 2012.

Lost revenues are computed using the applicable marginal block rate net of fuel costs and other variable costs times the estimated kWh savings for a three-year period from installation of the DSM measure. The estimate of kWh savings is based upon the results from any recently completed impact evaluation studies and actual customer participation. Lost revenues accumulate over a three-year period from the installation of each measure, unless a general rate case has occurred.

With respect to shared savings, Duke Energy Kentucky utilized the shared incentive of 10% of the total savings net of the costs of measures, incentives to customers, marketing, impact

evaluation, and administration. The savings are estimated by multiplying the program spending times the UCT value and then subtracting the program costs. Shared savings are only valued for installation of new DSM measures.

### **Outline of DSM Activity**

Duke Energy Kentucky is planning to offer the following DSM programs in Duke Energy Kentucky's service territory in 2011 as part of its current DSM model:

- Program 1: Residential Conservation and Energy Education
- Program 2: Residential Home Energy House Call
- Program 3: Residential Comprehensive Energy Education Program (NEED)
- Program 4: Program Administration, Development & Evaluation Funds
- Program 5: Payment Plus
- Program 6: Power Manager
- Program 7: Energy Star Products
- Program 8: Energy Efficiency Website
- Program 9: Personalized Energy Report (PER)®
- Program 10: C&I High Efficiency Incentive (including School Incentives)
- Program 11: PowerShare®
- Program 12: Residential Smart \$aver®

The Company is also offering the Home Energy Assistance (HEA) Program as approved by the Commission in its September 30, 2008 Order in Case No. 2008-00100 and approved continuation for another three year period as ordered by the Commission on August 18, 2011 in Case No. 2011-00109. The program reconciliation is in this application in Appendix B. This program began collecting funds in November of 2008. A total of \$249,075.20 was collected

from Duke Energy customers (\$144,383.30 electric and \$104,691.90 gas) from July 2010 - June of 2011. For this reporting period, the HEA program provided assistance to approximately 1,309 customers. The funds collected from the period beginning June 2010, were depleted in April 2011. The total disbursement between electric and gas accounts was approximately \$131,056.93(electric) and \$95,028.99 (gas) based on the number of electric and gas customers contributing to the fund. These funds are distributed throughout the year by Northern Kentucky Community Action Committee to assist low income customers' energy bill payments. The administrative costs for this period (2010-2011) totaled \$33,912.89.<sup>4</sup>

## **2011 DSM Riders**

In accordance with the Commission's Order in Case No. 95-312, the Joint Applicants submit the proposed DSM Riders (Appendices H and I). The Riders are intended to recover projected 2012 program costs, lost revenues and shared savings and to reconcile the actual DSM revenue requirement, as previously defined, to the revenue recovered under the DSM Riders for the period July 1, 2010 through June 30, 2011. Appendix B, page 1 of 6, tabulates the reconciliation of the DSM Revenue Requirement associated with the prior reconciliation, Duke Energy Kentucky's program costs, lost revenues, and shared savings between July 1, 2010 and June 30, 2011, and the revenues collected through the DSM Riders over the same period. The true-up adjustment is based upon the difference between the actual DSM revenue requirement and the revenues collected during the period July 1, 2010 through June 30, 2011.

The DSM revenue requirement for the period July 1, 2010 through June 30, 2011 consists of: (1) program expenditures, lost revenues, and shared savings; and (2) amounts approved for recovery in the previous reconciliation filing.

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<sup>4</sup> Administrative costs are based on funds distributed. There was an overspend of \$10,923.61 at the end of the filing period with the knowledge that funds would be received in July 2011.

Appendix B, page 5 of 6 contains the calculation of the 2011 Residential DSM Riders. The calculation includes the reconciliation adjustments calculated in Appendix B, page 1 of 6 and the DSM revenue requirement for 2012. The residential DSM revenue requirement for 2012 includes the costs associated with the Residential DSM programs, the program development funds, the Residential Conservation and Energy Education and Bill Assistance Program (Payment Plus), the Power Manager program, the Energy Star Products program, the Energy Efficiency Website program, the Personalized Energy Report (PER) program, the Residential Home Energy House Call program, The Residential Comprehensive Energy Education Program (NEED), Residential Smart \$aver®, and any applicable net lost revenues and shared savings (Appendix B, pages 2 and 3 of 6). Total revenue requirements are incorporated along with the projected electric and gas volumes (Appendix B, page 4 of 6) in the calculation of the Residential DSM Rider.

Appendix B, page 5 of 6 also contains the calculation of the 2012 Commercial and Industrial DSM Rider. The calculation includes the reconciliation adjustments calculated in Appendix B, page 1 of 6 and the DSM revenue requirement for 2012. The Commercial & Industrial DSM revenue requirement for 2012 includes the costs associated with the commercial and industrial DSM program (C&I High Efficiency Incentive), the PowerShare® program, the High Efficiency School Incentive program, program development funds, and the associated net lost revenues and shared savings (Appendix B, pages 2 and 3 of 6). The 2012 Commercial and Industrial DSM Rider is calculated in two parts. One part (Part A) is based upon the revenue requirements for the C&I High Efficiency Incentive Program (Business and Schools). This part is only recovered from all non-residential rate classes except rate TT. The other part (Part B) is based upon the revenue requirements for the PowerShare® program and is recovered from all non-residential rate classes including rate TT.

Total revenue requirements are incorporated along with the projected electric volumes (Appendix B, page 4 of 6) in the calculation of the Residential DSM Rider.

The Company's proposed DSM Riders, shown as Appendices H and I, replace the current DSM Riders, which were implemented in the first available billing cycle of July 2011. The electric DSM rider, proposed to be effective with the first billing cycle in the month following Commission approval, is applicable to service provided under Duke Energy Kentucky's electric service tariffs as follows:

- Residential Electric Service provided under:
  - Rate RS, Residential Service, Sheet No. 30
  - Non-Residential Electric Service provided under:
    - Rate DS, Service at Secondary Distribution Voltage, Sheet No. 40
    - Rate DT, Time-of-Day Rate for Service at Distribution Voltage, Sheet No. 41
    - Rate EH, Optional Rate for Electric Space Heating, Sheet No. 42
    - Rate SP, Seasonal Sports, Sheet No. 43
    - Rate GS-FL, Optional Unmetered General Service Rate for Small Fixed Loads, Sheet No. 44
  - Rate DP, Service at Primary Distribution Voltage, Sheet No. 45
  - Rate RTP-M, Real Time Pricing – Market-Based Pricing, Sheet No. 59
  - Rate RTP, Experimental Real Time Pricing Program, Sheet No. 99
  - Rate TT, Service at Transmission Voltage, Sheet No. 51

The gas DSM rider is applicable to service provided under the following residential gas service tariff:

- Rate RS, Residential Service, Sheet No. 30

### Calculation of the Residential Charge

The proposed residential charge per kWh for 2012 was calculated by dividing the sum of: (1) the reconciliation amount calculated in Appendix B, page 1 of 6; and (2) the DSM Revenue Requirement associated with the DSM programs projected for calendar year 2012, by the projected sales for calendar year 2012. DSM Program Costs for 2012 include the total implementation costs plus program rebates, lost revenues, and shared savings. The calculations in support of the residential recovery mechanism are provided in Appendix B, page 5 of 6. Page 6 of 6 provides an adjustment to the Home Energy House Call program from filing period July 2009 – June 2010 and is reflected on page 1 of 6. The adjustment incorporates a reduction in the revenue requirements due to an overstatement in the estimated load impacts.

### Calculation of the Non-Residential Charge

The proposed non-residential charge per kWh for 2012 was calculated in two parts. The first part (Part A), applicable to all non-residential rate classes except Rate TT, is calculated by dividing the sum of: (1) the reconciliation amount calculated in Appendix B, page 1 of 6; and (2) the DSM Revenue Requirement associated with the C&I High Efficiency Incentive Program projected for calendar year 2012, by the respective projected sales for calendar year 2012. The second part (Part B), applicable to all non-residential rate classes including Rate TT, is calculated by dividing the DSM Revenue Requirement associated with the PowerShare® program projected for calendar year 2012, by total non-residential projected sales for calendar year 2012. DSM Program Cost for 2012 includes the total implementation costs plus program rebates, lost revenues and shared savings.

The rider applicable to all non-residential rate classes except Rate TT is the sum of Part A and Part B. The rider applicable to all non-residential rate classes including Rate TT is only Part

B.

Allocation of the DSM Revenue Requirement

As required by KRS 278.285(3), the DSM Cost Recovery Mechanism attributes the costs to be recovered to the respective class that benefits from the programs. The amounts associated with the reconciliation of the Rider are similarly allocated as demonstrated in Appendix B, page 2 of 6. The costs for the Power Manager program are fully allocated to the residential electric class, since this is the class benefiting from the implementation of the program. As required, qualifying industrial customers are permitted to “opt-out” of participation in, and payment for, the C&I High Efficiency Incentive Program. All of Duke Energy Kentucky’s Rate TT customers met the “opt-out” requirements prior to the implementation of the DSM Riders in May 1996, and are not subject to this portion of the DSM Cost Recovery Mechanism. However, all non-residential customers, including Rate TT customers, will be charged for the PowerShare® program.

**WHEREFORE**, Duke Energy Kentucky respectfully requests that the Commission review and approve this Application and Duke Energy Kentucky gives notice that the new rates will take effect thirty days from the date of this Application.

Respectfully submitted,

DUKE ENERGY KENTUCKY, INC.

By:



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## **CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing filing was served on the following via ordinary mail, postage prepaid, this 14<sup>th</sup> day of November, 2011:

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Rocco O. D'Ascenzo



**Appendix A**  
**Cost Effectiveness Test Results**

<b>Program Name</b>	2010 - 2011			
	<b>UCT</b>	<b>TRC</b>	<b>RIM</b>	<b>Participant</b>
Residential Conservation and Energy Education	1.01	1.01	0.70	NA
Refrigerator Replacement	0.89	0.89	0.51	NA
Residential Home Energy House Call	1.15	1.87	0.43	NA
Residential Comprehensive Energy Education Program (NEED)	0.11	0.11	0.10	NA
Power Manager	3.75	4.47	3.75	NA
Energy Star Products	1.37	1.49	0.58	NA
Energy Efficiency Website	1.21	1.69	0.56	NA
Personal Energy Report (PER)	3.77	12.50	0.81	NA
C&I High Efficiency Incentive (for Businesses and Schools)				
Lighting	6.66	3.62	1.37	4.20
HVAC	3.30	1.34	1.38	1.40
Motors	13.96	3.50	1.54	3.76
Other	7.19	3.11	1.42	4.18
Custom Incentives for Schools	NA	NA	NA	NA
PowerShare	1.71	14.48	1.33	NA



Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

Residential Programs	(1) Projected Program Costs 7/2010 to 6/2011 (A)	(2) Projected Lost Revenues 7/2010 to 6/2011 (A)	(3) Projected Shared Savings 7/2010 to 6/2011 (A)	(4) Program Expenditures 7/10 through 6/11 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/10 through 6/11 (B)	(8) Shared Savings 7/10 through 6/11 (B)	(9) 2010 Reconciliation Gas (D)	(10) 2010 Reconciliation Electric (E)	(11) Rider Collection (F) Gas	(12) Rider Collection (F) Electric	(13) (Over)/Under Collection Gas (G)	(14) (Over)/Under Collection Electric (H)
Res. Conservation & Energy Education	\$ 499,800	\$ 16,525	\$ (3,499)	\$ 640,199	\$ 402,685	\$ 237,514	\$ 17,894	\$ 640			NA	NA	NA	NA
Refrigerator Replacement	\$ 100,000	\$ 6,145	\$ 300	\$ 72,957	\$ 72,957	\$ 11,209	\$ (803)				NA	NA	NA	NA
Residential Home Energy House Call	\$ 150,000	\$ 49,810	\$ 35,700	\$ 140,792	\$ 88,558	\$ 52,234	\$ 18,972	\$ (1,028)			NA	NA	NA	NA
Res. Comprehensive Energy Education	\$ 81,500	\$ -	\$ -	\$ 78,880	\$ 49,615	\$ 29,265	\$ -	\$ -						
Payment Plus	\$ 150,000	\$ -	\$ -	\$ 97,444	\$ -	\$ 97,444	\$ -	\$ -						
Power Manager	\$ 875,000	\$ -	\$ -	\$ 1,082,096	\$ -	\$ 1,082,096	\$ -	\$ -			NA	NA	NA	NA
Program Development Funds	\$ 140,000	\$ -	\$ -	\$ 18,564	\$ 11,676	\$ 6,888	\$ -	\$ -			NA	NA	NA	NA
Energy Star Products	\$ 243,000	\$ 690,225	\$ 63,450	\$ 122,046	\$ -	\$ 122,046	\$ 584,877	\$ 4,515			NA	NA	NA	NA
Energy Efficiency Website	\$ 31,110	\$ 26,781	\$ 2,955	\$ 13,667	\$ 8,596	\$ 5,071	\$ 10,792	\$ 287			NA	NA	NA	NA
Personalized Energy Report Program	\$ 153,000	\$ 121,547	\$ 73,134	\$ 90,693	\$ 57,046	\$ 33,647	\$ 185,758	\$ 25,118			NA	NA	NA	NA
Residential SmartSaver	\$ 448,520	\$ 50,150	\$ 53,822	\$ -	\$ -	\$ -	\$ -	\$ -						
Home Energy Assistance Pilot Program (I)	\$ 247,283	\$ -	\$ -	\$ 259,999	\$ 109,283	\$ 150,716	\$ -	\$ -			\$ 104,692	\$ 144,383	NA	NA
Revenues collected except for HEF											\$ 5,027,378	\$ 2,859,187		
Total	\$ 3,119,213	\$ 961,183	\$ 399,862	\$ 2,617,337	\$ 727,459	\$ 1,889,878	\$ 829,502	\$ 47,125	\$ (4,197)	\$ (1,040,783)	\$ 5,132,070	\$ 3,003,570	\$ (4,408,808)	\$ (1,277,849)

(A) Amounts identified in report filed on November 15, 2010.

(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2010 through June 30, 2011 and lost revenues for this period and from prior period DSM measure installations.

(C) Allocation of program expenditures to gas and electric. Uses 62.9% gas based upon saturation of gas space heating.

(D) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.

(E) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.

(F) Revenues collected through the DSM Rider between July 1, 2010 and June 30, 2011.

(G) Column (5) + Column (9) - Column(11).

(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).

(I) Revenues and expenses for the Home Energy Assistance Pilot Program.

Commercial Programs	(1) Projected Program Costs 7/2010 to 6/2011 (A)	(2) Projected Lost Revenues 7/2010 to 6/2011 (A)	(3) Projected Shared Savings 7/2010 to 6/2011 (A)	(4) Program Expenditures 7/10 through 6/11 (B)	(5) Program Expenditures Lost Revenues	(6) Shared Savings	(7) 2010 Reconciliation (C)	(8) Rider Collection (D)	(9) (Over)/Under Collection (E)
High Efficiency Program									
Lighting	\$ 209,520	\$ 308,352	\$ 10,698	\$ 232,849	\$ 484,005	\$ 131,835			
HVAC	\$ 142,760	\$ 29,247	\$ 14,588	\$ 113,104	\$ 38,202	\$ 26,012			
Motors	\$ 100,678	\$ 21,031	\$ 25,718	\$ 9,948	\$ 17,314	\$ 12,892			
Other	\$ 450,814	\$ 298,836	\$ 448,830	\$ 19,352	\$ 116,523	\$ 2,416			
Program Development Funds	\$ 60,000	\$ -	\$ -	\$ 5,222	\$ -	\$ -			
Total for High Efficiency Program	\$ 963,772	\$ 657,466	\$ 499,834	\$ 380,475	\$ 656,044	\$ 173,155	\$ 232,992	\$ 2,103,497	\$ (660,831)
PowerShare®	\$ 265,000	\$ -	\$ 107,641	\$ 407,028	\$ -	\$ 28,899	\$ 297,573	\$ 16,648	\$ 716,852

(A) Amounts identified in report filed on November 15, 2010.

(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2010 through June 30, 2011 and lost revenues for this period and from prior period DSM measure installations.

(C) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.

(D) Revenues collected through the DSM Rider between July 1, 2010 and June 30, 2011.

(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)

0

#### 2012 Projected Program Costs, Lost Revenues, and Shared Savings

## Residential Program Summary

	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs				Budget (Costs, Lost Revenue & Shared Savings)			
					Electric	Gas	Electric Costs	Electric	Gas Costs			
Residential - Current Programs/Measures												
Residential Conservation & Energy Education	\$ 499,800	\$ 16,525	\$ (3,499)	\$ 512,826	37.1%	62.9%	\$ 185,426	\$ 198,452	\$ 314,37			
Refrigerator Replacement	\$ 100,000	\$ 6,145	\$ 300	\$ 106,445	100.0%	0.0%	\$ 100,000	\$ 106,445	\$ -			
Home Energy House Call	\$ 150,000	\$ 49,810	\$ 35,700	\$ 235,510	37.1%	62.9%	\$ 55,650	\$ 141,160	\$ 94,35			
Residential Comprehensive Energy Education	\$ 81,500	\$ -	\$ -	\$ 81,500	37.1%	62.9%	\$ 30,237	\$ 30,237	\$ 51,26			
Home Energy Assistance Plus (continuing)	\$ 150,000	\$ -	\$ -	\$ 150,000	37.1%	62.9%	\$ 55,650	\$ 55,650	\$ 94,35			
Power Manager	\$ 875,000	\$ -	\$ 174,000	\$ 1,049,000	100.0%	0.0%	\$ 875,000	\$ 1,049,000	\$ -			
Program Development Funds	\$ 140,000	\$ -	\$ -	\$ 140,000	37.1%	62.9%	\$ 51,940	\$ 51,940	\$ 88,06			
Energy Star Products	\$ 243,000	\$ 690,225	\$ 63,450	\$ 996,675	100.0%	0.0%	\$ 243,000	\$ 996,675	\$ -			
CFL's (Compact Fluorescent Lights)												
Torchieres (Floor lamps)												
Energy Efficiency Web Site	\$ 31,110	\$ 26,781	\$ 2,955	\$ 60,846	37.1%	62.9%	\$ 11,542	\$ 41,278	\$ 19,56			
Personalized Energy Report Pilot Program	\$ 153,000	\$ 121,547	\$ 73,134	\$ 347,681	37.1%	62.9%	\$ 56,763	\$ 251,444	\$ 96,23			
Residential SmartSaver	\$ 448,520	\$ 50,150	\$ 53,822	\$ 552,492	37.1%	62.9%	\$ 166,401	\$ 270,373	\$ 282,11			
Total Costs, Net Lost Revenues, Shared Savings	\$ 2,871,930	\$ 961,183	\$ 399,862	\$ 4,232,975			\$ 1,831,608	\$ 3,192,653	\$ 1,040,32			
Home Energy Assistance Pilot Program	\$ 248,064									\$ 144,085	\$ 103,97	

C&I DSM Program Summary

0

Duke Energy Kentucky  
Demand Side Management Cost Recovery Rider (DSMR)  
Summary of Calculations for Programs

January, 2012 through December, 2012

	Program Costs (A)
<b><u>Electric Rider DSM</u></b>	
Residential Rate RS	\$ 3,192,653
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	\$ 2,121,069
Transmission Level Rates & Distribution Level Rates Part B	\$ 372,641
<b><u>Gas Rider DSM</u></b>	
Residential Rate RS	\$ 1,040,322

(A) See Appendix B, page 2 of 6.

0

# Duke Energy Kentucky

## Demand Side Management Cost Recovery Rider (DSMR)

### Summary of Billing Determinants

Year	2012
Projected Annual Electric Sales kWh	
Rates RS	1,476,126,000
Rates DS, DP, DT, GS-FL, EH, & SP	2,314,664,224
Rates DS, DP, DT, GS-FL, EH, SP, & TT	2,539,901,000
Projected Annual Gas Sales CCF	
Rate RS	63,317,380

0

Duke Energy Kentucky  
Demand Side Management Cost Recovery Rider (DSMR)  
Summary of Calculations

January, 2012 through December, 2012

Rate Schedule Riders	True-Up Amount (A)	Expected Program Costs (B)	Total DSM Revenue Requirements	Estimated Billing Determinants (C)	DSM Cost Recovery Rider (DSMR)
<u>Electric Rider DSM</u> Residential Rate RS	\$ (1,281,012)	\$ 3,192,653	\$ 1,911,642	1,476,126,000 kWh	\$ 0.001295 \$/kWh
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	\$ (662,467)	\$ 2,121,069	\$ 1,458,603	2,314,664,224 kWh	\$ 0.000630 \$/kWh
Transmission Level Rates & Distribution Level Rates Part B TT	\$ 718,627	\$ 372,641	\$ 1,091,268	2,539,901,000 kWh	\$ 0.000430 \$/kWh
Distribution Level Rates Total DS, DP, DT, GS-FL, EH & SP					\$ 0.001060 \$/kWh
<u>Gas Rider DSM</u> Residential Rate RS	\$ (4,419,719)	\$ 1,040,322	\$ (3,379,397)	63,317,380 CCF	\$ (0.053372) \$/CCF
Total Rider Recovery			\$ 1,082,114		
Customer Charge for HEA Program <u>Electric No.4</u> Residential Rate RS		Annual Revenues \$ 144,085	Number of Customers 120,071	Monthly Customer Charge \$ 0.10	
<u>Gas No. 5</u> Residential Rate RS		\$ 103,979	86,649	\$ 0.10	
Total Customer Charge Revenues		\$ 248,064			
Total Recovery		\$ 1,330,178			

(A) (Over)/Under of Appendix B page 1 multiplied by the average three-month commercial paper rate for 2011 to include interest on over or under-recovery in accordance with the Commission's order in Case No. 95-312. Valu 1.002475  
(B) Appendix B, page 2.

(C) Appendix B, page 4.

Appendix B

Reconciliation of Lost Revenues and Shared Savings

The calculation incorporates a reduction in the revenue requirements due to an overstatement in the estimated load.

Applicable Programs	Case No. 2010-00445							
	As Filed		New Values		Increase (Decrease) In Values		Increase (Decrease) In Values	
	Lost Revenues	Shared Savings	Lost Revenues	Shared Savings	Lost Revenues	Shared Savings	Lost Revenues (A)	Shared Savings (A)
Residential Home Energy House Call	\$ 30,643	\$ (384)	\$ 26,506	\$ (3,454)	\$ (4,137)	\$ (3,070)	\$ (4,231)	\$ (3,140)

(A) Difference in Lost Revenues/Shared Savings multiplied by 1.002733 for 2010 for the average three-month commercial paper rate to include interest on over or under-recovery in Case No. 2010-00445



# Process Evaluation of the Low Income Payment Plus and the Residential Conservation and Energy Education Programs in Kentucky - 2010/2011

Final Report

Prepared for  
Duke Energy

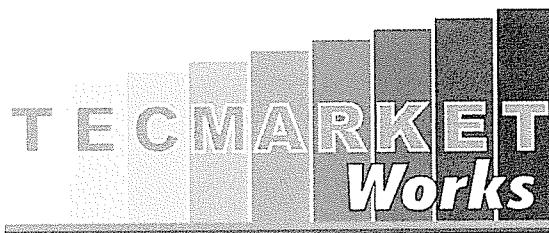
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October 27, 2011

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## Executive Summary

### About This Report

This report presents the results of a process evaluation of Duke Energy's Payment Plus and Residential Conservation and Energy Education Programs in Kentucky. The evaluation of the Residential Conservation and Energy Education program in this report is focused on participation through the Payment Plus Program.

This Payment Plus program provides energy efficiency, conservation and financial management training to participants. Upon completion of the courses, participants are referred to the Residential Conservation and Energy Education for weatherization services. Participants receive financial incentives in the form of arrearage credits to their account in order to encourage participation. Together the training and weatherization services are expected to lower participant's utility bills and improve their payment performance. This evaluation focuses on the program during the time period of summer 2010 through summer 2011.

### Summary of Findings

An overview of the key findings identified through this evaluation is presented in this section.

### Significant Process Evaluation Findings

TecMarket Works interviewed seven individuals associated with the design, management, and operations of the program. The findings from these interviews are presented in Section 1: Management Interview Results and summarized below.

1. The program received few customer complaints and appears to be working smoothly and effectively from a participant perspective. The managers interviewed all indicate that communications and coordination between all three teams (Duke Energy, PWC, and NKCAC) is working very well.
2. NKCAC would like to be able to conduct face-to-face enrollments with their clients. This is acceptable as long as they are pre-screened by Duke Energy prior to the offer so that the offer is only provided to customers who are eligible.
3. The interviewed managers reported some changes that they would like to see considered or made to the Payment Plus Program. A full list and description of these changes summarized below can be found in section "Program Changes Interviewees Would Like to See".
  - Lengthen the energy efficiency training session by 30 or 60 minutes to allow for more discussion and Q&A between the weatherization provider (Al Lovin, PWC) with the participants. None of the surveyed participants indicated that the sessions were too long.
  - To help the Payment Plus Program meet its participation goals, managers all agree that eligible customers should be identified in the spring in addition to (or instead of) in the fall.

- If demand for the program increases beyond the budget, managers believe that program credits per participant could be lowered and still be high enough to entice people to attend the training sessions.
- Training sessions should include promotional material for all of Duke Energy's residential programs (such as Smart Saver® and Power Manager®), not just other low-income programs.
- NKCAC currently checks the list of eligible customers pulled by Duke Energy for past participation. While NKCAC staff believe they are thorough, it would be helpful if Duke Energy screened the list as well.
- Consider offering lower credit amounts for customers with lower arrearages. With some of the customers having less arrearage than the total credit amount, they are receiving credits that are applied to current or future bills. These customers likely do not need the full \$500 credit amount to be enticed to participate. In fact, this may result in a client "gaming the system" by not paying a bill if they know that a credit amount that is more than what they owe will be applied to their bill after they complete the program components.

### **Significant Participant Survey Findings**

TecMarket Works attempted to contact all program participants and was able to survey twenty-eight of the 141 participants of the 2010 Payment Plus Program. The significant findings from these surveys are reported below:

1. The driving force for participation was to obtain financial help in paying their utility bill.
2. Program participants understood the program requirements. They were not confused by the program requirements or designs.
3. Participants are very satisfied with the training sessions. On a scale of 1-10, average scores for all aspects of the training sessions were high across all of the response categories for both sessions (energy & budgeting). Satisfaction was particularly high when rating the instructor's knowledge (9.2 & 9.3), comprehensiveness of subject matter (9.3 & 9.3), and the sessions overall (9.4 and 9.5). These are high satisfaction scores.
4. Weatherized participants report very high (9.5 or higher) satisfaction with all aspects of PWC's weatherization services.
4. Duke Energy is not always identified by participants as the primary program sponsor. Less than a third were able to correctly identify Duke Energy as the organization that funded the measures. Fewer than half of the surveyed participants that were weatherized were able to recall that it was PWC that provided the energy audit and weatherization work on their homes.

5. Participant's opinions of Duke Energy have improved as a result of the program, with more than half of the participants reporting at least somewhat more positive opinions of Duke Energy.
6. Participants report that they have increased their knowledge of how to save energy. Over ninety percent of the participants reported an increase in their knowledge of how to save energy – with most reporting several actions they have taken since attending the energy education training session.
7. Participants report lower utility bills. Fifty-two percent of participants report that their utility bills have decreased “*somewhat*” or “*a lot*” since their participation, indicating that most participants think the program has helped them reduce their consumption.

## Introduction

This report presents the results of a process evaluation of the Payment Plus Program in Kentucky.

To conduct the process evaluation we interviewed program managers, implementers and their staff that are employed by Duke Energy, the Northern Kentucky Community Action Commission (NKCAC), and People Working Cooperatively (PWC).

## Program Description

The Payment Plus Program is designed to help low-income customers with significant arrearage and payment problems obtain the information and skills needed to control their consumption, reduce their utility bills, and be capable of managing their accounts in a way that results in lower arrearage levels. The program provides participants with significant credits (up to \$500.00 total) to their arrearage in an effort to help move them out of debt. If their arrearage level is less than \$500, the credits are then applied to current or future bill charges.

The program has three components. The first component is participation in an energy education training session designed to teach participants how to manage their energy use. The second component is a training session on financial management and household budgeting designed to teach participants how to manage their financial affairs so that they can better live within their income levels and pay their bills on time. The third component is a weatherization service in which their home is weatherized to make it more energy efficient. Participants were required to complete the energy training session, but were not required to attend the household budgeting training session or have their home weatherized. However, to obtain the \$500 participation credit the participants need to complete all three components of the program.

Full participants took advantage of all three components of the program and received \$500 in credits, free weatherization of their homes, and training that provides them with the skills they need to conserve energy and better manage their household budgets. Other participants enrolled in the program, attended the first training session (energy) and did not attend the second session but went on to obtain weatherization services, or attended both training sessions but did not go on to obtain weatherization services (possibly because they were already weatherized previously and therefore did not qualify). These "partial" participants received partial credits depending on which components of the program they completed.

The program is funded by Duke Energy and implemented by the Northern Kentucky Community Action Commission (NKCAC) in concert with People Working Cooperatively (PWC). NKCAC manages and administers the program, and coordinates and presents lessons at the training sessions. PWC conducts a portion of the energy education training session and promotes the weatherization services at the energy education session, and then provides the weatherization service if the participant is eligible for it.

## Program Theory and Operations

The program theory is simple and easily understood. The primary theory is founded on the belief that many low-income customers with high arrears can gain control over their bills and begin to pay down their debt if they are provided with the skills and support services needed to

assist them through this effort. The program is grounded in the theory that providing participants with a significant reduction to their arrearage will place them in a better position to gain control over their utility bill. The credits provided by the program provide a financial helping-hand to the participants. However, the program is also designed from the theory that participants need more than financial assistance to be able to effectively manage their account. As a result, the program provides training on how to reduce consumption by implementing effective energy management strategies. In addition to the energy education training session, the program also weatherizes their home (if they qualify) so that it is more energy efficient. Combined, the energy education training session and the weatherization measures provide a foundation for reducing consumption to be more consistent with participant's ability to pay for that consumption. Finally, the program theory indicates that the participant's ability to manage their energy bill is, to some degree, a function of their financial management skills. To improve participant's financial management skills, the program provides educational efforts aimed at helping participants establish household budgets and live within their budget. The program theory is based on the belief that these three program services, linked with substantial bill credits to start them on an improved payment path, provides a platform from which participants can begin to gain control over their accounts.

The Payment Plus Program services are implemented through a series of efforts that are coordinated across three teams, Duke Energy, People Working Cooperatively (PWC), and the Northern Kentucky Community Action Commission (NKCAC). The implementation tasks are described below.

1. NKCAC manages and administers the Payment Plus program for Duke Energy through a contractual agreement between the two organizations.
2. Duke Energy annually identifies low-income customers who are LIHEAP participants, have high arrears, a good history of trying to pay their bills, and at least 12 months of home occupancy at their current address.
3. The eligible customers on the list provided by Duke Energy are contacted by NKCAC via a program introduction letter explaining the program and requesting that interested customers contact NKCAC to enroll in the program. NKCAC supplements this effort with phone calls to improve enrollment responses.
4. Program participants are required to successfully complete one task. The other two tasks are optional. These are:
  - a. Required Task: Attend one of the energy efficiency training sessions held on six different dates in September 2010. These workshops discussed and demonstrated methods to reduce energy consumption and gain control over their energy bill. In return, participants received a credit of \$200 applied to their arrearage.
  - b. Optional Task 1: Attend a household budgeting session held in October of 2010, which discussed and demonstrated household budgeting and management techniques to help participants understand how to better live at their income level. In return for attending this second training session, participants received a \$150 credit applied to their arrearage.
  - c. Optional Task 2: Receive an energy audit of their home to identify measures needed to lower energy costs, and receive weatherization services consistent with the audit results and approved measures. Both homeowners and renters could

receive weatherization services. However, if the participant rented, they needed to obtain the permission of the owner to conduct the audit and install the weatherization measures. After weatherization is completed, the customer received a credit of \$150 to their arrearage.

## Evaluation Methodology

The study methodology consisted of two parts. These are:

1. A process evaluation of the Payment Plus Program in which TecMarket Works interviewed key program managers and staff. The interviews were designed to review program operations and experiences and to identify and discuss any implementation issues associated with the program's design or operations.
2. A survey of participants was conducted to measure satisfaction levels, to identify implementation issues, and to identify barriers to program participation.

### Process Evaluation: Management Interviews

The process evaluation included onsite interviews with key Duke Energy, NKCAC, and PWC program delivery staff. These interviews focused on the design, planning, and implementation of the program and a review of the goals and objectives associated with the program. Interviews were conducted with the following individuals:

1. Nina Creech, PWC Weatherization Program Manager
2. Al Lovin, PWC Weatherization Program Supervisor
3. Support Staffer, PWC
4. Support Staffer, PWC
5. Tasha Davis, Duke Energy Program Manager
6. Jennifer Belisle, Deputy Director, Northern Kentucky Community Action Commission
7. Support Staffer, Northern Kentucky Community Action Commission

The interviews were conducted in August and September of 2011, and followed an evaluation interview protocol. This protocol is provided in Appendix A: Process Evaluation Interview Protocol and allows the reader to see the range and scope of the questions addressed during the process interviews.

### Process Evaluation: Participant Surveys

TecMarket Works' staff conducted interviews with twenty-eight participants who enrolled in the Payment Plus Program. The program enrolled 141 participants in 2010 that completed one or more program components. Eight surveyed participants took part in both training sessions and had weatherization measures installed in their homes.

The response rates for all surveyed participants is presented in Table 1 below. A summary of the demographics of the surveyed participants can be found in Appendix C: Participant Demographics.

**Table 1. Participant Survey Response Rate**

	Participants			
	Full Participants	Partial Participants		
		Both training sessions and weatherization	Energy training session only	Energy and financial training sessions
Enrollees	37	8	91	5
Surveyed	8	2	17	1
Response Rate	21.6%	25.0%	18.7%	20.0%

## Section 1: Management Interview Results

This section of the report presents the results of the process evaluation.

### Payment Plus Enrollment Process

The Northern Kentucky Community Action Commission (NKCAC) manages and administers the Payment Plus Program for Duke Energy. Duke Energy staff pulls a list of qualifying customers annually in August or September. NKCAC checks the list for past participants and removes customers that have participated in Payment Plus previously. The remaining eligible customers are then sent a letter informing them of the program and encouraging them to apply for participation. When the customer responds, NKCAC registers the customer for the training session(s) that best fits with the customer's location and schedule. If a customer does not respond to the letter, NKCAC calls the customer to encourage him or her to apply.

According to NKCAC managers, the Payment Plus Program is well received when verbally presented to customers and this practice results in increased enrollment in the program. Six of the 28 surveyed participants (21.4%) indicated that they learned of the program during a phone call from NKCAC or a "Duke Energy representative", which was likely NKCAC.

### Face-to-Face Enrollments

NKCAC staff report that they are in a good position to determine when a client is in need of the Payment Plus Program as a result of their ability to discuss their clients' specific problems and needs during their face-to-face encounters with them. However, if customers learn of the program before they are cleared by Duke Energy as eligible (showing a good payment history pattern, high arrearage, and sufficient duration of occupancy), there is the chance that some customers may "game the system" by increasing their arrearage until they feel that their enrollment application would be approved, or be turned down because they don't meet the program criteria.

According to interviewed managers, there will always be a few customers who will game the eligibility system in order to obtain the help they need or to obtain desired services. Savvy customers will learn that they can withhold payment until they are over the threshold and then apply for enrollment to get the help they seek. It may also mean an increase in disconnect notices as these customers increase their arrearage levels to gain program entry. If these customers are disconnected, they may find that they have gamed the system too far, thereby jeopardizing their eligibility by no longer being an active customer. These conditions are suggested by the interviewed managers and have not been validated via investigative interviews focusing on gaming practices.

### Participation is Not Meeting Program Goals

Payment Plus is budgeted for 200 participants annually. However, the program enrolled only 141 participants in 2010. The annual pull of customers for eligibility typically results in a list of about 400 customers being eligible for the program. After the list is screened by NKCAC to remove customers that have participated in previous years, the remaining customers on the list with over \$500 in arrearage are contacted first by a mailed letter and secondly by a phone call from NKCAC. When low participation results after this process, customers with \$300-\$500 in

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arrears are then contacted and offered the program. Even with this drop in arrearage requirements, the program is still not meeting its goal for participation.

TecMarket Works suggests that a list of eligible customers be pulled twice a year (instead of once a year). There is budget for 200 participants a year, and all of the program managers believe that maximum participation could be met if eligible customers were identified twice a year. All managers interviewed for this evaluation agree that this will help more low income customers, allow the program to achieve its enrollment goals, and doing so would not be a burden on program staff.

### Reasons for Non Participation in the Program

We asked all interviewees why they thought high arreased customers who have trouble paying their bills would not want to participate in the Payment Plus Program. We received a number of responses to this question. These include:

1. The customer is not sure if the offer is real, unsure about the real purpose of the program, don't believe it.
2. Their personal image is at stake. They don't want to be seen as poor money managers or as a low-income person who can't make resolve financial problems on their own.
3. They feel that they may be able to handle their debt if allowed more time.
4. They are not interested in a free service, handouts, and want to take care of their debt on their own.
5. Timing of the workshops does not fit into their schedule.
6. They are handicapped or otherwise have trouble getting around.
7. They may have account inconsistencies with regard to who is actually living in the home vs. the official name and contact information on the account and not want that discovered.
8. The arrearage is at a different address than where they live and they don't want this inconsistency discovered.

### Reasons for Non Participation in Weatherization

We also asked interviewees about the reasons participants might have for not wanting the weatherization service provided by the Payment Plus Program. We received only a few answers to this question. Interviewees indicated that all participants in Payment Plus that were eligible for weatherization did receive or were going to receive this service, indicating that participants who are eligible for weatherization and meet the documentation requirements will receive weatherization services. Reasons for not receiving / requesting weatherization services that were provided by interviewees include:

1. Landlords do not want anyone seeing the condition of the home because of code or housing violations, unsafe or non-working equipment or structures.
2. They do not want strangers in their homes.
3. They do not want people to see how they live or the condition of their home.
4. They are not interested in free service or handouts, want to do it on their own.
5. They are not sure about effects and benefits, think it may not be worth it.

Only about 30% of the 2010 participants received weatherization services through the Payment Plus Program. The participant survey included demographic questions, and 72% of the surveyed participants were renters.

### **No Problems with Enrolling Eligible and Willing Participants in Weatherization**

The weatherization enrollment and application process is included in the energy education training session so that participants can complete and turn in the weatherization application forms to PWC at the session. When the applications are collected and provided to PWC at the session, the energy audit is typically scheduled within a few days. The energy audit is completed within about one week from the scheduling of the audit, and the weatherization services are initiated usually within one week of the audit. As soon as a Payment Plus participant is weatherized, PWC calls Duke Energy to inform them the work has been completed and that the credit can be applied to the participant's bill.

### **Communication and Coordination is Excellent**

Communication and coordination between NKCAC, PWC, and Duke Energy are reported to be excellent by all involved. When the transition to a new Low Income Program Manager at Duke Energy occurred in March of 2011, there were some minor issues in getting needed and accurate data from Duke Energy, but nothing that resulted in any serious problems or frustrations. By the summer of 2011, all communications were prompt, accurate, and positive. The new Duke Energy program manager (Tasha Davis) received high praise from staff at both PWC and NKCAC.

PWC and NKCAC both report that they work together very well, and one PWC staffer attributed this directly to Florence Tandy and her hiring decisions at NKCAC.

### **Location of Workshops are Fine**

The training sessions are offered in each county throughout the service territory and by all accounts is working fine for both program management and program participants. Interviewees indicated that workshops are located so that they are convenient to the participant. It was also noted in these discussions that one-on-one training can be very effective and is offered to participating customers if necessary (especially for disabled or elderly clients).

### **Complaints Received From Participants**

Interviewees were asked if they had received complaints from participants during the program and if so, how they were handled.

Managers reported that they had very few complaints from participants about the program, and that the complaints received were minor. The issue discussed by interviewed managers and the complaints expressed on behalf of participants is that they have heard several complaints from participants regarding the speed at which credits were applied to participant's accounts. None of the managers identified this as an issue that needs significant attention as the credits are applied shortly after the participant completes a program component. Program records indicate that credits are applied 18 days, on average, after the participant attends the energy education training session and an average of 21 days after the household budgeting session. However, there are a

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few participants that had to wait almost 3 months after they attended the sessions to receive their credits.

One PWC manager indicated that they notify Duke Energy that they can credit an account for weatherization services within a day after the service is provided.

The late application of credits could be because Duke Energy will not apply the credit if there is a disconnect notice on the account. The credit can only be applied when the disconnection fee has been paid and the service is turned back on. This is communicated to the participants in the training sessions, but the rule is likely not recalled when the participant has a disconnect notice. These participants are likely frustrated that the credit cannot be applied to their bill at a time when they are facing a disconnection of service. This rule that they can't get the credit until they clear the disconnect notice from their account likely accounts for the complaints to program management and the reason for the delay in the participants' credits.

No other complaints or discussions of complaint issues were reported during the interviews. With these results, it is clear that the program process employed by Duke Energy allows the program to be a customer-oriented, coordinated delivery of program services that enjoys low levels of customer complaints.

**Program Changes Interviewees Would Like to See**

We asked managers to report the changes that they would like to see to the Payment Plus Program. Only a few recommendations were expressed by the managers, indicating that managers are satisfied with the program. However, a few of the interviewed managers provided recommendations for improvements. The recommendations provided by the interviewees are below.

1. Multiple managers and administrators of the Payment Plus program report that they would like to lengthen the energy efficiency training session by 30 or 60 minutes to allow for more discussion and Q&A between the weatherization provider (Al Lovin, PWC) with the participants. The session is scheduled for 2 hours, but more time would allow participants to ask questions and get them answered, and may result in more people obtaining the weatherization services.

None of the surveyed participants indicated that the sessions were too long, so TecMarket Works agrees that this session should be lengthened to allow participants to get as much information as they can and would like to receive while the program staff has their attention.

2. Allow NKCAC to recruit customers through their neighborhood centers and refer them to the Payment Plus Program. Participation is not meeting the limit of 200 participants a year. There is budget to help more low income customers, and NKCAC has the ability to check eligibility through "The Portal". They are not aware of any clients "gaming the system" by allowing their arrearage to build so that they can become eligible to enroll in Payment Plus, and they don't believe this would happen if they are allowed to check eligibility and recruit participants. However, ultimately, Duke Energy would have to

determine if these customers met the enrollment criteria. NKCAC could provide Duke Energy with the customer's name, address, and account number of the potential enrollee. Duke Energy could examine the participant's account information to test for an account history of at least twelve months, and to see if they had an arrearage of at least \$300.

The program enrollment process should be structured so that Duke Energy is not placed in the position of appearing to be an organization denying services to their low-income customers. This process could result in alienating Duke Energy's low income customers during the same period of time in which Duke Energy is providing valuable services to these customers and is seeking to improve these relationships. The program should not be presented to the customer until after the customer is approved for participation.

3. Pull a list of eligible customers in the spring instead of in the fall. The list of eligible customers is currently pulled in late August or early September. If a list were to be pulled in April or May, there would likely be a higher number of eligible customers, as many of low income customers may be struggling to pay arrearages they have accumulated over the winter heating season. This proposed schedule works for all managers interviewed. PWC indicates that they would be available to attend workshops in the spring and provide the weatherization work at that time. PWC indicated that this would be advantageous to the clients, allowing parents to bring their teenagers to also learn from the sessions (if training sessions are offered in the summer, when teenagers are not in school). PWC would not be overwhelmed with weatherization work in the spring, so the timing would work for them as well.
4. Pull a list of eligible customers twice a year. There is budget for 200 participants a year, and all of the program managers believe that maximum participation could be met if eligible customers were identified twice a year, in the spring and in the fall. This schedule works for all managers interviewed. PWC indicates that they would be available to attend additional workshops and provide the weatherization work.
5. The credits do not need to be as high as they are to entice people to attend the sessions. It would be possible to decrease program credits per participant to allow more participation and more program-wide focus on getting clients into both of the training sessions.
6. Program implementation managers would like for Duke Energy staff to attend the training sessions. (This did not occur in 2010 because of the transition to a new Low Income Program Manager that came on after the fall 2010 classes, in March of 2011.) Tasha Davis, the current Program Manager, is planning on attending all of the sessions in the fall of 2011.
7. Training sessions should include promotional material for all of Duke Energy's residential programs (such as Smart \$aver® and Power Manager®), not just other low-income programs.

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8. Provide rural customers with one-on-one classes if requested. There is available program budget to assist more customers, and if a rural customer is eligible and interested, the effort should be made to provide them with the training and weatherization services available through Payment Plus.
9. NKCAC currently checks the list of eligible customers for past participation. While NKCAC staff believe they are thorough, it would be helpful if Duke Energy screened the list as well.
10. Consider offering lower credit amounts for customers with lower arrearages. With some of the customers having less arrearage than the total credit amount, they are getting credits that apply to current or future bills. If participation is increased by allowing those with less than \$500 in arrearage to participate, they do not need the full \$500 credit amounts to be enticed to participate. In fact, this may result in a client not paying a bill if they know that a credit amount higher than their bill will be applied to their bill after they complete the program components.

### **Overall Benefits to the Participants**

Interviewed managers were asked to describe what the primary program benefits are to participants. We received a number of responses to this question, including:

- **Knowledge:** Participants gained a great deal of knowledge that will help them manage their bills, control their energy, and improve their lives. They learn to save energy, to reduce their bills, and to better budget for their household expenses.
- **Account Management Foundation:** The household budgeting training session provides participants with the skills to better manage their financial situation.
- **Arrearage Assistance:** The program provided a helping hand to give them a bit of a start down the road to improved financial management. It may take some time for them to see the benefits, but it is a start.
- **Corporate Caring:** Duke Energy is showing customers it cares about them and is willing to help these customers.
- **Lifestyle Changes:** If the program is successful it will change lifestyles and behaviors that have kept these customers down.

### **What Ratepayers Are Receiving**

Managers were also asked what benefits ratepayers receive from the Payment Plus Program. These responses are presented below:

- **Satisfaction:** Ratepayers can be satisfied that their utility and our society is providing help to these customers. We are all doing something to help by covering the program costs in the price of energy.

- **Lower Bad Debt:** If the program lowers debt levels then it helps all customers by controlling utility costs that must recover debt in the rates.
- **Not Another Welfare Program:** If the program helps these customers help themselves then it is not just another welfare program, but provides lasting value and improves lives.
- **Social Responsibility:** The program is a method of filling a social responsibility that people have to improve lives. In this case, the help is related to the energy needs of the low-income customer.

### What the Program Needs to Accomplish to be Called a Success

Interviewees were also asked what the program needed to accomplish to be called a success. The following responses were provided that indicated managers consider there to be two key areas of accomplishments. These are direct program impacts in both the level of energy consumption, but also in account performance. However, managers also reported that the program needs to accomplish social, behavioral or lifestyle changes to be called a success. However, managers could only speculate on the success of these issues. While managers reported that they think the education and weatherization services help, they are unsure of the degree of help or the actual results of the help provided by the program. The responses provided to this question are provided below:

1. Provide documented energy savings.
2. Provide documented debt reduction.
3. Have at least a part of participants move out of debt or lower their debt.
4. Help participants manage their money so that they have a higher quality of life.
5. Help participants use less energy and be able to spend that money on other things they need.
6. Lower participant arrearage levels to some degree.

## Section 2: Participant Survey Results

A total of twenty-eight interviews were conducted out of the 141 participating low-income customers. The survey was attempted with a census of participants rather than a sample. We interviewed twenty-eight participants who took part in one or more program events, including eight<sup>1</sup> participants who took part in both training sessions and had weatherization measures installed in their homes.

The response rates for all interviewed groups are presented in Table 2 below. The demographics of the interviewed customers can be found in Appendix C: Participant Demographics.

**Table 2. Participant Survey Response Rate**

	Participants			
	Full Participants	Partial Participants		
		Both training sessions and weatherization	Energy training session only	Energy and financial training sessions
Enrollees	37	8	91	5
Surveyed	8	2	17	1
Response Rate	21.6%	25.0%	18.7%	20.0%

### Recalling Participation or Enrollment in the Program

All twenty-eight surveyed participants were able to recall participating in the program.

### How Customers Learned about the Program

Thirteen of the 28 participants surveyed (46%) learned of the Payment Plus program by reading the enrollment letter sent to them by the Northern Kentucky Community Action Commission (NKCAC). Eight indicated that they learned of the program in a letter from Duke Energy. Three of the surveyed participants (11%) received a phone call from NKCAC and were told about the program by NKCAC staff. Three surveyed participants (11%) indicated that they were referred to the program by a Duke Energy representative over the phone.

**Table 3. How Participants Found Out About the Payment Plus Program**

	Frequency	Percent
Letter from NKCAC	13	46%
Letter from Duke Energy	8	29%
Phone call from NKCAC	3	11%
Phone call with Duke Energy	3	11%
Through another agency ("welfare office")	1	4%
Total	28	101%

<sup>1</sup> One of these six surveyed participants had to drop off during the course of the survey, however this participant's partial survey responses are included in this section.

### Main Reasons for Participation or Enrollment

The surveyed participants were asked why they enrolled in the Payment Plus program and they provided a total of 51 reasons. The most frequent response was "to help pay my current utility bill". The bill credits were another often cited reason, with eight of them indicated that was one of the reasons they enrolled.

**Table 4. Main Reasons Given for Enrolling in the Program**

N=28 participants; 51 reasons provided	Frequency	Percent
To help pay my current utility bill	21	41.2%
To receive the bill credits	8	15.7%
To save energy in my home	5	9.8%
To obtain weatherization services	5	9.8%
To make my home more comfortable	4	7.8%
To learn more about household budgeting	3	5.9%
To find ways to reduce my utility bills	2	3.9%
To avoid disconnect	2	3.9%
Other: "My bill was estimated \$800 for three months."	1	2.0%

### Obligation of Participants

Most participants understood their participation obligations fairly well. In responding, twenty-four of the 28 surveyed participants said that they had to attend two workshops though only one was required. Two indicated that they had to attend at least one workshop. Four of them thought that they had to get an energy audit done on their homes, and three specifically mentioned getting their homes weatherized was a requirement of participation. Only one of the surveyed participants was unable to say what was required of them (answering "don't know").

**Table 5. Participant's Understanding of Obligations of Enrolling in the Program**

N=28 participants; 35 responses provided by 27 surveyed participants	Frequency	Percent
Attend one workshop	2	5.7%
Attend two workshops	24	68.6%
Have an energy audit	4	11.4%
Obtain weatherization services	3	8.6%
Pay current utility bill on time	1	2.9%
Not be a previous participant	1	2.9%

Participants were also able to identify what they would receive in return for their participation. Twenty-seven of the twenty-eight indicated that they would receive bill credits, and four said that they would obtain home weatherization services. Others correctly said they would learn how to save energy and/or money at the workshops. Two provided incorrect answers and said that they would receive CFLs<sup>2</sup> or a refrigerator<sup>3</sup>.

<sup>2</sup> CFLs may have been provided at some of the training sessions.

<sup>3</sup> This participant may have also participated in the Low Income Refrigerator program offered by Duke Energy.

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- Money off the bill (n=27)
- Learn how to save energy (n=4)
- Weatherization (n=4)
- Learn how to budget money (n=2)
- CFLs (n=2)
- Refrigerator (n=1)

**Workshop Attendance: Reasons for Not Going and Suggestions for Improvement**

The survey discussed the reasons why participants did not or would not attend the educational training sessions. We asked this in two ways; first we asked participants who attended both training sessions why they think some participants elected to not attend the training sessions. Second, we asked participants who did not attend a training session why they did not attend.

Participants who attended both of the training sessions were asked for possible reasons for people not attending one or both of the training sessions. The responses include:

- "Don't make people give out personal information."
- "The location may have been an issue."
- "Let people know about it, many of my friends did not get a letter."
- "Maybe they didn't know about it."
- "People who live from month to month can't plan ahead."
- "Probably just didn't want to do it."
- "They may have skipped out and thought they would still get the credit."
- "Too long a day."
- "They might think they know it all."
- "Because they are crazy."
- "Because of their schedule (working hours).

When we asked the participants that did not attend the household budgeting training sessions why they did not. Responses were:

1. "I forgot."
2. One had privacy issues; did not want to share financial circumstances.
3. One had a scheduling conflict.
4. One blamed Duke Energy, saying that "Duke dropped the ball" by not responding to his request for weatherization.

The interview also included questions soliciting suggestions for increasing the number of people who attend the training sessions. The responses we obtained include:

1. Coupons for future bills (emergency use) and CFL coupons.
2. Offer more classes at different times and more convenient locations.

### Why Customers Aren't Getting Weatherization

All 28 participants surveyed were asked about why participants would not want to receive weatherization services. Again, we asked this question in two ways. One, if the participant received weatherization services or was on the waiting list to receive services, we asked them why they thought others were not responding to the offer. Surveyed participants that received weatherization provided the following responses:

- Poor people don't want others to see what their house is like.
- They don't want people in their homes.
- They think they can do the work themselves.
- They did not know about it.
- They thought they had to own the house.
- They may think that the weatherization service does not have much effect.

We asked those participants that did not have their homes weatherized why they did not take advantage of the service.

1. Duke did not respond to my request for weatherization. (n=4)
2. Did audit but they never came back or called. (n=3)
3. I did not qualify (did it within last 7 years).
4. I hired a non-approved weatherization contractor and so did not get credit.
5. PWC helped, but my landlord took the key to the attic so the insulation work was not done.

Suggestions for improving the number of participants that follow through and obtain weatherization services were offered by both weatherized and unweatherized participants. These included:

- Advertise. (n=2)
- Better communication is needed. Clarify what services are provided.
- Do more than the simple things.
- Go door to door when in the neighborhood.
- Let them know about benefits.
- Let them know how much it might help. Getting a furnace and insulation was huge for me.
- Let them know that they will save money.
- Provide insulation.
- Show them how much they could save.
- Shorten the waiting list
- Work through Brighton Center (community support center)
- Provide more information about benefits for landlord.

### Awareness of Credits and How They Would be Applied

The survey included a series of questions to determine if they were aware of specific aspects of the program operations. These questions were designed to determine if customers knew the

details about how the incentives would be credited. We asked the surveyed participants if they were aware that they would receive a credit on their bill after attending each of the sessions, and after the completion of the weatherization work.

As reflected in Table 6, most of the customers were aware of how the credits would be applied. The results of these questions indicate that participants knew the value of the credits and how the credits were to be applied.

**Table 6. Customer's Understanding of Credits**

Number of customers who understood (at the time of enrollment) that the:	Participants (n=28)	
	Frequency	Percent
Energy Session = \$200 credit	22	79%
Financial Session = \$150 credit	23	82%
Weatherization = \$150 credit	20	71%

### **Importance of (and Issues with) the Incentives**

Earlier we presented that the credits offered through the program were the main reason people chose to enroll in the program. Of the 28 participants surveyed, twenty-three (82%) scored the importance of the incentives a 10 on a 10-point scale. No participant scored the importance of the credits lower than 8 on the 10-point scale. Across all participants, the importance of the credits in their decision to participate averaged 9.7 on a 10-point scale.

While the credits were the single most important driver of program enrollment (discussed earlier) getting the credits applied to the participant's bill was an issue for many. Fourteen (50%) out of the 28 participants surveyed reported having a problem getting the credit applied to their bill. Two of the surveyed participants thought it took too long for the credits to be applied. The other participants could not or would not say what the problem was, and others said that they did not receive the credits. However, Duke Energy's records show that they all did indeed get their credits. The average wait time was approximately 3 weeks, but some participants waited as long as 3 months before their credits were applied. All credits were applied well before the surveys were conducted.

- “I did not get the credit for weatherization. The inspector told me that I needed a new furnace, but he never came back. An independent contractor said there was no need for a new furnace. Duke was rude when I called about it. I got CFLs but no furnace filters.”
- “I did not get the weatherization credit.”
- “I never got any credit for the two classes.”
- “It took longer than I thought it should.”
- “Took a while for the second credit.”
- “Would not give me credit.”

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### **Incentive Structure**

Participants were asked an open-ended question about the minimum amount of credit that would need to be offered for them to attend one of the program training sessions. Table 7 presents the resulting responses to this question expressed by twenty-one participants.

Responses ranged from a low of "any amount" to a high of \$200 per session. On average participants reported that \$128 would be needed to incentivize the training session attendance. The incentive offered by Duke Energy is greater than the mean incentive participants report needing in order to attend the training sessions.

**Table 7. Minimum Credit Needed to Attend a Training Session – Open-Ended Responses**

Open-ended response given	Participants (n=28)	
	Frequency	Percent
Don't Know	4	14%
\$75	1	4%
\$100	9	32%
\$150	11	39%
\$200	1	4%
Any Amount	2	7%

### **Satisfaction with the Training Sessions**

During the surveys, participants were asked to rate their satisfaction with specific aspects of the program's training sessions. Participants were asked to score their satisfaction using a 10-point scale where a 1 means very unsatisfied and a 10 means very satisfied. We asked participants to rate their satisfaction with the convenience of attending, comprehensiveness, materials, credits provided, the instructor's knowledge and the instructor's presentation skills. We asked these questions for each of the two training sessions. A score of less than 7 (on a 10-point scale) typically means that there is at least some level of dissatisfaction with a program component. When participants provide a score of 7 or less in a response, they were asked how that aspect of the program could be improved.

Participants report high levels of satisfaction with the bill credits and the comprehensiveness of the subjects covered. While all the mean satisfaction scores of both sessions are high, the highest scores are provided for the sessions overall. Table 8 presents the satisfaction scores for the surveyed program participants.

**Table 8. Mean Satisfaction Scores for Training Sessions**

Customer Satisfaction with:	Energy Session (n=28)	Financial Session (n=25)
Bill Credits Provided	9.36	9.29
Instructor Knowledge	9.21	9.25
Comprehensiveness of Subjects	9.32	9.33
Materials Handed Out	9.21	9.17
Instructor Presentation Skills	9.14	9.25
Convenience of Attending	9.14	9.13
Session Overall	9.39	9.50

The comments of participants scoring the energy education training session below a 7 are provided below. The factor being scored and scores are provided after the comments in parentheses.

1. "Was redundant." (Presentation Skills, score: 6)
2. "They were not able to answer some questions." (Comprehensiveness, score: 7)
3. "Should have been distributed at start of meeting." (Information Provided, score: 7)
4. "I did not get credit on my bill." (Bill Credit Provided, score: 0)
5. "I don't drive, but it wasn't that far, so it wasn't a big deal." (score: 7)

The comments of participants scoring the household budgeting training session below a 7 are provided below. The factor being scored and scores are provided after the comments in parentheses.

1. "Too long a day." (Convenience, score: 5)
2. "I did not get credit on my bill." (Bill Credit Provided, score: 0)
3. "Teach us better ways to execute a budget in the real world." (Information Provided, score: 6)

In other areas, the scores all have an average of over 9.0, indicating that the customers were very satisfied with the sessions. However, there were a few negative comments that came with the lower scores:

Energy training session comments:

- "Do sessions more often." (n=2)
- "Better information about requirements."
- "Clear answer on which is cheaper - electric or gas."
- "Do it every year."
- "Follow up after a year."
- "Have it more than once a year."
- "Offer better locations."
- "More information."
- "More review of the handouts, instead of giving them out at end of class."
- "Sign in process at beginning was not organized."

The energy education training session included games for the attendees to play. None of the surveyed participants reported learning anything from the games, but one participant said that the games "helped to make everybody comfortable and relaxed".

Household budgeting training session comments:

- "Tell me how to manage when my fixed income is less than the bills I must pay."
- "I would have liked more information."
- "I would like the opportunity to attend again next year."

We also asked the participants if the sessions were too long, too short, or about right. Table 9 indicates that the majority of customers thought that the training sessions were about the right length of time. None of the surveyed participants said that the sessions were too long.

**Table 9. Customer Opinions on the Length of the Training Sessions**

	Too Long		About Right		Too Short	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Energy Session (n=28)	0	-	26	93%	2	7%
Financial Session (n=24)	0	-	23	96%	1	4%

### Satisfaction with Weatherization Services

Surveyed program participants who had received their weatherization service before the evaluation survey are very satisfied with the quality of the measures installed and scheduling the energy audit. All aspects of the weatherization services are scored at 9.5 or higher on a 10-point scale.

**Table 10. Customer Satisfaction with Weatherization Services**

Satisfaction with:	(n=10)
Quality of the Measures Installed	9.9
Scheduling the Energy Audit	9.9
Weatherization Services Overall	9.8
Information on the Installed Measures	9.7
Scheduling Weatherization	9.5

There was only one score over all aspects of the weatherization lower than 8 that prompted the survey taker to ask why the participant was scoring the service so low. One participant had a problem with the scheduling of the weatherization. That comment is:

- "The weatherization was not done until the winter was almost over." (Scheduling, score: 6)

We also asked surveyed participants who received weatherization services if the installation crew completed any repairs on the home while they were installing the weatherization measures.

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While 8 out of the 10 participants reported that the weatherization crew did complete some home repairs, in all cases further discussion of these “repairs” turned out to be a component of the installation of a weatherization measure.

### Awareness of Providers

**Table 11. Participants Recollection of the Organizations Providing Weatherization Work**

	Audit and weatherization work done by:	Funding for the work was provided by:
Duke Energy	-	3
NKCAC	1	1
PWC	4	

Fewer than half of the participants were able to recall that it was PWC that provided the energy audit and weatherization work on their homes. Less than a third were able to correctly identify Duke Energy as the organization that funded the measures.

### Expectations of Weatherization

The program manager asked the evaluation team to ask participants what their expectations were with the weatherization service. We asked the following question of the nine surveyed participants that were weatherized: *"What did you expect from the weatherization services?"* Their responses were:

- "It would help me keep the air in."
- "I did not expect a new door that was a nice surprise. I knew about the rest."
- "I was happily surprised."
- "I thought they would just show me how to do shrink wrap. I had no idea they would do so much."
- "Insulation."
- "Not all that!"
- "Not as much as they did."
- "I was expecting that they would put shrink-wrap on my windows."
- "I thought I would get some CFLs."

### Value of Program

As part of the evaluation, we asked the customers to value the three components of the program. The customers were very appreciative and valued the program highly. Surveyed participants scored the value of the energy education training session, the household budgeting training session, and the weatherization services very high, with all three receiving a median score of 10. The mean value scores are as follows:

**Table 12 Mean Value Scores of Program**

Value of the:	Mean Score
energy education training session (n=28)	9.3
household budgeting training session (n=24)	9.4

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weatherization service (n=10)	9.8
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### Views of the Overall Program

We also asked the surveyed participants how satisfied they were with specific aspects of the Payment Plus program. The results indicate very high satisfaction with all aspects of the program. Table 13 presents the satisfaction scores for the aspects of the program that were measured.

**Table 13. Mean Satisfaction Scores of Program**

Satisfaction with:	Mean Score	Median Score
Overall Program	9.0	10
Ease of Filling out Application Forms	9.3	10
Communication during the Application Process	9.3	10
Communication during Sessions and Weatherization	8.9	10

These scores are all very high, and the complaints are minor or simply incorrect when program records and customer billing history is referenced - participants were called back and did receive credits for all program components that they participated in.

1. "I had to call with questions." (Ease of Application, score: 7)
2. "Lack of follow-up about the need for furnace replacement." (Communication during Application Process, score: 5)
3. "They put me on the waiting list for an audit but never called or helped." (Communication during Sessions and Weatherization, score: 4)
4. "Duke did not contact me about weatherization." (Communication during Sessions and Weatherization, score: 4)
5. "Duke did not follow through on budget class nor weatherization." (Program Overall, score: 4) *Note, this person did attend the budget class and received credit for doing so.*
6. "I never got weatherization." (Program Overall, score: 7)

Satisfaction scores are high, and twenty out of twenty-seven surveyed participants (74%) reported that they told friends and/or family about the program. These twenty participants estimated that they told a total of 177 people about the program, or an average of 8.8 people per surveyed participant.

We also wanted to know what surveyed participants liked the most about the Payment Plus program, and what they liked least. The informational and educational aspects appear to be the aspect of the program that surveyed participants liked most. While people enrolled for the credits, and valued the credits most, the training sessions were reported as the most liked aspect of the program.

When participants were asked what they liked most about the program made the following responses:

Educational efforts and information aspects:

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- Classes
- The way they communicated the information in the class.
- Showing us how to weatherize and save money.
- Explained things to me; how to figure out how to lower my bill.
- I learned how to conserve energy.
- Learning how to save energy, how to budget, and credits.
- Learning about winterizing.
- I learned so many things about saving energy.
- Information about phantom power, CFLS & insulating pipes.
- Knowledge about saving energy.
- It was informative; instructors had a good attitude; they taught us a lot about how to save energy and money.

Bill credits and billing assistance aspects:

- Credits (n=4)
- Help with the bill. (n=3)
- Getting bill credits for the class.

Other aspects they liked the most:

- That Duke would provide the program.
- Duke is willing to help people who need help.
- The fact they reached out to me and did so much without my asking in the first place.
- Program employees at sessions.
- The way they presented themselves. (Program staff & instructors)
- Willing to come out and help.

Weatherization aspects:

- Having my home insulated. (n=3)

We also asked surveyed participants what they liked least about the Payment Plus program. Twelve of the surveyed participants (44%) were able to identify what they liked least about the program. Their responses are below. The other participants could not think of anything that they liked least; they were very pleased with the program.

Least liked aspects of the training sessions:

- "Did not get weatherization." (n=2)
- "Could not determine if I should be using gas or electric for new appliances (re: energy costs)."
- "It took too long to complete weatherization."
- "Misinformation and lack of follow-up about need for furnace replacement."

Things they would change about the program:

- "Tell me how to manage when my fixed income is less than the bills I must pay."
- "Offer classes on different days."
- "More information."
- "Opportunity to attend next year." (n=2)
- "Follow up each year." (n=4)
- "Better communication about weatherization requirements."
- "Follow through with promised benefits."

### Views of Duke Energy

After being told that the Payment Plus Program was provided by Duke Energy, we asked if their attitude towards Duke Energy had become more positive, more negative, or stayed about the same. If they responded with a change, we asked them if their attitude was much or somewhat more positive or negative, and why.

Only one of the surveyed participants reported that their attitude toward Duke Energy had become somewhat more negative, and 69% indicated that their attitudes were more positive. The reasons for these positive changes in attitudes are described below Table 14.

**Table 14. Participant's View of Duke Energy**

View of Duke Energy is now:	Frequency	Percent
Much more positive	4	15%
Somewhat more positive	13	54%
About the same	8	33%
Somewhat more negative	1	4%
Much more negative	-	-

Participants offered the following comments after saying that their attitude towards Duke Energy has improved because of their participation in Payment Plus.

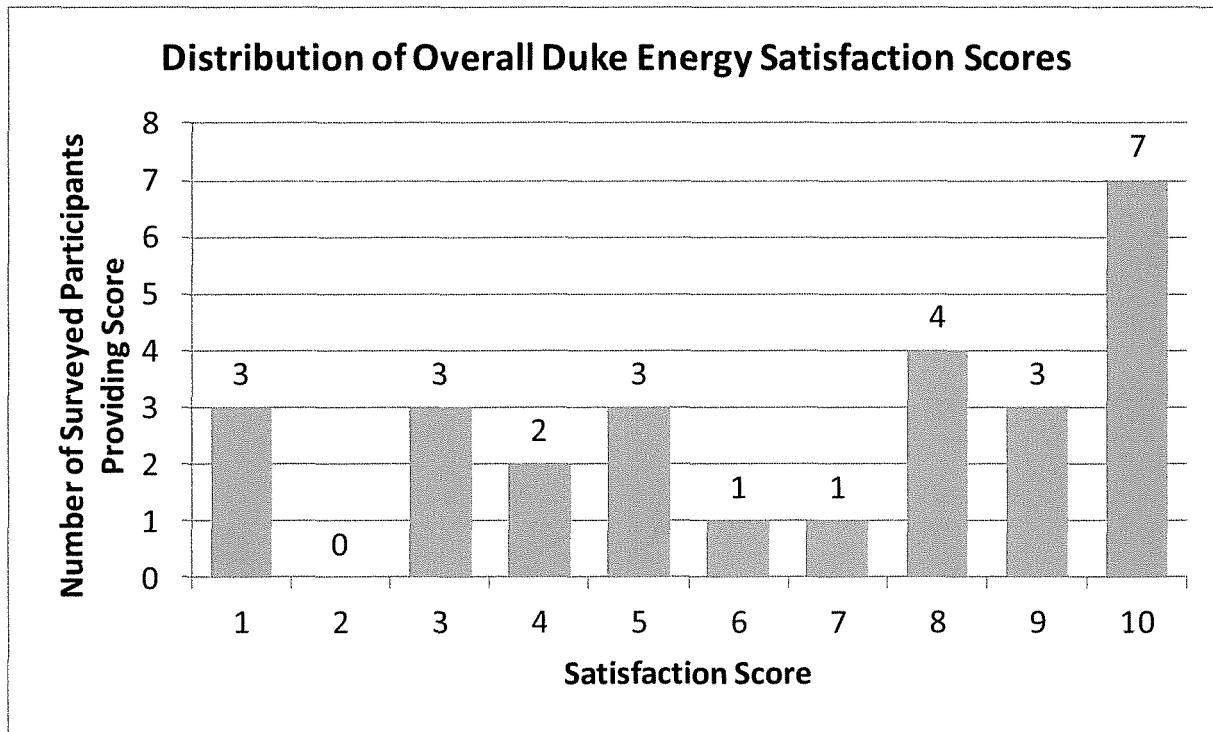
- "Because they are trying help us."
- "Duke is doing more to help customers."
- "Duke is making an effort to help us. It's a great program and should be continued."
- "Duke seems to be trying to help."
- "Duke seems to care about its customers."
- "I am thankful for this program."
- "I appreciated the money and the information."
- "Learned so much in the classes. They care."
- "There are so many companies that could help people but don't. Electricity is a necessity for a family."
- "They actually care about the people."
- "They did try to help us."

One participant offered a comment after saying that their attitude towards Duke Energy has become more negative.

- "Duke did not supply credits or do promised weatherization."

### Overall Satisfaction with Duke Energy

TecMarket Works asked surveyed participants to rate their overall satisfaction with Duke Energy on a 1 to 10 scale. The mean score was 6.6, but the median score given was 8. The most common response was 10. Of the seven surveyed participants providing a score of 10, five of them received weatherization through the Payment Plus Program. The distribution of satisfaction scores is presented in Figure 1 below.



**Figure 1. Distribution of Overall Satisfaction Scores for Duke Energy**

When a surveyed participant provided a satisfaction score of 7 or less, we asked how Duke Energy could improve their satisfaction. The following responses were provided:

- Duke charges too much. (score: 7)
- Lower electricity rates. (score: 6)
- I do not understand disconnection rules. (score: 5)
- Please give me the promised credits and weatherization. (score: 5)
- Sometimes Duke puts you on hold too long or never come back at all. (score: 5)
- Paying bill in full starting September 1 will be impossible. I used to work full-time, had my hours cut. This new policy will hurt a lot of people. (score: 4)
- Rates are much higher than utilities in nearby states. (score: 4)
- Duke won't respond to me about weatherization. (score: 3)
- Please end the new policy where people must pay their bill in full. And the rates are too high. (score: 3)
- These bills are way too high. More than my rent. They should be same the amount every month. (score: 3)

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- Don't require a deposit, I cannot afford it, I can only afford the bill. (score: 1)
- Duke Energy doesn't care about us. Care! (score: 1)
- Duke's style of working with people is less lenient than Cinergy. (score: 1)

**Participants' Recommendations for Program Improvements**

Participants were asked for suggestions for changes and what additional services the Payment Plus program could offer to improve the program and increase participation.

- Follow up after weatherization to check on it. (n=4)
- Allow people to participate more than once.
- Coupons for CFLs; shrink wrap for windows and other weatherization supplies.
- Have evening sessions for people who work (days).
- Help people every year.
- Information about other programs for poor and struggling families.
- Install new windows.
- More classes and more information.
- Provide more information about energy use - different fuels in particular.
- Show us additional ways to save money.
- Wish they would offer this program again.

We asked surveyed Payment Plus participants about their opinions on how Duke Energy can help low-income customers pay their bills on time. Their suggestions are given below.

- Don't charge late fees, poor people cannot afford an extra \$45 or \$10 a month.
- Don't charge late fees. Be more flexible about minimum amount required to pay on debt.
- Give extensions, don't cut off power.
- Give people a grace period. Listen to them and be more understanding of the unemployed. Lower amount required per month for back debt.
- Lower the bill.
- One on one counseling.
- Pay out of each paycheck. CAC helps people.
- Should not have closed payment centers. Don't have payment centers in grocery stores - people will spend their money on food before paying their bill.
- Three months to pay off an existing bill is much too short. Several hundred a month extra is impossible for fixed income as well as working people. Please take their circumstances into account.

**Changes in Energy and Payment Related Issues**

This section of the report presents the results of questions asked of the participants pertaining to changes in their utility bills, their ability to control energy costs and changes in their ability to manage their payments. The results of these questions are described below and summarized in Table 15.

### Changes in Knowledge of How to Conserve Energy and Ability to Pay Bills

None of the 28 participants surveyed said that their knowledge of how to save energy had decreased as a result of their participation. In fact, 92% of the participants said that their knowledge of how to save energy increased, indicating that the program's educational goals were successfully achieved. About 38% indicated that their ability to control energy use increased, but this does not correlate with an increase in their ability to pay their utility bill debt or other household bills. Participants cited increased living costs (food and gasoline were most often mentioned) as the reason for this.

**Table 15. Changes in Energy Knowledge, Use, Bill, and Ability to Pay**

	Increased a lot	Increased somewhat	Stayed about the same	Decreased somewhat	Decreased a lot
Knowledge of How to Save Energy	34.6%	57.7%	7.7%	-	-
Ability to Control Energy Use	19.2%	19.2%	57.7%	3.8%	-
Ability to Pay Utility Bill Arrearage	-	23.1%	65.4%	11.5%	-
Ability to Pay Other Household Bills	-	20.0%	68.0%	12.0%	-

### Changes in Monthly Utility Bill

Eleven out of twenty-three surveyed participants (47.8%) reported that their bills have decreased "somewhat" as a result of participation and one person (4.3%) said their bills have decreased "a lot". Together, 52% of participants said that their bills have decreased as a result of their participation. Seven of these participants that indicated a decrease in their bill and were able to provide an estimate of the change. The summaries of these estimates are in Table 16. Those that first indicated that their bill had decreased somewhat and provided an estimate of the monthly change gave a range of \$25 to \$120, with a mean estimated decrease of \$60. The participant that indicated that their utility bills had decreased gave an estimate of \$50 decrease in their utility bill as a result of participating in Payment Plus.

**Table 16. Estimates of Changes in Utility Bill**

	n	Percent reporting	Mean estimate of decrease
Participants that provided an estimate of decrease	12	52%	\$58.57
Reported bill decreased somewhat <b>with estimate</b>	6	48%	\$60.00
Reported bill decreased a lot <b>with estimate</b>	1	4%	\$50.00

### Most Important Things Learned from the Program

During the surveys, participants were asked to identify the most important thing(s) they learned from their participation. All but one participant reported that they learned one or more things

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that they would classify as most important. These items are listed as expressed by the participants and focus mostly on individual items learned during the training sessions.

Lessons learned from attending the energy education training session:

- Unplug unnecessary things (phantom energy draws) (n=14)
- How to save energy (n=8)
- Weather-strip windows & doors (n=6)
- CFLs (n=5)
- How to conserve hot water (n=4)
- Keep thermostat at constant temp (n=3)
- Thermostat lower in winter & higher in summer (n=2)
- Budgeting (n=1)
- Establish financial credit (n=1)
- How to winterize home (n=1)
- Low flow showerhead (n=1)
- Put plastic over windows (n=1)
- Refrigerator care (n=1)
- Water heater - insulate & lower temperature (n=1)
- Window coverings (n=1)

Lessons learned from the household budgeting training session:

- How to budget myself. (n=4)
- Saving energy means saving money. (n=3)
- Budgeting. Do not buy things you can do without.
- Buy what I need, not things I want.
- Financing on credit.
- How to manage money.
- I make a list before going to the store. I budget meals.
- Nothing, I'm on a fixed income.
- Spend a little to save in long run (saving \$50 a month using CFLs).
- Switch to CFL lights.
- We spend too much money on utilities.
- Writing out a budget.
- How to manage my credit report.
- To make a budget for all the things I owe.

**Actions Take as a Result of Participation**

One of the goals of the survey is to determine if participants have used the skills they learned during the two training sessions. To accomplish this goal we asked participants “*What actions, if any, have you taken in your home to save energy and reduce your utility bills as a result of what you learned in the this program?*” and “*What actions, if any, have you taken in your home to better manage your household budget as a result of what you learned in the this program?*” The responses to these questions demonstrate that participants are using the information and skills

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TecMarket Works	Findings
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gained during the training sessions to take actions that save energy, and that they have made adjustments to the way they handle their money. The actions taken as a result of participation in the energy education training session are listed below.

- Use CFLs (n=11)
- Unplug things (n=11)
- Shrink wrap windows (n=5)
- Keep thermostat at one setting (n=4)
- Window coverings - curtains, daylighting (n=4)
- Turn off lights (n=3)
- Turn off power strips (n=3)
- Weather-stripping windows & doors (n=3)
- Sealed drafts (n=2)
- Turn off AC when away (n=2)
- Be conscious of use
- Clean burners
- Clean filter monthly
- Close off unused rooms
- Don't run fans 24hrs a day
- I moved to an apartment
- Insulate pipes
- New Energy Star freezer and refrigerator
- Wash in cold water

Actions taken as a result of participation in the household budgeting training session:

- I don't buy it if I don't need it (n=2)
- I try to budget bills (n=2)
- I use CFLs
- Curb spending
- I always ask "Is this a want or need?" and avoid buying "wants"
- I am good at putting a budget on paper, but making it work is hard
- I am working on it. But it is hard on a fixed income
- I do not use payroll advance places
- I don't go to Wal-Mart and spend unnecessarily
- I live on \$500 a month and have no debts
- I try to be aware of financing
- I watch the electric bill closer
- It is easier to budget my money
- Paying more than minimum on bills
- Shop just for what I need

Overall, it seems that the participants were able to incorporate a significant amount of what they learned into their lives and the lives of their families.

## Appendix A: Process Evaluation Interview Protocol

Title: \_\_\_\_\_

Responsibilities associated with the Residential Conservation & Energy Education Program:

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### Customer recruitment and retention

- What are the various ways in which participants are identified, contacted and offered the program. Please describe each of the ways customers were identified, contacted and enrolled in the program.
- What aspects of this process worked well? Which worked least well? Why?
- Please describe how the targeted mailings used to inform customers worked and how successful you think this effort was as stimulating customer's interest and involvement in the program. How could this be improved?
- What system for identification, notification and enrollment do you think should be used in order to obtain participants and accomplish Duke Energy's program goals? Discuss how these might work.
- What screening tests were used to make sure the right customers were enrolled in the Residential Conservation & Weatherization Program. Please explain how the screening process worked. Walk through some different examples of how this worked. In your opinion, how well did this work? Why? Are any changes needed to the screening process?
- What were the eligibility requirements for participation in the Residential Conservation & Energy Education Program? (LIHEAP participant, in crisis, arrearage levels, length of relationship with Duke Energy, etc.)
- What percent of those contacted or approached were eligible?
- What are the main reasons customers have for not wanting to participate?
- What percent actually enroll once they apply and are screened?

### Program process

- What were the dates for the Energy workshops and where were they conducted?

- What were the dates for the Budgeting workshops and where were they conducted?
- When thinking about the way in which the workshops are conducted, do you think it is better for the participants to have multiple workshops located in different locations near where they live, or have workshops in one location and have the participants travel to that location? Why? What are the strengths and weaknesses of each approach?
- What complaints or customer issues did you experience in the Residential Conservation & Energy Education Program? How were these handled?
- What can be done to help resolve these complaints?
- I would like you to tell me about the customer's experiences with the program. What kinds of things did they like, what kinds of things did they dislike, and how do you think they feel about the program overall.

## Program Management and Communication

- Describe the process used for obtaining weatherization applications from program participants and getting the applications into the weatherization planning stream. Do you coordinate with other service providers in other states or counties?
- How well did this process work? Were there any problems in getting the applications to PWC after the participants filled them out? How can this process be improved?
- What is the system that is currently being used to credit accounts and how well is it working? In the program there were some issues with providing credits to participants after they attended a workshop. Are there any issues with applying these credits now?
- Were there any participant tracking, accounting or processing problems, or issues associated with tracking and delivering services or incentives? What were they and how can these be avoided in the future?
- What other types of management or participant issues have come up and what were their resolutions?
- If you had one thing to change about the Residential Conservation & Energy Education Program, what would it be? Why? How should this be incorporated into the program? Anything else that you would change?
- When you look at the help provided to participants by the program, and weigh the program costs and operational challenges; what would you say are the different types of benefits the participants receive from the program?

- Now I want to ask you about Duke Energy's ratepayers who are ultimately responsible for funding the Residential Conservation & Energy Education Program. What are the benefits that the program provides to all of Duke Energy's ratepayers?
- Do you think the cost and efforts associated with the Residential Conservation & Energy Education Program justify the results achieved? Why do you say this?
- Using your experience and knowledge about the Residential Conservation & Energy Education Program, please finish the rest of the following statement. I think this program can be viewed as a success if it accomplished the following things....
  - 1.
  - 2.
  - 3.
- How well do you think the Residential Conservation & Energy Education Program accomplished each of these things?

Now I would like to ask you about the kinds of things that the Program did not accomplish, did not accomplish well, or things that can be accomplished in a future version of this program.

- First, are there things that the program should have accomplished but for some reason was unable to accomplish? Why was this not accomplished? What can be done to accomplish this in the future?
  - 1.
  - 2.
  - 3.
- And, were there things that the program was designed to accomplish, but did not accomplish well? Why was that? What can be done to accomplish this in the future?
  - 1.
  - 2.
  - 3.
- And, are there things that could be accomplished by future programs, that were not a part of the past Programs? What are these and how can they be incorporated into the program?
  - 1.
  - 2.
  - 3.
- When we asked participants of the Program who funded and sponsored the program they did not report that Duke Energy (Duke Energy at the time) provided the program. What can the program do to help people understand that the program is being provided to them by Duke Energy, but is implemented through Duke Energy's contractors?
- One of the goals of the Program was to reach out to other counties and bring in participants across Duke Energy's northern Kentucky service territory. Has this been a program goal?

How can the program be structured to better provide services across Duke Energy's northern Kentucky customers? What kinds of things can be done to expand program services into these other counties?

## Appendix B: Participant Survey Instrument

### SURVEY INTRODUCTION

*If program participant has completed one or two training sessions and is a Residential Conservation/Weatherization participant. Use four attempts at different times of the day and different days before dropping from contact list. Call times are from 10:00 a.m. to 8:00 p.m. EST or 9-7 CST Monday through Saturday. No calls on Sunday. (Sample size N = census)*

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### SURVEY

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*Note: Only read words in bold type.*

**Hello, my name is \_\_\_\_\_ . I am calling on behalf of Duke Energy to conduct a customer survey about the Payment Plus Program. May I speak with \_\_\_\_\_ please?**

*If person talking, proceed. If person is called to the phone reintroduce.  
If not home, ask when would be a good time to call and schedule the call-back:*

Call 1: Date: \_\_\_\_\_, Time: \_\_\_\_\_ AM or PM  
Call 2: Date: \_\_\_\_\_, Time: \_\_\_\_\_ AM or PM  
Call 3: Date: \_\_\_\_\_, Time: \_\_\_\_\_ AM or PM  
Call 4: Date: \_\_\_\_\_, Time: \_\_\_\_\_ AM or PM

Contact dropped after fourth attempt.

**We are conducting this survey to obtain your opinions about the Payment Plus Program. We are not selling anything. The survey will take about 15-20 minutes and your answers will be confidential, and will help us to make improvements to the program to better serve others. May we begin the survey?**

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

**1. Do you recall participating in the Payment Plus Program?**

a.  Yes, begin —————→ *Skip to Q3.*

b.  No, —————

c.  DK/NS —————

**2. This program was provided through Northern Kentucky Community Action Commission. In this program, you took part in one or two training sessions on how to save energy and budget for household expenses. In exchange for attending these sessions, Duke Energy provided bill credits of \$200 for the energy conservation session, and \$150 for the household budgeting session. In addition, you may have had your home weatherized through the Residential Conservation and Energy Education Program, if so, another credit of \$150 was applied to your account for a total of \$500 in credits.**

**Do you remember participating in this program?**

a.  Yes, begin —————→ *Go to Q3.*

b.  No, —————

c.  DK/NS —————

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

**3. How did you first learn about or hear about Duke Energy's Payment Plus Program?  
(Check all that apply)**

1.  Received a letter in the mail from NKCAC describing the program
2.  Someone called me from the NKCAC (Northern Kentucky Community Action Commission) or the Kentucky Crisis Program
3.  Someone called me from Duke Energy
4.  I called NKCAC or the Crisis program or for other help
5.  I called Duke Energy for information or help
6.  Friends or neighbors
7.  Through another agency or organization (Church, PWC, State of KY, etc.)

*Specify response:* \_\_\_\_\_

8.  Other (fill in) \_\_\_\_\_

**4. What was the main reason you choose to participate in the Payment Plus Program? (do not read list, place a "1" next to the response that matches best)**

1. \_\_\_\_\_ To receive the bill credits on my arrearage or past-due debt

2. \_\_\_\_\_ To help pay my current utility bill
3. \_\_\_\_\_ To avoid having my power shut-off
4. \_\_\_\_\_ To receive Crisis program money or help with my utility bills
5. \_\_\_\_\_ Friends/neighbors/family encouraged me
6. \_\_\_\_\_ To obtain weatherization services or home repairs – improve efficiency
7. \_\_\_\_\_ To make home more comfortable
8. \_\_\_\_\_ To find ways to reduce my utility bills
9. \_\_\_\_\_ To save energy in my home
10. \_\_\_\_\_ To learn how to budget or make ends meet
11. \_\_\_\_\_ Other:  
\_\_\_\_\_  
\_\_\_\_\_

1. \_\_\_\_\_ Don't know

*If multiple responses: 4.a. Were there any other reasons? (number responses above in the order they are provided - Repeat until 'no' response. )*

**5. We are interested in learning what people understood about how the program operated. Please describe what you understood was required of you as a participant in the program and what you would receive in return for your participation.**

*(probe for details and fill in responses below)*

5a. Response (*What they needed to do*):

1.  Attended  1 or  2 sessions (check-off any applicable to response)
2.  Have my home audited via an energy audit      *(not required)*
3.  Have my home weatherized      *(not required)*
4.  Pay current consumption bills on time      *(not required)*
5.  Other responses on what they needed to do: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5b. Response (1) What they would receive, (2) how it would be received 3) what it could be used for): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**The Program offered participants bill credits on their utility bill debt to encourage participation in the program. I am going to read a list of things you might have known about the program, as I read each item please tell me if you were aware or not aware of each item at the time you first signed up for the program.**

**6. Were you aware that you would receive a bill credit of \$200 after the Energy Education training session?**

1.  Yes    2.  No    99.  DK/NS

*If No, 6a. Please tell me what you thought you would receive and what you had to do in order to receive it.*

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**7. Were you aware that you would receive a bill credit of \$150 after the Household Budgeting training session?**

1.  Yes    2.  No    99.  DK/NS

*If No, 7a. Please tell me what you thought you would receive and what you had to do in order to receive it.*

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**8. Were you aware that you would receive an additional bill credit of \$150 on your utility debt if you had your home weatherized?**

1.  Yes    2.  No    99.  DK/NS

*If No, 8a. Please tell me what you thought you would receive and what you had to do in order to receive the last credit.*

---

---

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**9. Were you aware that the credits offered through the program would be applied to your past-due debt?**

1.  Yes    2.  No    99.  DK/NS

*If No, 9a. Please tell me how you thought the credits would be paid.*

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**10. Did you have any problems or issues with getting the credits applied to your bill?**

1.  Yes    2.  No    99.  DK/NS

*If Yes, 10a. Please explain the problem.*

**11. You received total bill credits of \$ \_\_\_\_\_.00 for participation in the Program. On a scale of 0-10, with 10 being the most important reason, and 0 being the least important reason, how important were the bill credits in your decision to participate?**

\_\_\_\_\_ Score

**12. We are interested in learning what we might offer in order to convince people like yourself to participate in programs like the Payment Plus Program. Are there things that the program could have provided that you think would have caused more people to want to participate? \_\_\_\_\_**

**What is the minimum amount of credit that would need to be offered for you to attend one of the program sessions?: 12a:**

\$ \_\_\_\_\_ per session.

*If no amount given in Q12, ask Q13-Q16, else skip to Q17*

**13. Would you still have participated if the bill credits offered were \$25 a session instead of the \$150 to \$200 that was offered?**

1.  Yes    2.  No    99.  DK/NS

*If yes skip to Q 17, If no...*

**14. Would you still have participated if the bill credits offered were \$50 a session?**

1.  Yes    2.  No    99.  DK/NS

*If yes skip to Q 17, If no...*

**15. Would you still have participated if the bill credits offered were \$75 a session?**

1.  Yes    2.  No    99.  DK/NS

*If yes skip to Q 17, If no...*

**16. Would you still have participated if the bill credits offered were \$100 a session?**

1.  Yes    2.  No    99.  DK/NS

**17. What if the program provided the two sessions, but eliminated the weatherization work that was offered by the program. Would you still have participated?**

1.  Yes    2.  No    99.  DK/NS

I would now like to ask about your satisfaction with the Energy Education training session. I will read a list of items, after I read each item please tell me how satisfied you are with that item. Please indicate on a 0 to 10 scale with a 10 meaning you are very satisfied and a 0 to mean you are very dissatisfied.

**How satisfied are you with...**

**18. The convenience of attending the Energy training sessions?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**19. The knowledge of the Energy Education instructor?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**20. The presentation skills of the Energy Education instructor?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**21. The comprehensiveness of the subjects covered?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**22. The materials and information handed out at the session?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**23. The bill credits provided for attending the Energy Education session?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**24. The Energy Education session overall?**

       Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**25. How about the amount of time for the Energy Education session, was it ...**

- 1)  Too long,
- 2)  About right, or
- 3)  Too short?

**26. What would you say are the most important things you learned from the Energy Education session?**

Response:1 \_\_\_\_\_

**Anything else? If no, go to Q27.**

Response:2 \_\_\_\_\_

**Anything else? If no, go to Q27.**

Response:3 \_\_\_\_\_

**27. If you could change one thing about this session, what would that be?**

Response:1 \_\_\_\_\_

**Anything else? If no, go to Q28.**

Response:2 \_\_\_\_\_

**28. Did you learn anything from the games played in the session?**

1.  Yes    2.  No    99.  DK/NS

*If yes,*

**28a. What did you learn from them?**

Response:1 \_\_\_\_\_

**Anything else? If no, go to Q29.**

Response:2 \_\_\_\_\_

**29. Were you able to apply the information presented in the Energy Education session to your personal situation, or would it have been more helpful to have someone come to your home and discuss this information as it applies to you and your household?**

- a.  Sessions are fine
- b.  In-home would be better
- c.  DK/NS

**30. Using a 0 to 10 scale, with 0 meaning not at all valuable and a 10 meaning very valuable, how would you rate the overall value of the Energy Education session?**

\_\_\_\_\_ Score

**31. What actions, if any, have you taken in your home to save energy and reduce utility bills as a result of what you learned in this program?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

*Household Budgeting training session – if didn't participate, skip to Q47.*

**I would now like to ask about your satisfaction with the budgeting training session. I will read a list of items, after I read each item please tell me how satisfied you are with that item. Please indicate on a 0 to 10 scale with a 10 meaning you are very satisfied with that item and a 0 to mean you are very dissatisfied.**

**How satisfied are you with...**

**32. The convenience of attending the budgeting session?** \_\_\_\_\_ Score

*If 7 or less,*

**How could this be improved?** \_\_\_\_\_

**33. The knowledge of the budgeting instructor?**

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

**34. The presentation skills of the budgeting instructor?**

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

**35. The comprehensiveness of the subjects covered?**

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

**36. The materials and information handed out at the session?**

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

---

**37. The bill credits provided for attending the Budget session?**

\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

---

**38. The Budget session overall?**

\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_

---

**39. How about the amount of time for the budgeting session, was it ...**

- 1)  Too long,
- 2)  About right, or
- 3)  Too short?

**40. What would you say are the most important things you learned from the budgeting session?**

Response:1 \_\_\_\_\_

*Anything else? If no, go to Q41.*

Response:2 \_\_\_\_\_

*Anything else? If no, go to Q41.*

Response:3 \_\_\_\_\_

**41. If you could change one thing about this session, what would that be?**

Response:1 \_\_\_\_\_

*Anything else? If no, go to Q42.*

Response:2 \_\_\_\_\_

**42. Were you able to apply the information presented in the budgeting session to your personal situation, or would it have been more helpful to have someone come to your home and discuss this information as it applies to you and your household?**

- a.  Sessions are fine
- b.  In-home would be better
- c.  DK/NS

**Why would in-home be better for you?** \_\_\_\_\_

**43. Using the same 0 to 10 scale we used earlier, with 0 meaning not at all valuable and a 10 meaning very valuable, how would you rate the overall value of the budgeting session?**

Score \_\_\_\_\_

**44. What actions, if any, have you taken in your home to better manage your household budget as a result of what you learned in this program?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

**45. Some people who enrolled in this program did not attend the budgeting session. Why do you think people did not want to attend?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

**46. What do you think the program can do to increase people's interest in attending the budgeting sessions?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

*Skip to Q49.*

**47. Our records indicate that you chose not to participate in the Budgeting session that was offered with this program. What were the main reasons why you did not attend this session? Do not read list, check those that apply and fill in open-ended response as appropriate.**

- 1)  Privacy issues – did not want to share financial circumstances
- 2)  Forgot
- 3)  Don't have enough money to budget, owe a lot anyway
- 4)  Not interested in budgeting, don't care
- 5)  Didn't have good records of finances/budgeting
- 6)  Didn't think I would learn anything new, already know this material
- 7)  Have already attended other budgeting classes
- 8)  Could not make the training session due to:

---

9)  Other:

---

---

99)  DK/NS

**48. What do you think the program can do to increase people's interest in attending the budgeting sessions?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

*Weatherization – if didn't participate, skip to Q60. If not yet completed...skip to Q59*

**Next I want to ask you about your satisfaction with the weatherization service that inspected your home and installed items that made your home more energy efficient. I will read a list of several items, after I read each item please tell me how satisfied you are with that item. Please indicate on a 0 to 10 scale with a 10 meaning you are very satisfied with that item and a 0 to mean you are very dissatisfied.**

**How Satisfied are you with...**

**49. The ease of scheduling the energy examination of your home?** \_\_\_\_\_ Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**50. The convenience of scheduling the installation of the weatherization measures?** \_\_\_\_\_ Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**51. The quality of the measures installed in your home?** \_\_\_\_\_ Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**52. The information provided by the weatherization staff about what was installed in your home?** \_\_\_\_\_ Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**53. The Weatherization program overall?** \_\_\_\_\_ Score

*If 7 or less, How could this be improved? \_\_\_\_\_*

**54. Were there any repairs made to your home while it was being weatherized?**

1.  Yes    2.  No    99.  DK/NS

*If yes, 54.a. What types of changes or repairs were made? (Do not read list. Record all that apply.)*

1.  Roof repairs
  2.  Re-wiring
  3.  Fixing furnace
  4.  Repairing gas leaks
  5.  Other Specify:
- 
- 

99.  Don't know

**55. What did you expect from the weatherization services?**

---

---

**I would now like to ask you about the organizations that were involved in providing weatherization services to your home.**

**56. What were the names of the organizations that were involved in the energy audit and the weatherization of your home?**

---

---

**57. What were the names of the organizations that funded the weatherization measures installed in your home?**

---

---

**58. Using a 0 to 10 scale with a 10 meaning that it was very valuable to you and a 0 to mean that it was not at all valuable, how would you rate the value of the weatherization services provided as a result of your participation?**

Score \_\_\_\_\_

*If weatherization is complete, skip to Q60.*

**We understand that the weatherization on your home is not yet completed.**

**59. What are the primary reasons for the delays in scheduling the weatherization of your home?**

1.  Application too complicated
  2.  Difficulties in scheduling
  3.  Difficulties in gaining permission from landlord
  4.  Other
- 
- 

99.  DK/NS

**60. Some people who enrolled in this program did not respond when offered weatherization services. Why do you think people would choose not to have their homes weatherized?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

**61. What do you think the program can do to increase people's interest in having their homes weatherized?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

*Skip to Q64.*

**62. Our records indicate that you did not receive the weatherization services offered through this program. What were the main reasons why you did not get these services?**

- 1)  Privacy issues – did not want anyone in home
- 2)  House is already energy efficient, service not needed
- 3)  Not interested in weatherizing home, don't care
- 4)  I didn't send or forgot to send forms to the landlord
- 5)  Landlord did not want the service or did not return the forms
- 6)  Could not contact my landlord to get approval
- 7)  Don't own the house, not my responsibility
- 8)  Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

99.  DK/NS

*If response was 5 or 6:*

**62.a. What are the primary reasons why you think your landlord did not want to participate?**

---

---

**62.b. How can the program help you get the interest and permission from your landlord?**

---

---

**63. What can be done to get other people to participate in the weatherization services of programs like this?**

Response:1 \_\_\_\_\_

Response:2 \_\_\_\_\_

Response:3 \_\_\_\_\_

Response:4 \_\_\_\_\_

I would now like to ask about your satisfaction with certain aspects of the Payment Plus Program. I will read a list of items, after I read each item please tell me how satisfied you are using a 0 to 10 scale with a 10 meaning you are very satisfied and a 0 meaning you are very dissatisfied.

How satisfied are you with...

64. ...The application process and the ease of filling out the application forms?

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

65. ...The interactions and communications you had with the program staff during the application process?

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

66. The interactions and communications you had with program staff during and following the workshops and weatherization components of the program?

\_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

67. And, overall how satisfied are you with the program? \_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

68. And, overall how satisfied are you with Duke Energy? \_\_\_\_\_ Score

*If 7 or less, How could this be improved?* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

69. What one thing did you like most about the Program?

Response: \_\_\_\_\_

---

**70. What one thing did you like least about the Program?**

Response: \_\_\_\_\_

---

**71. What additional services would you like the program to provide that it does not now provide?**

Response: \_\_\_\_\_

---

**72. Are there any other things that you would like to see changed about the program?**

Response: \_\_\_\_\_

---

**73. Have you recommended the program to friends or relatives?**

- 1)  Yes
- 2)  No
- 99)  DK/NS

*If yes, 73a. How many people have you recommended the program to?*

Number: \_\_\_\_\_ (*Enter 99 if "Don't know".*)

**74. We are interested in other ways to encourage people to participate in programs like this. Can you suggest things that we can do to increase interest in programs like the Payment Plus Program?**

- 1.  Yes
- 2.  No
- 99.  DK/NS

*If yes, 74a. What are these things?*

Response: \_\_\_\_\_

---

**75. We are also interested in your ideas for how we can help people pay their bills on time. Are there other things that you think can be done to help people to pay their bills on time or pay off the debt they owe?**

- 1.  Yes
- 2.  No
- 99.  DK/NS

*If yes, 75.a. What are these things?*

Response: \_\_\_\_\_

**76. The Payment Plus Program was provided by Duke Energy. As a result of this program would you say your attitude toward Duke Energy is more positive, more negative or about the same? (If more positive/negative, ask if much more positive/negative or somewhat more positive/negative.)**

1.  Much more positive
2.  Somewhat more positive
3.  About the same
4.  Somewhat more negative
5.  Much more negative
99.  Don't know

*If attitude is more positive or more negative, then ask:*

**76.a. Why do you say that?**

Response: \_\_\_\_\_

**The next set of questions deal with some effects that the program may have had on you and your household.**

**As a result of your participation in this program....**

**77. Has your knowledge of how to save energy and reduce your utility bill increased, stayed the same, or decreased? (If increased or decreased, ask if a lot or somewhat)**

1.  Increased a lot
2.  Increased somewhat
3.  Stayed about the same
4.  Decreased somewhat
5.  Decreased a lot
99.  DK/NS

**78. Has your monthly utility bills increased, stayed the same, or decreased? (If increased or decreased, ask if a lot or somewhat)...**

1.  Increased a lot
2.  Increased somewhat
3.  Stayed about the same
4.  Decreased somewhat
5.  Decreased a lot
99.  DK/NS

*If answered 1, 2, 4, or 5:*

**78.a. Could you provide an estimate of how much your monthly utility bill, on average, has changed per month?**

\$ \_\_\_\_\_ per month

**79. Has your ability to pay what you owe the utility from previous months increased, stayed the same, or decreased? (If increased or decreased, ask if a lot or somewhat)...**

1.  Increased a lot
2.  Increased somewhat
3.  Stayed about the same
4.  Decreased somewhat
5.  Decreased a lot
99.  DK/NS

*If 1, 2, 4, or 5:*

**79.a. Why or how has your ability to pay changed?**

Response: \_\_\_\_\_

---

**80. Has your ability to pay other household bills increased, stayed the same, or decreased?**

*(If increased or decreased, ask if a lot or somewhat)...*

1.  Increased a lot
2.  Increased somewhat
3.  Stayed about the same
4.  Decreased somewhat
5.  Decreased a lot
99.  DK/NS

**81. Has your ability to control energy use in your home increased, stayed the same, or decreased? (If increased or decreased, ask if a lot or somewhat)...**

1.  Increased a lot
2.  Increased somewhat
3.  Stayed about the same
4.  Decreased somewhat
5.  Decreased a lot
99.  DK/NS

Demographics:

The last set of questions deal with household characteristics. These questions are optional and you do not need to give any information that you are uncomfortable with, but please keep in mind that any and all information you provide will remain confidential.

**82. Do you own or rent your home?**

1.  Own
2.  Rent or lease
3.  Other

**83. Which of the following categories best represents the age of the key Payment Plus Program participant in your home.**

1.  less than 18 years of age
2.  18 to 25 years
3.  26 to 35
4.  36 to 45
5.  46 to 55
6.  56 to 65
7.  66 to 75
8.  over 75

**84. How many people 18 or over currently live in your household? (record number)**

# \_\_\_\_\_ (*Record number*)

**85. Is the person you would call the head of the household employed...**

1.  full time
2.  part time
3.  unemployed
4.  retired, or
5.  disabled
6.  other

**86. How many other adults in your household are employed...**

\_\_\_\_\_ full time  
\_\_\_\_\_ part time  
\_\_\_\_\_ unemployed  
\_\_\_\_\_ retired  
\_\_\_\_\_ disabled

**87. How many people in your household are children under the age of 18?  
(fill in the age of each child)**

# \_\_\_\_\_ People

**88. How old is the building in which you live?**

\_\_\_\_ . \_\_\_\_ years

**89. How long have you lived in your home?**

\_\_\_\_ years \_\_\_\_ months

**90. What is the highest level of school you completed?**

1.  Middle school or less
2.  Some high school
3.  High school graduate
4.  Some college/technical school
5.  Technical school graduate
6.  College graduate
7.  Graduate degree or higher

**91. Which of the following BEST reflects your current marital status....**

1.  Currently married
2.  Unmarried but with partner
3.  Single, never married
4.  Single, divorced
5.  Single, widowed
6.  Other (*do not read response 6 or 7*)
7.  Prefer not to answer

**92. For the last question we would like to know which of the following categories best describes your total annual household income for 2010.**

1.  Less than \$5,000
2.  \$ 5,001 to 10,000
3.  \$10,001 to 15,000
4.  \$15,001 to 20,000
5.  \$20,001 to 25,000
6.  \$25,001 to 30,000
7.  \$30,001 to 35,000
8.  \$35,001 to 40,000
9.  Don't know, not sure
10.  Prefer not to answer

*Record the gender of the survey respondent / participant but do not ask the question.*

**93. Gender**

1.  Female
2.  Male

END

## Appendix C: Participant Demographics

This appendix presents the results to the demographic questions included in the participant interview.

### Home Ownership

Less than a third (28%) of the 25 participants interviewed own their homes.

	Count of Participants	Percent of Participants
Owners	8	28%
Renters	17	72%

### Age of Participants

Program enrollees were predominantly middle aged. This program continues to serve struggling customers with established adult lives.

Age	Count of Participants	Percent of Participants
18 to 25 years	1	4%
26 to 35	2	8%
36 to 45	5	20%
46 to 55	12	48%
56 to 65	2	8%
66 to 75	3	12%

### Size of Household

Most surveyed participants have one to three adults living in their home and many of the participants have children living in their homes.

Living in the Home	Count of Participants	Percent of Participants
1 adults	12	48%
2 adults	5	20%
3 adults	6	24%
4 adults	1	4%
6 adults	1	4%

Table 17 Number of Children in Participant's Homes

Children in the Home	Count of Participants	Percent of Participants
No children	12	44.4%
One child	7	25%
Two children	3	10.7%
Three children	2	7.1%
Four children	1	3.6%
Five children	2	7.1%

Ages of the surveyed participants' children:

- Participants reporting they had 1 child living in the home:
  - 5 months
  - 7 months
  - 4 years old
  - 5 years old
  - 7 years old
  - 13 years old
  - 17 years old
- Participants reporting they had 2 children living in the home:
  - 14 & 17 years old
  - 2 - 6 & 4 years old
  - 2 - 7 & 4 years old
- Participants reporting they had 3 children living in the home:
  - 2 month, 5 & 6 years old
  - 9, 8 & 5 years old
- Participants reporting they had 4 children living in the home:
  - 10, 8, 3 & 1 years old
- Participants reporting they had 5 children living in the home:
  - 17, 6, 4, 4 & 2 years old
  - 7, 6, 5, 4 & 1 years old.

### Employment status

Under a third of the surveyed participants have full time jobs. Most of the surveyed participants are either unemployed, retired, or disabled. Other adults in the surveyed participants' household show a similar pattern. However, when all adults are counted for, unemployment affects 25% of the surveyed participants' households, as shown in Table 19.

**Table 18 Employment Status of the Head of the Household**

The Head of the Household is...	Count of Participants	Percent of Participants
Employed full time	7	28%
Employed part time	3	12%
Unemployed	3	12%
Retired	4	16%
Disabled	7	28%

**Table 19 Employment Status of the All Adults in Households (inc. Head)**

All Adults in Households	Count of Adults	Percent of Participants
Employed full time	11	21.6%
Employed part time	7	13.7%
Unemployed	13	25.5%

## TecMarket Works

## Appendices

Retired	8	15.7%
Disabled	12	23.5%

### Age of Home

Fifteen participants were able to provide the age of their home, indicating the average age of the home is 63.5 years old. The age of the homes is widely distributed, and ranges from a low of 10 years old to a high of 140 years old.

- 10 years old
- 16
- 17
- 20
- 30
- 50 (n =2)
- 60
- 70
- 90
- 100 (n =4)
- 140

### Years in Home

As indicated in Table 20, the percentages of owners increases as the number of years they have been in their homes increases. Owners move substantially less than renters.

**Table 20 Years in Home, and Ownership of Home**

Number of years in home	Count of Participants	Renters	Owners	Other
less than 1	4	4		
1	2	2		
3	3	3		
4	3	4		
5-6	3	1	1	1
7-10	4	2	2	
11-20	2	1	1	
Over 20	3		3	

### Education

Most of surveyed participants are at least high school graduates.

**Table 21 Education of Participants**

Participant has completed....	Count of Participants	Percent of Participants
Middle school or less	2	8%
Some high school	5	20%
High school	11	44%

Some college/technical school	4	16%
Technical school	1	4%
College	1	4%
Graduate school	0	-

### Marital Status

Almost half of the surveyed participants are single adults that have never married.

**Table 22 Marital Status of Participants**

Marital Status	Count of Participants	Percent of Participants
Married	7	26.9%
Unmarried, living with partner	1	3.8%
Single, divorced	3	11.5%
Single, widowed	2	7.7%
Single, never married	12	46.1%
Prefer not to answer	1	3.8%

### Income

The majority of participants are from low, to exceptionally low income households with half having an annual household income of less than \$20,000 a year. Almost 60% of the households have an annual income under \$20,000. The program is doing very well in serving households with very low incomes.

**Table 7 Income**

Annual Income	Count of Participants	Percent of Participants
Less than \$5,000	4	15.4%
\$5,001 to 10,000	4	15.4%
\$10,001 to 15,000	3	11.5%
\$15,001 to 20,000	4	15.4%
\$20,001 to 25,000	1	3.8%
\$25,001 to 30,000	2	7.7%
\$30,001 to 35,000	1	3.8%
\$35,001 to 40,000	0	0%
Don't Know	5	19.2%
Prefer not to answer	2	7.7%

### Gender

Program participants, as in other low-income programs, are mostly female.

**Table 23 Gender**

Gender	Count of Participants	Percent of Participants
Female	21	77.8%
Male	6	22.2%



## Process Evaluation of the 2011 Kentucky Power Manager® Program

Final Report

Prepared for  
**Duke Energy**

139 East Fourth Street  
Cincinnati, OH 45201

October 26, 2011

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## Summary of Findings

### Customer Satisfaction

- Satisfaction with the Power Manager® program is high with over half of the survey respondents 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

- Nearly three-quarters of the surveyed participants (n=79) 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 99 benefits (1.2 each) they recalled being promoted by the program. Of the 99 benefits recalled by these participants, 47% 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 are members of an organization with an environmental mission.
- Many (32.1%) of the participants do not recall whether control events occurred since they joined the program. Eighty-two percent of participants did not notice the bill credits on their bill.
- Saving energy is the most commonly recalled benefit (43%) of the program while saving money was the most cited reason (47%) for participation.

### Survey Findings

- The majority of participants (70%) that are at home during a Power Manager activation event, experienced no change in comfort during the event.
- Twenty-two 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 38 percent were unsure of whether an activation had occurred or not.
- Twelve percent of participants 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. Seven percent of these “non-event” participants were correct in thinking that no Power Manager activation had occurred, and 80 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.
- No participants 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. However, 31% reported using a fan during the control events to help maintain comfort levels, while 37% 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 if there is a control event or what the high temperature or heat index of the day is. 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 tool for new Power Manager enrollees so that participants in these program 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 1.5 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 for approval of the 1.5kW level 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 1.5kW participation threshold.

## Introduction

This document presents the evaluation report for Duke Energy's Power Manager® Program as it was administered in Kentucky.

The evaluation was conducted by TecMarket Works with assistance from Integral Analytics and Yinsight. The survey instruments were developed by TecMarket Works. The survey was administered by TecMarket Works. Yinsight (a TecMarket Works subcontractor) conducted the in-depth interviews with program management.

### Methodology: Management Interviews

The in-depth management interviews were conducted with five Duke Energy program staff and three representatives from Power Manager's two main vendors, Cooper Power Systems and Good Cents.

### Methodology: Recency Surveys

TecMarket Works conducted after-event surveys to collect participant information for this evaluation. The survey was maintained in a "ready-to-launch" status until notified of a control event affecting Cannon switches used by Duke Energy Kentucky. The surveys were launched as soon as possible following the end of the control event (at 5pm Eastern) and continued over a 51 hour period with all call attempts made during regular surveying hours (10:00 a.m. to 8:00 p.m. Eastern Standard Time, Monday through Saturday). For example, if a control event occurred on a Monday, calling hours for that particular event were:

- Monday 5pm-8pm Eastern
- Tuesday 10am-8pm Eastern
- Wednesday 10am-8pm Eastern

Recency surveys followed events occurring on July 12, July 21 and August 1, 2011. TecMarket Works surveyed a total of 91 participants in Kentucky. The draft Recency Survey can be found in Appendix C: Participant Recency Survey.

Before we asked the participants about the event, we inquired if they knew that there was a control event within the last 7 days so that we could understand if they are able to identify when a control event had occurred. The surveyor then notified the customer that they had just had a control event which had begun at *<start hour of control>* and ended at *<end hour of control>*. This allowed the participants to immediately recall the time period of the event and be able to respond to questions regarding the impact of that event on their use of their air conditioner and allow recollection of other actions taken, as well as the impact of the event on their comfort. Once informed of the event that had just occurred, the survey also assessed satisfaction with the program at the point of an event.

TecMarket Works also called Power Manager participants on hot days without control events to conduct the same survey (with slight wording alterations, as shown in red text Appendix D: Participant Recency Survey for Non-Event Day Comparison). This survey was conducted on two different non-event days of at least 91°F. The heat index was also considered in determining

a non-event day. On and following the high temperature dates of July 11, July 28-29 and September 2, TecMarket Works surveyed a total of 61 Power Manager participants.

## **Methodology: Participant Surveys**

TecMarket Works developed a customer survey for the Power Manager® Program participants, which was implemented in July and August of 2011 after they experienced control events over the summer of 2011.

The complete survey was conducted with a random sample of 79 Power Manager® participants in Kentucky. There were 81 Kentucky customers willing to participate in the survey, however only 79 were able to complete the full survey. The responses from the 81 surveyed participants are included in the analysis for all questions which they were able to complete. These participants were surveyed by TecMarket Works. The survey can be found in Appendix B: Participant Survey Instrument.

## Section 1: Program Operations

### Interviewees

The in-depth management interviews were conducted with five Duke Energy program staff and three representatives from Power Manager<sup>®</sup>'s two main vendors, Cooper Power Systems and Good Cents.

### Program Background

Power Manager<sup>®</sup> is a voluntary residential program, available to homeowners with central air conditioning (AC) and heat pumps. On days where energy demand and/or energy costs are expected to be high, Duke Energy has permission from Power Manager<sup>®</sup> participants to cycle their air conditioning systems off for a period of time.

In Kentucky, the most recent Integrated Resource Plan found that existing demand response programs were sufficient to meet Kentucky's demand needs. Power Manager<sup>®</sup> currently does not solicit new participants, although Duke Energy customers may still enroll and participate in the program if they request to enroll.

There are three requirements that must be met for a customer to be eligible to participate in Power Manager<sup>®</sup>. First, they need to be a Duke Energy Kentucky customer. Second they need to own and live in their single family home. Third, they need to have a functional central air conditioner with an outside compressor that can be controlled.

Within Duke Energy Kentucky's portfolio, Power Manager<sup>®</sup> is currently the only residential demand response program. The Power Manager<sup>®</sup> program plays a key role in capacity planning; every year, Power Manager<sup>®</sup> provides an estimate as to how much capacity it can provide during the summer season, and this information is taken into account by the capacity planners.

### Program Operations

#### Marketing and Enrollment

Although the program is not currently soliciting new participants, Duke Energy customers may still learn about the Power Manager<sup>®</sup> program through Duke Energy's website. The website provides a toll free number to enroll by phone, as well as an online enrollment form. A vendor, GoodCents, receives both phone and online enrollment requests. GoodCents then processes the enrollment information and schedules the switch installation with their technicians. At the end of July there are 9,115 Kentucky participants, representing 9,453 switches (some homes have multiple units). There were 5 new switch installations in the first half of 2011, as a result of the limited marketing efforts employed.

The Power Manager<sup>®</sup> program allows customers to select which load reduction target they would be willing to achieve, either 1.0 kW or 1.5 kW. During an event, customers in the 1.5 kW option would have their air conditioner cycled off for a few minutes longer in each half hour than the

1.0 kW customers. Events may be called on non-holiday weekdays during the months May through September.

### **Power Manager Incentives**

Kentucky customers receive an incentive for enrolling as well as an incentive based upon the events that are called. Customers enrolling in the 1.0 kW option receive a \$25 bill credit, and customers enrolling in the 1.5 kW option receive a \$35 bill credit. Because there is no screening for kW reduction capacity during the enrollment process and because there are residential customers who do not use enough energy to have the capability to reduce demand by 1.5 kW, Duke Energy de-emphasizes the 1.5 kW enrollment option in some marketing materials. The website for Power Manager mentions both options, while the mailed brochure (which is also available online) only mentions the 1.5 kW option in small print. If a customer has more than one central air conditioning unit, they are eligible for the enrollment incentive for each AC unit that is controlled.

If events are called, customers also receive an event credit based upon the price of energy and the duration of the event. In return for the capability to cycle a customer's AC unit off during periods of high demand, Duke Energy shares savings from not needing to purchase or generate additional energy to meet higher demand. Customers are guaranteed a minimum seasonal credit, even if no events are called: Participants in the 1.0 kW option receive a minimum of \$5 per season, and participants in the 1.5 kW option receive a minimum of \$8 per season. Like the enrollment incentive, the event incentives are also increased for each AC unit that is controlled.

### **Switch Installation and Removal**

Customers are told that a field technician will be coming out in 30-45 days, and that they should receive their installation bill credit within 60-90 days, as well as any cycling credits. Customers do not need to be home for the installation, unless there are access issues.

During the installation, technicians first make sure that the AC is compatible and in good working condition. After they install the switch, the technician will conduct some tests on the switch and leave a door hanger with Power Manager® FAQs and a number to call if the customer has any questions.

If a new Power Manager participant has signed up for the 1.5 kW program, Duke Energy may wish to check whether that customer's AC energy usage (within that specific home's size and condition) offers the capacity to reduce by 1.5 kW at the time of the switch installation. This may be accomplished in different ways. For example, the installation technician could copy down the make and model number of the outdoor unit, and Duke Energy could later look up the cooling capacity (tons) and the efficiency (EER; which can be translated to kW/ton) to estimate the load reduction potential. Likewise, Duke Energy could develop rules-of-thumb regarding house age, size and condition and the size of the AC unit to set limits on the 1.5kW offer. Or, if the AC unit is running at the time of the switch installation, the technician can bring a portable watt meter and measure the unit kW and assess the characteristics of the home to make a determination while on site.

**RECOMMENDATION:** If Duke Energy is interested in determining whether a new customer has the capacity to reduce by 1.5 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 for approval of the 1.5kW level 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 1.5kW participation threshold.

GoodCents is also responsible for removing control switches and reports that the most common reason for removal requests is customer discomfort during events. However, GoodCents suggests that the perceived discomfort may be more mental than physical, since in their opinion home temperatures only rise, on average, 2-3 degrees during an event. Homes with undersized units that would require a near 100% duty cycle to maintain set point temperatures may be impacted to a greater degree. Good Cents reports that the disconnect request rate has been fairly steady over the past few years. A Duke Energy staff member reported that customers who call to request a disconnect may be offered a 0.5 kW program. If this is a substantial issue for Duke Energy, it may be informative for Duke Energy to conduct a study comparing the house and AC size characteristics with the disconnect or drop-out rate, to try to determine whether it is customers with undersized AC units that tend to drop out. If customers with undersized AC units are indeed the ones that tend to drop out, Duke Energy may wish to refine their targeting to avoid soliciting those customers.

### **Incentive Payments**

Incentives are paid as credits on a customer's bill. A GoodCents project manager reports that Power Manager® requires extensive tracking of the incentive records. GoodCents provides Duke Energy with records of which customers had installations or were removed. Duke Energy provides GoodCents with information on the cycling credits for each event. GoodCents then applies that information in the participating customers' record, and that information is transmitted to Duke Energy so that Duke Energy can apply a credit on the customer's bill. GoodCents reports that they've implemented tight security controls through use of firewalls and data backups. Quality control is implemented through comparison of GoodCents' files and Duke Energy's payout records.

### **Events**

Duke Energy's Retail Energy Desk (RED) is the group responsible for monitoring several variables that may indicate the need for a Power Manager® event. During the summer event season, a RED staff member monitors load forecasts, energy prices, system operating conditions, temperature and tracks recent event activity. On days in which all indicators suggest an event could be called, the RED staff calls a meeting with key stakeholders to consider whether or not to call a Power Manager® event. Stakeholders include customer service representatives, system operations representatives, and program managers, and the meeting discussion revolves around whether there are any customer-related or system-related concerns about having an event. When the decision is made to have a Power Manager® event, the RED staff member notifies the appropriate supply and control personnel within Duke Energy, including the call center operators (to be ready to field customer calls), about which hours and which regions will be affected.

The RED staff triggers an event by means of a software “head-end” system. This head-end system sends out a signal to cycle AC units through a paging system over a VHF frequency channel that is owned by Duke Energy.

Customers in Kentucky have the ability to opt out of one event per month without being removed from the Power Manager® program. To opt out of an event, they only need to call the customer service number that is answered by Good Cents. If customers would like to be permanently removed from the Power Manager® program, they can also make that request through the customer service number.

## Technology

The control switches in Kentucky are a combination of legacy switches made by CSE and Cannon switches with newer technology made by Cooper Power Systems. These switches all allow one-way communication in real time. A high percentage of the older switches have been found to be no longer operable. The newer Cannon switches also allow cycling data to be stored for several months.

Power Manager® is currently in the midst of a project to replace the older switches with the newer Cannon switches. Duke Energy was working on a schedule to complete the replacement of these switches in Kentucky by the end of 2011. The replacement schedule was delayed due to component equipment supply chain disruption due to the 9.0 earthquake and tsunami in Japan in March 2011.

Cooper Power Systems recently provided a new software package called Quick Read that provides field technicians with the capability to download data to their computers within 2-3 minutes, after which it can be emailed to the research division. The previous version of the Cannon switch software required 20 minutes for each switch to be scanned, and the scanner could only hold data for 20 switches before it had to be brought back to Duke Energy’s offices to be downloaded. The new software capabilities present a significant improvement in data collection efficiency. However, soon after the switches were installed, during a testing period, Duke Energy learned of some data problems that needed to be solved. At the time of these management interviews in July of 2011, Cooper is working with Duke Energy to resolve a data file problem that prevents immediate access to the Quick Read data. Because of the way that the switch is designed, during a scan, all data is first saved in a proprietary format. After that, the separate files from each switch are decoded. Due to a software error, the separate files are not being decoded automatically. In order to retrieve the data, the proprietary format data files need to be sent to Cooper Power Systems, where it is decoded by a project manager and then sent back to the research division. A Duke Energy staff member reports that this software issue was improved before the end of the summer data collection by Cooper providing a new version of the Quick Read software.

Cooper Power Systems reports that it was Duke Energy who suggested developing a switch that enabled a targeted cycle by incorporating AC capacity into the calculation of shed time, to target a specific level of kW reduction from an AC unit. Duke Energy wanted to target a fixed kW level such as 1 kW reduction from every house, which might require some AC units to be turned

off for different lengths of time, depending upon their power usage. That type of switch had not yet been developed, "No one had that; no one could do that." Cooper Power Systems reports that, working in response to Duke Energy's needs, they developed an intelligent Target Cycle switch that was able to convert the amp draw into a kW value. The Target Cycle switch has the additional benefit of preventing lower impacts from oversized AC units: if a customer had an AC unit that was twice as big as they really needed, then the AC's natural duty cycle would fit into a legacy switch's 50/50 cycle, resulting in zero load shed against that customer's baseline AC energy use. By using the intelligent switches, Duke Energy is assured of achieving the target kW during each event by controlling the duty cycle until that load attainment is achieved. This is a substantial improvement in the ability to acquire the contracted load reduction via residential AC load control programs and impacts load control programs well beyond Duke Energy's territory. One Cooper Power Systems project manager mentioned that the Duke Energy Power Manager product manager gave a presentation on target cycling at their annual Cannon switch Users Group Meeting and that it was very helpful. They would recommend that Duke Energy continue to do that for several reasons: 1) it was an opportunity to receive more training on the technology, 2) it was an opportunity to meet and talk with Cooper's firmware and hardware developers face to face, 3) it was an opportunity for Duke Energy to direct the development of future technologies, and 4) it would allow Duke Energy to see what other utility customers were doing with the same equipment and perhaps give Duke Energy new ideas for demand response programs.

## Vendor Relationships

Both vendors interviewed volunteered that Duke Energy staff was very easy to work with. One vendor states, "*I enjoy the partnership with them. They have been a great partner and it's always a joint venture.*" Another vendor reports that they consider Duke Energy's "spring training" sessions to be an industry best practice. Every spring, Power Manager's team invites both GoodCents and Cooper Power Systems project managers to a multi-day session where all parties are free to share ideas and work collaboratively towards addressing any upcoming issues. "*It's such a nice way to run a program. We've taken that concept and tried to work with other big utilities to encourage them to do the same. Talking before there are problems or issues, and solving little things before they turn into big things; that's so helpful for everybody.*" This opportunity gives all parties a chance to build relationships that can facilitate open communications in the future, and to delve into "big picture" issues without interruption in a way that may not be possible in a normal work day.

## Power Manager Research

The Retail Energy Desk's research analysts have responsibility for determining the impact of the Power Manager® program. The research analysts conduct two main studies, an AC duty cycle study and a switch operability study. The AC duty cycle study provides a regression model of residential energy use (assuming all switches are in working order) during summer months if no events were called. This natural duty cycle can then be used as a baseline against which to calculate kW reduction when events are called. The AC duty cycle study is conducted with a sample of residents (referred to as "the M&V sample") who are often not cycled during events, in order to capture their energy use on peak load days.

The operability study provides an estimate of the number of AC units in the field that are responding as expected. By combining the operability ratio with results from the regression model, Duke Energy is able to provide an estimate of load reduction from the population of AC units with operable switches.

Because Kentucky is on schedule to have all older switches replaced by the end of 2011, Duke Energy will not conduct an operability study for 2011. Operability studies are normally scheduled on an as-needed basis, with the decision made by the research division at the beginning of each year.

This year, Duke Energy's research division is planning to conduct a separate payback study that looks at overall payback from an event. After an event call, air conditioners tend to run longer to handle the rise in indoor temperature that occurs after AC units have been cycled off. The payback study will look at event energy use including the period of time after an event call. In order to conduct the payback study, the M&V sample will be cycled along with the general population of participants, in order to capture any extended AC use after an event ends. Data collection occurs throughout the event season and is completed by October of each year to allow for impact analyses.

### **Impact analysis**

One recommendation from the previous evaluation study was to estimate load reduction directly from a representative sample of the population, instead of modeling reduction using a natural duty cycle model. Duke Energy has adopted this recommendation and reports that they will be testing a methodology based upon that recommendation that uses data from a particular event to estimate payback, instead of using data that are averaged across several events.

### **Data Collection Efforts**

Data collection efforts throughout the summer event season allow Duke Energy to monitor the quality of data being obtained. According to Cooper Power Systems, Duke Energy is unique among their customers for monitoring data quality and this has allowed Duke Energy to identify any problems with enough time to resolve them. *"What is going really well is what the [Duke team] does with the M&V data, and the fact that they're continuously collecting data so that they know what their system is capable of doing at any time. I have so many customers that wait until the end of the year to collect data only to find out something was not working...they might have had [switch] addressing wrong or some other little problem. These kinds of issues don't get past Duke...If I could copy what they do for our other utilities it would be a good thing."*

A research division staff member reports that her group had faced some challenges in 2011 with unanticipated data collection needs. Duke Energy hires contractors to collect data in the field, but in order to scope their contracts, the research division had to estimate its sample sizes in February, prior to being able to finalize their kW model for Power Manager® 2011. When a problem arose with a planned data collection effort and the research division needed more data, they had initial difficulty obtaining additional data because it required efforts that were beyond the planned scope of the contract. That problem was resolved. Another Duke Energy staff member explains that their data collection vendors are routinely accommodating of requests outside of their contract terms but that each data collection effort requires planning and staffing.

This staff member explains that each year's research needs are delineated during the Power Manager spring training sessions, well in advance of the event season. Because the timing and geographic coverage of these data needs vary depending on each research study, the vendor must have sufficient time to plan for and hire enough temporary staff for each effort: the wider the geographic coverage, the more staff they need to hire and train. The Duke Energy staff member explains that current contracts with vendors do include provisions for unanticipated data collection needs, but these data collection efforts cannot be fielded immediately simply because it takes time to adequately staff each effort.

### **AC Duty Cycle Study**

The AC duty cycle study is collected throughout the summer. However, due to a bug in the new Quick Read software, the research division has not received the AC run time data at the time of these interviews (July of 2011). This is expected to be a temporary problem since Cooper Power Systems can manually decode the data files. This problem should be considered a one-time event because Cooper Power System is currently working on a permanent solution.

The sample for the impact analysis of Power Manager® Kentucky is combined with the sample for Power Manager® Ohio. Together, the sample size is 72. While not overly robust, this is a reasonable sample and we do not recommend increasing it at this time.

### **Program Changes**

One recommendation from the previous evaluation study was to add more staff to help with administrative needs during the control season. The Duke Energy program managers reports that staff has been added, and that program management has been restructured so that there is now a RED staff member dedicated to Power Manager® and one dedicated to PowerShare®, the nonresidential demand response program. In past years, program management was assigned based on geography so that the Midwest region had one RED staff member and the Southeast region had another RED staff member, with each one responsible for both Power Manager® and PowerShare® within their region. A Duke Energy manager reports that he has seen an improvement in operations with this new program management structure: "*It's working out better, to date*".

### **Future Plans for Power Manager®**

The Duke Energy product manager is currently considering improvements to the Power Manager® program, one of which is a communications network with HVAC dealers and repair service groups. This would allow Duke Energy to notify them of the start and stop times of any events so that they can properly respond to any calls from customers about inoperable air conditioners. Another improvement that Duke Energy is considering is using the Duke Energy website to inform customers of events. While there exists a hotline that customers can call for information, providing event information on a website would meet the needs of customers who prefer web-based communications.

There do not seem to be any other major improvements to Power Manager® that are needed at this point, according to the interviewees. Although interviewees described several current efforts under way to address Power Manager® program challenges, most interviewees could not identify

any new issues that had not or were not already being addressed. One vendor explained, “*That’s the benefit of [getting to know each other so well during] ‘spring training’, if we see it we can just tell them. I don’t see anything outstanding.*”

For this reason, TecMarket Works suggests that this program does not require another process evaluation until 2014, or until significant changes to the program have occurred.

## Section 2: Participant Survey Results

TecMarket Works conducted telephone surveys with 81 randomly selected program participants in the state of Kentucky. This section presents the results from the surveys. The survey instrument can be found in Appendix B: Participant Survey Instrument. Of the 81 participant surveys, completed surveys were obtained from 79 participants. The results from the 79 completed surveys are presented below, with the results of the partial surveys included as applicable.

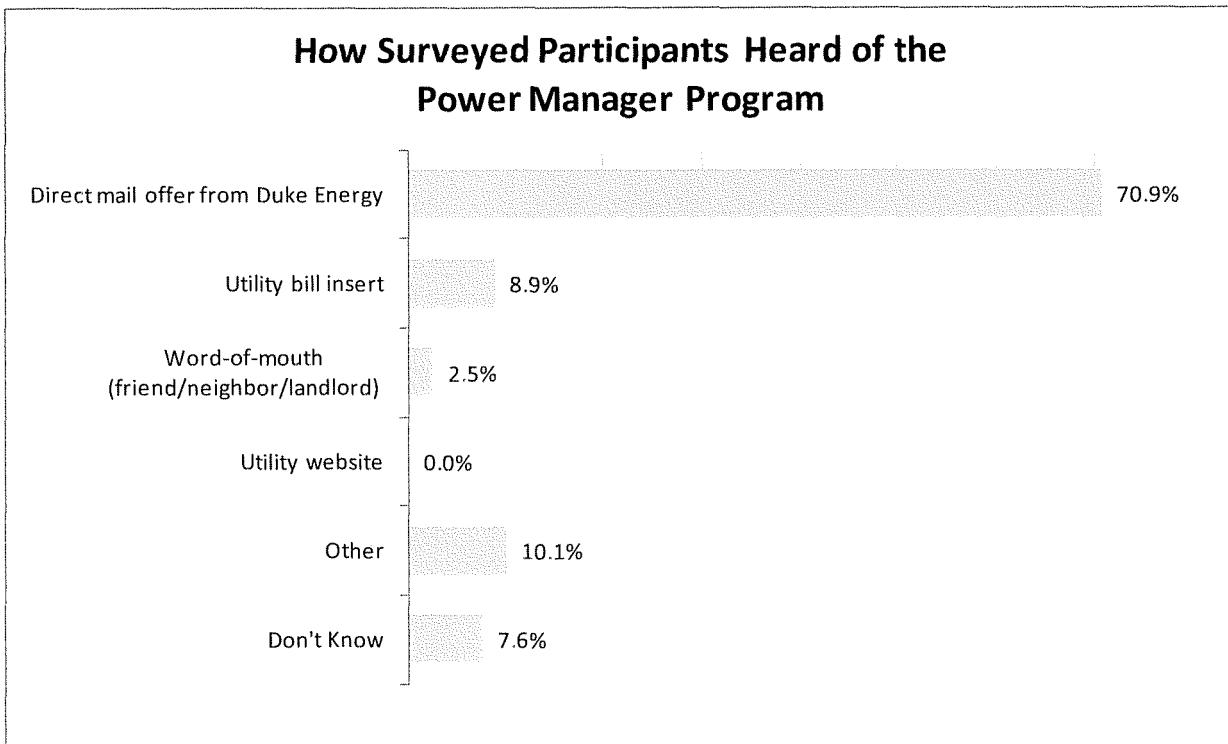
### Participation Drivers

Surveyed Power Manager® program participants in Kentucky were very likely to have been involved with the decision to participate in the Power Manager® Program with all but two out of 81 surveyed (97.5%) indicating that they were involved.

**Table 1. Were you involved in the decision to participate in Duke Energy's Power Manager® Program?**

	KY	
	N	Percent
No	2	2.5%
Yes	79	97.5%
Don't Know	-	-

Most of the surveyed participants learned of the Power Manager® program from a direct mail offer or through a bill insert from Duke Energy. Very few surveyed participants learned of the program from the Duke Energy web site or through word of mouth. Direct mail continues to be the most successful approach for enrolling customers compared to all other approaches examined.



**Figure 1. How Participants Learned of the Power Manager® Program**

## Recalling Promoted Program Benefits

During the survey, we asked participants an unprompted question to recall what the promoted program benefits were. The results are presented in the table below, and summarized in Figure 2. The “Tags” column categorizes the survey responses using five tag words to summarize various responses, including:

1. Money savings: used if the participant mentioned bill credits or lowered bills
2. Energy savings: used if the participant mentioned energy savings
3. Reduced outages: used if the participant mentioned reduced load or preventing brown-outs or black outs
4. Environmental benefits: used if the participant mentioned environmental benefits
5. Other: used if the participant mentioned benefits such as “helping the community” or other benefits that do not fall into the above categories.

The tag words/responses are then summarized in Figure 2.

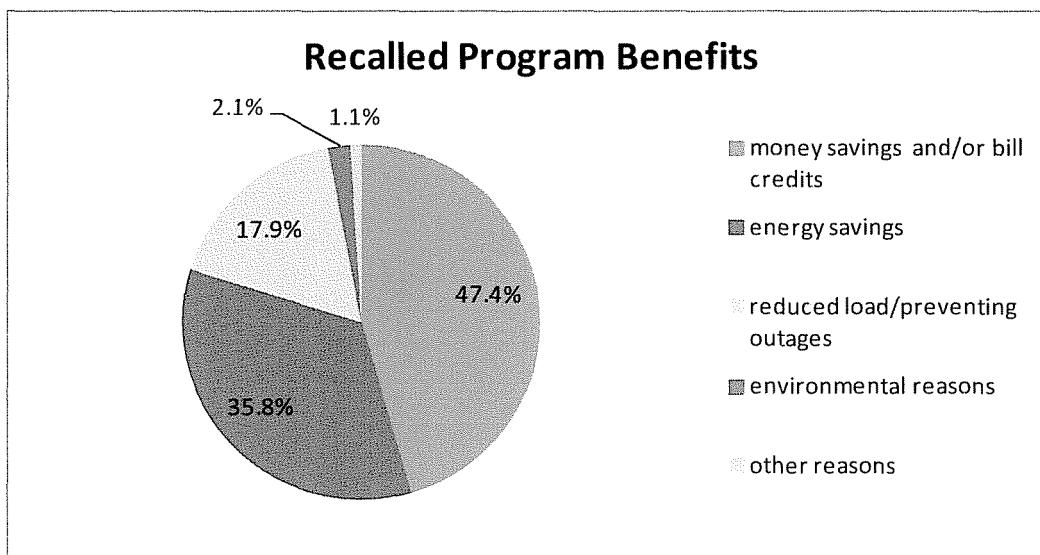
**Table 2. Participants' Recalled Program Benefits**

Recalled Benefits	Number of times mentioned	Percentage of participants (n=79) recalling each benefit
Save energy	34	43.0%

Lower bills by using less energy	21	26.6%
Reduce Outages	17	21.5%
Bill credits	15	19.0%
Incentive	9	11.4%
Helping the Environment	2	2.5%
Other	1	1.3%

Note: adds to more than 100% due to multiple responses

Nearly three-quarters (74.7%) of the surveyed participants were able to recall benefits promoted by the program. The surveyed participants that did recall program benefits were able to provide 99 benefits that they recalled being promoted by the program. Of the 99 benefits recalled by these participants, 47.4% of them mentioned money savings either by recalling the bill credits or financial incentives for participating in the Power Manager® program. The next most commonly recalled program benefit was the energy savings that can be obtained through participation at 35.8% of recalled benefits. Almost eighteen percent of the recalled benefits included a mention of the load control function of the program as a means of reducing blackouts and/or brownouts.



**Figure 2. Recalled Program Benefits: Summary of Responses**

In addition to asking about the benefits of the program, TecMarket Works also asked the surveyed participants about their reasons for participating in the Power Manager® program. The most common response was “to save energy”, however many respondents expected to have lower utility bills (31.3%) if they participated. “Helping Duke Energy avoid power shortages” was also an often-cited response.

**Table 3. Reasons for Participation in Power Manager®**

Reason for Participation	N	Percent
To save energy	30	37.5%
To save money (through lower utility bills)	25	31.3%

Helping Duke avoid power shortages/outages	8	10%
To help the environment	4	5%
For the bill credits	4	5%
I don't use the air conditioner much	2	2.5%
Other: It was free	2	2.5%
Other: To see how it works	2	2.5%
Other: not specified	2	2.5%
Don't Know	1	1.25%

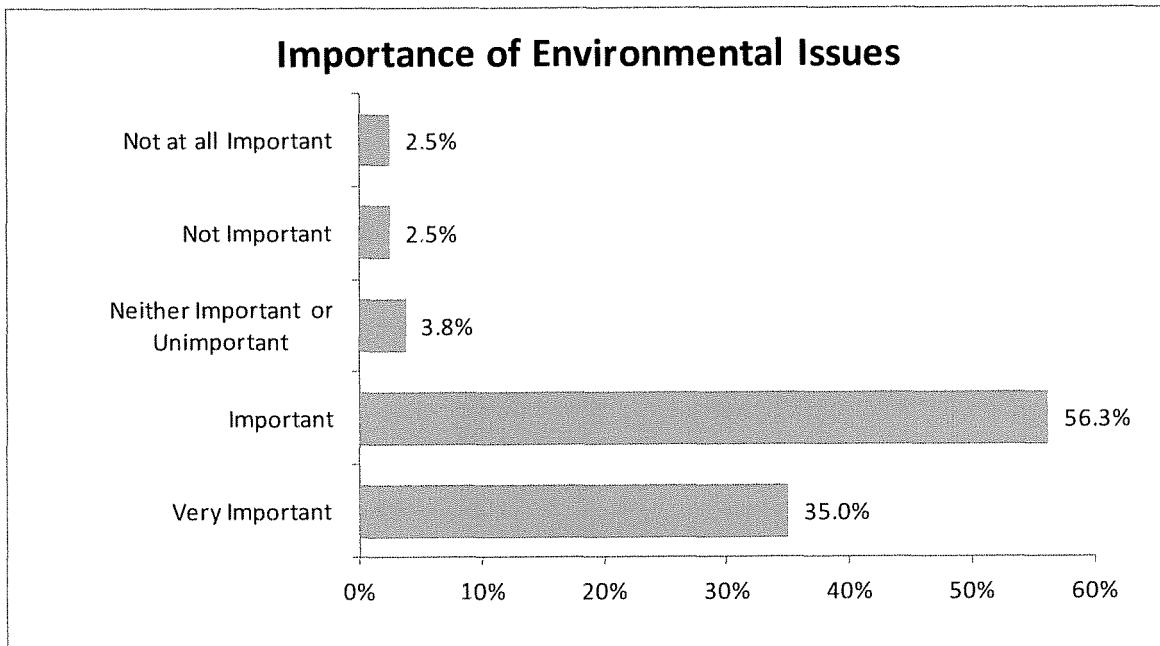
After respondents told us why they participated in Power Manager®, we asked them if they recalled reading about the benefits or reasons presented in the program brochure. Table 4 summarizes their responses. More than half of the thirty respondents who said they participated in the program to save energy and/or money recalled reading about this benefit in the program brochure.

**Table 4. Reason for Participation: Read in Program Brochure**

	Do you recall reading about this benefit on the program brochure?					<b>Total</b>
	No	Yes	Do not remember brochure	Did not get brochure	Don't Know	
To save energy	0	18	10	0	2	30
To save money (through lower utility bills)	0	16	8	0	1	25
Helping Duke avoid power shortages/outages	0	4	2	0	2	8
To help the environment	0	3	1	0	0	4
For the bill credits	0	3	1	0	0	4
I don't use the air conditioner much	0	0	2	0	0	2
Other: It was free	0	1	0	0	1	2
Other: To see how it works	0	1	1	0	0	2
Other: not specified	0	0	2	0	0	2
Don't Know	0	0	0	0	1	1
<b>Total</b>	0	43	26	0	7	80

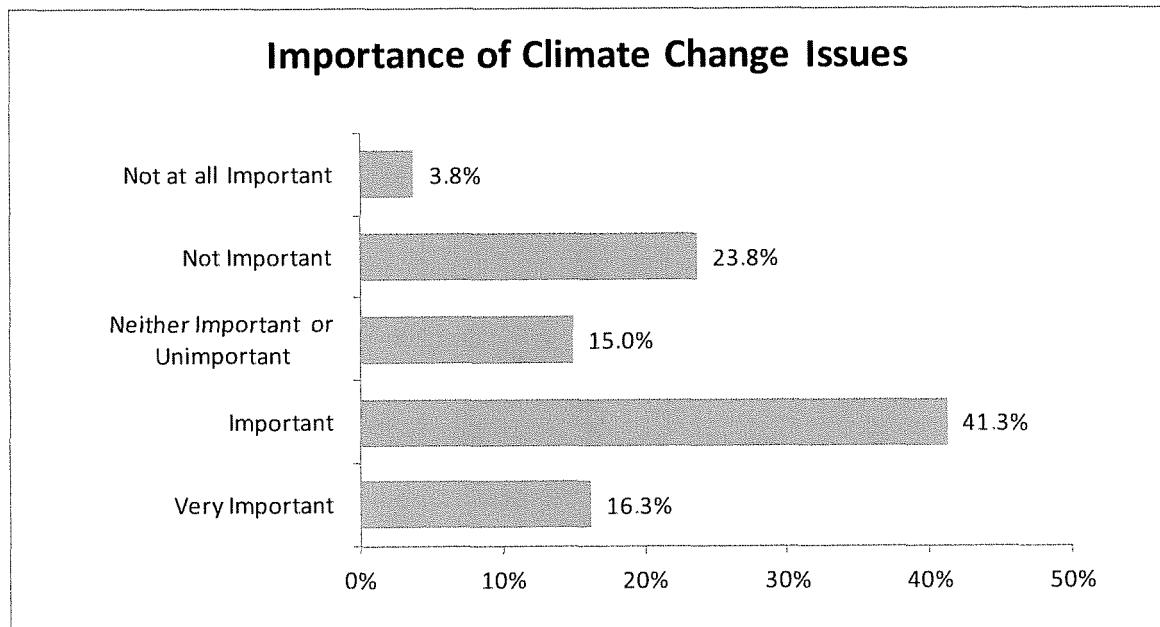
## Importance of Environmental Issues to Participants

Most (91.3%) surveyed Power Manager® participants indicated that environmental issues are either “important” or “very important” to them. Only two of the respondents indicated that environmental issues were “not at all important”, and a few said that they thought environmental issues were “not important” or “neither important nor unimportant.”



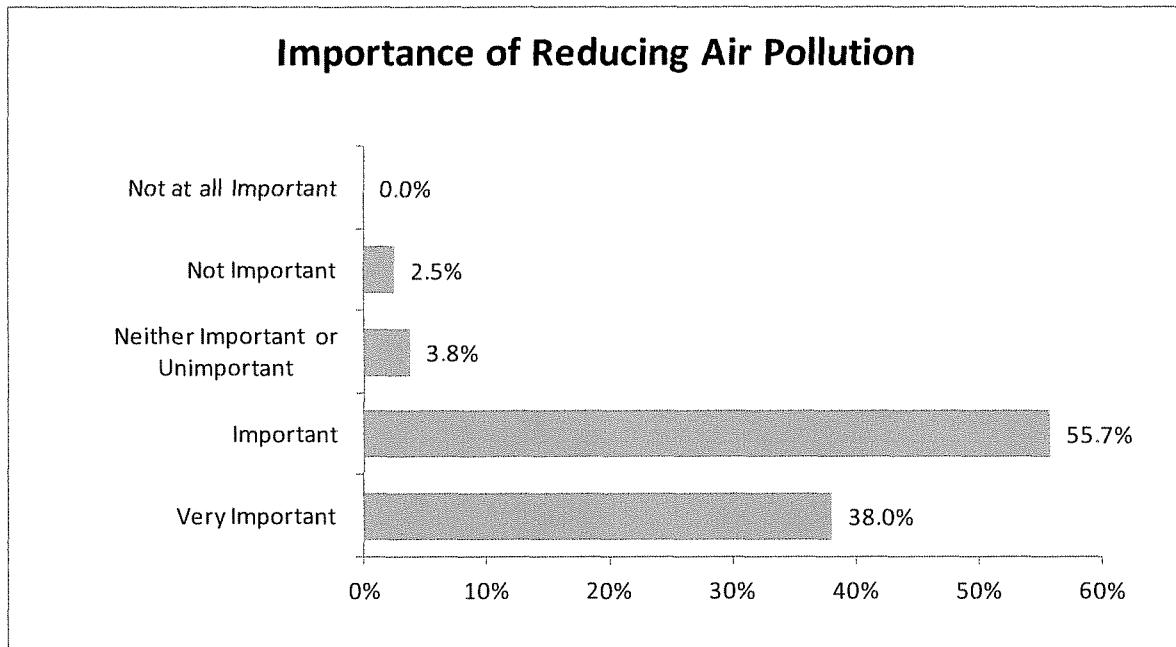
**Figure 3. Importance of Environmental Issues to Power Manager® Participants**

When TecMarket Works asked the surveyed participants about the importance of climate change issues, responses shifted. 16.3% of participants found climate change issues to be “very important” and an additional 41.3% said they were “important”. Together 57.6% said that climate change issues were important or very important. However, 23.8% found them to be “not important,” and 3.8% said that climate change issues were “not at all important”.



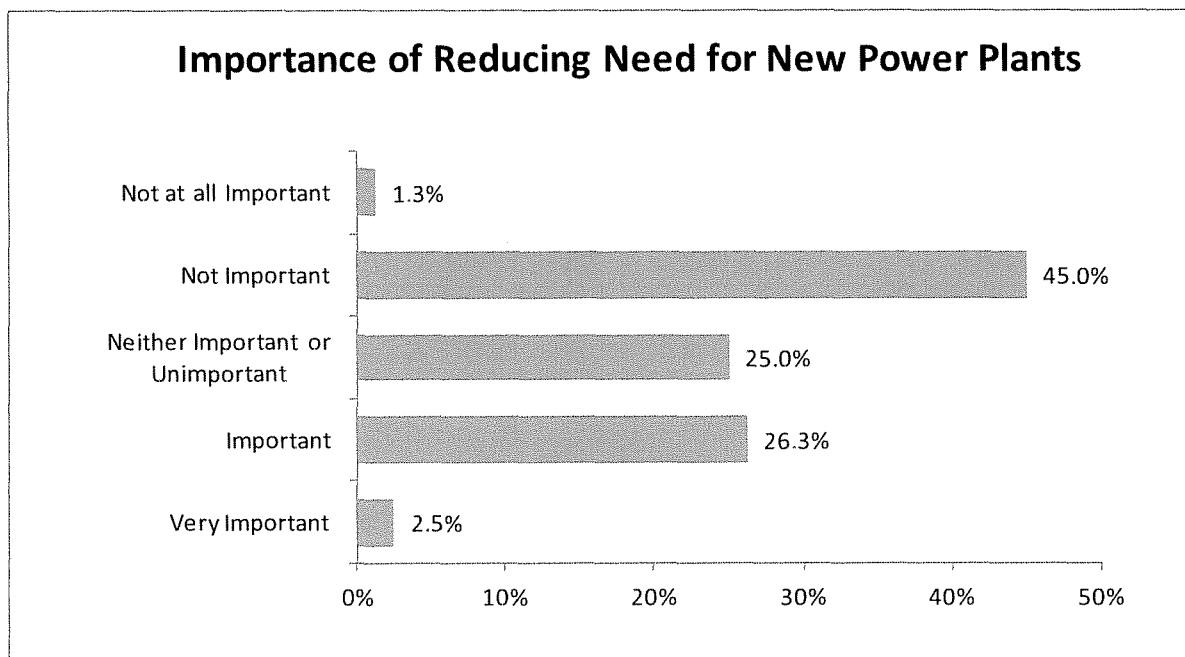
**Figure 4. Importance of Climate Change Issues to Power Manager® Participants**

Reducing air pollution was more important to participants than climate change issues. Together over 93% of respondents said that reducing air pollution was “important” or “very important” in their participation decision. Power Manager® participants represent a population segment that is focused on environmental issues and considers these issues important or very important in their participation decisions.



**Figure 5. Importance of Reducing Air Pollution to Power Manager® Participants**

When the respondents were asked how important it was to reduce the need for new power plants, opinions varied more than with previous environmental issues. Forty-five percent of Kentucky surveyed participants said that reducing the need for new power plants was not important. Only 2.5% of Kentucky respondents rated this issue as “very important” to them. Participants seem to be okay with building new power plants as long as they do not result in increased pollution or, to a lesser degree impact climate change.



**Figure 6. Importance of Reducing Need for New Power Plants to Power Manager® Participants**

While environmental issues are important or very important to these customers, only five of the eighty surveyed participants are members of a group or club that has an environmental mission (6.7%).

**Table 5. Are you a member of any groups or clubs that have environmental missions?**

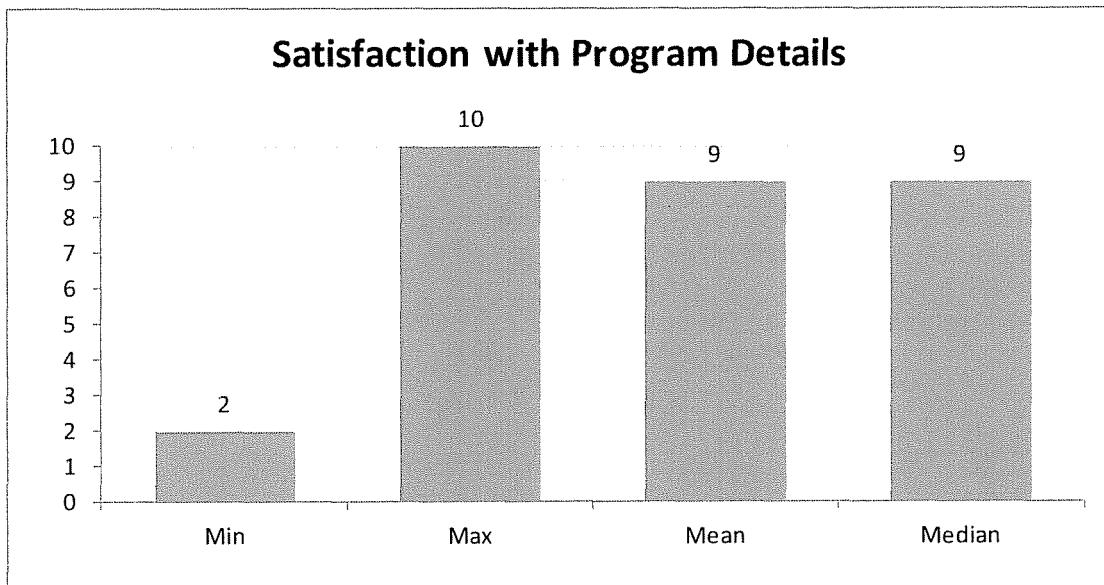
No	Yes	Total
75	5	80
93.7%	6.3%	100%

If respondents indicated that there were a member of an organization with an environmental mission, we asked for the name of the organization. Some of them were able to provide specific names while others could not. In addition, most of these respondents identified organizations that are not environmentally focused as their primary mission, indicating that very few of the participants are associated with an organization that has environmental causes as their primary mission. Their responses are listed below.

- “Nature Conservancy”
- “Ohio River Foundation”
- “Ohio Citizens Action”
- “Historic preservation”
- “AARP”
- “VFW”

## Participant Understanding of the Program

Participants are satisfied with the program information that was provided to them, giving the program information a mean score of 9.0 in Kentucky on a 1-10 scale with 10 indicating that they were “very satisfied”. Eleven participants answered “Don’t Know” for this question giving it a sample value of 69.



**Figure 7. Participant Satisfaction with Program Details**

If a respondent indicated that their satisfaction with the program details was 8 or lower, we asked them why they were less than satisfied. Three of the nineteen that provided scores of 8 or lower provided a reason. The reasons for low satisfaction scores that were provided are listed below.

- “I was disappointed by the savings.”
- “Program information was incomplete – did not give enough details.”
- “I was misled about supposed savings.”

## Expectations of Power Manager® Events

Surveyed participants were asked how many times Duke Energy said it would activate the Power Manager® device in a summer. About 61% (or 49 out of 80) of the surveyed participants didn't know how many control events to expect. A few others didn't provide a number of events but thought they would occur as needed and determined by Duke Energy.

Response	Percentage
Don't Know	61.25%
As Needed	13.75%
Did not say	8.75%
A few times	6.25%

Once a year	5.0%
Other	5.0%

Other surveyed participants' individual responses included:

- “At least twice a quarter”
- “Maybe every day”
- “Rarely”
- “In the summer”

### Expectations of Monetary Incentives for Participation

Surveyed participants were asked to estimate how many dollars they would receive in bill credits for their participation in the Power Manager® program. The responses are in Table 6 and are varied considerably, indicating a general lack of awareness of the bill credit amounts. Most respondents (over 81%) didn't respond with an answer, and instead said they didn't know.

**Table 6. Expected of Bill Credits for Participating in Power Manager®**

Response	n	Percent
Don't know	65	81.3%
Negligible amount	3	3.8%
\$25	3	3.8%
\$10	3	3.8%
\$30	2	2.5%
\$40	2	2.5%
\$5	1	1.3%
\$220	1	1.3%
<b>Total</b>	<b>80</b>	<b>100%</b>

When surveyed participants were asked if they have received any bill credits for their Power Manager® program participation, more than three-quarters of survey respondents didn't know. Five (6.3%) respondents said that they did not get any credits when they did in fact get them on their bill (due to there being events in the summer of 2011). Only about a third of the participants noticed the bill credits for their participation.

**Table 7. Did you receive bill credits this year from Duke Energy for participating in this program in 2011?**

	KY	
	N	Percent
No	5	6.3%
Yes	14	17.5%
Don't Know	61	76.2%

**Despite the uncertainty of many of the participants over bill credits and control events, few of the survey respondents indicated that anything about the program was unclear to them. Only seven (8.8%) of respondents surveyed in Kentucky had some questions about the program.**

**Table 8. Is anything unclear to you about how the program works?**

	KY	
	N	Percent
No	72	90%
Yes	7	8.8%
Don't Know	1	1.2%

What's respondents indicated was unclear about the program:

- “Bill credits are not on my bills.”
- “Why don't I notice any difference in comfort?”
- “How does bill crediting work?”
- “How often does it get cycled off?”
- “Not sure that I am still enrolled”
- “Why are there no noticeable savings?”

**Table 9. Did you ever call or email Duke Energy to find out more about the Power Manager® Program?**

	KY	
	N	Percent
No	75	94%
Yes	3	3.8%
Don't Know	2	2.2%

The one surveyed participant that contacted Duke Energy to find out more about the Power Manager® program was satisfied (score of 7 on a 10-point scale) with the ease of reaching a Duke Energy representative to discuss the program, and another was unsatisfied (a score of 3). Both participants cited a long wait time on hold as the reason for their ratings. Both respondents were satisfied (a 10 and 8 on 10-point scale, respectively) with how the representative responded to their questions.

### Awareness and Response to Activation

Thirty percent of the surveyed respondents are not aware of the Power Manager® control events when they occur either because they are not at home, or don't notice the event or the bill credits for events.

**Table 10. Has Duke Energy activated the Power Manager® device since you joined the program?**

	KY	
	N	Percent
No	1	1.2%
Yes	55	68.8%
Don't Know	24	30%

In Kentucky, 68.8% were aware of an event occurring because of the following reasons.

- The AC shuts down (N=15)
- Home temperature rises (N=19)
- Light on the meter is on (N=3)
- Light on the AC flashes (N=10)
- Bill Credits (N=6)

Few if any of the Kentucky participants that were surveyed knew the number of control events had occurred at the time of their survey. Some surveyed participants offered guesses; however, 90% reported that they didn't know. Participants were surveyed in July and August, after a time in which they would have experienced three to seven events out of a total of 8 control events that occurred in the 2011 cooling season.

**Table 11. About how many times did Duke Energy activate your Power Manager® device during this past summer?**

	KY	
	N	Percent
One	5	6.3%
Two	1	1.3%
Three	0	-
Four	3	3.7%
Five	1	1.3%
Seven	1	1.3%
Seventeen	1	1.3%
Twenty-five	1	1.3%
Several	2	2.5%
Too Many	1	1.3%
Don't Know	64	80.0%

Most participants do not know how many times their units have been activated, with many not knowing if they have been activated at all. However, over 95% of the surveyed participants in Kentucky report that someone is usually home on weekday afternoons in the summer with four respondents saying that no one is usually home during this time.

When TecMarket Works asked the participants if they were home during any of the control events, most did not know, but some (26%) said that they were home during at least one of the events.

**Table 12. Were you or any members of your household home when Duke Energy activated your Power Manager® device this past summer?**

	KY	
	N	Percent
No	1	26.2%
Yes	21	1.3%
Don't Know	58	72.5%

TecMarket Works then asked the 19 respondents who reported being at home during control events to think back to the event time and then to rate their comfort before and during the event on a 1-to-10 scale with 1 being very uncomfortable and 10 being very comfortable.

**Table 13. Comfort ratings before and during control events**

Participant	Rating before event	Rating during event	Difference
1	9	7	2
2	8	8	0
3	9	8	1
4	10	4	6
5	10	8	2
6	10	9	1
7	10	7	3
8	9	9	0
9	10	10	0
10	9	7	2
11	9	9	0
12	9	9	0
13	10	5	5
14	9	8	1
15	9	9	0
16	9	9	0
17	10	5	5
18	9	9	0
19	7	3	4
<b>Mean</b>	<b>9.2</b>	<b>7.5</b>	<b>1.7</b>
<b>Median</b>	<b>9</b>	<b>8</b>	<b>1</b>

Eight of the 19 reported no difference in comfort as a result of the event. When considering only the 11 respondents whose in-event rating was lower than the pre-event rating, the average difference in ratings is 2.9 with a median of 2.

The eleven respondents that indicated that they felt uncomfortable during the periods of activation all indicated that they felt their discomfort was a direct result of the Power Manager®

control unit activation. However, ten of the respondents also indicated that a higher temperature was causing their discomfort while five of the ten also cited a rise in humidity.

TecMarket Works then asked the respondents if they recalled doing anything to keep cool during the control event. Five respondents recalled trying to keep cool:

- Wore less clothing (N=2)
- Closed blinds and turned on fans
- Closed blinds and drank something cool
- Called Duke and opted out of the control even

### **Reasons for the Power Manager® Program and Events**

We asked the surveyed participants the following question: "*Why do you think Duke Energy activates your Power Manager® device on summertime weekdays during the afternoon as opposed to other times of the day or year?*" The responses are presented in Table 14. Sixty-two percent of the respondents mentioned peak demand or load control in their answer.

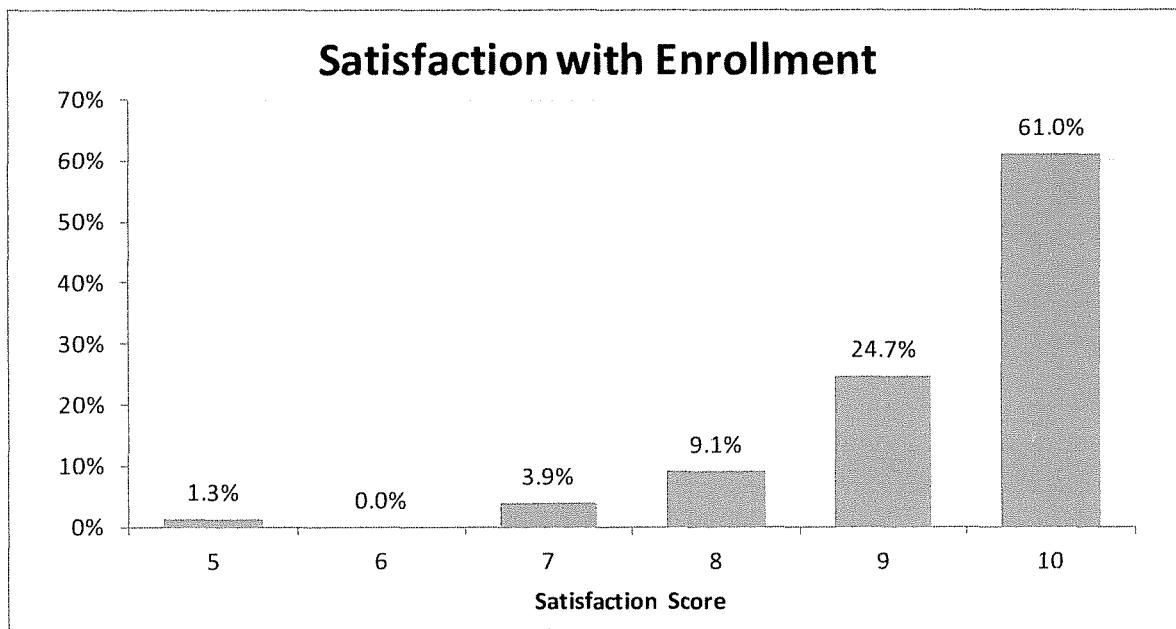
**Table 14. Perceived Reasons for Power Manager®**

Reasons mentioned	N	Percentage of all survey respondents mentioning reason (n=80)
Peak Demand	50	62.5%
Hottest time of day	23	28.8%
Fewer people are home	19	23.8%
Don't Know	4	5%

Note: Multiple responses allowed.

### **Program Satisfaction**

Surveyed respondents indicate a high level of satisfaction with the enrollment process of the Power Manager® program. Kentucky participants report a mean satisfaction score of 9.4 with the enrollment process on a scale of 1 to 10 with 10 meaning they were very satisfied.

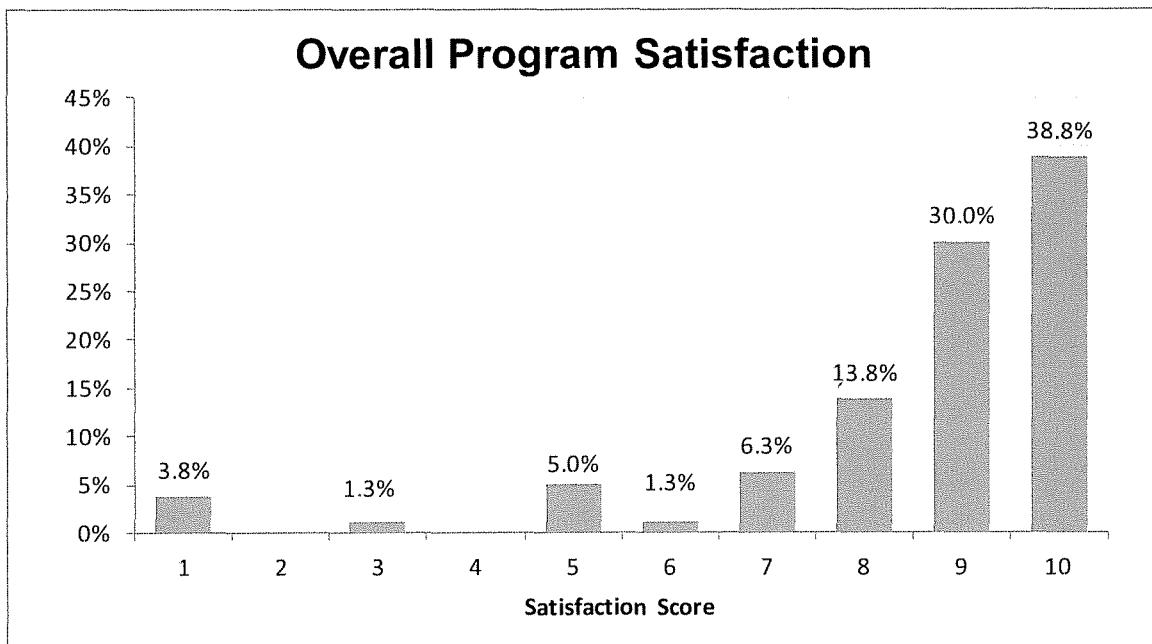


**Figure 8. Satisfaction with Power Manager's® Enrollment Process**

The following are the reasons for participants reporting low (score of 8 or less) satisfaction scores with the program enrollment. These scores indicate that the customers, who scored satisfaction low, typically do not have a reason for that lower enrollment satisfaction score.

- “It was almost too easy - what's the catch”
- “I didn't know enough about it and am not sure the savings are worth it.”
- “I had to re-apply.”
- “Not that big a deal.”

Overall program satisfaction scores for Power Manager® are an average of 8.5 in Kentucky. However, more than 65% of the survey respondents report a satisfaction score of 9 or 10 with the Power Manager® program.



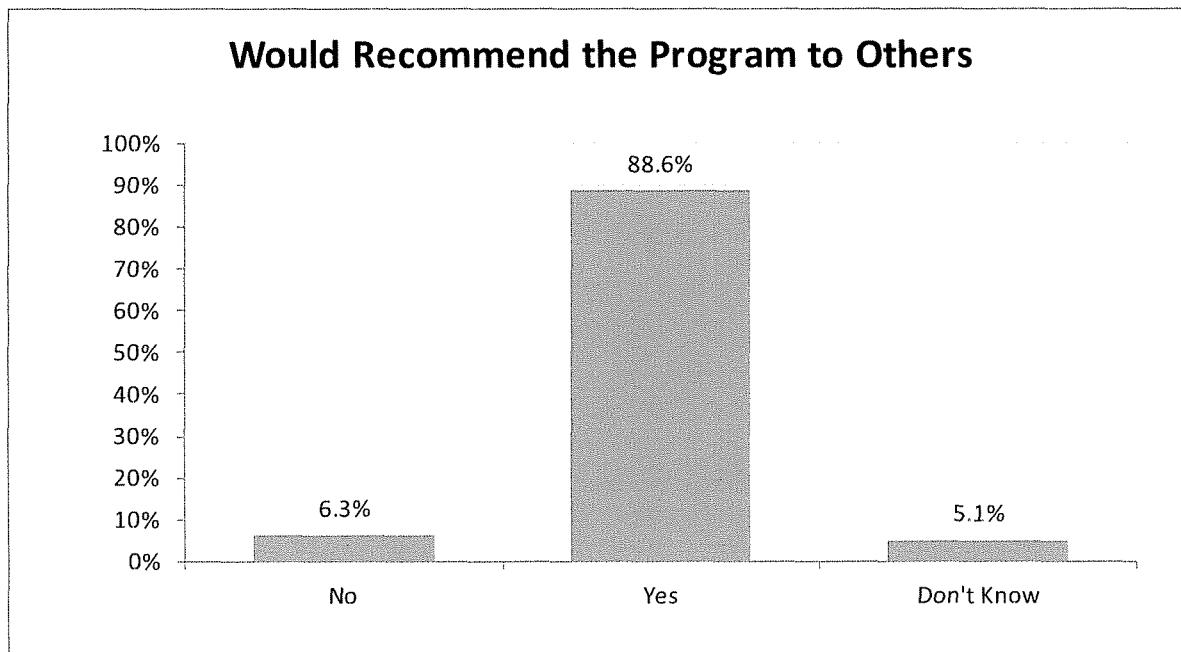
**Figure 9. Overall Program Satisfaction**

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

- “I am not seeing the savings.”
- “I am not sure the savings justify it.”
- “I can't tell when it's been activated.”
- “I do not know it is activated (too invisible a process).”
- “The cycles are longer now than when I signed up. I was not notified of the change.”
- “A Duke technician changed my device without prior notice.”
- “Duke cycled both of my units at the same time and the house got very hot.”
- “Rate still too high.”
- “The activation is too close to my return from work in late afternoon.”

The majority of surveyed participants (88%) would recommend the Power Manager® program to others. When a surveyed participant said they would not recommend the program, they offered the following reasons:

- “I let people make their own decisions. (N=3)
- “I would provide facts and let them decide.”
- “It doesn't seem to save energy or money, given wear & tear on AC units trying to catch up on cooling.”



**Figure 10. Percent of Participants that would Recommend the Program to Others**

### Awareness of Other Duke Energy Programs

We asked the surveyed participants if they were aware of any other Duke Energy programs. Fifty-two (65%) of the participants were able to name other programs, and the most cited programs were the Home Energy House Call Program and the CFL Program.

	KY (n=78)	
	N	Percent
CFL Program	20	25.6%
Home Energy House Call	27	34.6%
Personalized Energy Report	3	3.8%
Smart \$aver	0	-
Energy Star Homes	2	2.6%
Low Income Programs	5	6.4%
Home Energy Comparison Report	3	3.8%
Total	60	76.9%

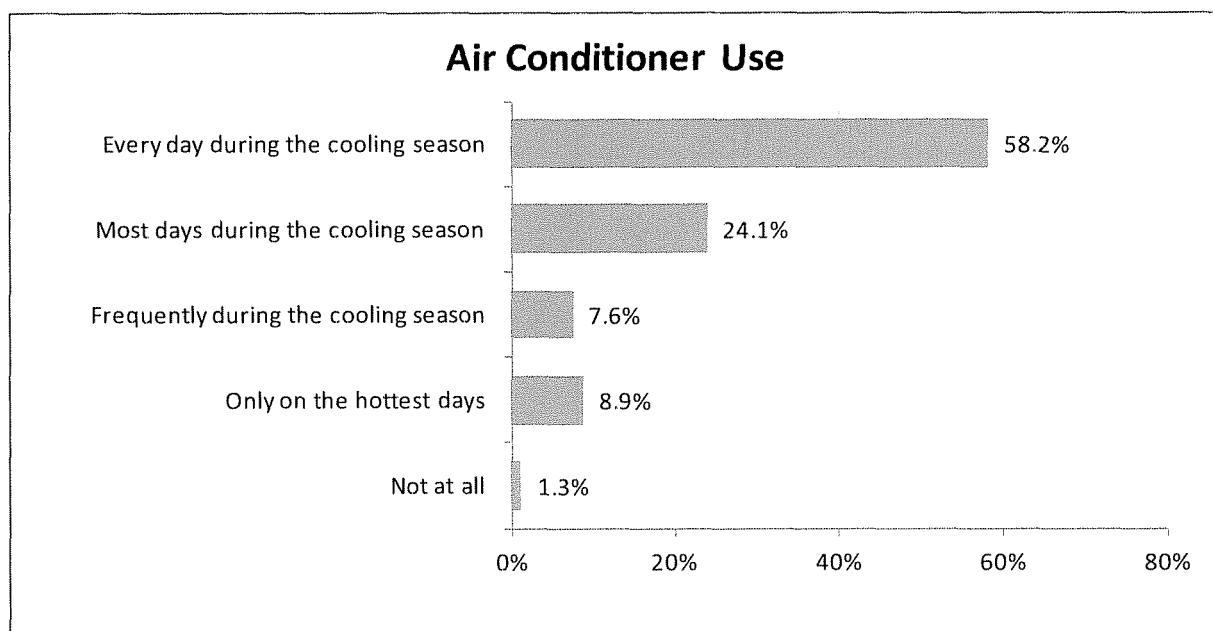
We then asked them what kinds of programs or services they think that Duke Energy should offer to its customers. Their responses are bulleted below:

- “Best reliable power at lowest rate.”
- “Better notice about tree trimming. Minimize trimming and pay more attention to impact on trees.”
- “Buy power in advance for customers like the Ohio Energy Credit program.”

- “Charge lower rates for off-peak (my Michigan utility offered cheaper evening and weekend rates).”
- “Energy audit in my home, not just online.”
- “Free CFLs.”
- “Give incentives to customers who buy energy-efficient appliances.”
- “Help the elderly with thermostat advice via telephone.”
- “Highlight the savings from Power Manager on my bill.”
- “Home heat loss analysis. Home Energy House Call was not satisfactory.”
- “Itemize Power Manager bill credits in a more prominent way.”
- “Lower rates and incentives. Provide a call-ahead service to notify customers when Duke technicians are coming. (Cinergy used to do that).”
- “Make bills more customer-friendly. They should show longer periods of usage (2 years) for comparison.”

## Air Conditioner Practices

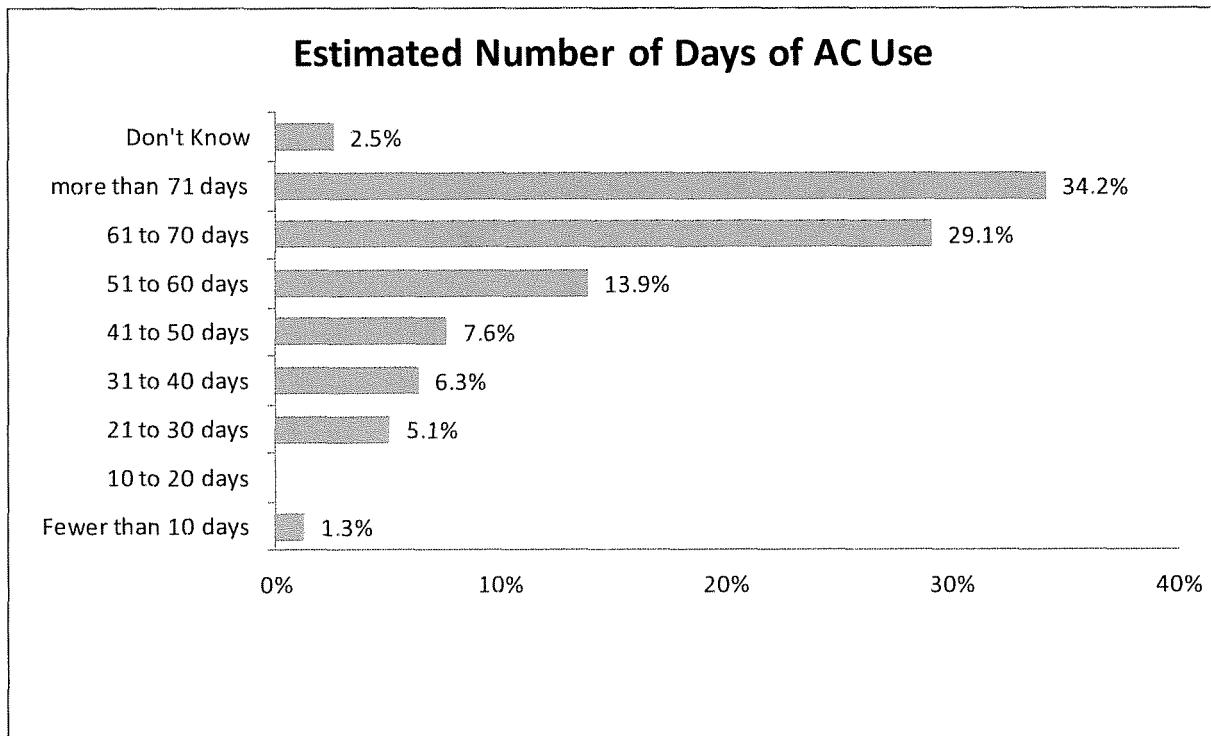
We asked the surveyed participants about their air conditioning use. First we asked if they used their air conditioner only on the hottest days of the cooling season, or if they used it frequently, most days, every day, or not at all. The Power Manager® program in Kentucky is successful in enrolling participants that routinely use their air conditioners on the hottest days, but also use their units most of the cooling season. The program is reaching and enrolling the customers that typically and routinely use their units on control days. Only 1.3% (n=1) of the Kentucky respondents indicated that they never use their air conditioner.



**Figure 11. Air Conditioner Use of Power Manager® Participants**

We then asked the surveyed participants to estimate how many days they had their air conditioners on during the summer of 2011 previous to taking the survey. These results are presented in Figure 12. These results match closely to the estimates provided in Figure 11, and a

significant correlation between these two responses (.771) is shown in Table 15, indicating that these self-reported values are likely to be an accurate representation of the participants' air conditioner use.



**Figure 12. Estimated Number of Days of Air Conditioner Use, Summer 2010**

**Table 15. Correlation of Air Conditioner Use Responses**

		How often do you use your central air conditioner? Would you say you use it ...	About how many days would you estimate that you had your air conditioner on during the summer of 2010?
How often do you use your central air conditioner? Would you say you use it ...	Pearson Correlation	1	.771(**)
	Sig. (2-tailed)		.000
	N	77	77

\*\* Correlation is significant at the 0.01 level (2-tailed).

Seventy-two percent of the Kentucky participants that were surveyed reported that they had someone tune-up or repair their air conditioner in the time since they enrolled in the Power Manager® program.

**Table 16. Respondents Receiving AC Services (tune-up or repair) Since Enrolling in Power Manager®**

	KY	
	N	Percent
No	21	26.6%
Yes	57	72.2%
Don't Know	1	1.2%

Forty-eight of the surveyed participants in Kentucky had their air conditioner serviced by an AC contractor, two participants noted that an electrician serviced their AC, four participants had their AC serviced by a friend in the HVAC business, three participants serviced their AC themselves, and one participant had the AC serviced by a handyman. Slightly more than half of those who had their AC serviced report that the performance of the AC unit did not improve as a result.

**Table 17. Did the performance of your air conditioner improve after you had it serviced?**

	KY	
	N	Percent
No	22	50.1%
Yes	29	38.6%
Don't Know	6	10.5%

Surveyed participants report that there is usually someone at the home and using the air conditioner on weekday summer afternoons in 87% of homes in Kentucky.

**Table 18. Is the air conditioner typically used to keep someone at home comfortable during weekday summer afternoons before 5 P.M.?**

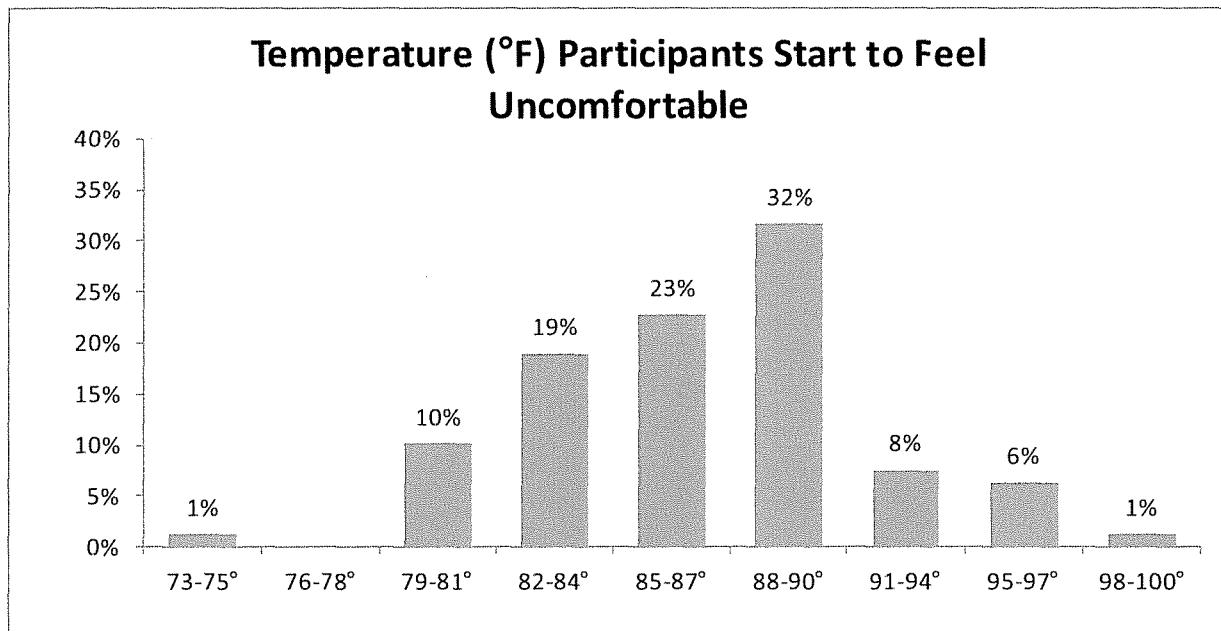
	KY	
	N	Percent
No	10	12.7%
Yes	69	87.3%

**Table 19. Is the air conditioner typically used to keep someone at home comfortable during weekday summer afternoons after 5 P.M.?**

	KY	
	N	Percent
No	0	7.7%
Yes	79	92.3%

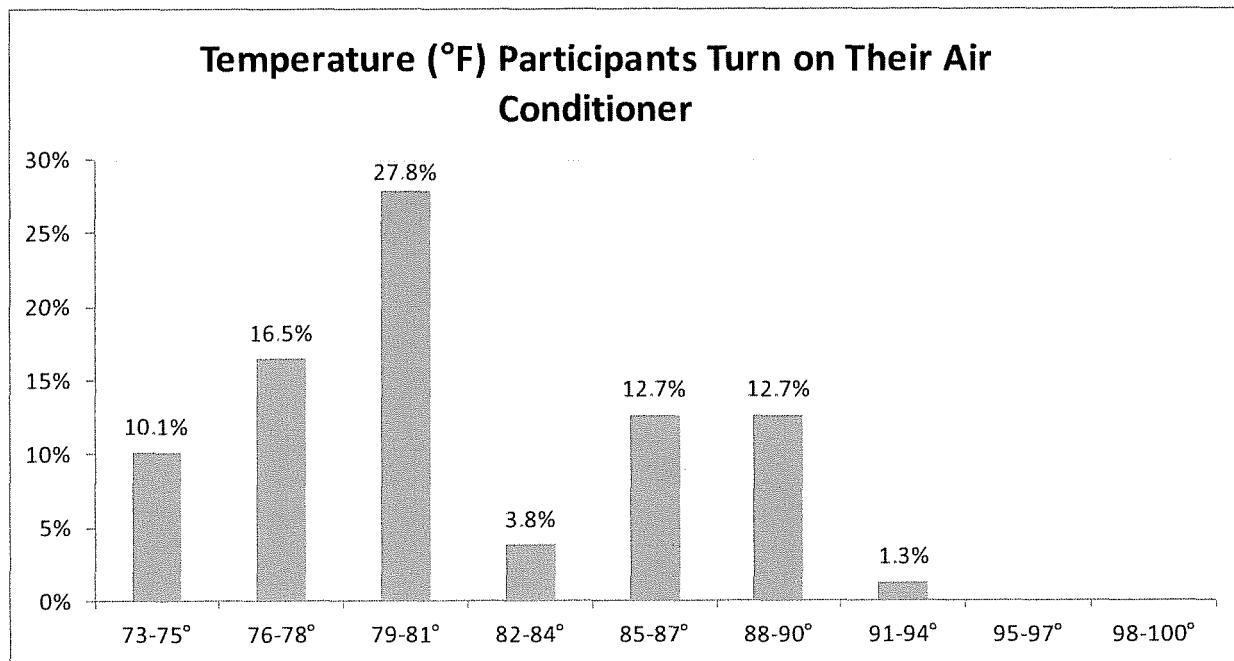
## Outside Temperatures and Thermostat Settings

Surveyed Power Manager® participants were asked to think about a hot and humid summer day, and then to tell us at what outside temperature they start to feel uncomfortably warm. The responses are presented in Figure 13. The median temperature range of discomfort is 85-87°F in Kentucky.



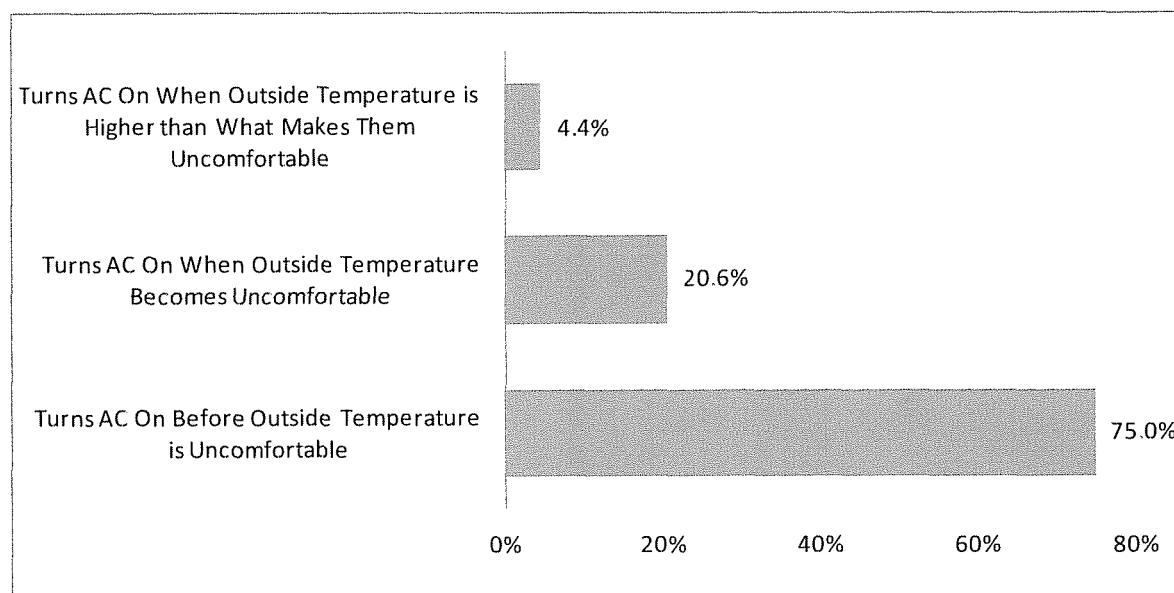
**Figure 13. Outside Temperatures at Which Participants Feel Uncomfortably Warm**

We then asked the surveyed participants at what outside temperature they tend to turn their air conditioners on. The median outside temperature range for which air conditioners are turned on is 79-81°F in Kentucky (two ranges lower than their discomfort level). The frequency of responses are presented in Figure 14.



**Figure 14. Outside Temperatures that Participants Turn On Their Air Conditioners**

Comparing these two temperature points (of discomfort and when participants turn on their air conditioners) provides us with Figure 15, which shows that three-quarters of Kentucky participants turn on their air conditioners before the temperature becomes uncomfortable, many (20.6%) turn it on when the weather becomes uncomfortable, and very few (4.4%) of them wait until the temperature is higher than when they begin to feel uncomfortable.



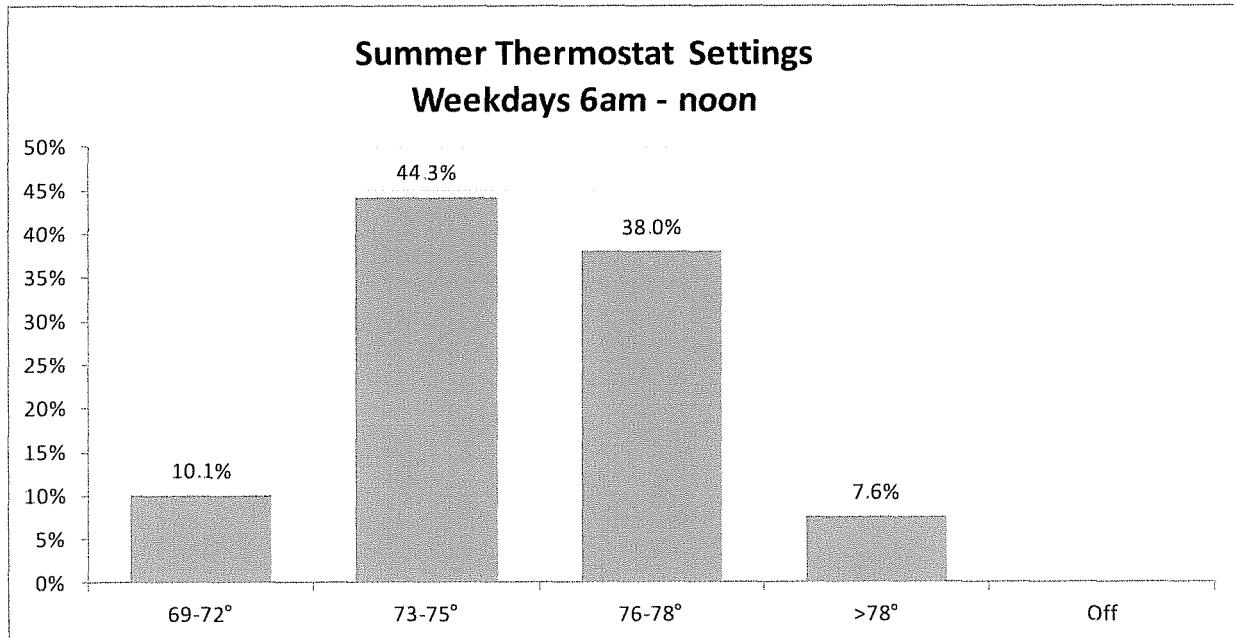
**Figure 15. Percent of Participants Turning Their Air Conditioners When Temperatures Reach an Uncomfortable Level**

If the respondent indicated that the AC is turned on at a certain temperature through their programmed thermostat, we asked the participant if they set the thermostat seasonally or if they set it when the weather gets hot. The surveyed participants were nearly split in their responses.

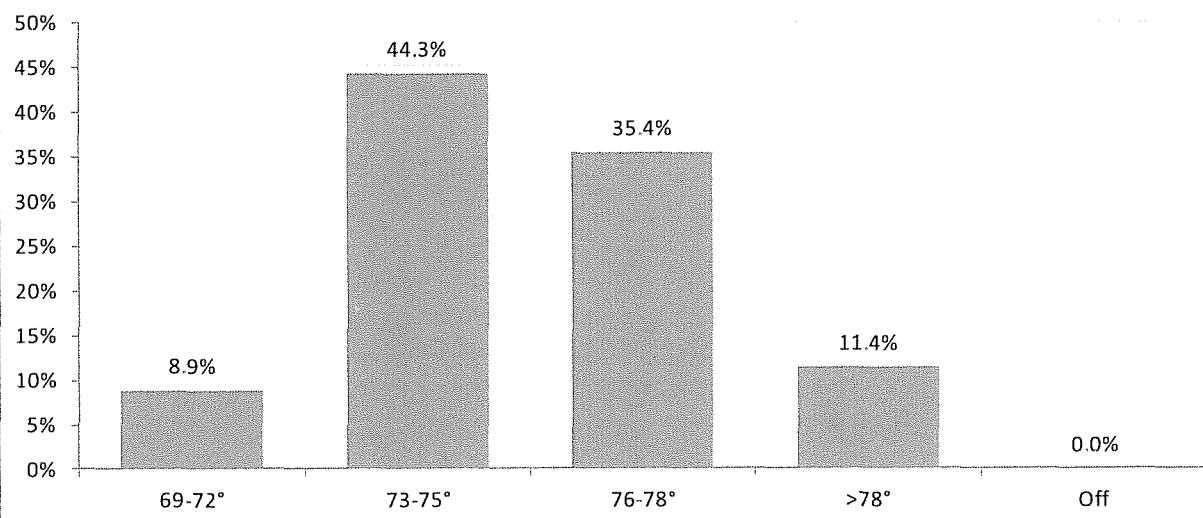
	KY	
	N	Percent
I program the thermostat seasonally	6	46.2%
When the weather gets hot	7	53.8%

## Thermostat Settings

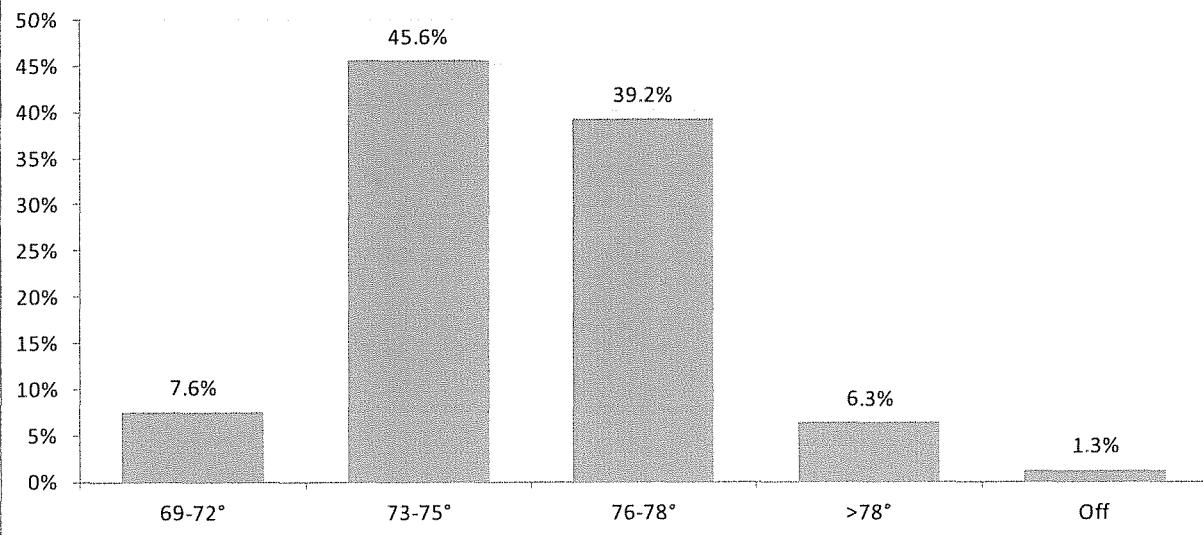
The following graphs present the frequencies of thermostat settings of the Kentucky surveyed participants on weekdays and weekends at four time periods throughout the day (6am-12pm, 12pm-5pm, 5pm-10pm, and 10pm-6am). All eight of these graphs show that the most common thermostat setting over all days and time periods is 73-75°F.

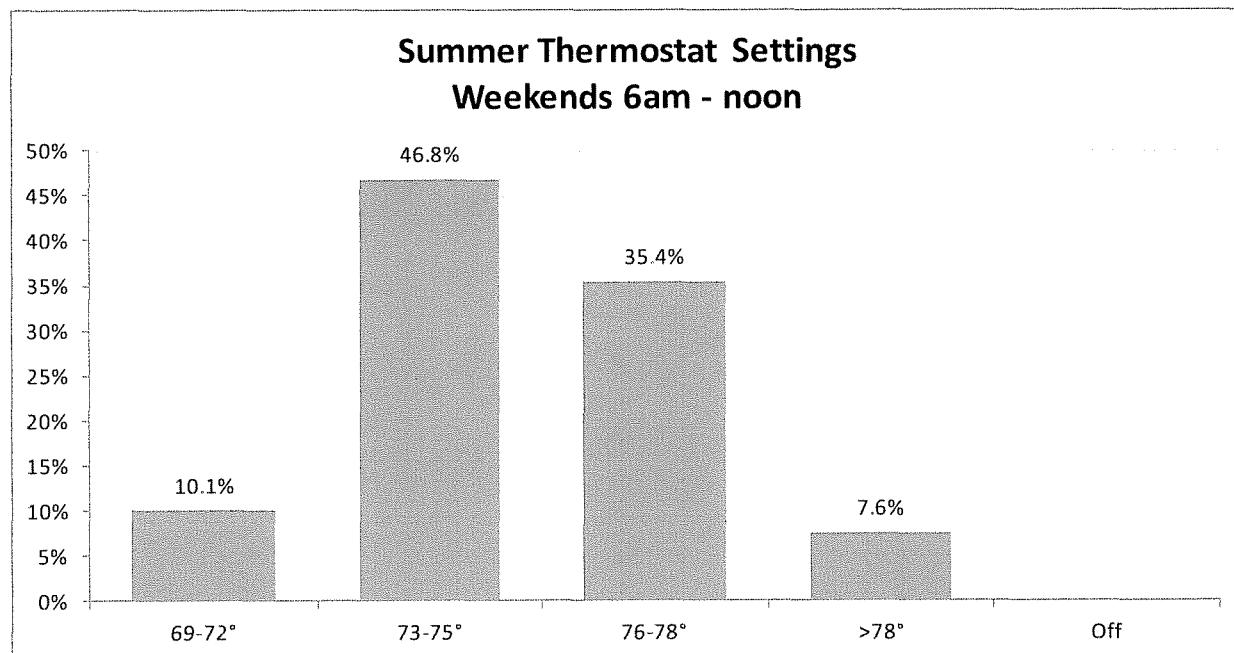
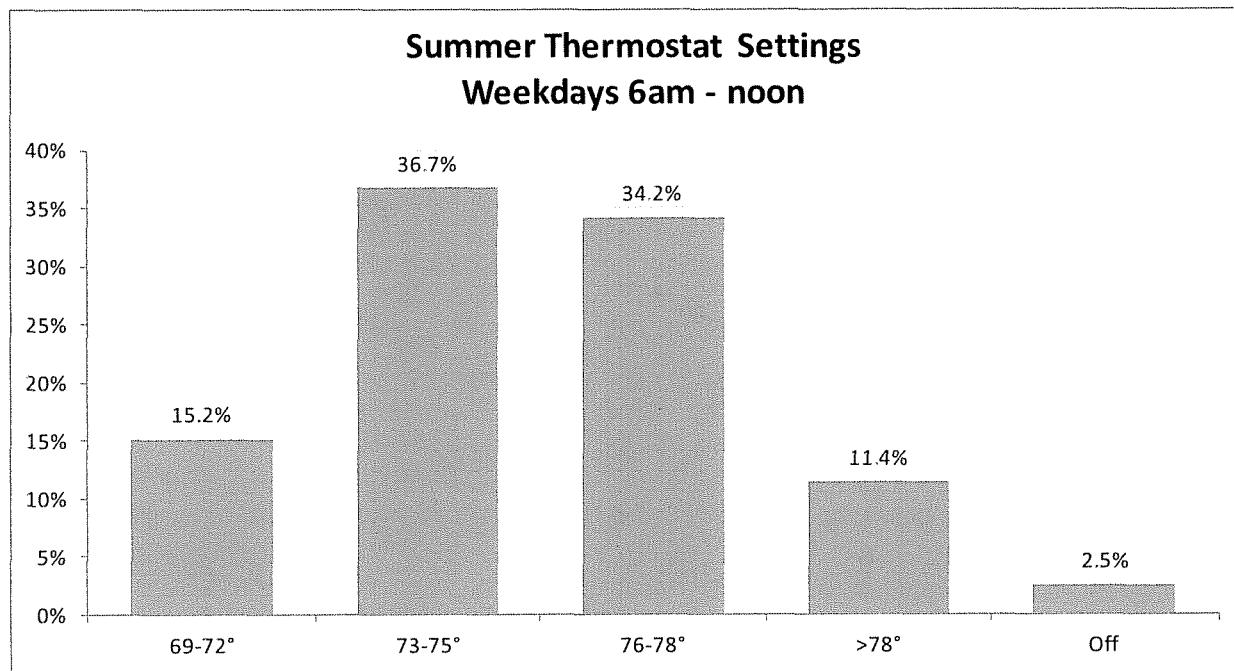


### **Summer Thermostat Settings Weekdays noon - 5pm**

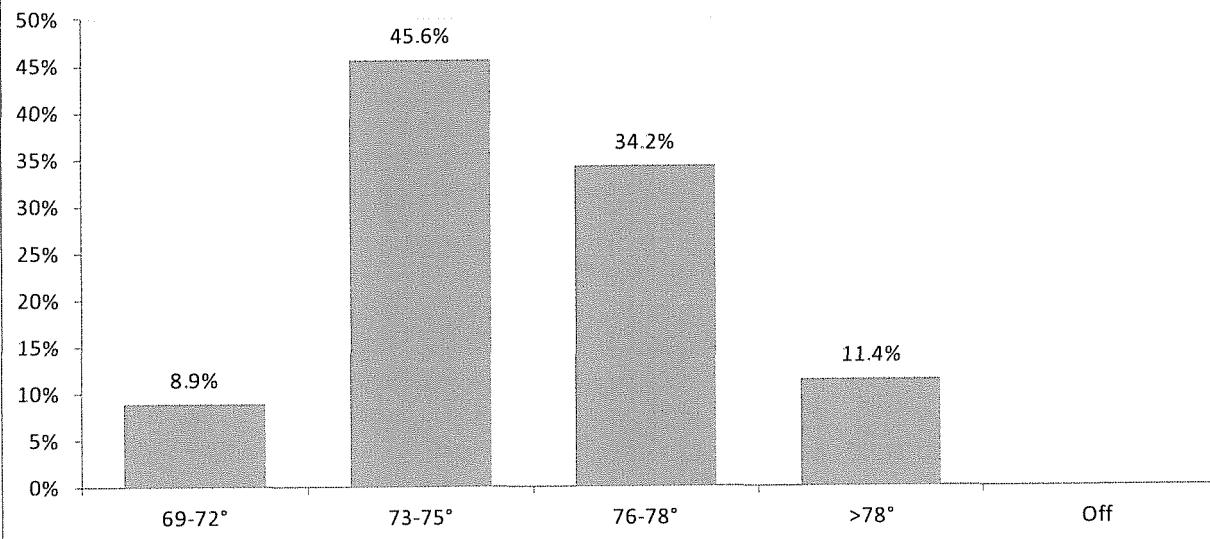


### **Summer Thermostat Settings Weekdays 5pm- 10pm**

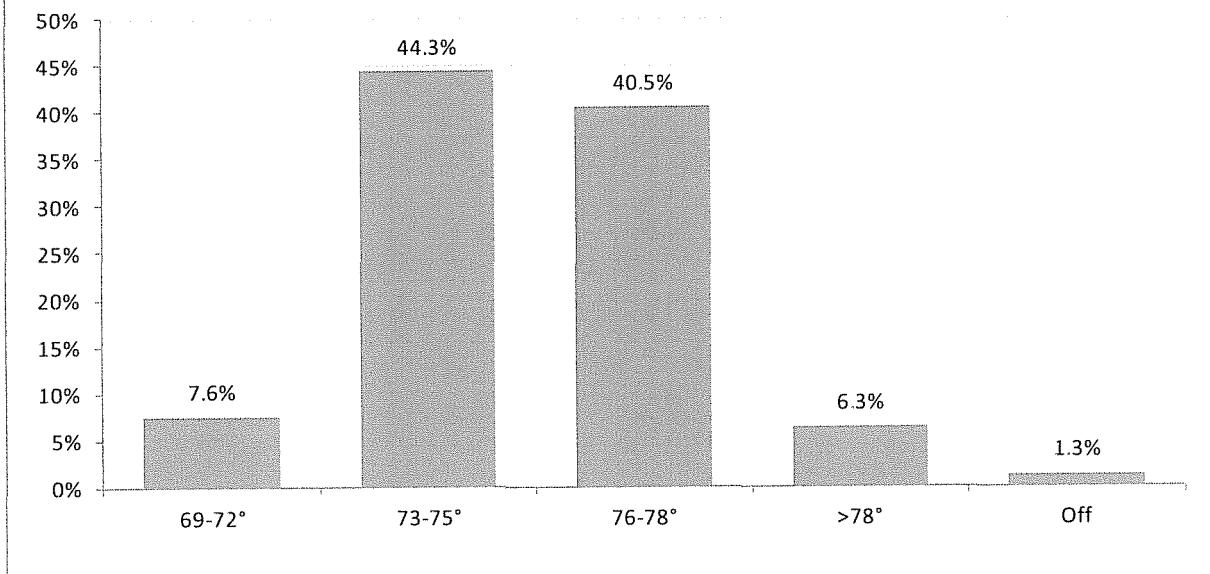


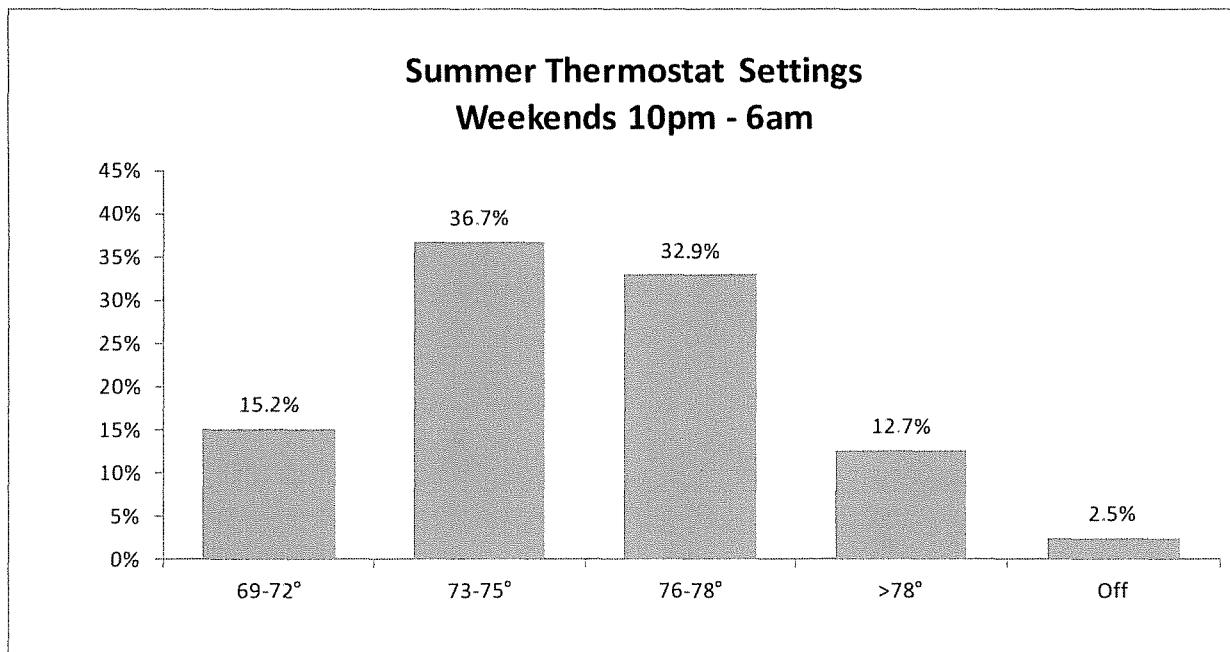


### Summer Thermostat Settings Weekends noon - 5pm



### Summer Thermostat Settings Weekends 5pm-10pm



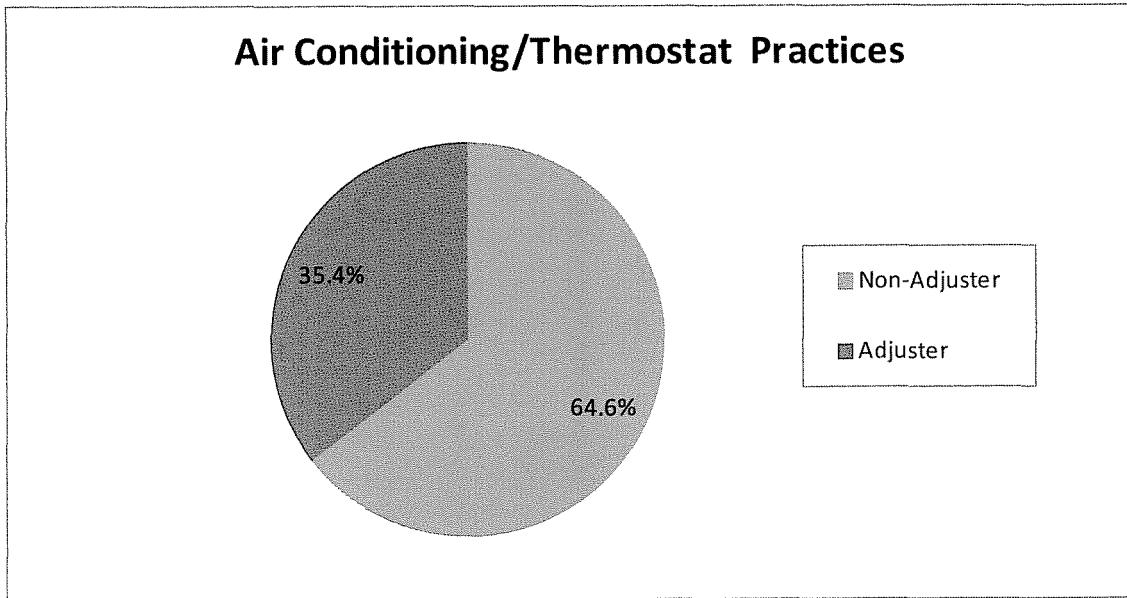


Most of the Power Manager® participants leave their settings the same every day, from weekdays to weekends. Some Kentucky respondents are likely to lower their AC temperature settings (using more energy) on weekends from 12-5pm. There were a few participants reporting that they set their thermostats to higher temperature settings during the weekend.

**Table 20. Changes in Thermostat Settings of Power Manager® Participants**

Time period	KY		
	Same every day	Lower AC temperature on weekends	Higher AC temperature on weekends
6am-12pm	97.5%	0.0%	2.5%
12pm-5pm	93.7%	3.8%	6.3%
5pm-10pm	98.8%	1.2%	0.0%
10pm-6am	98.8%	1.2%	0.0%

We found that there are two types of customers in the Power Manager® participant group in Kentucky: those that turn their air conditioners on to a set temperature and leave it at that temperature all day, every day (non-adjusters), and those that change the temperature settings (adjusters). Figure 16 below shows that 64.6% of the surveyed Power Manager® participants are "non-adjusters". Over a third of these participants adjust their thermostat settings at some point during the week.



**Figure 16. Thermostat Practices of Power Manager® Participants**

We split the surveyed participants into these two groups to calculate the outside temperature points at which they become uncomfortable and turn on their air conditioners. Table 21 presents these median temperature ranges.

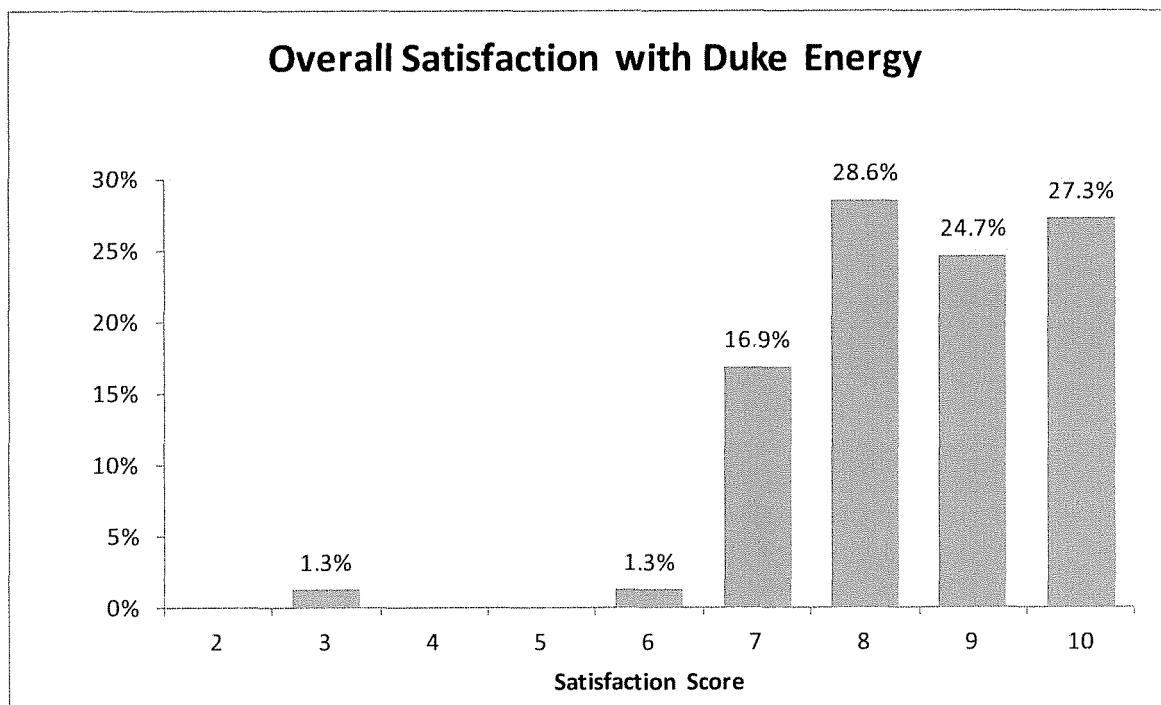
Both adjusters and non-adjusters become uncomfortable when the outside temperature reaches 85-87°F, and will turn their air conditioners on when the outside temperature reaches 79-81°F

**Table 21. Temperature Points for Non-Adjusters and Adjusters**

Non-Adjusters	KY
Median Temperature Range of Discomfort	85-87
Median Temperature to Turn AC On	79-81
Median Temperature of Thermostat	79-81
Adjusters	
Median Temperature Range of Discomfort	85-87
Median Temperature to Turn AC On	79-81

### Satisfaction with Duke Energy

Overall satisfaction with Duke Energy is quite high. Kentucky participants report an average satisfaction score of 8.5 on a ten-point scale. The frequency of responses is presented in Figure 17.



**Figure 17. Overall Satisfaction with Duke Energy**

Kentucky surveyed participants that gave a satisfaction score lower than 9 were asked why they were less than satisfied with Duke Energy. Their responses are below.

Surveyed participants that scored their satisfaction with Duke Energy at 8:

- “Rates are too high.” (N=6)
- “A nearby power pole burned down due to electrical fire, yet Duke was slow to respond to that emergency.”
- “My bills don't always fit my usage.”
- “Too many delays in restoring power after storm outages.”
- “Duke gave an untruthful estimate on my outage repair. Duke should be more honest.”
- “Duke is getting too automated. I am a landlord who'd like to have more flexible services.”
- “Duke technician changed my Power Manager device without prior notice and upset my Rottweiler.”
- “Duke threatened to cut off my power once.”
- “Duke was not very cooperative about a tree trimming problem.”
- “I didn't qualify for an Energy Star rebate for my new AC unit only because I live in Kentucky.”
- “I do not like all the surveys Duke does.”
- “I had a gas meter problem last year. Duke estimated usage at too high an amount before the repair. The repair service was tardy.”
- “I have an unresolved claim about \$80 AC repair charge after Duke technician improperly installed new Power Manager device.”

- “I was charged \$35 for trimming a bush near my meter. There have been more outages and surges than normal this year.”
- “My gas leak problem was dismissed by a Duke representative and service was delayed. It is unfair to charge customers for infrastructure repairs after storms.”
- “No reason in particular - they just haven't wowed me yet.”
- “No strong opinion.”
- “Outages take longer to repair than when Cinergy/Cincinnati Gas & Elec. owned the utility. Duke has made too many maintenance cutbacks.”
- “Power surge destroyed my old washing machine. Duke should warn customers.”
- “Tree-trimming is too haphazard and arrogant.”
- “Stock dividends could be higher.”
- “*Strike Stop* anti-lightning/grounding service failed to protect my computer and I had to fight for a settlement.”
- “Tree trimming.”
- “Wish my bills were lower.”

## Section 3: Recency Surveys

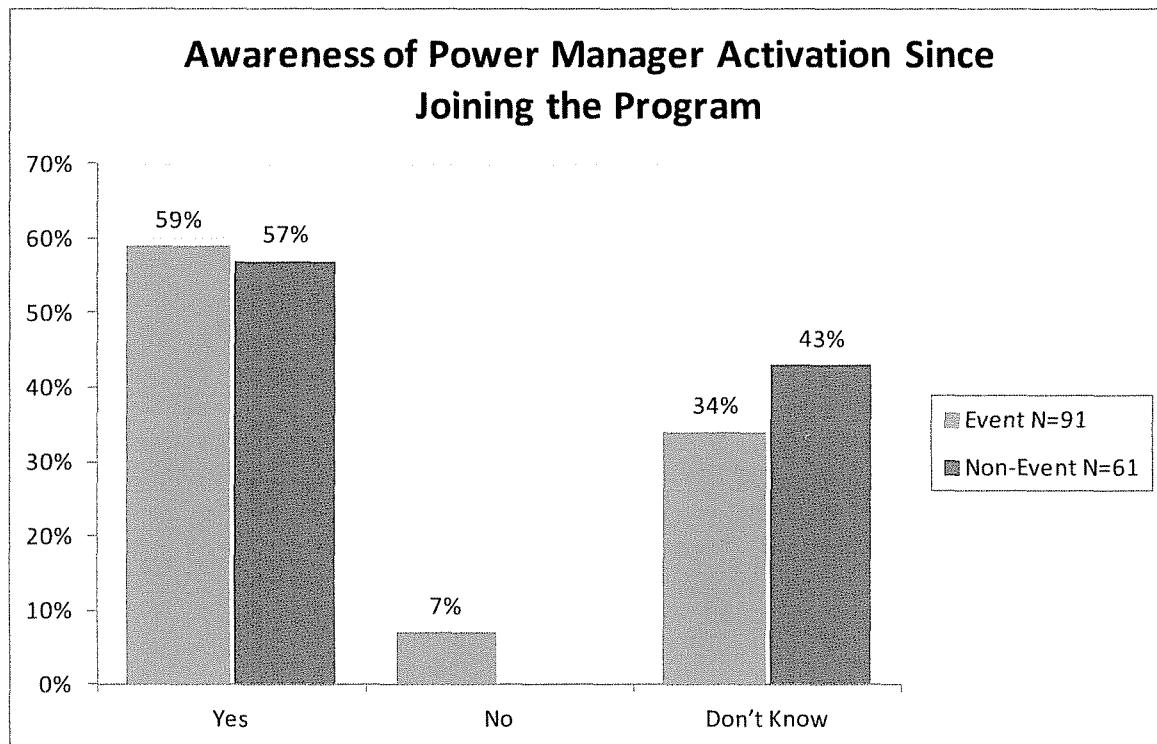
In addition to the participant surveys reported above, TecMarket Works also conducted surveys of current Power Manager participants in order to better gauge their awareness of Power Manager events and their perception of discomfort caused by Power Manager curtailment events.

TecMarket Works conducted the recency surveys regarding each event during a 50-hour window beginning at 5 p.m. EST on the day that a curtailment event occurred and ending at 7 p.m. EST two days after the curtailment event. Calling hours were 9 a.m.-7 p.m. EST. Following events occurring on July 12, July 21 and August 1, TecMarket Works surveyed a total of 91 participants in Kentucky. The event survey protocol is located in Appendix C: Participant Recency Survey.

In order to control for customer perceptions and experiences not caused by Power Manager curtailment events, TecMarket Works also surveyed participants referencing days on which the heat index was high enough to trigger a curtailment event, but on which no curtailment event actually occurred. On and following the high temperature dates of July 11, July 28-29 and September 2, TecMarket Works surveyed a total of 61 participants in Kentucky. The high temperature non-event survey is located in Appendix D: Participant Recency Survey for Non-Event Day Comparison.

## Awareness of Device Activation

In order to gauge awareness of the Power Manager device activation, TecMarket Works first asked event and non-event participants if they were aware of a device activation occurring since they had joined the program. The results in Figure 18 show that a majority of event and non-event participants were aware of an activation at some point since their enrollment. Furthermore, the distribution of answers is quite similar between event and non-event participants.



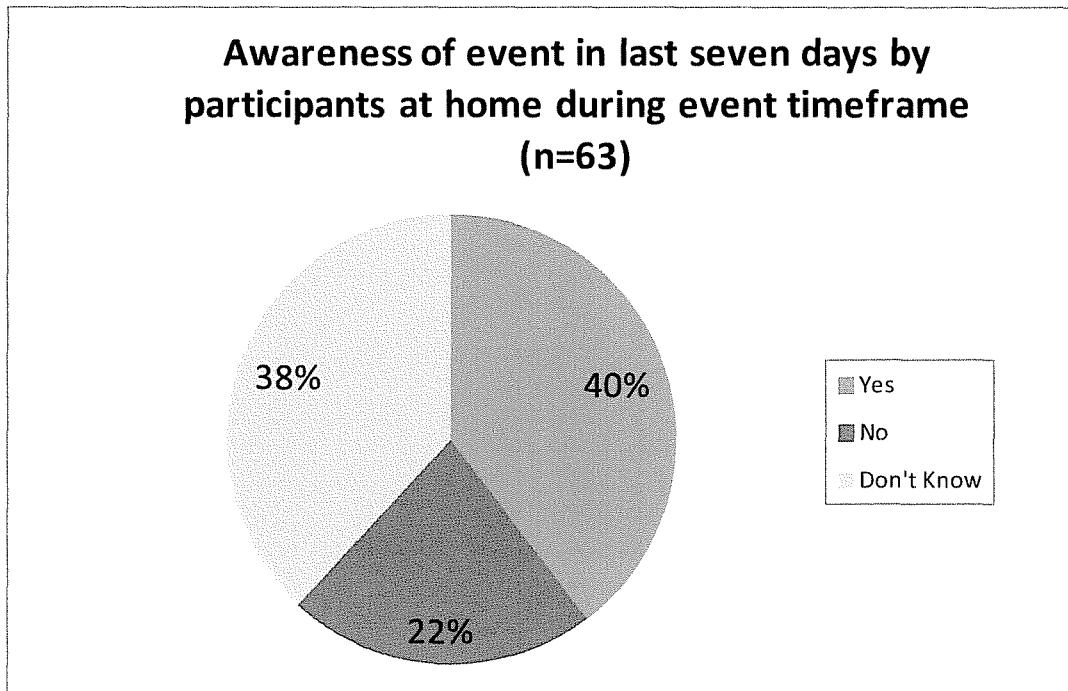
**Figure 18. Awareness of Power Manager Activation Since Enrolling in the Program**

TecMarket Works followed up the initial awareness question by asking participants an open-ended question as to how they knew that the Power Manager device had been activated. Forty-two event participants (46%) and 36 non-event participants (59%) stated that they did not know how to tell if the Power Manager device had been activated. The responses from the remaining participants in Table 22 below show that the shut-down of the A/C compressor and a rise in home temperature are the most cited reasons for awareness of a Power Manager device activation.

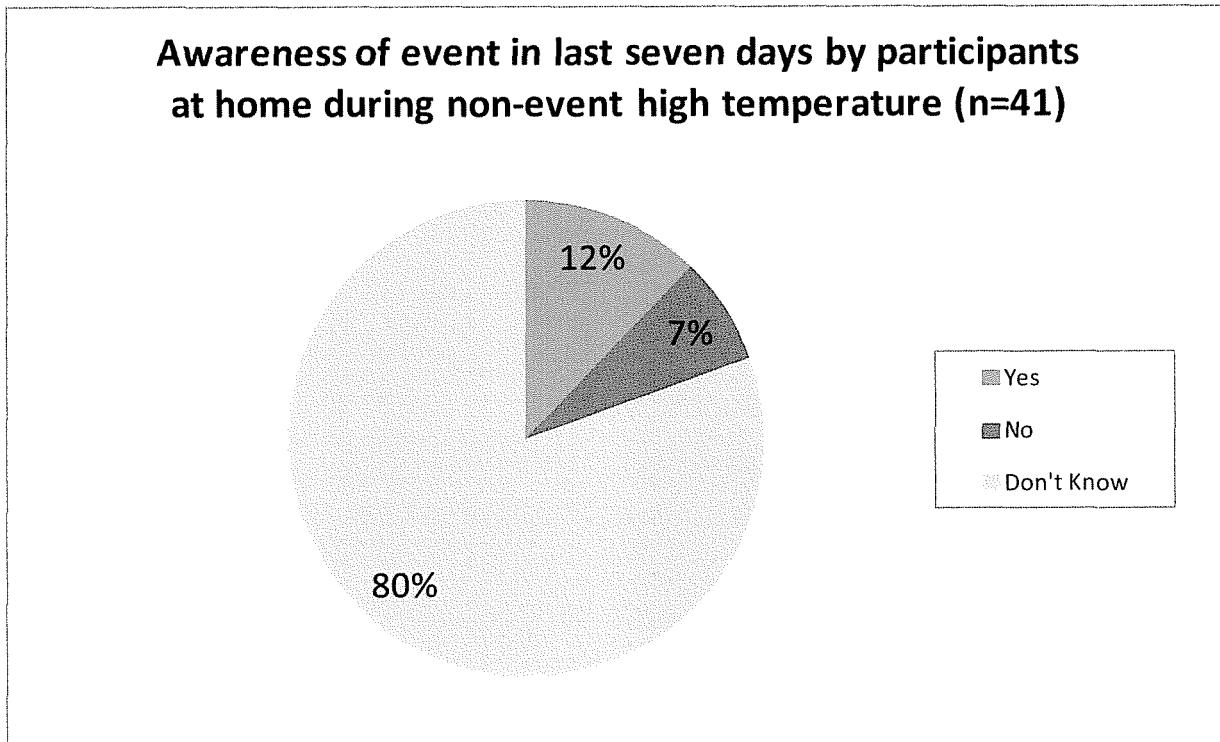
**Table 22. Reasons for Awareness of Activation**

	Number of times mentioned by...		Difference
	Event Participants (N=91)	Non-Event Participants (N=61)	
A/C shuts down	47.3%	16.4%	30.9%
Home Temperature rises	30.8%	6.6%	24.2%
The light on the meter is on	1.1%	4.9%	-3.8%
The light on the A/C unit flashes	3.3%	6.6%	-3.3%
Bill Credits	6.6%	1.6%	5%
Lower Bill	-	1.6%	-1.6%
Sent a card in the mail	-	4.9%	-4.9%
Caused circuit breaker to trip	1.1%	0	1.1%

TecMarket Works then asked both event and non-event participants whether they were aware of their Power Manager device being activated in the last seven days. However, in the case of the non-event participants, such an activation had not occurred. This fact is supported by the results in Figure 19 and Figure 20. In Figure 19, forty percent of event respondent were aware of a Power Manager activation, while Figure 20 shows that 87 percent of non-event participants thought that no power manager activation had occurred, or were unsure of whether an activation had occurred or not.

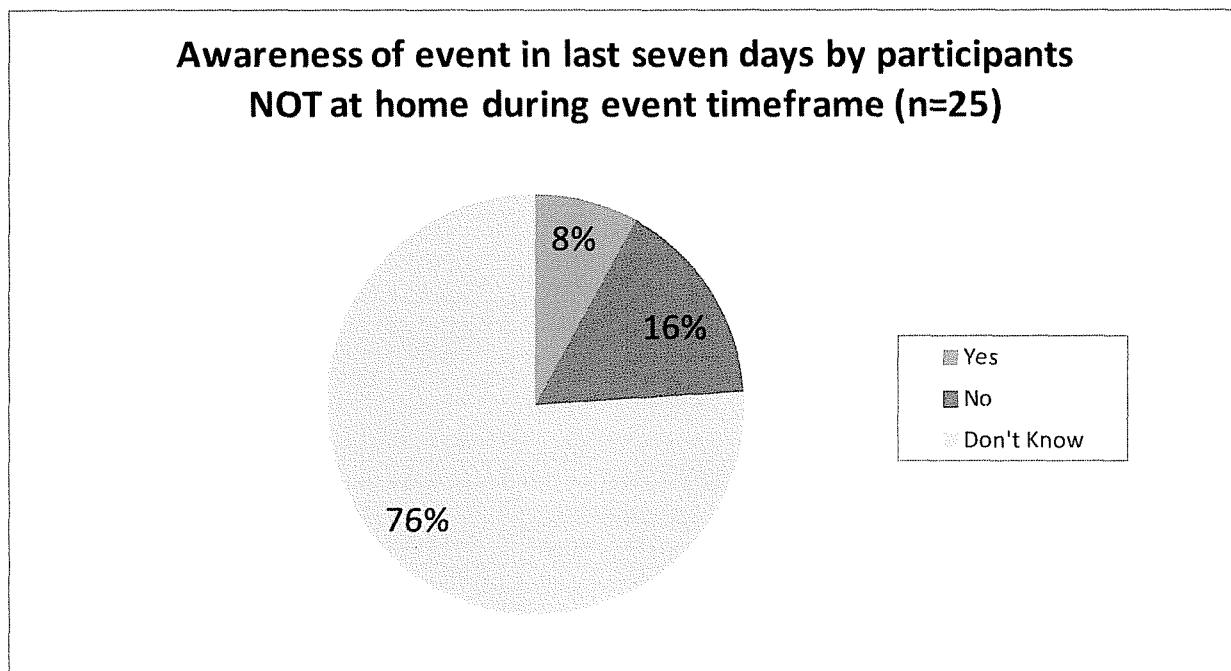


**Figure 19. Awareness of activation in past seven days by event participants**



**Figure 20. Awareness of event in last seven days by non-event participants.**

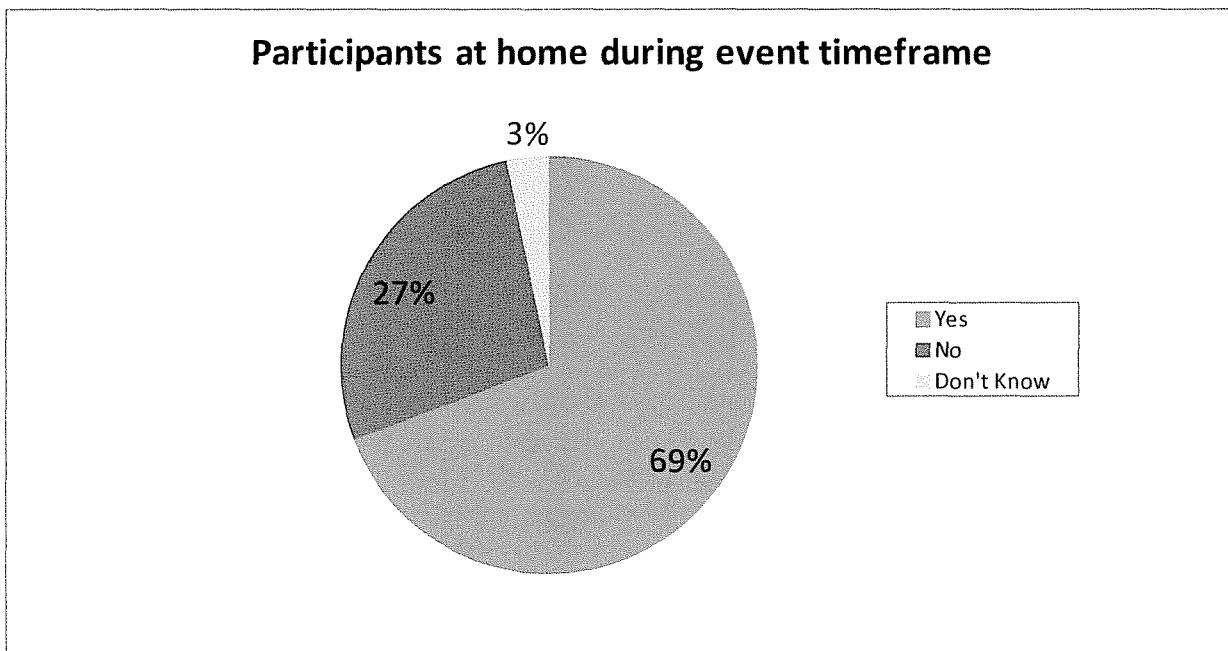
TecMarket Works also asked event participants who were not at home during the event timeframe whether they were aware of the Power Manager device activation. As shown in Figure 21, ninety-two percent of event participants stated either that they thought no activation had occurred or were unsure of whether an activation had occurred or not. This suggests that the effects of a Power Manager activation do not persist beyond the event timeframe.



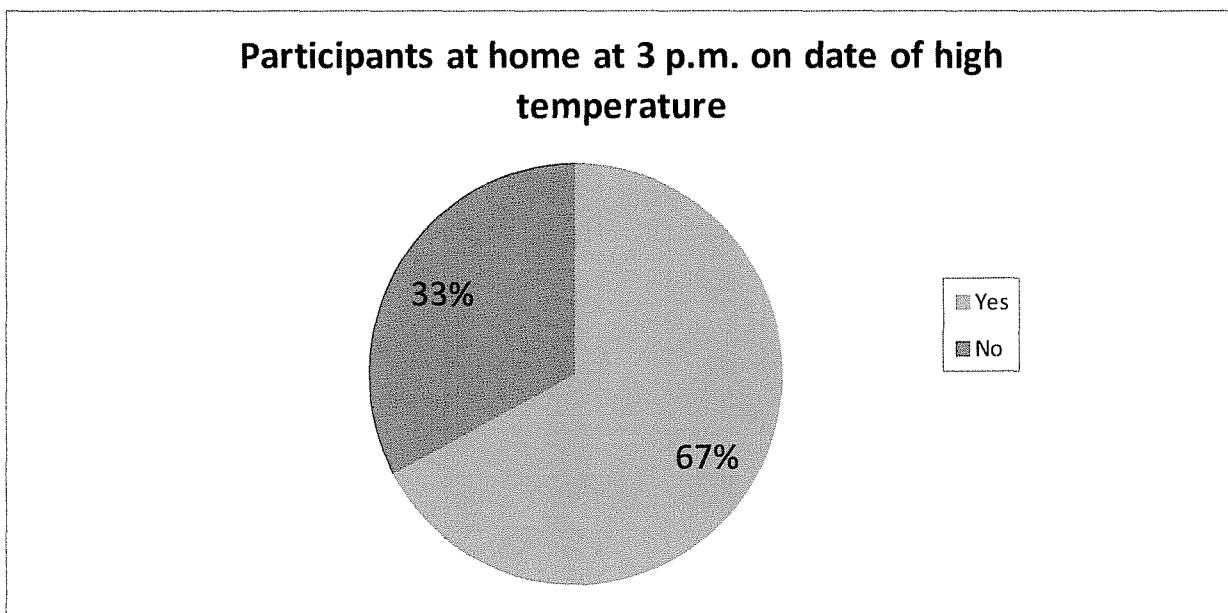
**Figure 21. Awareness of event activation by event participants not at home.**

### **Home Occupancy During Power Manager Activation**

TecMarket Works then asked Event respondents whether they were home during the actual event timeframe (typically 2-5pm EST) and asked Non-Event survey respondents if they were home at 3pm EST on the date of the high temperature. The results in Figure 22 and Figure 23 show that roughly two-thirds of both event and non-event survey respondents were home during these times.



**Figure 22.** Event Participants at home during event timeframe. N=91



**Figure 23.** Non-Event participants at home at 3 p.m. on date of high temperature. N=61

### Changes in Comfort and Comfort Drivers

The next part of the survey for both Event and Non-Event participants dealt with any perceived change in comfort being ascribed to a Power Manager activation and whether there were other drivers of that comfort change beyond the activation.

TecMarket Works then asked two comfort related questions to the 61 event participants and 36 non-event participants that indicated that they or a family member were home during the event or high temperature.

The first question asked for the participant to rate their level of comfort before the activation or time of high temperature on a 1-to-10 scale with one being very uncomfortable and ten being very comfortable. TecMarket Works then asked participants to rate their comfort level during the event or time of high temperature using the same scale. Table 23 below shows that the majority of both Event and Non-Event survey respondent indicated no change in their comfort level during the Power Manager activation or time of high temperature.

**Table 23. Comfort perception percentages by customers at home during an event**

		Event (N=61)	Non-Event (N=36)
Participants at home who noticed any change in comfort	N	19	7
	%	31.10%	19.40%

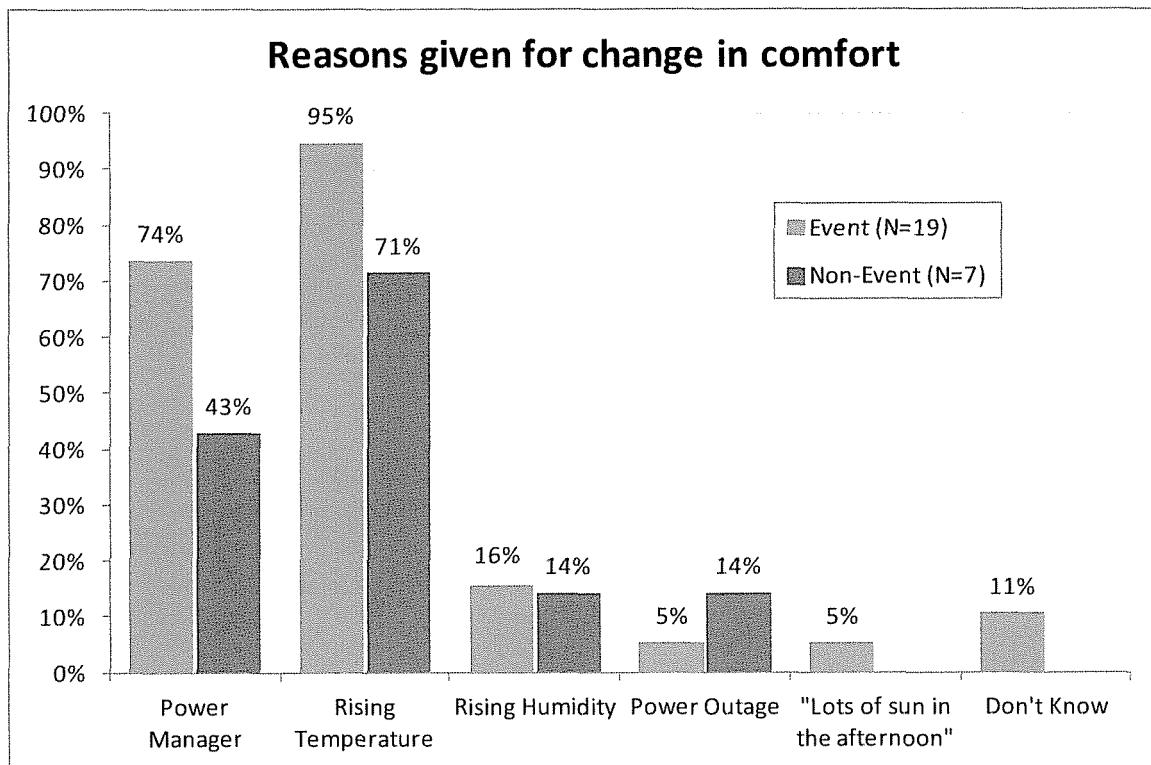
For the participants that did notice a change, Table 24 shows the mean ratings for before and during the event or high temperature as well as the high, low and mean difference for event and non-event participants.

**Table 24. Rating differences for Events and Non-Events by customers at home during an event**

	Event (N=19)	Non- Event (N=7)
Mean of pre-event comfort rating	8.84	9.86
Mean of rating during event or high temperature	5.11	5.35
Mean difference of ratings	3.74	3.84
Highest difference	9	6
Lowest difference	1	2

### **Participant Perceptions Relative to Comfort Change**

TecMarket Works asked participants who noted a change in comfort during the event or non-event timeline an open-ended question as to what they believe caused the change in comfort. The responses are shown below in Figure 24.



**Figure 24. Reasons for comfort change**

Figure 24 shows that most event and non-event participants attribute their change in comfort to rising temperature, however, only a small percentage attribute the change to high humidity.

Also of note is the fact that not all of the event participants cited Power Manager as contributing to their change in comfort. Three out of seven (43%) non-event participants did cite Power Manager for their change in comfort even though there was no device activation on the day in question.

A power outage was a contributing factor given by one event participant and one non-event participant; however, the overall percentage for non-event participants was much higher.

This data – along with the data from Figure 19 showing that only 40% of event participants were aware of an event occurring in the past seven days – suggests there is uncertainty among many participants as to how Power Manager affects their air conditioner and home comfort level. That is, some participants may be unaware that the Power Manager device is causing the changes they feel in comfort, while others may be attributing a change in comfort to participation in Power Manager when that change is in fact being caused by other factors.

## Behaviors During Event Activation

TecMarket Works asked several questions regarding behavior associated with a Power Manager device activation.

### **Thermostat Adjustments**

Participants who indicated that they or a family member had been home during the time of the event or high temperature non-event day were asked if they had adjusted their thermostat during that time. One event participant stated that they adjusted the thermostat from 78 degrees to 75 degrees during the device activation. Three non-event participants stated that they had adjusted their thermostats: one from 74 degrees to 72 degrees, one from 76 degrees to 74 degrees, and one from 78 degrees to 74 degrees, for a mean change of 2.7 degrees.

### **Use of Fans and Other Ways to Keep Cool**

Participants who indicated that they or a family member had been home during the time of the event or high temperature period were then asked if they had turned on any fans during that time period. The results are shown in Table 25.

**Table 25. Did you or your family turn on a fan during event or high temperature?**

	Event (N=64)	Non-Event (N=40)
Yes	31.20%	37.50%
No	64.10%	63.50%
Don't Know	4.70%	-

Participants were then asked an open-ended question as to whether they did anything else to keep cool during the timeframe of the Power Manager device activation or high temperature. Thirty-five out of sixty-four event participants (54.7%) and 34 out of 40 (85%) of non-event participants stated that they either did nothing else or nothing at all in response to the device activation or high temperature. The other responses are included in Table 26.

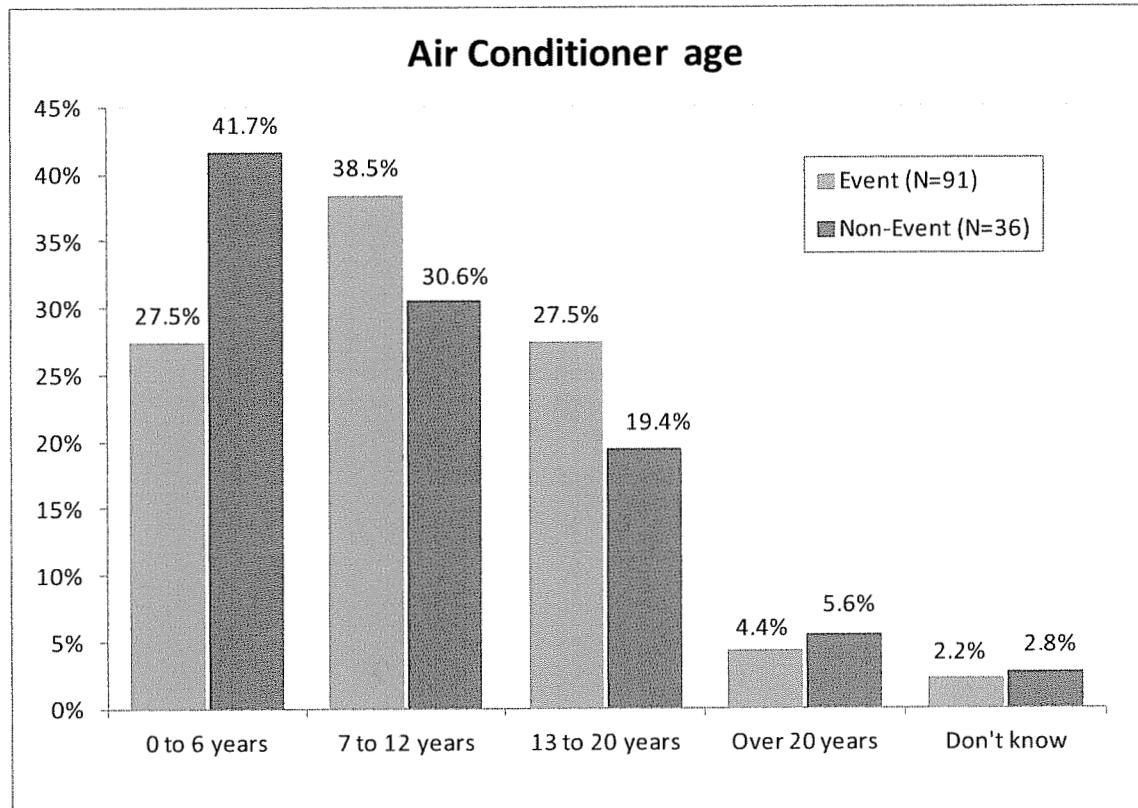
**Table 26. Activities participants took to cool down**

	Times mentioned for...		Difference
	Event (N=64)	Non-Event (N=40)	
Moved to a cooler part of the house	12.5%	2.5%	10%
Left the house and went somewhere cool	4.7%	-	4.7%
Drank more water/cool drinks	18.8%	2.5%	16.3%
Closed blinds/shades	-	2.5%	-2.5%
Swam in pool	1.6%	-	1.6%
Sat still	3.1%	-	3.1%

No event or non-event participants indicated that they had used any room air conditioners to keep cool or to compensate for the Power Manager device activation.

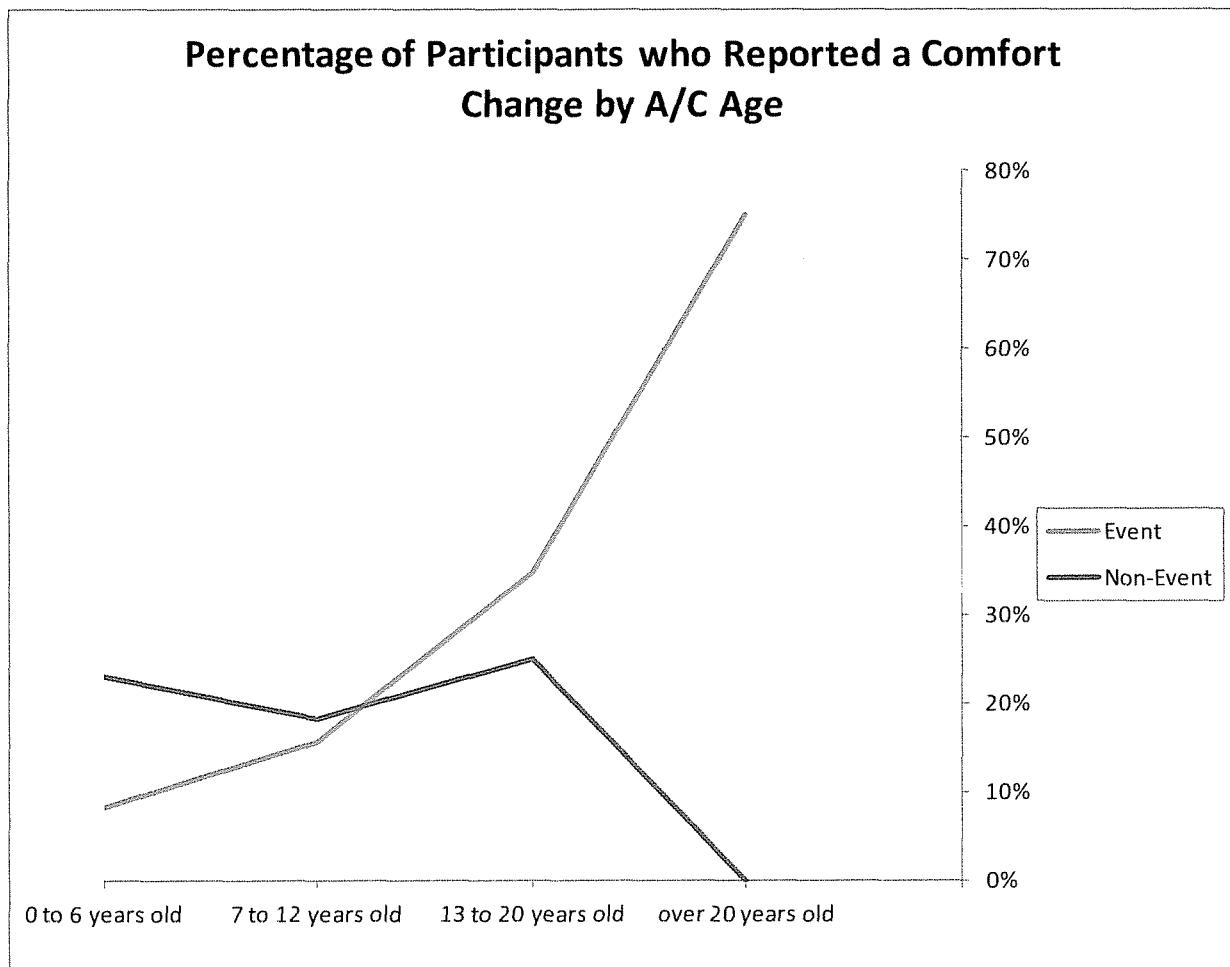
### **Age of Air-Conditioner and Change in Comfort Levels During Event**

TecMarket Works asked participants for the age of their air conditioner. The distributions are shown below in Figure 25.



**Figure 25. Air Conditioner age**

These distributions are similar between Event and Non-Event participants with the majority of air conditioners 12 years old or less for both groups. Cross-tabulating air conditioner age with comfort ratings yields the following line chart (Figure 26).



**Figure 26. Comfort change vs. Air conditioner age**

In Figure 26 there is clearly a difference in the direction of the lines between Event and Non-Event participants. This suggests that there is a strong correlation between the age of a Power Manager participant's air conditioner and the change in comfort perceived during a Power Manager activation event.

Figure 27 and Figure 28 show more detail on this issue. In Figure 27 the ratio between participants who experienced no change and those who experienced change becomes smaller as the graph moves from left to right. In Figure 28 these ratios remain relatively constant regardless of the age of the air conditioner.

This finding suggests that targeting customers with air conditioners less than 12 years old may result in better comfort ratings as well as a higher retention rate for Power Manager participants, but may not result in more effective power shed. Furthermore, cross-selling opportunities may exist for marketing Duke Energy's Residential Smart \$aver program for air conditioner savings to Power Manager participants with older air conditioners.

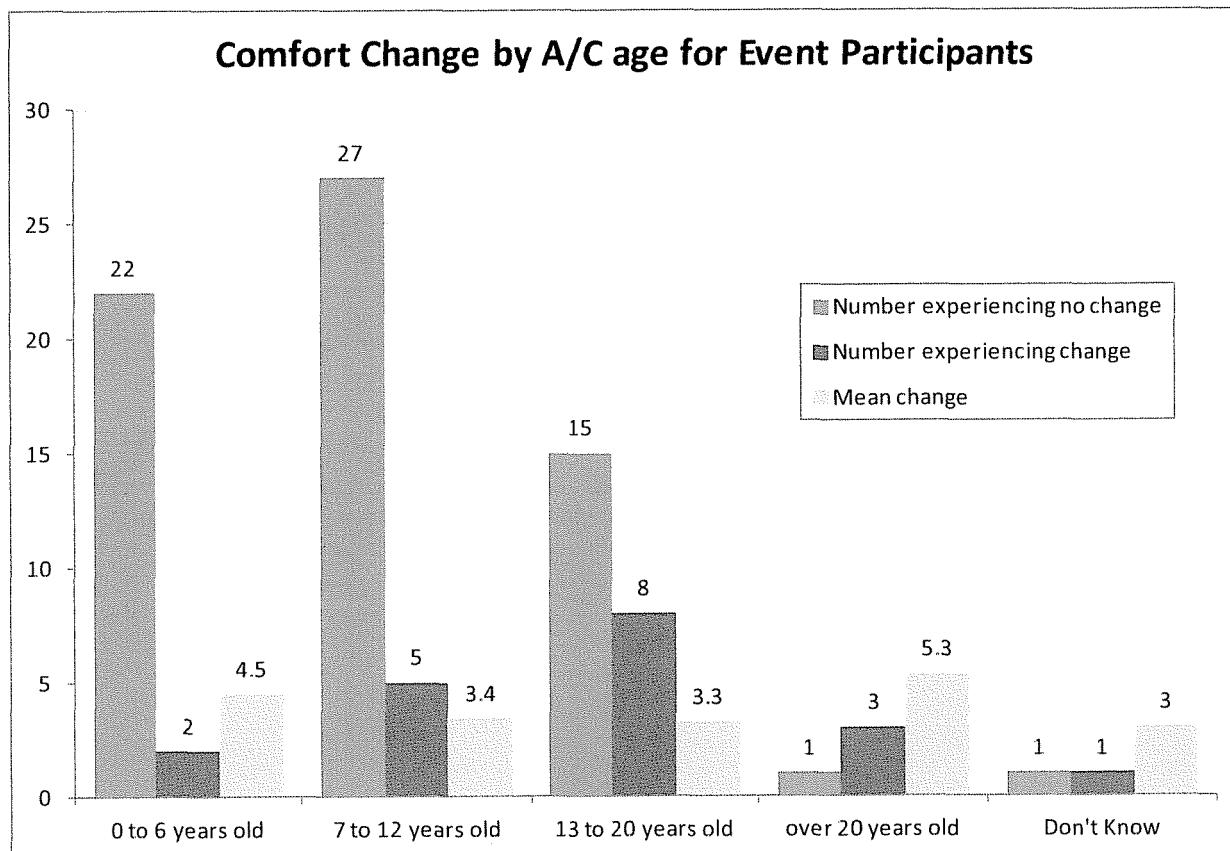


Figure 27. Comfort Change vs. Air conditioner age for event participants

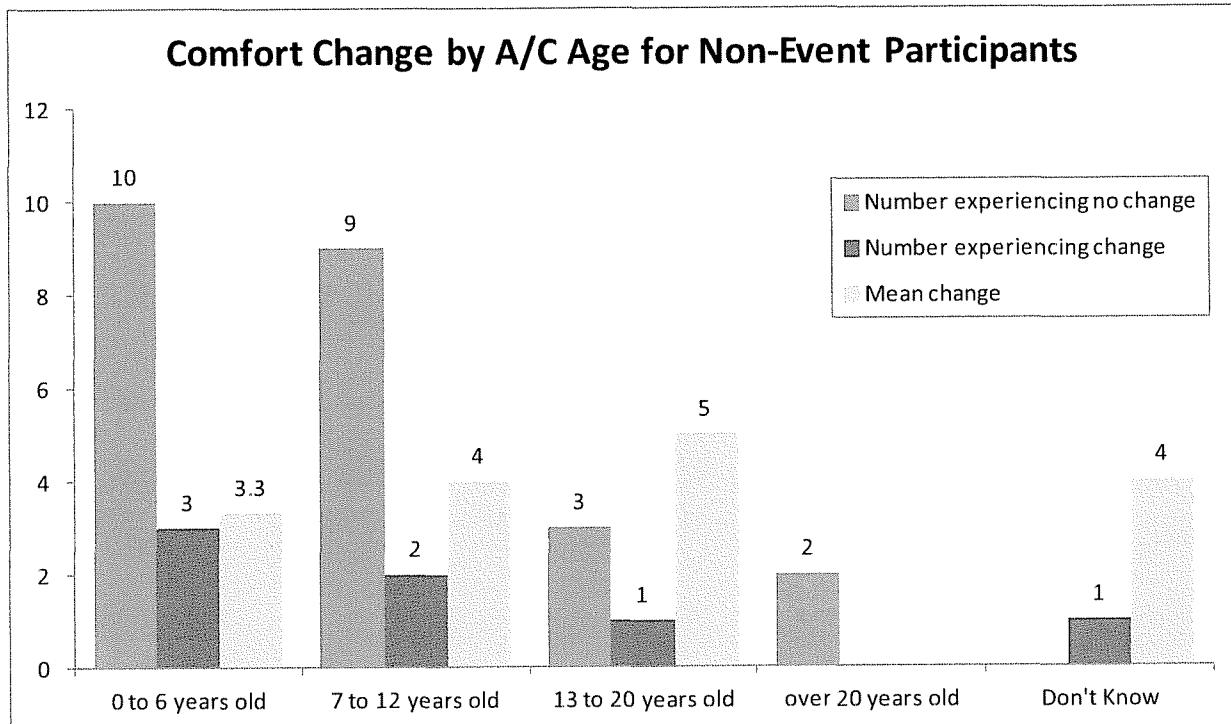
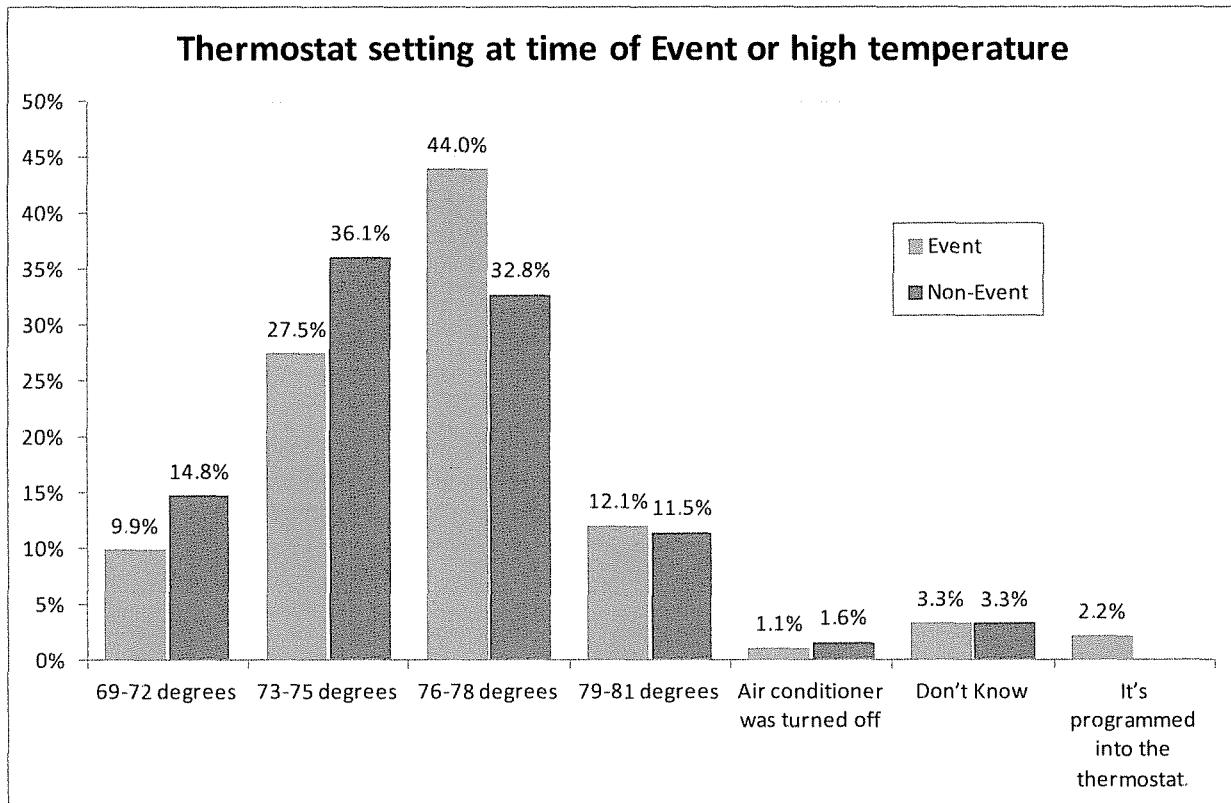


Figure 28. Comfort Change vs. Air conditioner age for non-event participants

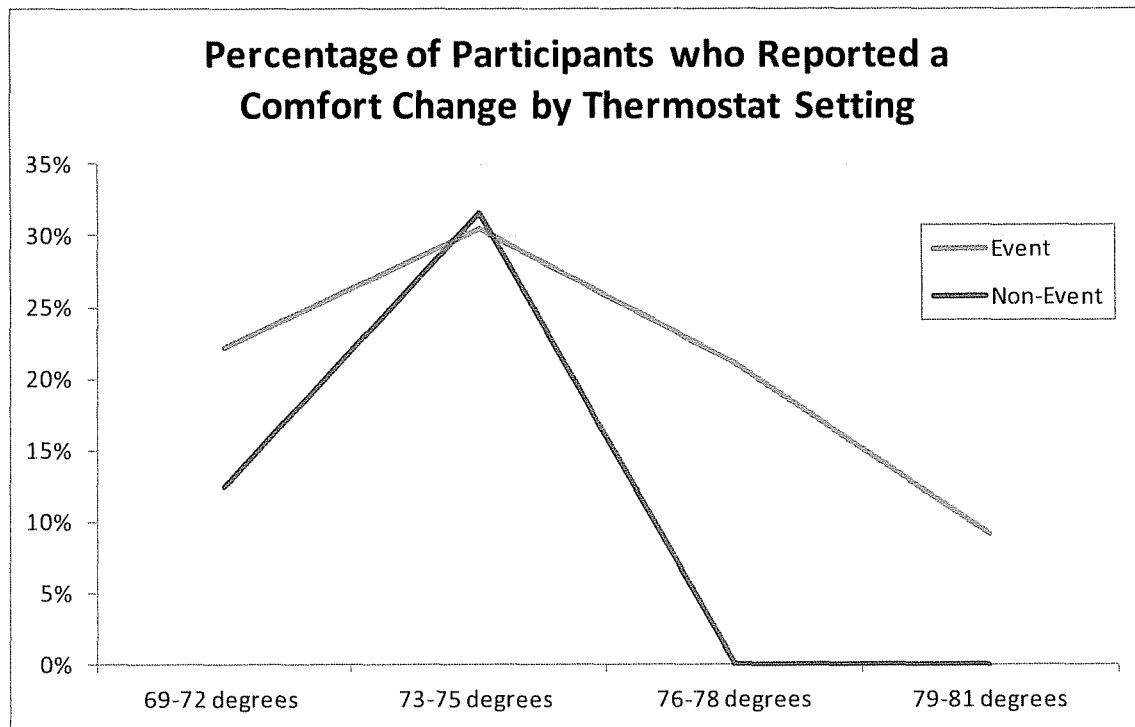
### Thermostat Settings and Change in Comfort Levels During Event

TecMarket Works asked participants for the temperature at which their thermostat was set at the time of the activation or high temperature. The distributions are shown below in Figure 29.



**Figure 29. Thermostat setting at the time of event or high temperature**

TecMarket Works then cross-tabulated the thermostat settings of participants with comfort ratings to determine if the customers' thermostat setting had any effect on perceived comfort. Figure 30 compares these percentages between Event and Non-Event Participants.



**Figure 30. Comfort Change vs. Thermostat setting**

In Figure 30 both lines follow roughly the same pattern, rising at 73-75 degrees and lowering above that level. The similarity of the two lines makes it difficult to determine whether a change in thermostat level results in a change in comfort that is caused by a Power Manager activation.

Figure 31 and Figure 32 show the same cross-tabulation with more detail and the same result. The ratios and direction of both graphs are very similar.

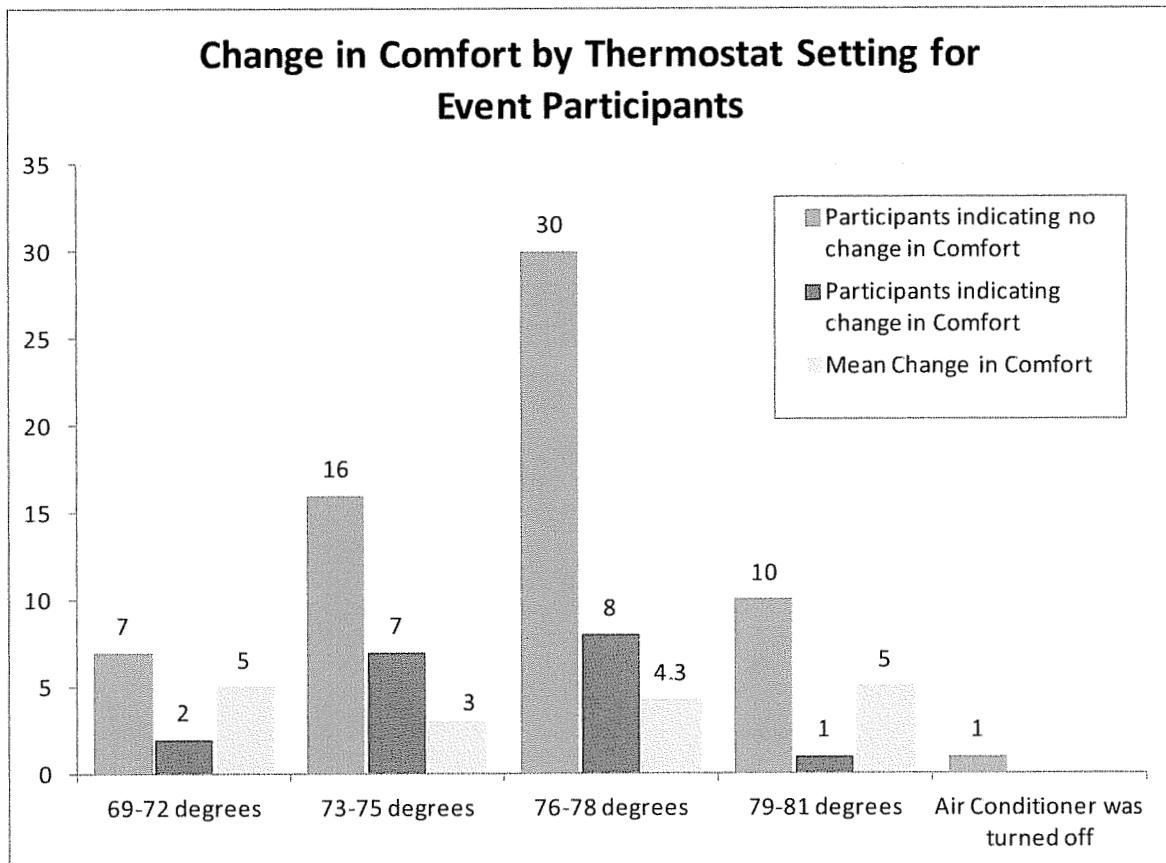
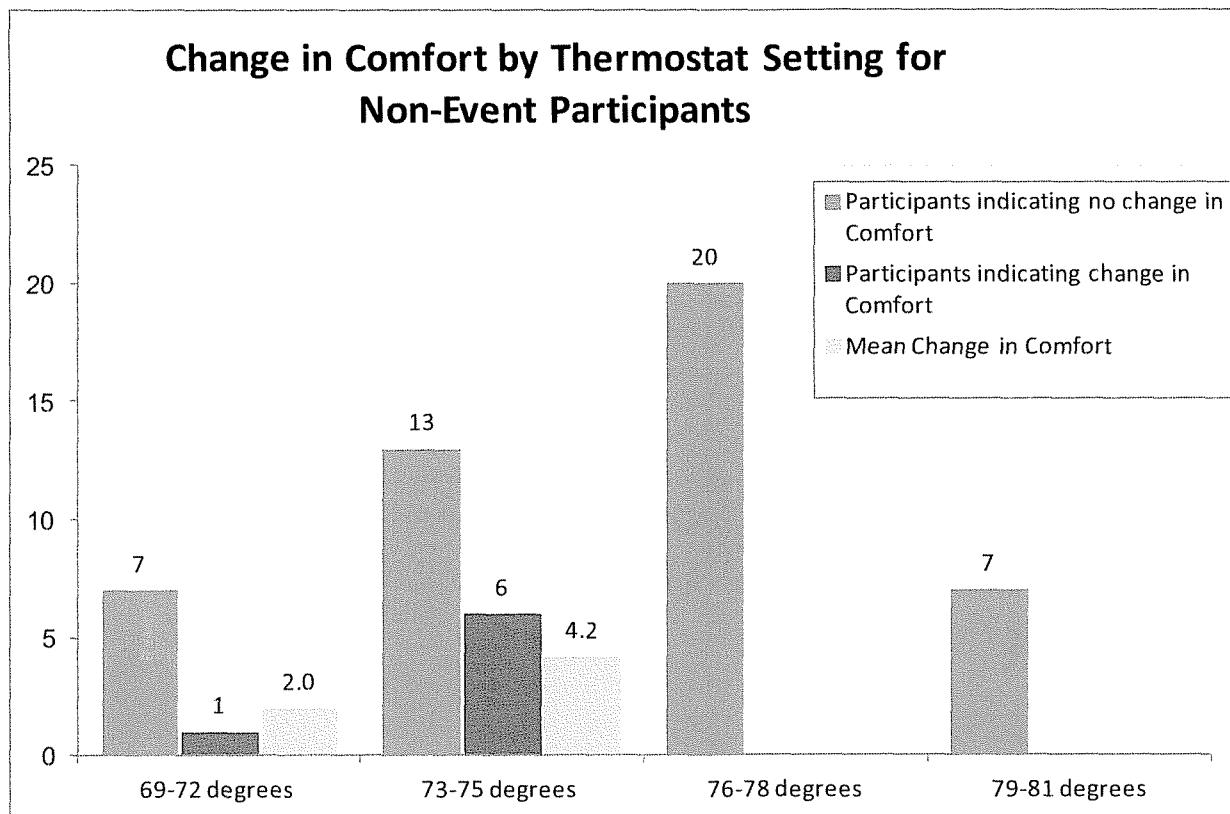


Figure 31. Comfort Change vs. Thermostat for Events

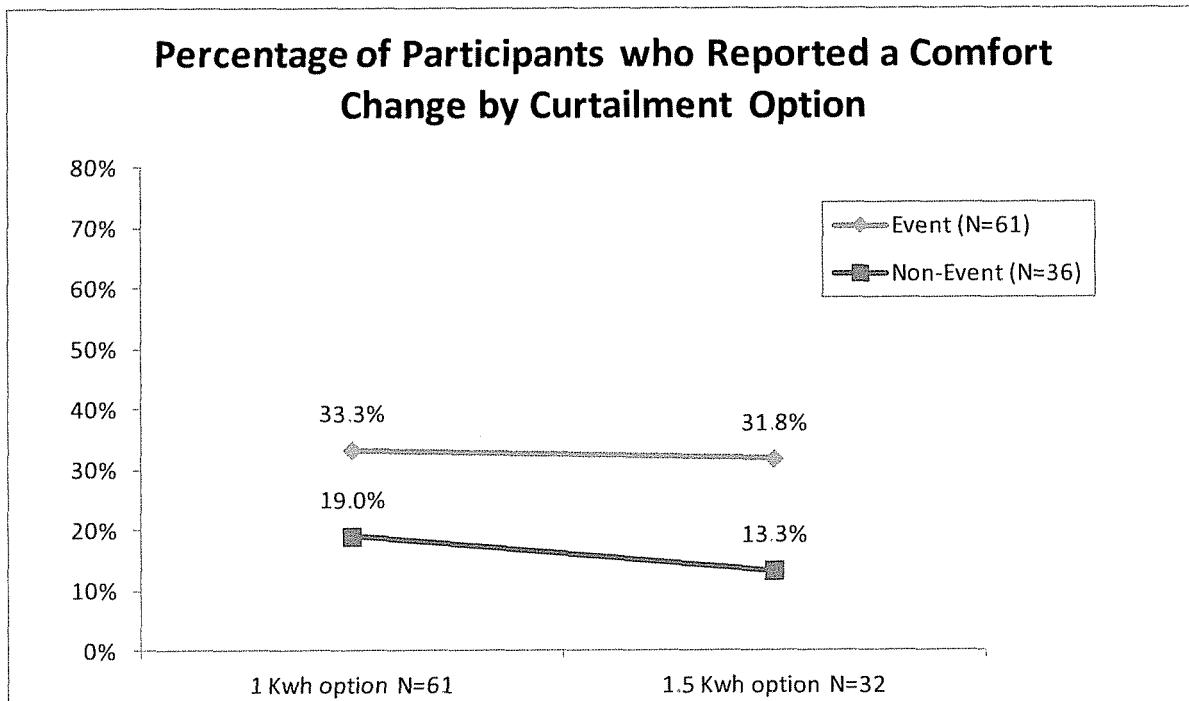


**Figure 32. Comfort Change vs. Thermostat for Non-Events**

### Curtailment kWh Option and Change in Comfort Levels During Event

In Kentucky, Power Manager participants have the option to sign up for either of two levels of curtailment: 1 kWh or 1.5 kWh. The larger option offers a higher bill credit to the participant, but also requires a longer “cycle” or activation period and a longer time period that the participant would be without the A/C compressor running during event activation.

TecMarket Works surveyed both 1 kWh and 1.5 kWh option participants and cross-tabulated the comfort levels of participants by the participants’ kWh option supplied from Duke Energy to determine if either option had an effect on participant comfort during an event. The results of the cross-tabulation can be seen below in Figure 33.



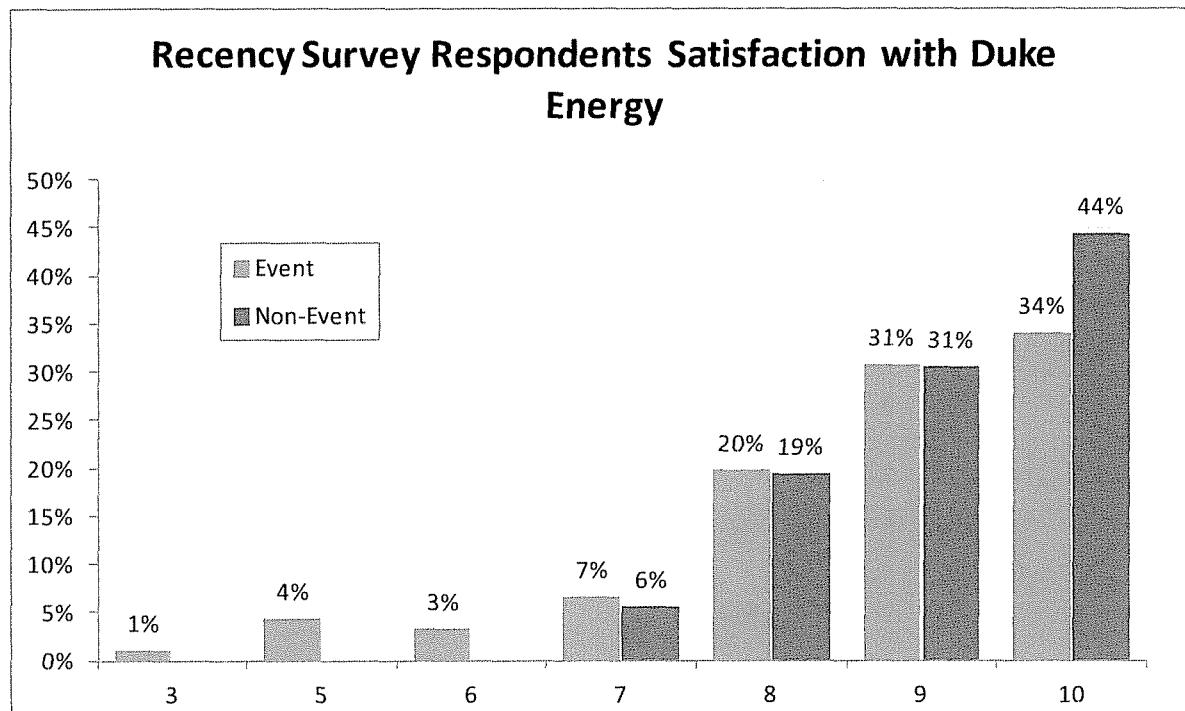
**Figure 33. Comfort change vs. curtailment option**

As can be seen in Figure 33, the kWh curtailment option does not appear to have a correlation with participants' perceived comfort change during an event. Nearly a third of event participants noted a comfort change for both the 1 kWh and the 1.5 kWh option events. Likewise, the percentage of non-event participants noting a change in comfort is below 20% for both kWh options.

The mean difference in comfort was also similar for both curtailment options – 3.7 and 3.8 for event participants, and 4.2 and 3.9 for non-event participants.

### **Recency Respondents Satisfaction**

Overall satisfaction with Duke Energy for recency survey respondents is high at 8.8 on a 1-to-10 scale with 1 being not at all satisfied and 10 being very satisfied. Event respondents overall satisfaction mean is 8.7 while the mean for non-event respondents is 9.1. The distribution of ratings is show in Figure 34 below.



**Figure 34. Distribution of Recency Survey Satisfaction Ratings**

### Recency Participant Population

Recency survey participants were also asked how many people lived in their home and how many were regularly home on a weekday afternoon. The distributions are shown below in Figure 35 and Figure 36.

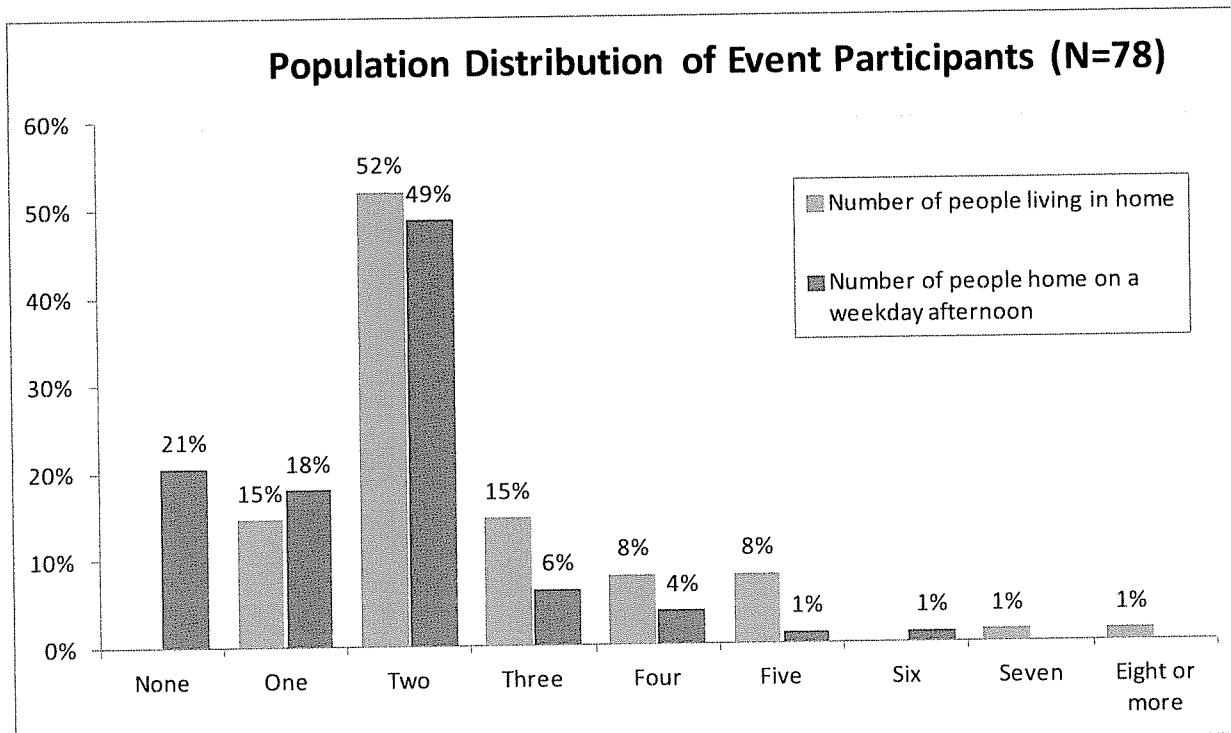


Figure 35. Population distribution of Event participants

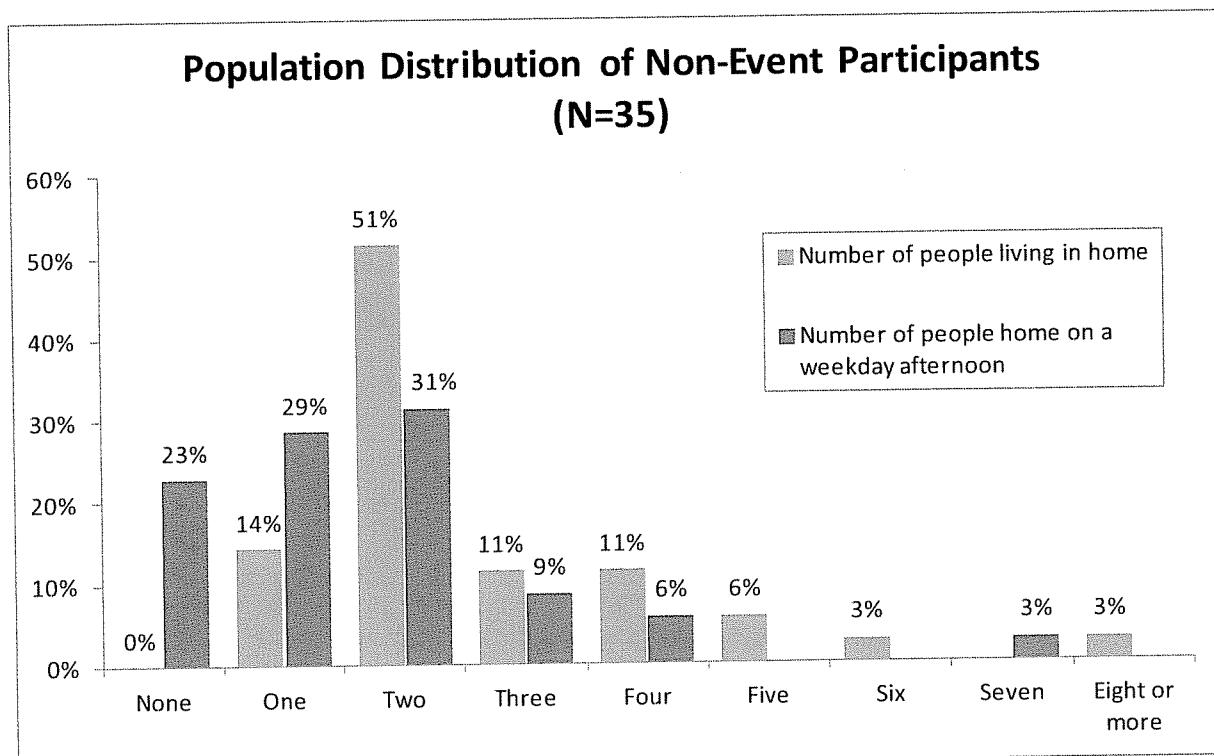


Figure 36. Population distribution of Non-Event Participants

## Section 4: Comfort Values and Heat Index

In order to examine what effect, if any, that different temperatures and heat index values had on participant comfort, TecMarket Works noted the high temperature and heat index number during the day for each event or non-event. A recency survey was conducted with the participants within three days of the Power Manager event or high heat index day. The heat index values were then cross-tabulated with comfort ratings to determine what effect, if any, the daily heat index had on the perceived comfort of participants before and during the event and non-event period.

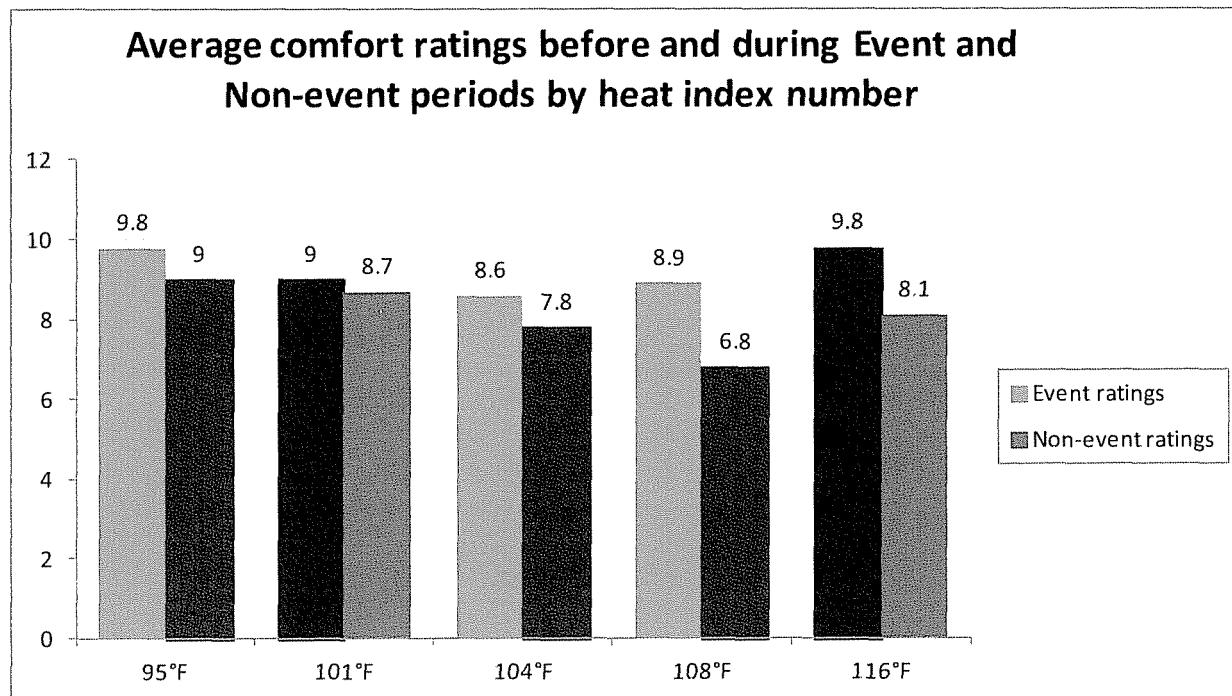
The heat index values (based on temperature and humidity) and the number of participants who indicated that they were home during the event or non-event (and gave comfort ratings for both before and during the corresponding time period) are shown in Table 27.

**Table 27. Number of participants who provided comfort ratings by heat index number**

2011 Dates	Heat Index	Event participants	Non-Event participants
August 1	95°F	17	-
July 28			
July 29	101°F	-	23
September 2			
July 12	104°F	23	-
July 21	108°F	18	-
July 11	116°F	-	12
	<b>Totals</b>	<b>58</b>	<b>35</b>

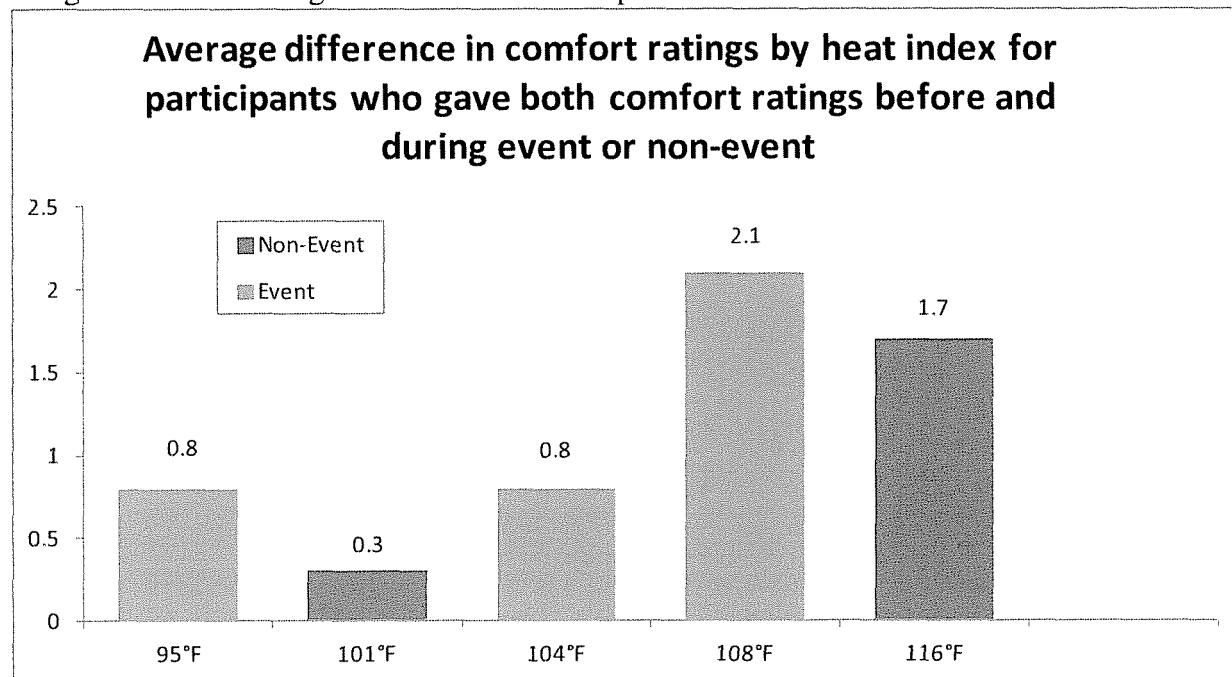
Surveyed participants were asked to rate their comfort on a 1 to 10 scale with 1 indicating that they were very uncomfortable and 10 indicating they were very comfortable during the control event (or the afternoon of the high temperature and heat index for non-event days). Figure 37 below illustrates the mean comfort ratings given by event and non-event participants both before and during the event and non-event time periods.

A key difference in the series of questions should be considered when interpreting this data. The event participants were told early in the survey that there was a Power Manager control event on the day in question. The non-event survey did not indicate if there was an event. Six of the surveyed participants that were surveyed about non-event days (17%) indicated that they thought there was a control event in the past week when there was not. About 30% of the participants surveyed after an event were aware of a control event occurring in the previous week. Regardless of the surveyed participants' awareness, their comfort data is provided in the results presented in this section.



**Figure 37. Average comfort ratings before and during event and non-event periods by heat index number**

Figure 38 uses the same data as Figure 37 to more clearly present the differences in average ratings before and during an event or non-event period.

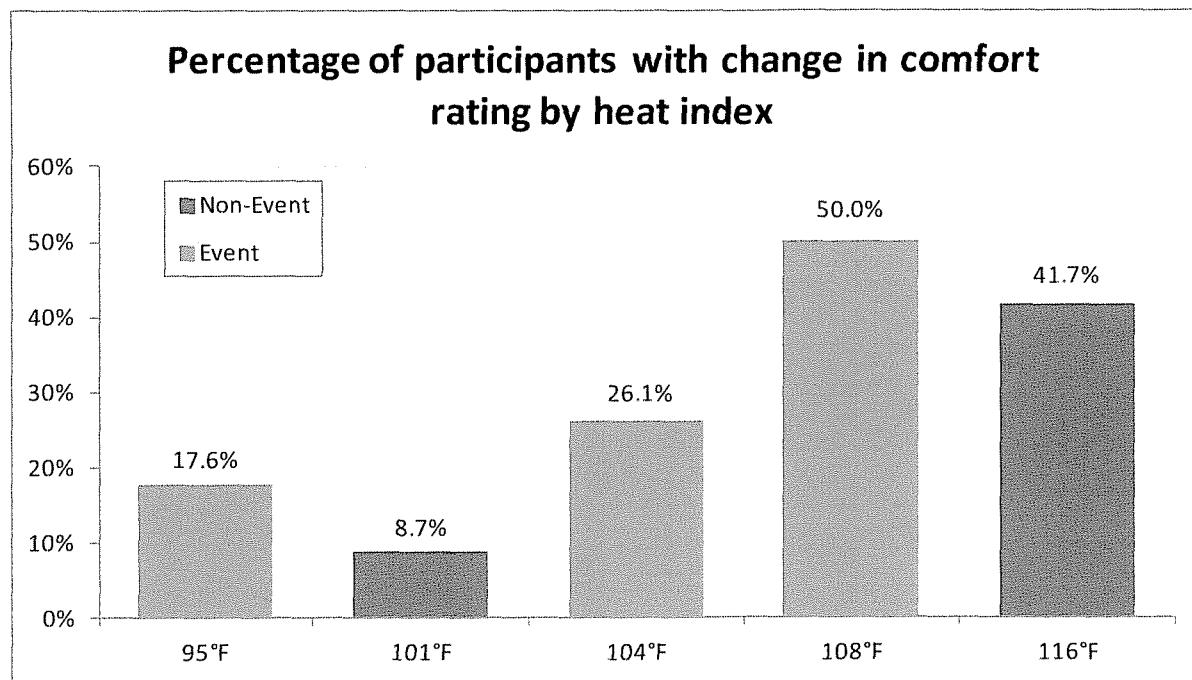


**Figure 38. Average difference in comfort ratings by heat index for participants who gave both comfort ratings before and during an event or non-event**

Figure 38 shows the overall trend is toward a greater change in comfort ratings as the heat index value rises.

However, Figure 38 also shows that the mean difference in comfort ratings for non-event participants at the heat indexes of 101°F and 116 °F are lower than the difference in comfort ratings for event participants at the heat indexes of 95°F and 106°F respectively. That is, participants at these heat indexes reported experiencing a greater mean change in comfort when there was a Power Manager control event than the non-event participants, despite experiencing a lower heat index during the corresponding time period.

Figure 39 below shows a similar distribution when comparing the percentage of participants who indicated a change in comfort before and during the event or non-event time period.



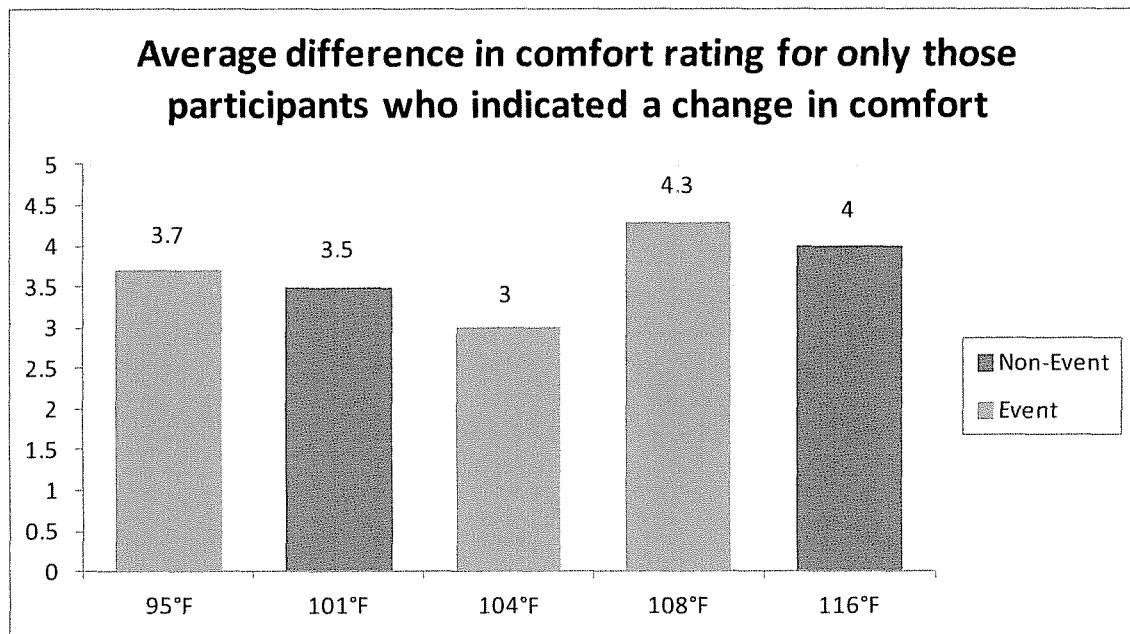
**Figure 39. Percentage of participants with change in comfort rating by heat index**

Again, the overall trend is an increase in percentage from left to right as the heat index value rises, but fewer non-event participants indicated a change in comfort than event participants at the immediately lower heat index value.

Together, this data suggests that the activation of the Power Manager device is having an effect on event participants' perception of a change in comfort during activation and beyond the effect of a rising heat index alone.

While it is clear that more event participants than non-event survey participants noticed a change in comfort when compared across heat index ratings, what is less clear is if there is any difference in the amount of comfort change experienced by participants who experienced any change.

Figure 40 illustrates the distribution of the mean difference in comfort ratings for only those participants who reported a change in comfort.



**Figure 40. Average difference in comfort rating for participants who indicated a change**

There is a slight trend toward a higher mean difference in comfort ratings from left to right. However, the lowest mean rating difference is indicated by event participants at the median heat index value.

### No Correlation: Heat Index and Comfort Levels

There is no statistical relationship between a surveyed participants' awareness of an event occurring and an event actually occurring. That is, if an event occurs and a customer was surveyed, they were no more likely to correctly answer if there was an event or not than someone who did not experience a control event.

In addition, there is no significant correlation (Pearson Correlation = -0.090 and is not statistically significant) between a surveyed participant's comfort level and the temperature setting on the day in question before the event or the day prior to the high temperature day (for participants surveyed about non-event days), regardless if there was an event or not. This indicates that people are comfortable in their homes with their temperature settings before the event. Further, there is no significant correlation (Pearson Correlation = 0.055 and is not statistically significant) between a surveyed participant's comfort level and the temperature setting during the event or high temperature period.

This suggests that the customers are comfortable in their homes, at the temperature setting they have their thermostats set at. Looking at reported comfort levels during the event or high temperature day again reveals no correlation (-.086 and -.142, respectively, neither with

statistical significance). Finally, looking at reported change in comfort levels compared to the high temperature and the heat index for the day in question reveals no correlation (.096 and .219, respectively, with the latter significant at the 0.05 level).

This suggests that the customers are comfortable in their home with their air conditioners on, and do not experience any significant change in comfort regardless if there is a control event or what the high temperature or heat index of the day is.

## Appendix A: Program Manager Interview Instrument

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Position description and general responsibilities:

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**We are conducting this interview to obtain your opinions about and experiences with the Power Manager program. We'll talk about the Power Manager Program and its objectives and your thoughts on improving the program. The interview will take about one hour to complete. Your responses during this interview will be kept confidential. May we begin?**

### Program Objectives & Operations

1. Please explain how the Power Manager program works: Walk us through the participatory steps starting with a customer who knows nothing about the program.
  - Outreach and Marketing
  - Enrollment
  - Event Call
  - Response
  - Payment
2. Please describe your role and scope of responsibility in detail. When did you take on this role?
3. Do you feel that you have enough support and resources to adequately manage this program? If not, what else is needed?
4. In your own words, please briefly describe the Power Manager Program's objectives. Any other objectives?
5. Have these objectives changed in the last year or so, and if so how? Why?
6. In your opinion, how well are objectives being met?
7. Are there any new external influences on the program since the objectives were developed, that might be affecting program operations? If yes, is there anything the program can do to

address those influences? Or, do you think the objectives should be adjusted to reflect the new influences?

8. Do you think the materials and information presented to the residential customer about the Power Manager program provides a complete enough picture for them to understand the potential importance of the program to them and their participatory benefits of the program?
9. Do you think the incentives offered through the Power Manager program are adequate enough to entice the residential customer to enroll in the program? Why or why not? What can be improved in the area of incentives or enticements?
10. Are there any changes to the incentives or marketing that could possibly increase participation in the program? What would happen if the incentives were decreased or increased, how would this impact your ability to acquire power reductions?
11. What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program? Are there any changes to the program marketing that you think would increase participation?

## **Program Design & Implementation**

12. How does Duke determine the best target markets or customer segments to focus on?
13. Are there any market information, research or market assessments that you are using to identify market barriers, and to develop more effective operational mechanisms?
14. How do you track, manage, and monitor or evaluate customer involvement?
15. What is the quality control, tracking and accounting process for determining how well control strategies work?
16. (for post-season interview) Please tell me about the events that were called in 2011. How many events were called? Why were they called?
17. (for post-season interview) How were the events called? What did you learn from the event call process? Where there any surprises with the process? What could be done to improve the way the events are called in the future?
18. (for post-season interview) Did you achieve the load shift you needed? How do you know this?
19. (for post-season interview) How well did the payment process operate? Did the program staff come across any issues or problems with payment? How were they resolved?

## **Overall Power Manager Management**

20. (summer interview) During the last process evaluation of Power Manager, Duke Energy was in the process of addressing some problems in communication with the switches and failure rates. Can you describe this so that we understand it well? Are you experiencing the same problems in 2011? What is being done to deal with this issue? Do you have any suggestions for improving this in addition to the approaches being taken?
21. (summer interview) The last process evaluation of Power Manager, included a number of recommendations for Duke Energy to consider. I'd like to go over these and find out if Duke has adopted those recommendations or, if not, why Duke decided against them.
  - Add staff to help with the administrative needs during control season. It is critical to ensure that program operations run efficiently in the eyes of the participants during those times, and that all customer concerns during events are addressed promptly.
  - In program planning, estimate the number of economic events separately from emergency events should be considered.
  - 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  
*(for the analytical team members:)*
  - A potential alternative approach for future impact evaluations is to use the data from the M&V (and possibly the operability) sample to directly estimate impacts via statistical models. This approach could use a time-series, cross-sectional analysis where the dependent variable is the actual AC load (or run time), and the independent variables include weather conditions, time of day, day of week, and the Power Manager® control event. In essence, this would produce an overall duty-cycle model, and the coefficient on the Power Manager® control event variable(s) would estimate the actual load impacts during those events. This assumption is based on the panel sample being representative of the program population.
22. Describe the use of any internal or outside program advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use these resources? What do you use them for?
23. In what ways do you think the Power Manager Program's operations could be improved?
24. Do you have any suggestions for how program participation can be increased?
25. If you could change any part of the program what would you change first?
26. What would you say are the program's biggest successes?
27. We've covered a lot of areas today, but are there any other issues or topics you think we should know about and discuss for this evaluation?
28. Do you have any questions for me, about this interview or this process evaluation?

Thank you for your time...

## Appendix B: Participant Survey Instrument

*Use five attempts at different times of the day and different days before dropping from contact list. Call times are from 10:00 a.m. to 8:00 p.m. EST or 9-7 CST Monday through Saturday. No calls on Sunday.*

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### SURVEY

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#### Introduction

*Note: Only read words in bold type.*

#### Introduction

**Hello, my name is \_\_\_\_\_, and I'm calling on behalf of Duke Energy. According to our information, you presently participate in Duke Energy's Power Manager® Program. This program allows Duke Energy to cycle your air conditioner when there is a critical need for electricity in the region. This survey will take about 15 minutes to complete, and the information you provide will be confidential and will help to improve the program.**

**1. Are you aware of your participation in the Power Manager® program?**

Yes     No     DK

*If no, May I please speak to the person who would be most familiar with your household's participation in the Power Manager® program?*

*If not available, try to schedule a callback time. If transferred, begin survey from beginning (Introduction).*

#### Participation Drivers

**We would like to collect some information on why you agreed to participate in the program and how you heard about it.**

**2. Were you involved in the decision to participate in Duke Energy's Power Manager® Program?**

Yes     No     DK

*If no, skip to question 5.*

**3. Do you recall how you first heard about the program?**

Yes     No     DK

*If yes, 3a. How did you hear about the Power Manager® Program?*

- a)  utility bill insert
- b)  direct mail offer from Duke Energy
- c)  utility website
- d)  Word-of-mouth (friend/neighbor/landlord)
- e)  Newspapers
- f)  Social network: \_\_\_\_\_
- g)  Don't know
- h)  Other: \_\_\_\_\_

**4. To the best of your ability, could you please tell me what the promoted benefits of the program were?**

- a)  \_\_\_\_\_
- b)  Don't Know.

**5. What was the main reason why you chose to participate in the program?**

- a)  For the bill credits
- b)  Helping Duke avoid power shortages/outages
- c)  To save energy
- d)  To save money (through lower utility bills)
- e)  To help the environment
  - a. Please explain: (to reduce carbon or GHG, etc...) \_\_\_\_\_
- f)  I don't use the air conditioner much
- g)  I'm usually not home when the events are supposed to occur
- h)  Don't know
- i)  Other: \_\_\_\_\_

**5a. Do you recall reading this benefit in the program brochure or materials sent to you?**

Yes     No     DK  
 Did not get brochure     Do not remember brochure

**6. What were your other reasons for choosing to participate in this program?**

- a)  For the bill credits
- b)  Helping Duke avoid power shortages/outages
- c)  To save energy (through lower utility bills)
- d)  To save money
- e)  To help the environment
  - a. Please explain: (to reduce carbon or GHG, etc...) \_\_\_\_\_
- f)  I don't use the air conditioner much

- g)  I'm usually not home when the events are supposed to occur
- h)  Don't know
- i)  Other: \_\_\_\_\_
- j)  No other reasons.

**6a. Do you recall reading anything about this benefit in the program brochure or materials sent to you?**

- Yes     No     DK
- Did not get brochure     Do not remember brochure

**7. Generally speaking, how important are environmental issues to you? Would you say they are...**

- a.  Very Important
- b.  Important
- c.  Neither Important Nor Not Important
- d.  Not Important, or
- e.  Not At All Important

**8. How important are climate change issues to you? Would you say they are...**

- a.  Very Important
- b.  Important
- c.  Neither Important Nor Not Important
- d.  Not Important, or
- e.  Not At All Important

**9. How important is reducing air pollution to you? Would you say it is...**

- a.  Very Important
- b.  Important
- c.  Neither Important Nor Not Important
- d.  Not Important, or
- e.  Not At All Important

**10. How important is the need to reduce the rate of building new power plants? Would you say it is...**

- a. Very Important
- b. Important
- c. Neither Important Nor Not Important
- d. Not Important
- e. Not At All Important

**11. Are you a member of any groups or clubs that have environmental missions?**

Yes     No     DK

If yes, 11a. Which ones?

- a)  List: \_\_\_\_\_
- b)  Don't know

## Understanding the Program

12. Before you enrolled in the program, you received program information from Duke Energy that described how the program works. Using a scale of 1 to 10 where 1 indicates "Very Dissatisfied" and 10 indicates "Very Satisfied", how satisfied were you with this information in helping you to understand how the program works?

1    2    3    4    5    6    7    8    9    10

If 8 or below, 12b. Why were you less than satisfied with this information?

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DK

13. How often per year did Duke Energy say it would activate the Power Manager® device on your air conditioner?

---

DK

14. What's your best estimate of how many dollars you will receive in yearly bill credits from Duke Energy for participating in the Power Manager® program?

- a)  \$\_\_\_\_\_
- b)  Don't know

15. According to our information are currently a participant in this program. Have you receive any bill credits this year from Duke Energy for participating in this program?

Yes     No     DK

16. Is anything unclear to you about how the program works?

Yes     No     DK

If yes, 16a. What is unclear to you?

---

DK**17. Did you ever call or email Duke Energy to find out more about the Power Manager® Program?** Yes     No     DK*If no, skip to question 18.*

*If yes, 17a. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, how satisfied were you with the ease of reaching a Duke Energy representative?*

1    2    3    4    5    6    7    8    9    10

*If 8 or below, 17b. Why were you less than satisfied?*

---

**17c. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, how satisfied were you with how the person responded to your questions?**

1    2    3    4    5    6    7    8    9    10

*If 8 or below, 17d. Why were you less than satisfied with this information?*

- a)  Didn't respond to my questions/ concerns
- b)  Unable to answer/address my questions/concerns
- c)  Not professional/courteous
- d)  Other: \_\_\_\_\_
- e)  Don't know

## Program Experience

**18. Has Duke Energy activated the Power Manager® device since you joined the program?**  
*[If they ask what this means, respond with: “Duke Energy has the ability to send a signal to activate the device to cycle your central air conditioner on and off during an event.” Repeat the question.* Yes     No     DK**19. How do you know when the device has been activated?**

- a)  A/C shuts down

- b)  Home temperature rises
- c)  The light on the meter is on
- d)  Light on AC unit flashes
- e)  Bill credits
- f)  Lower bill
- g)  Other: \_\_\_\_\_
- h)  Don't know

**20. About how many times did Duke Energy activate your Power Manager® device so far in 2011?**

- a)  \_\_\_\_\_
- b)  Don't know

**21: Were you or any members of your household home when Duke Energy activated your Power Manager® device this past summer?**

Yes     No     DK

*If no or don't know, skip to question 28.*

**22. During this activation, using a scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort before the control event?**

1    2    3    4    5    6    7    8    9    10

- a)  DK

**23. Using the same scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort during the control event?**

1    2    3    4    5    6    7    8    9    10

- a)  DK

*If score from Q23 is lower than score from Q22:*

**24. What do you feel caused your decrease in comfort?**

*Select all that apply:*

- a)  Power Manager
- b)  Rising Temperature
- c)  Rising Humidity
- d)  Power Outage

- e)  Other: \_\_\_\_\_  
f)  Don't Know

**25. When Duke Energy activated your Power Manager® device, did you or any other members of your household adjust the settings on your thermostat?**

Yes     No     DK

*If yes, 25a. What temperature was it originally at, and what temperature did you set it to during the control event?*

Original temperature setting: \_\_\_\_\_ degrees F

DK

Adjusted temperature setting: \_\_\_\_\_ degrees F

DK

**26. Thinking about this summer, how many times do you think the activation of the Power Manager® program affected your level of comfort?**

- a)  \_\_\_\_\_  
b)  Don't know

**27. When Duke Energy activated your Power Manager® device, did you or any other members of your household turn on any fans to keep cool?**

Yes     No     DK

**27a. What else did you or other members of your household do to keep cool?**

- a)  Continued normal activities/ Didn't do anything different  
b)  Turned on room/window air conditioners  
c)  Closed blinds/shades  
d)  Moved to a cooler part of the house  
e)  Left the house and went somewhere cool  
f)  Wore less clothing  
g)  Drank more water/cool drinks  
h)  Turned on fans  
i)  Opened windows  
j)  Other: \_\_\_\_\_  
k)  Don't know

**28. When Duke Energy activates your Power Manager® device, it usually does so on summertime afternoons. Is someone usually home on weekday afternoons during the summertime?**

Yes     No     DK

**29. Why do you think Duke Energy activates your Power Manager® device on summertime weekdays during the afternoon as opposed to other times of the day or year?**

- a)  \_\_\_\_\_
- b)  Don't know

## Overall Program Satisfaction

**30. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, how satisfied were you with the process of enrolling in the program?**

1    2    3    4    5    6    7    8    9    10

*If 8 or below, 30b. Why were you dissatisfied with this enrollment process?*

- a)  \_\_\_\_\_
- b)  Don't Know

**31. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, how satisfied are you with the Power Manager® program in general?**

1    2    3    4    5    6    7    8    9    10

*If 8 or below, 31b. Why were you less than satisfied with Power Manager®?*

- a)  They activated my Power Manager® device more often than I would like
- b)  The bill credits/incentives were not large enough
- c)  I was uncomfortable when my Power Manager® device was activated
- d)  Other: \_\_\_\_\_
- e)  Don't Know

**31c. Were there any other reasons you were less than satisfied with Power Manager®?**

- a)  They activated my Power Manager® device more often than I would like
- b)  The bill credits/incentives were not large enough
- c)  I was uncomfortable when my Power Manager® device was activated
- d)  Other: \_\_\_\_\_
- e)  Don't Know
- f)  No

**32. Would you recommend this program to a friend, neighbor, or co-worker?**

Yes     No     DK

*If no, 32b. Why not?*

- a)  \_\_\_\_\_
- b)  Don't Know

**33. What, if any, Duke Energy programs or services have you heard of that help customers save energy? Any others?**

- a)  Smart Saver (other than CFL)
- b)  Personalized Energy Report
- c)  Home Energy House Call
- d)  Home Energy Comparison Report
- e)  CFL Program
- f)  Energy Star Homes
- g)  Low Income, Weatherization, or Low Income Weatherization
- h)  K12, NEED, or "Get Energy Smart"
- i)  Other: \_\_\_\_\_
- j)  Don't Know

## Air Conditioning Practices

**Now I'm going to ask you some questions about your air conditioning use.**

**34. How often do you use your central air conditioner? Would you say you use it ...**

- a)  Not at all
- b)  Only on the hottest days
- c)  Frequently during the cooling season
- d)  Most days during the cooling season
- e)  Everyday during the cooling season
- f)  Don't know

*If b-e, 34a. About how many days would you estimate that you had your air conditioner on so far this summer?*

- a)  Fewer than 10 days
- b)  10 to 20 days
- c)  21 to 30 days
- d)  31 to 40 days
- e)  41 to 50 days
- f)  51 to 60 days

- g)  61 to 70 days
- h)  more than 71 days
- i)  every day
- j)  Don't know

**35. Have you had your air conditioner tuned-up or serviced since you enrolled in the Power Manager® program?**

Yes     No     DK

*If yes, 35a. Did the performance of your air conditioner improve after you had it serviced?*

Yes     No     DK

**35b. Who serviced your air conditioner?**

- a)  Air conditioning contractor
- b)  Duke Energy
- c)  Electrician
- d)  Other: \_\_\_\_\_
- e)  Don't Know

**36. Is the air conditioner typically used to keep someone at home comfortable during weekday summer afternoons before 5 P.M.?**

Yes     No     DK

**37. Is the air conditioner typically used to keep someone at home comfortable during summer weekdays after 5 P.M.?**

Yes     No     DK

**38. When you think of a typical hot and humid summer day, at what outside temperature do you tend to feel uncomfortably warm?**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  79-81 degrees
- g)  82-84 degrees
- h)  85-87 degrees
- i)  88-90 degrees
- j)  91-94 degrees
- k)  95-97 degrees

- l)  98-100 degrees
- m)  > 100 degrees
- n)  Don't Know

**39. At what outside temperature do you tend to turn on the air conditioner?**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  79-81 degrees
- g)  82-84 degrees
- h)  85-87 degrees
- i)  88-90 degrees
- j)  91-94 degrees
- k)  95-97 degrees
- l)  98-100 degrees
- m)  > 100 degrees
- n)  It's programmed into the thermostat.
- o)  Don't Know

*If n, 39a. Do you set your thermostat seasonally or when the weather gets hot?*

- i.  I program the thermostat seasonally
- ii.  When the weather gets hot
- iii.  Other: \_\_\_\_\_

**40. I am going to read a list of time periods. For each time period, please tell me the temperature that your thermostat is typically set to on a hot summer weekday when you are using the air conditioner, or if it is turned off.**

**40a. On a hot weekday morning from 6 am to noon.**

- p)  < 65 degrees
- q)  65-68 degrees
- r)  69-72 degrees
- s)  73-75 degrees
- t)  76-78 degrees
- u)  >78 degrees
- v)  No change from an average summer week day
- w)  OFF

**40b. On a hot weekday afternoon from noon to 5 pm**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer week day
- h)  OFF

40c. On a hot weekday evening from 5 pm to 10pm.

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer week day
- h)  OFF

40d. During a hot weekday night from 10pm to 6am.

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer week day
- h)  OFF

41. I would now like to know the thermostat temperature setting for those same time periods but on a hot summer weekend.

41a. On a hot weekend morning from 6 am to noon.

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer weekend day
- h)  OFF

**41b. On a hot weekend afternoon from noon to 5 pm**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer weekend day
- h)  OFF

**41c. On a hot weekend evening from 5 pm to 10pm.**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer weekend day
- h)  OFF

**41d. During a hot weekend night from 10pm to 6am.**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  >78 degrees
- g)  No change from an average summer weekend day
- h)  OFF

**42. How old is your air conditioner?**

- a)  0 to 6 years old
- b)  7 to 12 years old
- c)  13 to 20 years old
- d)  over 20 years old
- e)  Don't Know

43. Duke Energy is always looking for other ways to help their customers. If Duke were to offer a program that cycles other equipment at your home such as an electric water heater, would you be interested in participating??

Yes     No     DK

44. Are there any programs or services that you think Duke Energy should provide to its residential customers that are currently not provided?

Yes     No     DK

If yes, 44b. What services or types of programs?

---

45. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, What is your overall satisfaction with Duke Energy?

1    2    3    4    5    6    7    8    9    10

a)  Don't Know

If 8 or below, 45b. Why were you less than satisfied with Duke Energy?

---

46. Did you experience any power outage issues on any of the days that Duke Energy activated your Power Manager® device?

Yes     No     DK

## Demographics

Finally, we have two short demographic questions.

47. How many people live in this home?

- a)  1
- b)  2
- c)  3
- d)  4
- e)  5
- f)  6

- g)  7
- h)  8 or more

**48. How many persons are usually home on a weekday afternoon?**

- a)  1
- b)  2
- c)  3
- d)  4
- e)  5
- f)  6
- g)  7
- h)  8 or more

**Thank you for your time and feedback today! Politely end call.**

## Appendix C: Participant Recency Survey

*Use three attempts at different times of the day within 51 hours of event notification before dropping contact from the contact list. Call times are from 10:00 a.m. to 8:00 p.m. EST or 9-7 CST Monday through Saturday. No calls on Sunday. For example, if a control event occurs on a Monday, calling hours for that particular event would be:*

- *Monday 5pm-8pm Eastern (4-7 Central)*
- *Tuesday 10am-8pm Eastern (9-7 Central)*
- *Wednesday 10am-8pm Eastern (9-7 Central)*

### SURVEY

*Note: Only read words in bold type.*

#### *Introduction*

**Hello, my name is \_\_\_\_\_, and I'm calling on behalf of Duke Energy. According to our information, you presently participate in Duke Energy's Power Manager® Program. This program allows Duke Energy to cycle your air conditioner when there is a critical need for electricity in the region. This is a short survey that will take about 5 minutes to complete, and the information you provide will be confidential and will help to improve the program.**

**1. Are you aware of your participation in the Power Manager® program?**

Yes     No     DK

*If no, May I please speak to the person who would be most familiar with your household's participation in the Power Manager® program?*

*If not available, try to schedule a callback time within the 51 hour time-frame for the particular event. If transferred, begin survey from beginning (Introduction).*

**2. Has Duke Energy activated the Power Manager® device since you joined the program?**  
*[If they ask what this means, respond with: "Duke Energy has the ability to send a signal to activate the device to cycle your central air conditioner on and off during an event." Repeat the question.]*

Yes     No     DK

**3. How do you know when the device has been activated?**

- a)  A/C shuts down
- b)  Home temperature rises
- c)  The light on the meter is on
- d)  Light on AC unit flashes
- e)  Bill credits
- f)  Lower bill
- g)  Other: \_\_\_\_\_
- h)  Don't know

**4. Has your device been activated within the last 7 days?**

Yes     No     DK

**Your Power Manager device was recently activated on <date> starting at <start time> and ending at <end time>.**

**5. At what temperature was your thermostat set to during the time of the event?**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  79-81 degrees
- g)  82-84 degrees
- h)  85-87 degrees
- i)  88-90 degrees
- j)  91-94 degrees
- k)  95-97 degrees
- l)  98-100 degrees
- m)  > 100 degrees
- n)  It's programmed into the thermostat.
- o)  Thermostat was turned off
- p)  Air conditioner was turned off
- q)  DK

**6. Were you or any members of your household home when Duke Energy activated your Power Manager® device at that time?**

Yes     No     DK

*If no or don't know, skip to question 13.*

7. During this recent activation, using a scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort before the control event?

1      2      3      4      5      6      7      8      9      10

- a)  DK

8. Using the same scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort during the control event?

1      2      3      4      5      6      7      8      9      10

- a)  DK

If score from Q8 is lower than score from Q7:

9. What do you feel caused your decrease in comfort?

Select all that apply:

- a)  Power Manager  
b)  Rising Temperature  
c)  Rising Humidity  
d)  Power Outage  
e)  Other: \_\_\_\_\_  
f)  Don't Know

10. When Duke Energy activated your Power Manager® device <today, yesterday, or two days ago>, did you or any other members of your household adjust the settings on your thermostat?

Yes     No     DK

If yes, 10a. What temperature was it originally at, and what temperature did you set it to during the control event?

Original temperature setting: \_\_\_\_\_ degrees F  
 DK

Adjusted temperature setting: \_\_\_\_\_ degrees F  
 DK

**11. When Duke Energy activated your Power Manager® device, did you or any other members of your household turn on any fans to keep cool?**

Yes     No     DK

**12. What else did you or other members of your household do to keep cool?**

- a)  Continued normal activities/ Didn't do anything different
- b)  Turned on room/window air conditioners
- c)  Closed blinds/shades
- d)  Moved to a cooler part of the house
- e)  Left the house and went somewhere cool
- f)  Wore less clothing
- g)  Drank more water/cool drinks
- h)  Turned on fans
- i)  Opened windows
- j)  Other: \_\_\_\_\_
- k)  Don't know

**Now I'm going to ask you some questions about your air conditioning use.**

**13. How often do you use your central air conditioner? Would you say you use it ...**

- a)  Not at all
- b)  Only on the hottest days
- c)  Frequently during the cooling season
- d)  Most days during the cooling season
- e)  Everyday during the cooling season
- f)  Don't know

**14. When you think of a typical hot and humid summer day, at what outside temperature do you tend to feel uncomfortably warm?**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  79-81 degrees
- g)  82-84 degrees
- h)  85-87 degrees
- i)  88-90 degrees
- j)  91-94 degrees
- k)  95-97 degrees

- l)  98-100 degrees
- m)  > 100 degrees
- n)  Don't know

**15. At what outside temperature do you tend to turn on the air conditioner?**

- a)  < 65 degrees
- b)  65-68 degrees
- c)  69-72 degrees
- d)  73-75 degrees
- e)  76-78 degrees
- f)  79-81 degrees
- g)  82-84 degrees
- h)  85-87 degrees
- i)  88-90 degrees
- j)  91-94 degrees
- k)  95-97 degrees
- l)  98-100 degrees
- m)  > 100 degrees
- n)  It's programmed into the thermostat.
- o)  Don't know

**16. How old is your air conditioner?**

- a)  0 to 6 years old
- b)  7 to 12 years old
- c)  13 to 20 years old
- d)  over 20 years old
- e)  Don't Know

**17. Using a scale of 1 to 10 where 1 indicates "Very Dissatisfied" and 10 indicates "Very Satisfied", What is your overall satisfaction with the Power Manager® program?**

1      2      3      4      5      6      7      8      9      10

*If 8 or below, 17b. Why are you less than satisfied with Power Manager®?*

- a)  They activated my Power Manager® device more often than I would like
- b)  The bill credits/incentives were not large enough
- c)  I was uncomfortable when my Power Manager® device was activated
- d)  Other: \_\_\_\_\_
- e)  Don't Know

**18. Using a scale of 1 to 10 where 1 indicates “Very Dissatisfied” and 10 indicates “Very Satisfied”, What is your overall satisfaction with Duke Energy?**

1      2      3      4      5      6      7      8      9      10

*If 8 or below, 18b. Why are you less than satisfied with Duke Energy?*

---

**19. Did you experience any power outage issues on the day of the event?**

Yes     No     DK

**Finally, we have two short demographic questions.**

**20. How many people live in this home?**

- a)  1
- b)  2
- c)  3
- d)  4
- e)  5
- f)  6
- g)  7
- h)  8 or more

**21. How many persons are usually home on a weekday afternoon?**

- a)  0
- b)  1
- c)  2
- d)  3
- e)  4
- f)  5
- g)  6
- h)  7
- i)  8 or more

**Thank you for your time and feedback today! Politely end call.**

## Appendix D: Participant Recency Survey for Non-Event Day Comparison

*Use three attempts at different times of the day within 51 hours of weather exceeding 90°F and no Power Manager event being called. Call times are from 10:00 a.m. to 8:00 p.m. EST or 9-7 CST Monday through Saturday. No calls on Sunday. For example, if a high temperature/no event day occurs on a Monday, calling hours for that particular non-event would be:*

- *Monday 5pm-8pm Eastern (4-7 Central)*
- *Tuesday 10am-8pm Eastern (9-7 Central)*
- *Wednesday 10am-8pm Eastern (9-7 Central)*

### SURVEY

*Note: Only read words in bold type.*

#### *Introduction*

**Hello, my name is \_\_\_\_\_, and I'm calling on behalf of Duke Energy. According to our information, you presently participate in Duke Energy's Power Manager® Program. This program allows Duke Energy to cycle your air conditioner when there is a critical need for electricity in the region. This is a short survey that will take about 5 minutes to complete, and the information you provide will be confidential and will help to improve the program.**

**1. Are you aware of your participation in the Power Manager® program?**

Yes     No     DK

*If no, May I please speak to the person who would be most familiar with your household's participation in the Power Manager® program?*

*If not available, try to schedule a callback time within the 51 hour time-frame for the particular event. If transferred, begin survey from beginning (Introduction).*

**2. Has Duke Energy activated the Power Manager® device since you joined the program?**  
*[If they ask what this means, respond with: "Duke Energy has the ability to send a signal to activate the device to cycle your central air conditioner on and off during an event." Repeat the question.]*

Yes     No     DK

**3. How do you know when the device has been activated?**

- i)  A/C shuts down
- j)  Home temperature rises
- k)  The light on the meter is on
- l)  Light on AC unit flashes
- m)  Bill credits
- n)  Lower bill
- o)  Other: \_\_\_\_\_
- p)  Don't know

**4. Has your device been activated within the last 7 days?**

Yes     No     DK

**5. At what temperature was your thermostat set to at 3pm on <day of high temperature>?**

- r)  < 65 degrees
- s)  65-68 degrees
- t)  69-72 degrees
- u)  73-75 degrees
- v)  76-78 degrees
- w)  79-81 degrees
- x)  82-84 degrees
- y)  85-87 degrees
- z)  88-90 degrees
- aa)  91-94 degrees
- bb)  95-97 degrees
- cc)  98-100 degrees
- dd)  > 100 degrees
- ee)  It's programmed into the thermostat.
- ff)  Thermostat was turned off
- gg)  Air conditioner was turned off
- hh)  DK

**6. Were you or any members of your household home at that time?**

Yes     No     DK

*If no or don't know, skip to question 13.*

**7. Using a scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort on <day before high temperature>?**

1    2    3    4    5    6    7    8    9    10

b)  DK

**8. Using the same scale of 1 to 10 where 1 means very uncomfortable and 10 means very comfortable, how would you describe your level of comfort on <day of high temperature>?**

1      2      3      4      5      6      7      8      9      10

b)  DK

*If score from Q8 is lower than score from Q7:*

**9. What do you feel caused your decrease in comfort?**

*Select all that apply:*

- g)  Power Manager
- h)  Rising Temperature
- i)  Rising Humidity
- j)  Power Outage
- k)  Other: \_\_\_\_\_
- l)  Don't Know

**10. On <day of high temperature>, did you or any other members of your household adjust the settings on your thermostat?**

Yes     No     DK

*If yes, 10a. What temperature was it originally at, and what temperature did you set it to during the control event?*

Original temperature setting: \_\_\_\_\_ degrees F  
 DK

Adjusted temperature setting: \_\_\_\_\_ degrees F  
 DK

**11. Did you or any other members of your household turn on any fans to keep cool?**

Yes     No     DK

**12. What else did you or other members of your household do to keep cool?**

- l)  Continued normal activities/ Didn't do anything different
- m)  Turned on room/window air conditioners
- n)  Closed blinds/shades
- o)  Moved to a cooler part of the house
- p)  Left the house and went somewhere cool
- q)  Wore less clothing
- r)  Drank more water/cool drinks
- s)  Turned on fans
- t)  Opened windows
- u)  Other: \_\_\_\_\_
- v)  Don't know

**Now I'm going to ask you some questions about your air conditioning use.**

**13. How often do you use your central air conditioner? Would you say you use it ...**

- g)  Not at all
- h)  Only on the hottest days
- i)  Frequently during the cooling season
- j)  Most days during the cooling season
- k)  Everyday during the cooling season
- l)  Don't know

**14. When you think of a typical hot and humid summer day, at what outside temperature do you tend to feel uncomfortably warm?**

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**Finally, we have two short demographic questions.**

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- j)  2
- k)  3
- l)  4
- m)  5
- n)  6
- o)  7
- p)  8 or more

21. How many persons are usually home on a weekday afternoon?

- j)  0
- k)  1
- l)  2
- m)  3
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- o)  5
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- q)  7
- r)  8 or more

**Thank you for your time and feedback today! Politely end call.**



Final Report

**Ohio Residential Smart Saver CFL Program**  
Results of a Process and Impact Evaluation

**June 29, 2010**

Prepared for

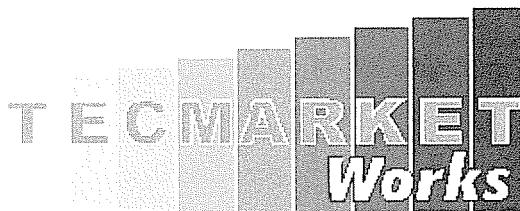
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This evaluation was conducted by TecMarket Works and BuildingMetrics with support from Duke Energy.

The process evaluation was conducted by TecMarket Works. The impact evaluation was conducted by Duke Energy with BuildingMetrics supervision, review and approval. The CFL surveys were developed by TecMarket Works and Duke Energy. The survey fielding was conducted by Duke Energy with oversight by TecMarket Works. The survey data analysis was supervised, reviewed and approved by TecMarket Works.

TecMarket Works and BuildingMetrics are independent evaluation firms providing energy efficiency program evaluation services to government and utility clients.

## Executive Summary

This report presents the findings of the Residential Smart Saver Compact Fluorescent Lightbulb (CFL) Program for Duke Energy from October 2008 through September 2009. Three campaigns took place during this time – a “Lowe’s campaign”, a “Walmart campaign”, and a “GE campaign”, all featuring mailed coupons. This report reviews the program’s customer satisfaction, demographics, CFL use, and the energy savings from the CFLs purchased through the program. The evaluation is separated into the two components: a process evaluation, and an energy impact analysis: To support this analysis two surveys were conducted – a coupon redeemer survey, and a coupon non redeemer survey. In addition, interviews were conducted of Duke Energy program managers, CFL bulb retailers, and manufacturers that offered CFL coupons. Finally, for the impact evaluation, a lighting logger study was conducted with customers who redeemed CFL coupons to estimate lighting usage in their home.

## Methodology

To conduct the energy impact analysis this study combined the information from two data collection approaches that together allowed the estimation of saved energy. In addition, this study conducted interviews with program managers and retail store managers that when combined with customer surveys allowed for the assessment of the operations of the program.

The kilowatt hour savings were calculated using the data obtained from the lighting logger study performed on homes in the targeted areas served by the program, which provided average hours of use for each room type in which the CFLs were installed. These values were used to inform the customer responses to the CFL coupon redeemer survey which indicated the room type, wattage of lamp installed, wattage of lamp replaced, and customer-estimated hours of use.

Two surveys were sent to customers: a coupon redeemer survey sent to customers who redeemed Duke Energy coupons for CFL bulbs, and a coupon non redeemer survey sent to customers who received but did not redeem coupons for CFL bulbs. The coupon redeemer survey asked customers to provide information regarding their purchase of CFL bulbs, their experience with CFL bulbs, and their satisfaction with CFL bulbs. Customers who did not redeem CFL coupons were sent a coupon non-redeemer survey. This survey also asked customers questions regarding their purchase of CFL bulbs, why they did not redeem Duke Energy coupons, and their experience and satisfaction with CFL bulbs. The surveys can be found in the appendices of this report.

Program operations were evaluated through an in-depth interview with two program managers and five retail store managers.

## Summary of Findings and Recommendations

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

## 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 and providing substitutions and back orders. This is a substantial increase in sales and reflects well on Duke Energy and on their marketing efforts and promotional initiatives. Duke managers report large movements of CFLs in all Duke 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 12% and 17% compared to about 3% with the price reduction coupons.
3. The strategy of using individual customer-coded coupons allows Duke 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 does not carry the partnered brand resulting in a large CFL retailer not being allowed to participate in the program. However, by moving to a manufacturer's coupon Duke is able to take the retail store out of the equation, letting the customer to go more stores that carry the manufacturer's brand. 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 their 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 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. However, 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.

## 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 calibrate the participants' reported hours of use (from the participant survey) to the results of the logger study that recorded the actual hours of use. To establish actual hours of use for the surveyed population the evaluation team regressed the data from the lighting logger study, to the participant's estimated hours of use responses to the survey questions. This allowed the impact estimate to be based on the adjusted hours of use, times the difference in wattage between the bulb replaced and the bulb installed as reported by the participants. From this calculation a gross yearly energy savings of 29,068 kWh/year was estimated for those 200 customers who installed a total of 561 bulbs and who completed the participant survey, or a net program-induced savings of 44.75 kWh per bulb

### Free Riders and Free Drivers

From the survey results, it was determined that 40.74% of CFL purchases made were due to free riders<sup>1</sup>, while 25.56% of purchases made were due to free drivers<sup>2</sup> for a net-to gross-adjustment factor of 15.18% excluding additional market effects caused by the program beyond the participant purchases<sup>3</sup>.

### Total Program Net Energy Savings Calculations

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

**Table 1. Impact Evaluation Summary Table**

<sup>1</sup> Free rider: someone who would have taken the same action without the program's influence.

<sup>2</sup> Free driver: someone who takes additional actions as a result of the influence of the program.

<sup>3</sup> 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.

Metric	Result
Number of Bulbs	561
Gross kW per bulb	0.06 kw
Gross kWh per bulb	52.76 kwh
Gross therms per bulb	N/A
Freeridership rate	40.74%
Spillover rate	25.56%
Self Selection and False Response rate	N/A
Total Discounting to be applied to Gross values	15.18%
<b>Net peak kW per bulb</b>	<b>0.04 kW</b>
<b>Net annual kWh per bulb</b>	<b>44.75kWh</b>
Net therms per participant	N/A
Measure Life	5 years*
Effective useful life net savings per bulb	223.75kWh

\* 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 advertised effective useful life. The adjustment approach for reducing the effective useful life to 5 years is presented in the Appendix entitled: Effective Useful Life Adjustment Factor for Installed CFLs.

Table 2 shows the location where CFLs purchased with coupons were installed in participants' homes, the average wattage of the bulb replaced, and the self-reported average number of hours the CFL is turned on each day as reported on the CFL coupon redeemer survey. Most bulbs were installed in either the living room, bed room, kitchen or "other" rooms. CFLs installed here typically replaced a 50-60W bulb. In addition, CFLs purchased with coupons could include 13W, 20W, and/or 26W bulbs bringing the typical wattage replaced to below 50 watts in a number of rooms. The kitchen, den, laundry room, and living room lights were turned on for a longer period of time than the lights in many other room types.

**Table 2. 2009 CFL Redeemer Survey: Location of Purchased Bulbs, n=200**

	Number of Replacements by Room	Percent of Respondents Replacing at Least One Bulb in This Room	Average Wattage of Bulb Replaced	Average Self Reported Hours Bulb Used
Living Room	184	40.0%	50.65	3.62
Bedroom	164	36.0%	48.71	2.13
Kitchen	115	26.0%	47.83	4.73
Other	83	27.5%	52.94	2.31
Basement	79	18.0%	62.99	3.16
Bathroom	74	16.0%	45.01	2.27
Hallway	51	15.0%	51.08	2.36
Dining Room	31	7.5%	60.40	1.76
Garage	19	6.0%	70.37	1.29
Office	17	5.5%	47.94	3.29
Laundry Room	12	5.5%	56.67	3.98
Den	12	5.0%	66.25	4.00
Entryway	9	2.0%	60.00	1.17
Stairway	3	1.0%	60.00	3.50
Foyer	2	1.0%	30.00	3.50

## Recommendations

TecMarket Works and Building Metrics offer the following recommendations for the Smart Saver CFL Program.

1. Consider conducting light logger studies near the spring and fall equinox to limit the effect of daylength on the logger study results.
2. Consider conducting light logger studies at different times of the year to observe the daylight effect (more expensive).
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 time as more customers adopt CFLs and continue to install bulbs in lower use sockets and fixtures. 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 July 2010. Duke Energy also reports that they continue to test ways to increase CFL use via toll-free number and internet exposure as well as direct marketing.)
5. Consider incorporating a market effects study to identify ways to transition the program moving forward as traditional CFLs are phased out in the coming years, as shown in Table 3 below.

**Table 3. EISA Schedule for General Service Incandescent<sup>4</sup>**

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

<sup>4</sup> Source: [http://www1.eere.energy.gov/buildings/appliance\\_standards/residential/pdfs/lighting\\_legislation\\_fact\\_sheet\\_03\\_13\\_08.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/lighting_legislation_fact_sheet_03_13_08.pdf)

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 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 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.)

## CFL Marketing Efforts

Duke Energy has been using experimental design techniques for several years to carefully track and understand the relative productivity of their coupons and other consumer offers. For example, in 2008 depending on the target (coupon redeemers, CFL adopters, or non-adopters) Duke Energy found that by experimentally varying the message used in coupons, message productivity could be increased 15 to 200%.

This section presents short descriptions of the CFL campaigns and offers being promoted by Duke Energy in 2010. All of the offers provide Duke Energy customers an opportunity to 'opt-in' for CFL bulbs. Each campaign offer provides a new channel and will help Duke Energy to reach coupon non-redeemers and customers who qualify for CFLs.

1. BRC (Business Reply Card) – Duke Energy will mail a business reply card to eligible customers to 'opt-in' and request a free 6 pack of CFLs to ship directly to their homes at

no additional cost. Each BRC contains a unique barcode to track requests to a Duke Energy account number. BRCs are returned back to Duke Energy to scan and a file will be created to send to a 3<sup>rd</sup> party vendor for fulfillment. The vendor will ship the kits and upload the results to the EE database for impacts.

- a. The first round of BRCs will be mailed to customers in the Carolinas and Ohio beginning June 1, 2010.
  - b. The second round of BRCs will be mailed to customers in the Carolinas and Ohio beginning July 14, 2010.
  - c. The third round of BRCs will be mailed to customers in Indiana (once approved) beginning (tentatively) in September 2010.
2. IVR/WEB/OLS (CFL offer) – Duke Energy will provide eligible customers three new channels to request free CFLs to be shipped directly to their homes at no additional cost. Customers can choose the channel they prefer to request the bulbs.
    - a. The IVR will consist of a toll free number for Duke Energy customers to call in to authenticate their account(s) to see how many bulbs they qualify for. Customers acknowledge the order and Duke Energy processes the file to be fulfilled by a 3<sup>rd</sup> party vendor. The file will go directly to the vendor (processed daily) to speed up the ordering process.
    - b. The WEB will consist of screenshots walking a customer through the ordering process. Customers will enter their account number and/or phone # plus last four digits of their social security number to check eligibility. Customers will immediately see how many bulbs they qualify for, accept or decline the order, and proceed to check out.
    - c. OLS customers (new and existing) will receive a ‘pop up’ upon logging into OLS stating that they qualify for CFLs. They can choose to accept or decline. The same ordering process is identical to the WEB stated above. If an OLS customer declines upon logging into OLS they will only see a “promo” box upon entering OLS during their next visit.
      - i. Duke Energy will do a ‘slow’ rollout during the initial launch (scheduled for September 2010) of the program utilizing low cost/no cost channels to gain experience with the CFL offer. Orders will ship weekly with results uploaded by the vendor.
  3. Property Manager – Duke Energy is partnering with NC and Ohio property managers to ship ‘bulk’ CFLs to rental properties. Duke Energy will pay for the bulbs and the Property Manager will pay for the shipping costs. The goal is to identify the number of units and permanent fixtures available with each apartment unit. Property Managers will install CFLs into the permanent fixtures during their routine maintenance visits and provide tracking for each unit and the number of bulbs installed. Duke Energy will upload the results upon completing the bulb installation.

- a. We are currently working on an RFP to identify a 3<sup>rd</sup> party vendor to manage the Property Manager program. The RFP review selection should be completed by Mid-June of 2010.
4. Door to Door Canvassing – Duke Energy is piloting a door to door canvassing event in Ohio (May 15, 2010). Duke Energy is working with the Greater Cincinnati Energy Alliance to conduct a CFL canvassing offer for a free 6-pack of CFLs delivered directly to customers' homes in targeted neighborhoods. Each kit will be tracked to a Duke Energy account and the results will be uploaded upon completion of the event. If the event proves successful, we will look at additional non-profit organizations in other Duke Energy approved states to conduct the other door to door canvassing events.

These efforts reflect not only a desire on Duke Energy's part to market the CFL product, but these efforts reflect a strategic planning framework for increasing exposure to and sales of CFLs. It is gratifying to see utilities go beyond the use of limited marketing and promotional approaches and use different strategies that reach out to customers via multiple approaches.

## Evaluation Findings

### Process Evaluation

#### Program Design and Operations

The overall design of the program as related by program managers is to encourage people to start thinking in terms of energy efficiency in their homes and not necessarily to push CFLs specifically. CFLs are not seen as a long-term program offering but instead serve as a bridge to emerging technologies like LEDs and potentially high efficiency incandescent bulbs. Program managers also view the CFL offering as a high profile entry point for informing customers of other energy efficient technologies that are currently available through Duke Energy's programs such as programmable thermostats, high efficiency appliances, etc.

Program managers noted that while savings are measured at the bulb level, the program focuses on customers and the number of customers that can be cost effectively reached for the typical number of bulbs per participating customer. Managers report that the program is not an attempt at marketing CFLs to the point of socket saturation, but is an attempt to raise awareness of energy efficient products and behaviors via a focus on CFLs.

The customer incentive (value of the coupon) is delivered using direct-mail manufacturers' coupons partnering with GE, and for a period prior to the completion the program partnered with Lowe's and Walmart and offered coupons for *BrightEffects* bulbs. Originally the program partnered with individual retailers; however Duke wanted the coupons to be used in more places than just the retail partner locations. This change was also needed because the program found that some of the partnering retailers did not stock the inventory needed by the program, thereby reducing sales and making redemption problematic. As a result, Duke switched from the use of retailer coupons to using manufacturers coupons, significantly expanding the locations available for coupon redemption. However, while this approach expanded the places where coupons could be redeemed, opening up new outlets (ACE Hardware, TruValue, Lowe's, Walmart, and rural hardware stores for example), it also served to limit redemption to only stores that carry GE bulbs. Retail stores, such as Home Depot, that do not carry GE CFLs could not take part in the CFL push efforts.

The coupons are tiered. Customers can buy three CFLs to try them out, or any combination of 3 bulbs (6, 9, 12) up to 15 if they want to acquire multiple bulbs at the same time.

The program is very popular with retailers. Neither of the retail partners interviewed could identify a component of the program or the approach used that is in need of improvement and indicated that their sales are very positively affected by the coupons.

Program managers however, suggest that there is room for expansion in CFL sales because of the number of sockets still filled with incandescent bulbs and the potential for expanded adoption of the technology. Managers report concern that with the changes in the federal standard, the window for CFLs as a program-pushed technology is not more than two years. Retail partners agree but also think that there is room for sales growth and report that saturation of first-time

buyers is only 20% of the market with 80% of the households in their retail areas not yet adopting CFLs. They also report that second-time buyers need an incentive to continue to buy CFLs. They note that the vast majority of sockets are still filled with incandescent bulbs and note the availability of specialty CFL bulbs that can capture a larger share of the market. Retailers note that they continue to sell far more standard bulbs than CFLs.

Program managers note that the approach using GE bulbs works well because GE has their own fulfillment house that pays the stores the Duke Energy incentive and then bills Duke for those coupon sales, greatly simplifying the operations of the program thereby increasing program cost effectiveness. It also allows the GE fulfillment house to maintain accurate records on program sales that are then made available to Duke Energy as a program tracking metric. In this way Duke Energy can avoid much of the management and administration costs of the coupon payments and focus on tracking customers, market share progress and energy savings from those who used the coupons.

### Challenges

In Ohio the numbers of coupon users per number of coupons distributed are dropping and may indicate a beginning of reduction in need for additional CFLs for coupon users. While customers who use their coupons are not sent follow-up coupons, managers note that some customers just don't use coupons. Managers note that they need to find a cost effective way to motivate the non-coupon user to buy CFLs now rather than waiting until they have no choice.

The mailing of coupons is targeted by zip code and calibrated to the need for savings and the budget for the program. Partners are informed of the mailing, and store managers report that it can be a challenge to anticipate the high traffic. Some store managers report an increase in CFL sales volumes of 500%. As an example, Sylvania (before the switch to GE) gave Duke four weeks of data on sales before a coupon mailing. After the mailing the volume jumped to 10 times the weekly average for several weeks.

As a result, store managers report needing as much lead time as possible to plan for the increased traffic. They report that because they order their bulbs months in advance, they need longer notification lead times. . However, when asked what changes are needed to the program, retail managers only identified the need for longer lead times between notification of the mailings and the actual mailing to allow them to prepare for the sales surge and the need to extend the coupon expiration date to allow for a longer sales period.

### Response to Slowed Redemption Rates

Duke Energy managers noted that they are starting to see a drop in redemption rates as the coupon users become saturated and sales to this segment are slowing. Duke Energy is exploring ways to boost the number of program-induced sales and are now starting to include a CFL coupon offer to customers who contact the Duke Energy call center with billing questions or for other reasons. Managers are also starting to piggyback CFL coupons on other efficiency programs so that as customers inquire about other programs and services they are offered CFL coupons. Duke Energy is also currently exploring the opportunities for partnering with property

managers and apartment owners to help promote CFL use by their tenants. Each of these approaches represents an added market niche for pushing CFL adoption and use to save energy. In view that the costs for CFLs are low, and savings are comparatively high for such a low cost item, it make sense for Duke Energy to move as many of the CFLs into the market as possible in ways that acquire net savings that are below program costs. In view that there is a need to acquire net savings to meet Duke Energy's savings goals, all cost effective routes for moving CFLs into the market should be explored until such time that new federal appliance standards make CFLs mandatory. Exploring and using all cost effective routes into the market, until such time as the market is effectively transformed, as documented by a market conditions in which most sockets are filled with efficient lighting products, can also serve as market channels for more efficient LED bulbs or other similar products as they become cost effective to deliver via these same routes. At this time the CFL market does not appear to be transformed and should not be considered transformed until the vast majority of bulbs sold are at least as efficient as CFLs. Retail managers report that the vast majority of the bulbs they sell remain incandescent bulbs. This period of time, in which the market still buys incandescence bulbs as the lighting technology of choice represents an opportunity period in which new net savings can be acquired via approaches that increase the sales and use of CFLs. This market opportunity may not last but a few more years as Duke Energy and other market interventions transform the market to the point where CFLs represent the majority of sales and net new savings become difficult to acquire.

## **CFL Coupon Redeemers**

This survey focused on customers who, according to program tracking records, redeemed their CFL coupons. The survey was mailed out to 1,000 customers who had redeemed their CFL coupons. Of these, 209 surveys were returned, for a 20.9% response rate. Of those surveys returned, 200 had valid responses and were included in the final data set.

### **Participation in the Program**

Nearly all redeemers responding to the survey (96.0%) recall receiving CFL coupons in the mail. Similarly, most of the redeemers kept all of the coupons provided by Duke Energy (84.4%) while some gave at least one of their coupons away to another user (15.6%). However, 9% of the respondents indicated that they did not redeem at least one of the coupons, indicating that others may have redeemed them. And 91% of the respondents indicated that they redeemed at least one coupon. This indicates that at least a few of the respondents were not aware that someone in their household redeemed at least one coupon. A few respondents may have given some of their coupons away, and were not aware that the recipient redeemed them.

	Yes	No	Total
Do you recall receiving compact fluorescent light bulb (CFL) coupons from Duke Energy?	192	8	200
	96.0%	4.0%	100.0%
	Yes	No	Total
Did you give away any of your coupons to someone else to use?	30	162	192
	15.6%	84.4%	100.0%

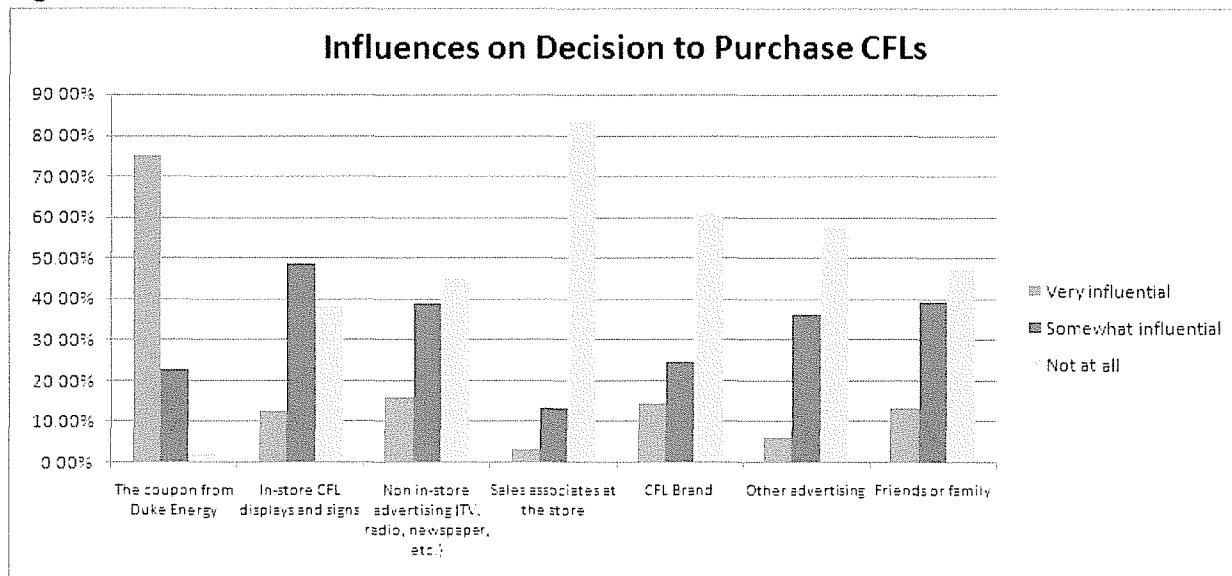
	Yes	No	Total
Did you use at least one coupon yourself?	182	18	200
	91.0%	9.0%	100.0%

Seventy-five percent (75.1%) of redeemers found the coupon from Duke Energy to be “very influential” in their decision to purchase CFLs, indicating that the coupon was a key purchase driver. Although previous Duke Energy CFL studies have found the CFL coupon from Duke Energy to be even more influential, the coupon still seems to be the main driver in redeemers’ decisions to purchase CFLs.<sup>5</sup> In-store CFL displays and signs were found to be somewhat influential, and other forms of advertising were found to be not at all influential by most redeemers. Redeemers did not find CFL branding or friends and family recommendations to be influential in their decision to purchase CFLs. As indicated in the following table, the Duke Energy coupon was the primary driver leading to the purchase of the program-induced CFL by a significant margin, however, the decision was also influenced, to a limited degree, by other events.

How influential were the following in your decision to purchase CFLs?

	Very influential	Somewhat influential	Not at all	Total
<b>The coupon from Duke Energy</b>	136	41	4	181
	75.1%	22.7%	2.2%	100.0%
<b>In-store CFL displays and signs</b>	21	80	63	164
	12.8%	48.8%	38.4%	100.0%
<b>Non in-store advertising (TV, radio, newspaper, etc.)</b>	26	63	73	162
	16.0%	38.9%	45.1%	100.0%
<b>Sales associates at the store</b>	5	21	131	157
	3.2%	13.4%	83.4%	100.0%
<b>CFL Brand</b>	23	39	96	158
	14.6%	24.7%	60.8%	100.0%
<b>Other advertising</b>	10	57	90	157
	6.4%	36.3%	57.3%	100.0%
<b>Friends or family</b>	21	61	73	155
	13.5%	39.4%	47.1%	100.0%

<sup>5</sup> “An Evaluation of Energy Star Products: Results of a Process and Impact Evaluation of Duke Energy’s CFL Promotion and Lighting Logger Programs” prepared for Duke Energy by TecMarket Works and Building Metrics, September 24, 2008, page 38. This study will be referenced as the “2008 study” through this report.

**Figure 1. Influences on Decision to Purchase CFLs - Redeemers**

According to Duke Energy tracking records, redeemers who were mailed a coupon redeemer survey redeemed coupons good for the purchase of CFLs at either Walmart or Lowe's stores. At the time the surveys went out, Duke Energy had also recently initiated an additional CFL campaign, which offered a manufacturer's coupon good for CFL bulbs redeemable at any store selling the manufacturer's bulbs.<sup>6</sup> As shown in the table below, most redeemers did recall purchasing their CFLs at either Lowe's or Walmart using the CFL coupons. In addition, redeemers also mentioned stores where they may have purchased CFL bulbs using the manufacturer's coupons.

At which store did you purchase your CFL bulbs using the Duke Energy coupons?

Walmart	80	36.20%
Lowes	54	24.43%
Not Specified	47	21.27%
Home Depot	26	11.76%
Meijer	5	2.26%
Kroger	4	1.81%
Target	3	1.36%
Ace Hardware	1	0.45%
Walgreens	1	0.45%
Total	221	100.00%

<sup>6</sup> Due to the short time span (approximately one month) between the drop of the manufacturer's campaign and the mailing of this survey, only a few customers would have recalled receiving or redeeming manufacturer's coupons.

Redeemers were asked if they purchased any of the following additional items when they purchased their CFLs: wall/ceiling insulation, faucet aerators, showerheads, weather stripping, caulking, outlet gaskets, or programmable thermostats. Most redeemers did not purchase additional items when purchasing their CFLs (85.3%), however, those redeemers who did purchase additional items purchased either weather stripping or caulking. These purchase decisions are compared to those of coupon non redeemers later in this report.

Did you purchase any of the following items at the same time you purchased the CFLs with the Duke Energy coupons?

None	133	85.30%
Caulking	10	6.40%
Weather stripping	9	5.80%
Low flow showerhead	2	1.30%
Faucet aerators	1	0.60%
Electric wall outlet gaskets	1	0.60%
Wall or ceiling insulation	0	0.00%
Programmable thermostat	0	0.00%

## Use of CFL Coupons

Redeemers could have purchased between 3 and 15 bulbs using the Duke Energy coupons. The majority of redeemers stated they purchased 12 or more CFLs, with similar number of redeemers stating they purchased 6 or 7-11 CFLs. This data indicates that not only was the Duke Energy coupon the key driver for the purchase decision, but that purchase decisions typically involved 6 or more bulbs. A small number of redeemers stated that they purchased 1 or 2 CFLs. Since the CFLs eligible for the coupons were packages of 3 or 6 bulbs, these redeemers may have been describing the number of packages of CFLs they purchased, or they did not recall the number of bulbs purchased and were providing their best guess.

Just over one quarter of redeemers stated they installed 6 of the CFLs they purchased using the Duke Energy coupons. A comparison of the number of CFLs a redeemer stated to have purchased vs. the number of CFLs a redeemer installed shows that on average redeemers are installing 83.1% of the CFLs they purchase using Duke Energy coupons. That is, not only is the program causing the purchase decision, but the vast majority of the bulbs are being installed and used immediately upon purchase.

How many CFL bulbs did you purchase in TOTAL with the Duke Energy coupon(s)?

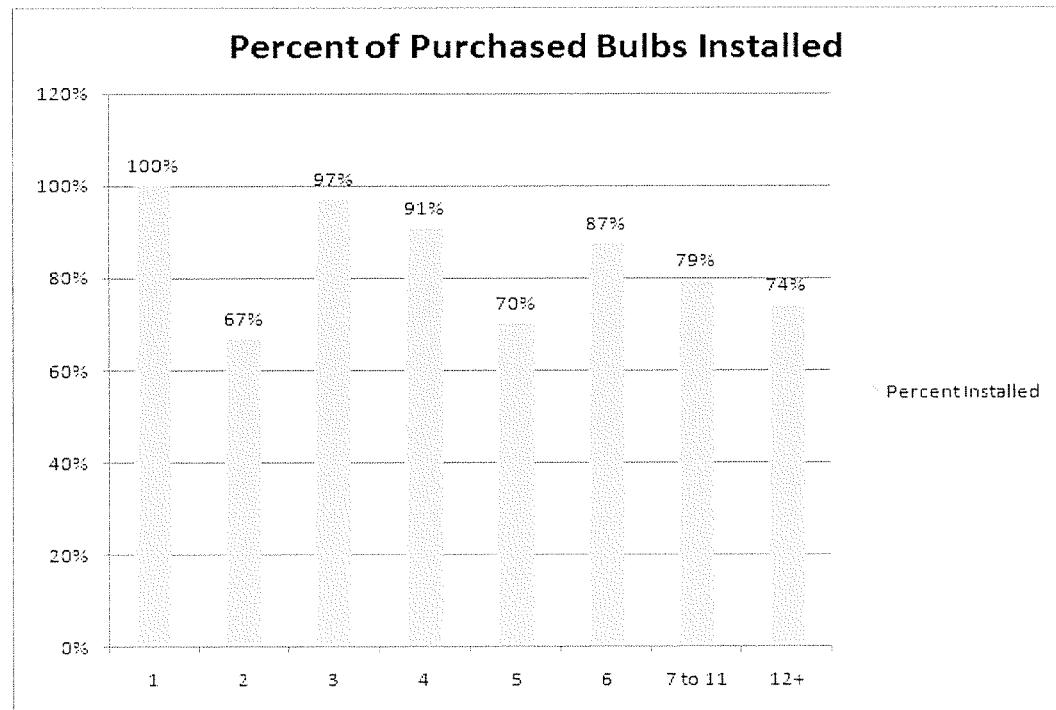
1	2	3	4	5	6	7-11	12+	Total

2	3	11	30	2	43	39	47	177
1.1%	1.7%	6.2%	16.9%	1.1%	24.3%	22.0%	26.6%	100.0%

Of the CFLs you bought with the Duke Energy coupons: How many CFLs are now installed?

0	1	2	3	4	5	6	7-11	12+	Total
1	3	11	17	36	8	47	31	24	178
.6%	1.7%	6.2%	9.6%	20.2%	4.5%	26.4%	17.4%	13.5%	100.0%

**Figure 2. Percent of Purchased Bulbs Installed**



About one third of redeemers stated that they would not have bought any CFLs without the coupon (33.5%), and an even larger number of redeemers (47.5%) stated that they have not purchased any additional CFLs since using the coupon. These two statements corroborate the previous statement made by redeemers that receiving the coupon in the mail was most influential in a participant's decision to purchase CFLs. However, a higher percentage of redeemers agreed with these two statements in the previous Duke Energy Ohio CFL study<sup>7</sup>, suggesting that redeemers' adoption of CFLs on their own may be increasing.

<sup>7</sup> In "An Evaluation of Energy Star Products: Results of a Process and Impact Evaluation of Duke Energy's CFL Promotion and Lighting Logger Programs" prepared for Duke Energy by TecMarket Works and Building Metrics, September 24, 2008, 52.8% of customers stated they would not have bought any CFLs without the Duke Energy coupon, and 69.8% of customers stated they had not purchased any additional CFLs since purchasing CFLs with the Duke Energy coupon.

How many CFL bulbs would you have bought if you had not had the Duke Energy coupon(s)?

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7-11</b>	<b>12+</b>	<b>Total</b>
58	11	20	14	23	0	21	16	10	173
33.5%	6.4%	11.6%	8.1%	13.3%	.0%	12.1%	9.2%	5.8%	100.0%

How many CFL bulbs have you since purchased without Duke Energy coupons?

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7-11</b>	<b>12+</b>	<b>Total</b>
84	4	19	16	14	2	18	9	11	177
47.5%	2.3%	10.7%	9.0%	7.9%	1.1%	10.2%	5.1%	6.2%	100.0%

## CFL Usage and Satisfaction

Most redeemers have not altered their behavior after installing their CFLs; that is, they have not changed the hours of use of fixtures (87.1%), and they have not removed any of the CFLs they installed (84.0%). Of those redeemers who did change their usage, over half increased it (59.1%), and of those redeemers who did remove a CFL they had installed, over two thirds of redeemers did so because the bulb burned out.

	Yes	No	Total
Have you changed the hours of use of any fixture in which you installed the CFLs?	22	148	170
	12.9%	87.1%	100.0%

	Increased usage	Decreased usage	Total
If you answered yes, how did your average usage change?	13	9	22
	59.1%	40.9%	100.0%

	Yes	No	Total
Have you removed any of the CFLs you installed?	26	136	162
	16.0%	84.0%	100.0%

	1	2	3	4	5	6	7-11	12+	Total
If yes, how many did you remove?	20	13	2	2	2	1	0	1	41
	48.8%	31.7%	4.9%	4.9%	4.9%	2.4%	.0%	2.4%	100.0%

	Not bright enough	Did not like the light	Too slow to start	Burned out	Not working properly	Other	Total
Why did you remove them?	6	1	3	27	1	2	40
	15.0%	2.5%	7.5%	67.5%	2.5%	5.0%	100.0%

Other:

- My 2 year old tipped lamp and broke the bulb...I hope you realize how dangerous the mercury is to a child.
- Bare bulbs are okay. Enclosed globe and flood bulbs are too slow to start.
- Base is loose.
- Bulb didn't work in custom lamp.

- Changed paint color on walls.
- Did not remove but may in the future. Too expensive and does not last long as promised by the manufacturer.
- Doesn't work!
- I replaced with CFL also.
- None removed, though some are not bright enough.
- They do not last longer than 5 years.
- What do we use with motion detectors?

Not quite half of redeemers stated they already had at least one CFL installed in their house before purchasing bulbs with Duke Energy coupons, and just over half of redeemers stated they did not already have CFLs installed. Of those redeemers who indicated that they had already installed a CFL, 59.8% had already installed 2, 3, or 4 bulbs. The majority of the other redeemers had more than 4 bulbs installed in their home. Nearly the same number of redeemers in a previous Duke Energy study had between 1 and 4 bulbs installed in their home before receiving the Duke Energy coupons (2008 - 65.6%; 2009 – 66.7%).

	Yes	No	Total
Did you have any CFLs installed in light sockets in your house before you bought the CFLs with the Duke Energy coupon?	75	95	170
	44.1%	55.9%	100.0%

	1	2	3	4	5	6	7-11	12+	Total
If yes, about how many were already installed?	5	19	12	12	6	7	5	6	72
	6.9%	26.4%	16.7%	16.7%	8.3%	9.7%	6.9%	8.3%	100.0%

Only about one third of redeemers indicate that they have been using CFLs for 1-2 years, and nearly 75% of these redeemers are very satisfied with their CFLs. This data suggests that CFL saturation is still low within the coupon redeeming population prior to the use of the Duke Energy coupon.

	Never purchased until now	1 year or less	1-2 Years	2-3 Years	3-4 Years	4 or more years	Total
How long have you been using CFL light bulbs?	21	44	58	28	9	13	173
	12.1%	25.4%	33.5%	16.2%	5.2%	7.5%	100.0%

	Very Satisfied	Somewhat satisfied	Not at all satisfied	Total
Overall, how satisfied are you with the	130	41	5	176

Duke discounted CFLs?	73.9%	23.3%	2.8%	100.0%
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## ENERGY STAR Awareness

Over 75% of redeemers state that they never use the Duke Energy website. Most redeemers (80.7%) are aware of the ENERGY STAR label, and 71.4% of redeemers look for the label when purchasing appliances. About half of redeemers typically purchase an appliance with an ENERGY STAR label.

	Often	Sometimes	Never	Total
Do you use the Duke Energy Website?	8	34	138	180
	4.4%	18.9%	76.7%	100.0%

	Yes	No	Total
Have you added any major electrical appliances to your home in the past year?	28	143	171
	16.4%	83.6%	100.0%

	Yes	No	Total
Are you aware of the ENERGY STAR label?	142	34	176
	80.7%	19.3%	100.0%

	Yes	No	Total
Do you typically look for the ENERGY STAR label when purchasing an appliance?	125	50	175
	71.4%	28.6%	100.0%

	Yes	Some of the time	Never	Total
Do you typically buy appliances with the ENERGY STAR label?	90	51	24	165
	54.5%	30.9%	14.5%	100.0%

## Future CFL Purchases

Redeemers were asked to consider their future CFL purchases and identify how many CFLs they would expect to purchase in the next year if CFLs were offered at a certain price compared to a standard (incandescent) bulb. With CFLs being offered at the same prices as a standard bulb, 91.1% of redeemers will purchase at least one CFL, and most frequently will purchase 12 or more. Similarly, a majority of redeemers (over half) will purchase any number of CFLs at prices above a standard bulb, until the price reaches \$3.00 more. At prices of \$3.00 more than a

standard bulb, 58.3% of redeemers will not purchase CFLs. This data suggests that the market remains price sensitive to the higher price of the unincented CFL.

If the CFL bulbs are free with a rebate form, 14.2% of redeemers said that they will purchase zero CFLs. This suggests that some redeemers are experiencing a barrier other than price when deciding to purchase CFLs; for example, redeemers may not be at all interested in purchasing CFLs due to size, aesthetics or the quality of light and would purchase no CFLs regardless of price. In addition, for some of these redeemers the hassle of the rebate process may outweigh other advantages of purchasing CFLs; for example, a small number of redeemers (10) who stated they would purchase CFLs at a price equal to standard bulbs would not purchase them if they were free through the use of a rebate.

Considering future CFL purchases, how many CFL bulbs would you purchase in the next year if...

		<b>0</b>	<b>1-2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7-11</b>	<b>12+</b>	<b>Total</b>
<b>They were the same price as a standard bulb?</b>	Count	14	12	8	28	8	37	13	38	158
	%	8.9%	7.6%	5.1%	17.7%	5.1%	23.4%	8.2%	24.1%	100%
<b>They were \$1.00 more than standard bulbs?</b>	Count	33	17	13	23	13	24	8	15	146
	%	22.6%	11.6%	8.9%	15.8%	8.9%	16.4%	5.5%	10.3%	100%
<b>They were \$2.00 more than standard bulbs?</b>	Count	62	18	9	22	6	15	4	6	142
	%	43.7%	12.7%	6.3%	15.5%	4.2%	10.6%	2.8%	4.2%	100%
<b>They were \$3.00 more than standard bulbs?</b>	Count	84	15	8	19	3	8	3	4	144
	%	58.3%	10.4%	5.6%	13.2%	2.1%	5.6%	2.1%	2.8%	100%
<b>They were free but you had to mail in a rebate form to get your money back?</b>	Count	21	7	7	22	7	26	15	43	148
	%	14.2%	4.7%	4.7%	14.9%	4.7%	17.6%	10.1%	29.1%	100%

## CFL Coupon Non-Redeemers

This survey focused on customers who according to program tracking records did not redeem CFL coupons, and was mailed out to 1000 respondents who did not redeem coupons. 104 surveys were returned, for a 10.4% response rate.

### Awareness of Advertising

14.7% of non-redeemers do not remember receiving any CFL coupons, and of those who did recall receiving the coupons, 59% stated that they did not use any of the coupons. Nearly three quarters of non-redeemers stated that they had heard about the CFL program (71.4%). Nearly 15% of non-redeemers stated that they did not redeem the coupons because they do not shop at Wal-Mart or Lowe's. These non-redeemers might be interested in participating in a CFL program with a retailer coupon for another store or participating in a program offering a manufacturer's coupon. (For example, they may have been a participant in the manufacturer's coupon campaign Duke Energy ran subsequently to this offer.)

	Yes	No	Total
Do you recall receiving Compact Fluorescent Light bulb (CFL) coupons from Duke Energy?	87	15	102
	85.3%	14.7%	100.0%

### Why did you decide NOT to use these coupons?

Too much hassle	2	4.40%
Do not use CFL's	6	13.30%
Do not shop at WalMart / Lowe's	6	13.30%
Did not understand program	2	4.40%
Thought there was a catch	1	2.20%
Could not be bothered	3	6.70%
Don't like CFL's	6	13.30%

If other, please specify:

- All of the bulbs I received from you were broken except for one and it lasted 2-3 months.
- All ready have some (6)
- Bought some at Sam's Club because they were cheaper (2)
- CFL bulbs have mercury in them
- Did not need bulbs; cannot afford CFL's
- Did not receive the coupons (3)
- Do not have light sockets in my apartment to use the CFL Bulbs

- Do not need bulbs yet
- Got same from people helping co-op
- Have not needed to replace any bulbs recently
- I am concerned about the mercury in CFLs and the fact that you cannot dispose of them in the regular trash.
- I had already bought over 20 of them at the dollar store where they were cheaper without the coupon you sent out
- Junk mail is Junk mail
- Just did not need them before they expire
- Lamp shades do not fit
- Takes more time to fully light. Not as bright
- They expired
- Too costly and already had some on hand
- Unsightly
- We do not usually buy the bulbs

Over half of non-redeemers stated that the CFL coupons did not increase their awareness of how to save energy using CFLs (60.8%), nor inspired them to purchase CFLs somewhere else without the coupon (78.0%). Unlike for coupon redeemers, the CFL coupon itself is not a strong factor in these non-redeemers' decisions to purchase CFLs with or without the Duke Energy coupon. Of those who did purchase bulbs elsewhere, most non-redeemers purchased 1, 2, or more than 6 bulbs (66.6%).

	Yes	No	Somewhat aware	Total
Did receiving the Compact Fluorescent Light bulb coupons increase your awareness of how you could save energy by using compact fluorescent light bulbs?	13	31	7	51
	25.5%	60.8%	13.7%	100.0%

	No	Yes	Total
Did the Compact Fluorescent Light bulb coupons inspire you to purchase compact fluorescent light bulbs without using the Duke Energy coupons?	39	11	50
	78.0%	22.0%	100.0%

	1	2	3	4	5	6	more than 6	Total
If "Yes", how many CFLs did you purchase without the coupons?	2	2	1	1	0	1	2	9
	22.2 %	22.2 %	11.1 %	11.1 %	0%	11.1 %	22.2%	100.0 %

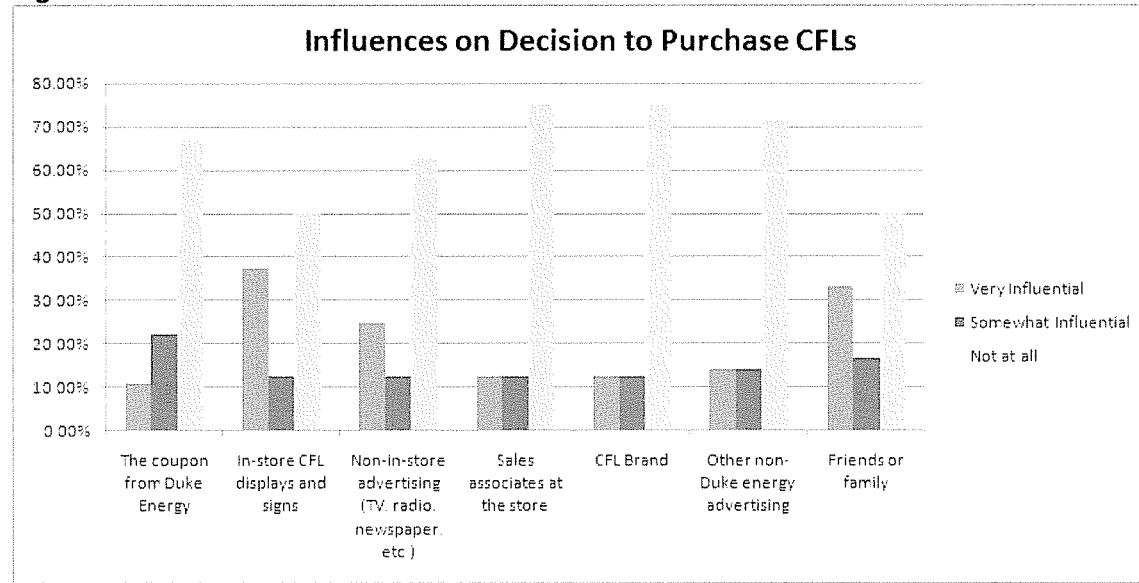
Of the non-redeemers who stated they purchased CFLs without the coupons, most non-redeemers were not influenced by any of the factors listed below. Some non-redeemers were

very influenced by friends and family (33.3%), in store CFL displays (37.5%), and other advertising (25.0%). Non-redeemers who purchased CFLs without the Duke Energy coupons shopped at several stores, including Home Depot, Kroger, Sam's Club, and Walmart.

How influential were the following in your decision to purchase CFL(s) without the coupons?

	Very Influential	Somewhat Influential	Not at all	Total
The coupon from Duke Energy	1	2	6	9
	11.1%	22.2%	66.7%	100.0%
In-store CFL displays and signs	3	1	4	8
	37.5%	12.5%	50.0%	100.0%
Non-in-store advertising (TV, radio, newspaper, etc.)	2	1	5	8
	25.0%	12.5%	62.5%	100.0%
Sales associates at the store	1	1	6	8
	12.5%	12.5%	75.0%	100.0%
CFL Brand	1	1	6	8
	12.5%	12.5%	75.0%	100.0%
Other non-Duke energy advertising	1	1	5	7
	14.3%	14.3%	71.4%	100.0%
Friends or family	4	2	6	12
	33.3%	16.7%	50.0%	100.0%

**Figure 3. Influences on Decision to Purchase CFLs - Non Redeemers**



	Home Depot	Kroger	Sam's Club	Walmart	Total
At which store did you purchase your CFL	3	2	2	1	8
	37.50%	25.00%	25.00%	12.50%	100.00%

bulbs?						
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Unlike the CFL coupon redeemers, coupon non-redeemers did not purchase any of the additional items listed below when they purchased their CFLs. This may suggest that non-redeemers who purchased CFLs without coupons already have these additional items installed in their home. Other reasons may include that non-redeemers purchasing CFLs on their own already have these additional items installed in their home, or non-redeemers are making a shopping trip specifically to purchase CFLs.

Since, unlike coupon non-redeemers, coupon redeemers did purchase additional items at the same time they purchased their CFLs, it is possible that coupon redeemers were inspired by the Duke Energy coupons to adopt CFLs, as well as to purchase additional energy saving items for their home. (See the earlier discussion of the coupon redeemer survey for a description of the items purchased by coupon redeemers.)

Did you purchase any of the following items at the same time you purchased the CFLs?

Mark all that apply.

Wall or insulation	0	0%
Faucet aerators	0	0%
Low flow showerhead	0	0%
Weatherstripping	0	0%
Caulking	0	0%
Electric wall outlet	0	0%
Gaskets		
Programmable thermostat	0	0%
None of these	10	100%
Total	10	100%

One quarter of coupon non-redeemers stated they have 0 CFLs installed in their home. Of those who do have CFLs in their house, over 25% of non-redeemers stated they have 7 or more CFLs installed in their home. These installation rates reflect non-redeemers earlier statements that they did not purchase CFLs using the Duke Energy coupons because they already had purchased bulbs and/or did not need any new ones before the coupons expired. This data also suggests that typical non-redeeming customers may not be purchasing bulbs to store away for future use, and are using all or most of the bulbs that they purchase.

	0	1	2	3	4	5	6	7-11	12+	Total
How many CFLs are currently	14	3	6	4	7	3	3	9	6	55

installed in light sockets in your home?	25.5%	5.5%	10.9%	7.3%	12.7%	5.5%	5.5%	16.4%	10.9%	100.0%
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Most non-redeemers stated they had been using CFL bulbs for 1-2 years (30.9%). Some non-redeemers have been using CFLs for 4 or more years, but a majority of non-redeemers have been using CFLs for two years or less. Non-redeemers who have purchased CFLs are satisfied or very satisfied with the CFLs they purchased.

	Never purchased	1 Year or less	1-2 Years	2-3 Years	3-4 Years	4 or more years	Total
How long have you been using CFL light bulbs?	13	13	17	7	3	2	55
	23.6%	23.6%	30.9%	12.7%	5.5%	3.6%	100.0%

	Very Satisfied	Somewhat Satisfied	Not at all	Total
If you have purchased CFLs, overall, how satisfied are you with the CFLs you purchased?	17	19	6	42
	40.5%	45.2%	14.3%	100.0%

## ENERGY STAR Awareness

Most non-redeemers stated that they do not use the Duke Energy website (69.6%). Almost three quarters of non-redeemers (71.4%) have not added any electrical appliances to their homes. Nearly all responding non-redeemers state that they are aware of ENERGY STAR (80.4%), and over half of non-redeemers look for the ENERGY STAR label when purchasing an appliance (64.8%).

	Often	Sometimes	Never	Total
Do you use the Duke Energy Website?	4	13	39	56
	7.1%	23.2%	69.6%	100.0%

	Yes	No	Total
Have you added any major electrical appliances to your home in the past year?	16	40	56
	28.6%	71.4%	100.0%

	Yes	No	Total
Are you aware of the ENERGY STAR label?	45	11	56

	80.4%	19.6%	100.0%
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	Yes	No	Total
Do you typically look for the ENERGY STAR label when purchasing an appliance?	35	19	54
	64.8%	35.2%	100.0%

	Yes	Some of the time	Never	Total
Do you typically buy appliances with the ENERGY STAR label?	26	20	7	53
	49.1%	37.7%	13.2%	100.0%

## Future CFL Purchases

Non-redeemers were asked to describe how they would make CFL purchases in the future, given that CFLs were a certain price compared to a standard light bulb. At the same price as a standard bulb, most non-redeemers would either purchase six, or 12 or more CFLs. At a price of \$1.00 more than a standard CFL, a majority of non-redeemers would still purchase CFLs, although they would purchase fewer bulbs overall. Once the price of the bulb rises above the cost of a standard bulb by \$2.00 or more, the majority of non-redeemers would purchase 0 CFLs.

Interestingly, if a CFL was free, but you had to mail in a rebate form to receive a refund, more non-redeemers would purchase no CFLs than would if the CFL was the same price as a standard bulb. However, more non-redeemers would purchase 12 or more CFLs if they were free, than would if they were the same price as a standard bulb. These two results suggest that having to initially pay for a free CFL bulb is a hassle and deterrent to CFL purchases for some non-redeemers, but an ultimately free bulb is an encouragement for other non-redeemers to purchase more CFLs.

Considering future CFL purchases, how many CFL bulbs would you purchase in the next year if they were...

		0	1-2	3	4	5	6	7-11	12+	Total
...the same price as a standard bulb?	Count	8	3	2	5	4	10	9	10	51
	%	15.7%	5.9%	3.9%	9.8%	7.8%	19.6%	17.6%	19.6%	100.0%
...\$1.00 more than standard bulbs?	Count	18	3	2	6	6	7	7	3	52
	%	34.6%	5.8%	3.8%	11.5%	11.5%	13.5%	13.5%	5.8%	100.0%
...\$2.00 more than standard bulbs?	Count	26	7	1	9	2	4	2	2	53
	%	49.1%	13.2%	1.9%	17.0%	3.8%	7.5%	3.8%	3.8%	100.0%
...\$3.00 more than standard bulbs?	Count	36	4	2	1	4	2	1	2	52
	%	69.2%	7.7%	3.8%	1.9%	7.7%	3.8%	1.9%	3.8%	100.0%
...free but you had to	Count	13	5	2	5	1	7	7	11	51

mail in a rebate form to get your money back?	%	25.5%	9.8%	3.9%	9.8%	2.0%	13.7%	13.7%	21.6%	100.0%
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## Impact Evaluation

The savings presented in this section were calculated using survey data from participants in the 2009 CFL campaigns. Customers provided data describing their installation of the CFL bulbs purchased with Duke Energy coupons. This data was supplemented with lighting logger data collected from participants' homes during the months of August 2009. The hourly use from the logger data was adjusted to reflect yearly averages using the day-length algorithm developed via a larger logger study conducted in California that documented the monthly change in lighting usage due to seasonal variances in day length. These two data sets were combined to calculate the per-bulb savings for this program to include the day-length adjustment to logged hours of use.

### Self Reported CFL Data

Customers who returned surveys indicating their participation in the CFL program (some of whom also participated in the lighting logger study) were asked to indicate where the CFL bulbs they purchased were installed, what wattage of bulb the CFLs replaced, and approximately how many hours the bulbs were used each day. 3 below presents the responses from the 200 survey responses obtained from those that redeemed the CFL coupons.

**Table 4. CFL Redeemer Survey: Self Reported Location of Purchased Bulbs, n=200**

	Number of Replacements by Room	Percent of Respondents Replacing at Least One Bulb in This Room	Average Wattage of Bulb Replaced	Average Self Reported Hours Bulb Used
Living Room	184	40.00%	50.65	3.62
Bedroom	164	36.00%	48.71	2.13
Kitchen	115	26.00%	47.83	4.73
Other	83	27.50%	52.94	2.31
Basement	79	18.00%	62.99	3.16
Bathroom	74	16.00%	45.01	2.27
Hallway	51	15.00%	51.08	2.36
Dining Room	31	7.50%	60.40	1.76
Garage	19	6.00%	70.37	1.29
Office	17	5.50%	47.94	3.29
Laundry Room	12	5.50%	56.67	3.98
Den	12	5.00%	66.25	4.00
Entryway	9	2.00%	60.00	1.17
Stairway	3	1.00%	60.00	3.50
Foyer	2	1.00%	30.00	3.50

### Lighting Logger Study

In conjunction with the surveys, a lighting logger study was performed with a subset of customers who returned the CFL redeemer survey. The purpose of this logger study was to determine how customers who redeem Duke Energy coupons are using CFL bulbs (i.e., what

room or fixture are the bulbs installed in), as well as to determine the actual hours of use of these CFL bulbs. Customers who indicated on their survey that they were interested in participating in the lighting logger study were contacted by an outside market research firm to determine the customers' interest and availability to participate in the study. Duke Energy field technicians then set up appointments with the customer to install the lighting loggers.<sup>8</sup> The loggers remained in place for approximately three weeks during the month of August, and then were removed by the field technicians at follow up appointments. Customers received a \$50 incentive for participating in the study. In total, 212 lighting loggers were installed in 58 homes.

### CFL Placement and Wattage of Bulbs Replaced

As described in Table 4, about half of bulbs logged were GE brand (43.90%). Just over one third (34.10%) of the bulbs logged were in table lamps, with about one quarter of bulbs (26.50%) installed in a ceiling fixture. Over half of bulbs were 13 watts (54.00%) and nearly all the bulbs logged were CFLs. The most frequent locations for logged bulbs were the bedroom, kitchen, living room, bathroom, and dining room.

<sup>8</sup> The technicians were identified as Duke Energy representatives by their Duke Energy badges, Duke Energy clothing, and the Duke Energy magnets on their vehicles. All field technicians received proper employment screening prior to conducting this field work.

**Table 5. Brand, Wattage, Bulb Type, Fixture Type, and Room of Logged Bulbs**

Brand	Count	%
GE	104	49.30%
Bright Effects	49	23.20%
Commercial Electric	11	5.20%
Sylvania	9	4.30%
Hg	6	2.80%
Lights of America	5	2.40%
Ecosmart	3	1.40%
Feit Electric	3	1.40%
Invision	3	1.40%
N:Vision	3	1.40%
Other	3	1.40%
Conserv Energy	2	0.90%
Marathon	2	0.90%
Niagara	2	0.90%
Phillips	2	0.90%
Great Value	1	0.50%
Helius	1	0.50%
LKM514	1	0.50%
Meijer	1	0.50%

Wattage	Count	%
13	114	54.00%
20	25	11.80%
23	20	9.50%
14	15	7.10%
26	12	5.70%
9	5	2.40%
15	5	2.40%
25	5	2.40%
10	2	0.90%
30	2	0.90%
60	2	0.90%
5	1	0.50%
12	1	0.50%
19	1	0.50%
22	1	0.50%

Bulb Type	Count	%
CFL	209	99.10%
Incandescent	2	0.90%

Fixture Type	Count	%
Table Lamp	72	34.10%
Ceiling	56	26.50%
Ceiling Fan	33	15.60%
Floor Lamp	22	10.40%
Wall	21	10.00%
Can Light	3	1.40%
Hood Light	3	1.40%
Lamp	1	0.50%

Room	Count	%
Bedroom	53	25.12%
Living Room	39	18.48%
Kitchen	27	12.80%
Bathroom	18	8.53%
Dining Room	18	8.53%
Basement	17	8.06%
Hallway	15	7.11%
Family Room	9	4.27%
Entryway	5	2.37%
Other	3	1.42%
Garage	2	0.95%
Office	2	0.95%
Den	1	0.47%
Laundry Room	1	0.47%
Stairway	1	0.47%

Comparing customers' self reported hours of operation to the actual hours of operation shows that on average, customers responding to the survey overestimated their lighting usage by about 40%.<sup>9</sup>

**Table 6. Self Reported and Actual Hours of Use**

Room	Hours of Use		Difference (Self Rep - Actual)	% 28.96% 183.43% 19.56% 538.98% -24.06% -39.14% 27.80% -26.68% 51.80% 3.02% 17.91% 4.23% 8.53% -0.98% -0.46% 0.70% -1.80% 7.86% 0.73% -1.34% 2.43%	Weight (from # of self reports) 0.10422164 0.09762533 0.21635884 0.01583113 0.04089710 0.01187335 0.02506596 0.06728232 0.15171504 0.24274406 0.02242744 0.00395778	Weighted Percentages 3.02% 17.91% 4.23% 8.53% -0.98% -0.46% 0.70% -1.80% 7.86% 0.73% -1.34% 2.43%
	Self Reported	Actual				
Basement	3.157	2.448	0.709	28.96%	0.10422164	3.02%
Bathroom	2.270	0.801	1.469	183.43%	0.09762533	17.91%
Bedroom	2.134	1.785	0.349	19.56%	0.21635884	4.23%
Den	4.000	0.626	3.374	538.98%	0.01583113	8.53%
Dining Room	1.760	2.318	-0.558	-24.06%	0.04089710	-0.98%
Entryway	1.167	1.917	-0.750	-39.14%	0.01187335	-0.46%
Garage	1.289	1.009	0.280	27.80%	0.02506596	0.70%
Hallway	2.358	3.216	-0.858	-26.68%	0.06728232	-1.80%
Kitchen	4.735	3.119	1.616	51.80%	0.15171504	7.86%
Living Room	3.622	3.516	0.106	3.02%	0.24274406	0.73%
Office	3.294	8.220	-4.926	-59.93%	0.02242744	-1.34%
Stairway	3.500	0.491	3.009	612.83%	0.00395778	2.43%
			Average	109.71%	Weighted Average	40.82%

### Daylength Adjustments

The frequency and length of time a customer uses their CFL is affected by daylength. As days become longer and shorter throughout the year, the length of time a bulb needs to be used increases and decreases in rooms where natural lighting is used to offset CFL use. Depending on which time of the year lighting usage is measured, the amount of use recorded by the lighting loggers may over or under predict a customer's overall usage for the year. The amount of daylight during any given season is a factor of the position of the sun which determines the sunrise and sunset time and the number of hours of daylight. The increase and decrease in hours of daylight experienced throughout the year can be expressed as a sine function, and the average over or under prediction in hours of use as a result of increased or decreased daylight can be calculated using the following equation<sup>10</sup>.

$$\text{Equation 1: Hours/day} = \text{hours/day}_{\text{average}} + \text{Max deviation} * \sin(\theta_d)$$

<sup>9</sup> "Other" category was not included in comparison. Rooms labeled "other" in lighting logger study were not directly comparable to rooms labeled "other" in self reported survey results.

<sup>10</sup> The Cadmus Group. "Upstream Lighting Program Evaluation Report. Prepared for CPUC." November 16, 2009. Pg. 16.

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

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

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

The Cadmus regression model predicted the annual average hours of use and the maximum deviation. The ratio of the maximum deviation to the annual average represents a the maximum percent difference in the daily hours of use relative to the annual average. The equation above can be used to predict the percent over or under estimation of lighting hours at any particular day of the year. This is the daylength adjustment factor. The Cadmus data are summarized in the Table below:

Logger wave	Daytype	Average Hours / day	Maximum deviation (hr)	% deviation
1	WD	1.73	0.35	20.2%
	WE	1.74	0.31	17.8%
2	WD	1.6	0.23	14.4%
	WE	1.6	0.26	16.3%
3	WD	1.89	0.25	13.2%
	WE	1.86	0.27	14.5%
Average		1.74	0.28	16.1%

Thus, the predicted maximum deviation from the annual average hours of use from the Cadmus study is on the order of  $\pm 16\%$ .

To calculate the daylength adjustment factor for this lighting logger study, equation 2 was evaluated at the median date of the lighting logger study (August 15). This value was applied to the max deviation above to estimate the daylight adjustment factor.

Finally, the ratio of Equation 1 calculated for the date of the lighting logger study and the date of the nearest equinox is the percent over or under estimation of annual hours of use for the lighting logger study.

Based on the dates of the lighting logger study, the hours of use captured by the lighting logger study under predict actual hours of use per day for the year by approximately 9.1%. The data for these calculations for this study are shown in Table 6.

**Table 7. Daylength Adjustment Calculation**

Date	n	$\text{Sin}(\theta_d)$	Max adjustment	August adjustment
15-Aug	277	0.59	16%	9.5%

The daylength adjusted average actual hours of use by room from the lighting logger study are shown below.

**Table 8. Average Actual Hours of Use by Room – Daylength Adjusted**

Basement	2.68
Bathroom	0.88
Bedroom	1.95
Den	0.69
Dining Room	2.54
Entryway	2.10
Garage	1.10
Hallway	3.52
Kitchen	3.42
Living Room	3.85
Office	9.00
Stairway	0.54

Comparing customers' self reported hours of use to the daylength adjusted actual hours of use shows that customers are overestimating their hours of use by 28% (Table 8). This is 12% less than the original calculation in Table 5., meaning after customers' actual hours of use are daylength adjusted, customers estimates are closer to their actual hours of use, but still overestimate their actual hours of use. The downward adjustment of 28.6% is applied to customers' self reported hours of use to calculate savings.

**Table 9. Ratio (Actual/Self Reported HOU) – Daylength Adjusted**

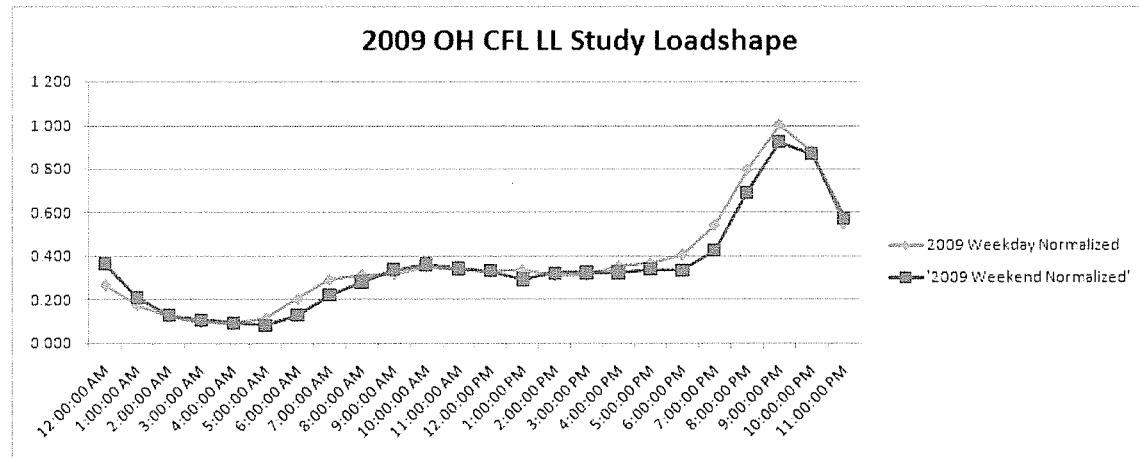
Room	Hours of Use		Difference (Self Rep - Actual)	% 17.77% 158.84% 9.19% 483.54% -30.65% -44.42% 16.71% -33.04% 38.63% -5.92% -63.40%	Weight (from # of self reports) 0.104222 0.097625 0.216359 0.015831 0.040897 0.011873 0.025066 0.067282 0.151715 0.242744 0.022427	Weighted Percentages 1.85% 15.51% 1.99% 7.66% -1.25% -0.53% 0.42% -2.22% 5.86% -1.44% -1.42%
	Self Reported	Actual Daylength Adjusted				
Basement	3.157	2.681	0.476	17.77%	0.104222	1.85%
Bathroom	2.270	0.877	1.393	158.84%	0.097625	15.51%
Bedroom	2.134	1.955	0.180	9.19%	0.216359	1.99%
Den	4.000	0.685	3.315	483.54%	0.015831	7.66%
Dining Room	1.760	2.538	-0.778	-30.65%	0.040897	-1.25%
Entryway	1.167	2.099	-0.932	-44.42%	0.011873	-0.53%
Garage	1.289	1.105	0.185	16.71%	0.025066	0.42%
Hallway	2.358	3.522	-1.164	-33.04%	0.067282	-2.22%
Kitchen	4.735	3.415	1.319	38.63%	0.151715	5.86%
Living Room	3.622	3.850	-0.228	-5.92%	0.242744	-1.44%
Office	3.294	9.001	-5.707	-63.40%	0.022427	-1.42%

Stairway	3.500	0.538	2.962	550.99%	0.003958	2.18%
Average			Weighted Average		28.60%	

## Loadshape

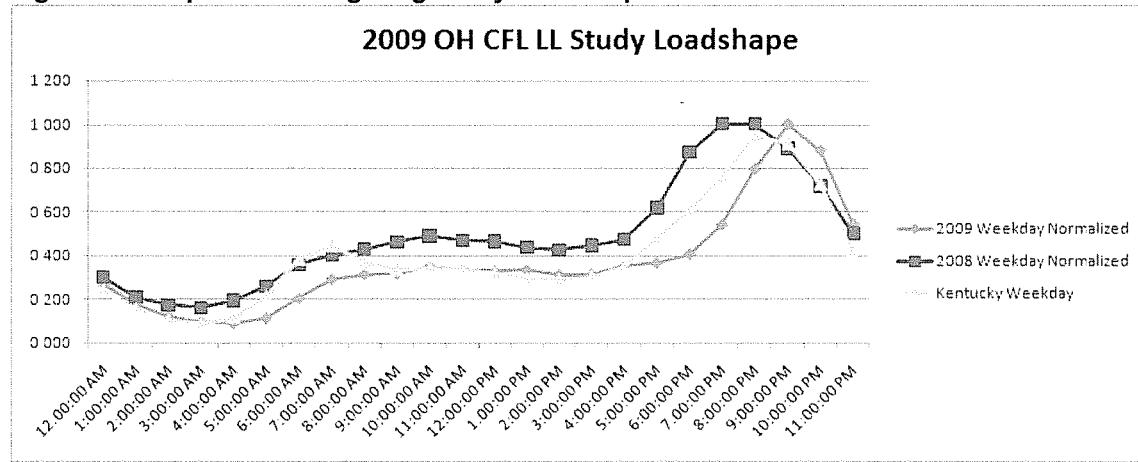
The customers' loadshape from August of 2009 is shown in Figure 5 below. The weekday and weekend hours of use are normalized to the highest weekday value. As the shape demonstrates, customers' lighting usage is at its peak around 8 or 9pm.

**Figure 4. 2009 CFL Loadshape**



Comparing the loads hape from this study with other Duke

Energy Midwest lighting study loadshapes shows a pattern in lighting usage throughout the season. The 2008 lighting logger study was performed in February of 2008, while the Kentucky lighting logger study was performed in October of 2009 (report forthcoming). Customers' lighting usage patterns shift depending on the time of day and season, while their overall lighting usage pattern remains the same. Customers' operating hours also increase depending on the season; average operating hours in the 2008 study were 3.5 hours per day, while average operating hours in the 2009 study were 2.4 hours per day. This is also reflected by the difference in the area under the curve of the loadshape.

**Figure 5. Comparison of Lighting Study Loadshapes**

The hours of use of CFLs are also affected by the amount

nt customers use the fixtures where the CFLs are installed. As high use fixtures such as fixtures in living rooms or kitchens become saturated with CFLs, customers will move to installing CFLs in lower use fixtures such as those in closets or hallways, resulting in a decrease in the average hours of use of CFLs. Comparing the 2008 CFL survey results to the 2009 survey results, the percent of respondents installing at least one fixture in high use fixtures/rooms has decreased, and in many cases, the percent of customers installing CFLs in lower use fixtures has increased.

**Table 10. Percent of Respondents Installing Bulbs in This Room**

<b>Basement</b>	15.60%	18.00%	2.40%
<b>Bathroom</b>	25.20%	16.00%	-9.20%
<b>Bedroom</b>	44.90%	36.00%	-8.90%
<b>Closet</b>	1.20%	3.50%	2.30%
<b>Dining Room</b>	11.10%	7.50%	-3.60%
<b>Garage</b>	3.90%	6.00%	2.10%
<b>Hallway</b>	9.60%	15.00%	5.40%
<b>Kitchen</b>	31.70%	26.00%	-5.70%
<b>Living Room</b>	65.90%	40.00%	-25.90%
<b>Office</b>	7.40%	5.50%	-1.90%
<b>Outdoor</b>	9.90%	6.50%	-3.40%
<b>Utility Room</b>	2.40%	1.00%	-1.40%

## Free Riders and Free Drivers

Based on survey responses, 40.74% of purchases made by those participating in the CFL survey were due to free riders, which are people that intended to purchase CFLs before learning of the program, so they took the “free ride” by using the coupons and saving money, while 25.56% of purchases were made due to free drivers: purchases made beyond initial plans.

## Program Savings

The total gross savings from these surveys are 29,068 kWh/year. After adjusting for freeridership and free drivers (spillover), the total net savings are 24,657 kWh/year. The findings are described below. This results in an average savings for the program of 44.75 kwh per bulb.

**Table 11. Program Savings**

Metric	Result
Number of Bulbs	561
Gross kW per bulb	0.06 kw
Gross kWh per bulb	52.76 kwh
Gross therms per bulb	N/A
Freeridership rate	40.74%
Spillover rate	25.56%
Self Selection and False Response rate	N/A
Total Discounting to be applied to Gross values	15.18%
<b>Net kW per bulb</b>	<b>0.04 kW</b>
<b>Net kWh per bulb</b>	<b>44.75kWh</b>
Net therms per participant	N/A
Measure Life	5 years
Effective useful life net savings per bulb	223.75kWh

## Home Profile Questions

Customers who returned CFL Coupon Redeemer and Non Redeemer surveys were asked to fill out some demographic questions, called “home profile” questions. Overall, the demographics of coupon redeemers and non redeemers were similar. Additional discussion of comparable questions can be found in the “Comparison of Survey Results” section of the report.

How would you best describe the type of home in which you live?

	Redeemers		Non Redeemers	
Detached single family	154	86.00%	39	67.20%
Apartment	1	0.60%	2	3.40%
Townhouse	5	2.80%	8	13.80%
Manufactured	4	2.20%	2	3.40%
Condominium	9	5.00%	5	8.60%
Multi-family	2	1.10%	2	3.40%
Duplex/two family	4	2.20%	0	0.00%
Total	179	100.00%	58	100.00%

In what year was your home built?

	1959 or before	1960-1979	1980-1989	1990-1997	1998-2000	2001-2007	2008 or later	Total
Redeemers	59	59	26	19	10	7	1	181
	32.6%	32.6%	14.4%	10.5%	5.5%	3.9%	.6%	100.0%
Non Redeemers	23	19	7	3	1	5	0	58
	39.7%	32.8%	12.1%	5.2%	1.7%	8.6%	.0%	100.0%

What is the approximate square footage (heated area) of your home?

	Redeemers		Non Redeemers	
Less than 500	1	0.60%	1	1.90%
500 – 999	8	4.70%	4	7.40%
1000 – 1499	41	24.00%	10	18.50%
1500 – 1999	30	17.50%	7	13.00%
2000 – 2499	32	18.70%	7	13.00%
2500 – 2999	24	14.00%	5	9.30%
3000 – 3499	14	8.20%	4	7.40%
3500 – 3999	0	0.00%	1	1.90%
4000 - or more	1	0.60%	2	3.70%

Don't know	20	11.70%	13	24.10%
Total	171	100.00%	54	100.00%

What range best describes your total annual household income?

	Redeemers		Non Redeemers	
Less than \$25,000	23	13.50%	6	10.50%
\$25,000 - \$49,999	36	21.20%	16	28.10%
\$50,000 – \$74,999	21	12.40%	4	7.00%
\$75,000 – \$100,000	20	11.80%	4	7.00%
Over \$100,000	29	17.10%	8	14.00%
Don't know	1	0.60%	1	1.80%
Prefer not to answer	40	23.50%	18	31.60%
Total	170	100.00%	57	100.00%

How many people live in your home?

	1	2	3	4	5	6	7	8 or more	Total
Redeemers	42	90	19	16	10	0	0	0	177
	23.7%	50.8%	10.7%	9.0%	5.6%	.0%	.0%	.0%	100.0%
Non Redeemers	17	24	8	3	3	3	0	0	58
	29.3%	41.4%	13.8%	5.2%	5.2%	5.2%	.0%	.0%	100.0%

Do you own or rent your home?

	Own	Rent	Total
Redeemers	169	10	179
	94.4%	5.6%	100.0%
Non Redeemers	51	8	59
	86.4%	13.6%	100.0%

Primary heating fuel?

	Electric	Gas	Oil	Propane	Other	None	Total
Redeemers	38	107	13	5	3	0	166

	22.9%	64.5%	7.8%	3.0%	1.8%	.0%	100.0%
Non Redeemers	13	38	3	0	0	0	54
	24.1%	70.4%	5.6%	.0%	.0%	.0%	100.0%

Type of heating system?

	Redeemers		Non Redeemers	
Central Furnace	127	77.90%	44	78.6%
Electric baseboard	4	2.50%	5	8.9%
Heat pump	24	14.70%	5	8.9%
Geothermal Heat pump	1	0.60%	0	0.0%
Hot water steam boiler	6	3.70%	2	3.6%
Other	1	0.60%	0	0.0%
Do not have	0	0.00%	0	0.0%
Total	163	100.00%	56	100.0%

Age of heating system in years?

	0-4	5-9	10-14	15-19	> 19	Don't know	Do not have	Total
Redeemers	32	47	35	17	27	10	0	168
	19.0%	28.0%	20.8%	10.1%	16.1%	6.0%	.0%	100.0%
Non Redeemers	17	14	7	4	10	8	0	60
	28.3%	23.3%	11.7%	6.7%	16.7%	13.3%	.0%	100.0%

Primary cooling fuel?

	Electric	Gas	oil	Propane	Other	None	Total
Redeemers	151	6	2	0	0	3	162
	93.2%	3.7%	1.2%	.0%	.0%	1.9%	100.0%
Non Redeemers	52	5	1	0	0	0	58
	89.7%	8.6%	1.7%	.0%	.0%	.0%	100.0%

Type of cooling system?

	Central air	Window / room unit	Heat pump	Geo thermal heat pump	Other	No cooling system	Total
Redeemers	130	12	22	0	0	3	167
	77.8%	7.2%	13.2%	.0%	.0%	1.8%	100.0%
Non Redeemers	46	8	6	0	0	0	60
	76.7%	13.3%	10.0%	.0%	.0%	.0%	100.0%

Age of cooling system in years?

	0-4	5-9	10-14	15-19	> 19	Don't know	Do not have	Total
Redeemers	39	51	33	22	16	5	4	170
	22.9%	30.0%	19.4%	12.9%	9.4%	2.9%	2.4%	100.0%
Non Redeemers	20	17	5	6	7	4	1	60
	33.3%	28.3%	8.3%	10.0%	11.7%	6.7%	1.7%	100.0%

## Comparison of Survey Results

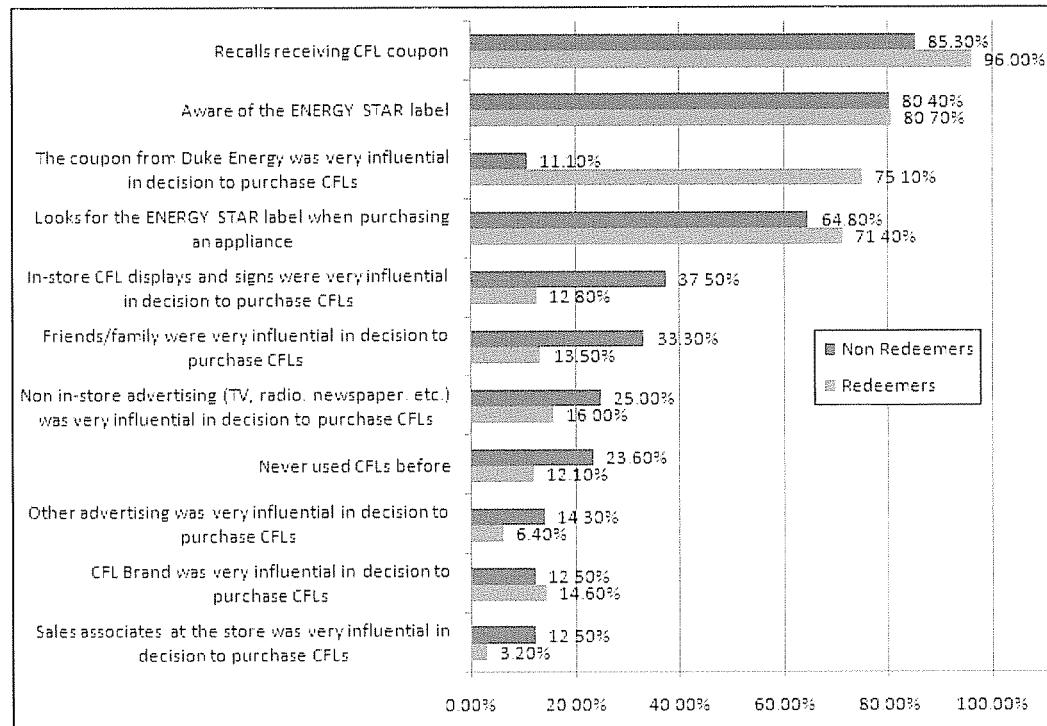
This section of the report presents the results of portions of the surveys that are directly comparable. The following figures show results from those that redeemed CFL coupons and those that did not.

### Promotional Information

The figure below shows the percent of responders that are aware of the ENERGY STAR label, their lack of experience with CFLs, and what promotional materials were very influential in their decision to purchase CFLs.

Unlike in previous Duke Energy CFL program surveys, the non redeemers are not more likely to be aware of the ENERGY STAR label or to look for the ENERGY STAR label when purchasing an appliance than the redeemers. However, non redeemers were more likely to be influenced by advertising, such as in-store displays, friends/family, or other types of advertising, in their decision to purchase CFLs (in this case without using a Duke Energy coupon). This suggests that non redeemers may need additional influence besides the Duke Energy coupon in order to be motivated to purchase CFLs.

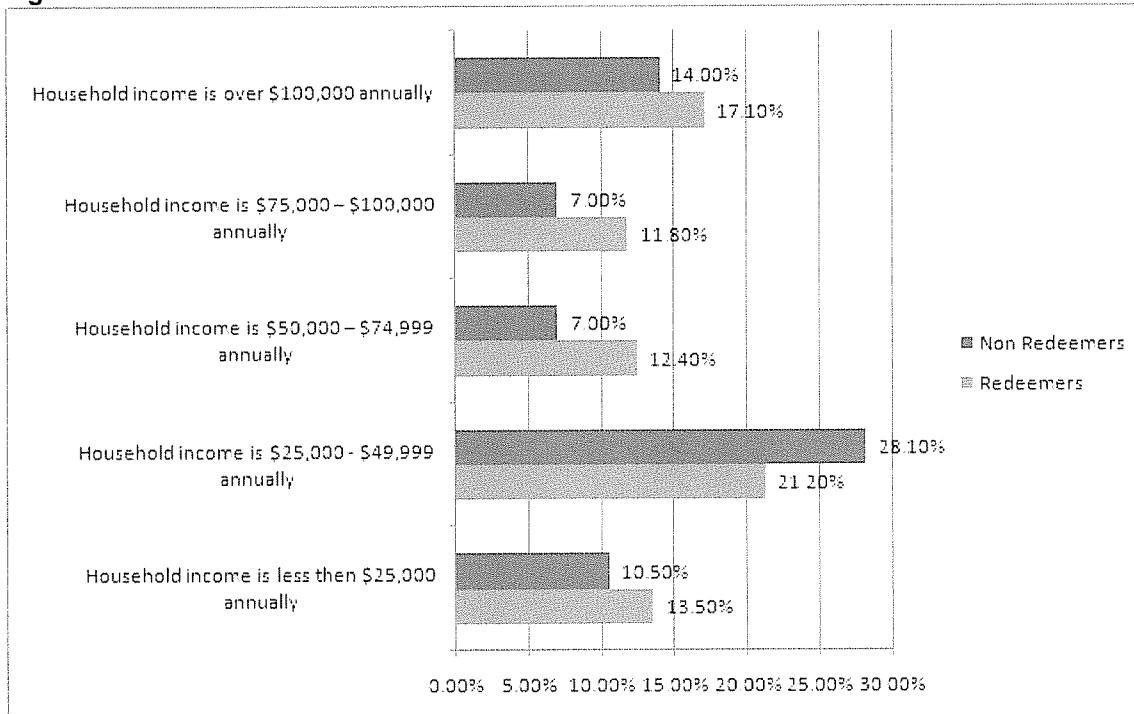
**Figure 6. Redeemers vs. Non Redeemers - Promotional Information**



## Income

Income does not have much of an impact on whether customers redeem Duke Energy coupons, although more redeemers fall into the low and high income ranges than do non redeemers.

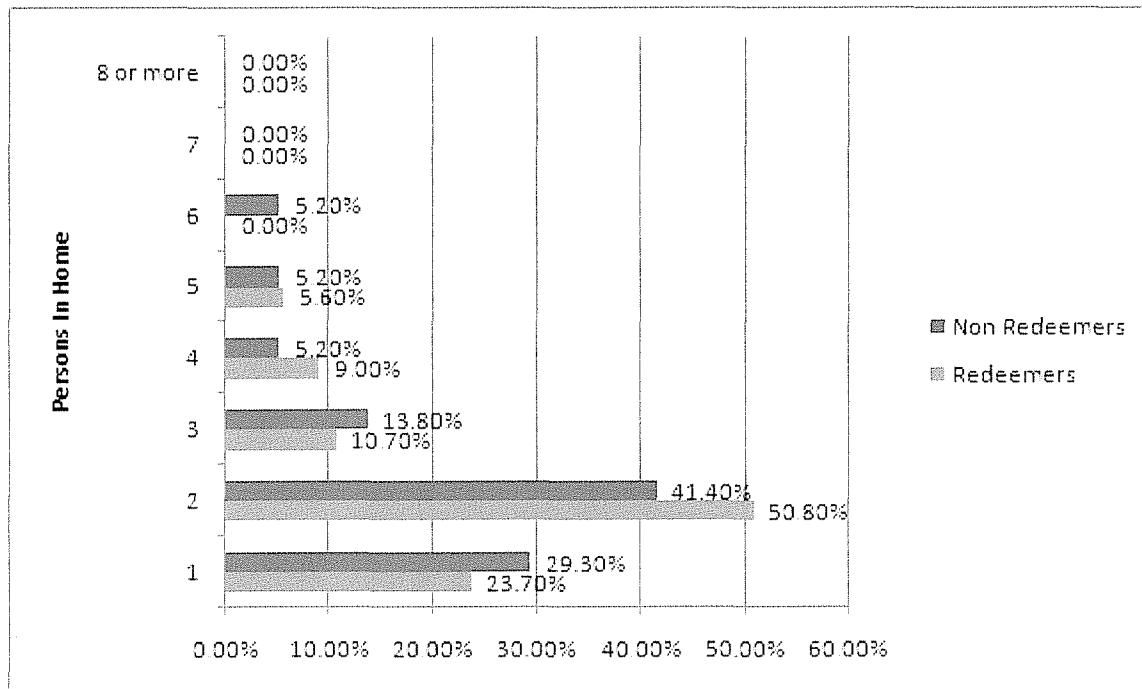
**Figure 7. Redeemers vs. Non Redeemers - Income**



## Number of Occupants

Similarly to previous Duke Energy CFL program surveys, the number of occupants in the home does not distinguish between CFL coupon redeemers and non redeemers.

**Figure 8. Redeemers vs. Non Redeemers - Occupants**



## Comparison of Results Across Other States

Overall, it is very difficult to compare different utilities' CFL programs across the U.S. due to large differences in population density, program types, marketing approaches, delivery methods, reporting formats, and recorded metrics, among other factors. The following is a summary of findings and an attempt to relate those programs with comparable savings figures. The list of utilities and programs used for comparison can be found in Appendix E: Data used for comparison of other states' savings:

There are three separate utilities from California represented in the list in Appendix F. There is a huge disparity in reported savings (from 61,425 to 536,939,370 kWh annually) which is a result of differences in program size. The latter number was reported by PG&E. In 2001, they were able to enlist the help of over 400 different retail locations. All told they gave rebates to about 1.35 million customers for over seven million CFLs for a per-bulb savings of approximately 76 kWh annually. They boast that there were more CFLs sold in California in 2001 than in the entire U.S. in 2000. One major reason that they were able to be so successful is their eligible population of approximately 4.5 million residential and small business customers.

The second most successful program in terms of kWh saved occurred outside the U.S. owing to Ontario Power Authority in Ontario, Canada. They redeemed over 2.7 million CFL coupons and delivered 500,000 CFLs door to door. They reported and verified savings of 132 million kWh through their Every Kilowatt Counts program in 2007 putting their per-bulb savings at 41 kWh. In third place on the list are Nevada Power and Sierra Pacific Power from Nevada. They managed to sell over two million CFLs for a first year savings of 116 million kWh and a per-

bulb savings of 58 kWh through their residential lighting program. In fourth place is the New Jersey Board of Public Utilities, which reported savings of 57,884,000 kWh but did not report the total number of CFLs rebated.

Apart from these giants, there were many other utilities that reported much more attainable kWh savings; all can be seen in Table 1 in descending order. It is by no means an exhaustive list, merely a cross-section. Connecticut and Illinois utilities have programs that reported savings around seven million kWh. Connecticut Municipal Electric Energy Cooperative's program utilized CFL distribution, CFL direct install programs, and CFL school fundraisers while Illinois Department of Commerce and Economic Opportunity was a standard rebate program; they rebated 107,432 bulbs in 2004, the year they reported seven million kWh savings, yielding a per-bulb savings of 65 kWh. The Wisconsin Department of Administration: Division of Energy, through a very similar rebate program, rebated almost the same amount, 105,538 bulbs from 2001 to 2003, but only reported savings of 5,377,372 kWh, or 51 kWh per bulb. AmerenUE reported approximately half of the savings as the Wisconsin program. Likewise, they reported rebating approximately half the number of bulbs: 49,047 bulbs rebated and 2,505,837 kWh saved in 2003, generating the same per-bulb savings of 51 kWh.

**Table 12. Annual kWh savings per program**

Utility	Annual kWh	per-bulb kWh
Pacific Gas & Electric	536,939,370	76
Delta-Montrose Electric Association / Intermountain Energy	219,000	73
Illinois Department of Commerce and Economic Opportunity	7,000,000	65
Nevada Power and Sierra Pacific Power	116,000,000	58
Wisconsin Department of Administration, Division of Energy	5,377,372	51
AmerenUE	2,505,837	51
<b>Duke Energy</b>	<b>29,068</b>	<b>45</b>
Ontario Power Authority	132,000,000	41
Connecticut Municipal Electric Energy Cooperative	7,668,000	32
New Jersey Board of Public Utilities	57,884,000	30

Some reports on market characterization were also looked at. These reports did not mention savings, but rather detailed changes in CFL consumption behaviors and pricing. The Northwest Energy Efficiency Alliance had a program in Idaho, Montana, Oregon, and Washington with the goal of increasing CFL sales in the region from 750K to 1 million annually, reaching total sales of 10.8 million by 2009. They reached their goal three years early, in 2006. They also saw the total 2008 CFL sales reach 24.7 million, a 36% increase from 2007. A different but similar study on CFL availability in the states of Maine, New Hampshire, Rhode Island, and New York, showed the total number of CFLs available shoot up from 31,000 in the spring of 2005 to over 200,000 in the fall of 2006.

The two aforementioned market characterization studies also collected data for and reported on the pricing of CFLs. The first found little to no change in average CFL price from 2006 to 2008

as well as little to no difficulty from suppliers to supply the market. The second observed a decrease in prices over the same time period. A further study was launched in Massachusetts in 2008 to collect data on incandescent bulbs and CFLs, comparing prices and incremental costs. They found that one lumen adds only \$0.002 to the cost of a CFL. The incremental cost of each type of bulb can be seen in Table 2.

**Table 11: Incremental cost per bulb type**

Bulb Type	Incremental Cost
Flood bulb	\$3.15
A-bulb	\$1.74
Bullet bulb	\$2.78
3-way bulb	\$2.76
Bug bulb	\$2.58
Globe bulb	\$2.27
Candelabra Bulb	\$1.54

## Appendix A: CFL Coupon Redeemer Survey



Survey Test  
123456 Does This Layout Work Rd  
Seems Like It Is. OK 55555

Dear Customer

Duke Energy is continuously trying to improve our service for you. To help us improve the Compact Fluorescent Light bulb program, we would like your input. Please let us know what you think about the compact fluorescent light bulbs (CFLs) you purchased through our coupon promotion. Some examples of CFLs are in the pictures below. If you have any questions, please contact Duke Energy at [www.duke-energy.com](http://www.duke-energy.com).



### WE WOULD LIKE YOUR OPINION ABOUT OUR COMPACT FLUORESCENT LIGHT BULB (CFL) COUPON PROGRAM. PLEASE FILL IN THE CIRCLES COMPLETELY USING BLUE OR BLACK INK.

- Do you recall receiving Compact Fluorescent Light bulb (CFL) coupons from Duke Energy?  Yes  No
- Did you give away any of your coupons to someone else to use?  Yes  No
- Did you use at least one coupon yourself?  Yes - Continue this survey  No - Thank you! Please return survey.

#### How influential were the following in your decision to purchase CFL(s)?

	Very Influential	Somewhat Influential	Not at all Influential
The coupon from Duke Energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-store CFL displays and signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-in-store advertising (TV, radio, newspaper, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sales associates at the store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CFL Brand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other advertising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends or family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

At which store did you purchase your CFL bulbs using the Duke Energy coupon? \_\_\_\_\_

Did you purchase any of the following items at the same time you purchased the CFLs with the Duke Energy coupon? (Mark all that apply)

- Wall or ceiling insulation  Faucet aerators  Low flow showerhead  Weatherstripping  
 Caulking  Electric wall outlet gadgets  Programmable thermostat  None of these

#### In this section of the survey, we would like to understand how you have used the CFL packs you purchased with the coupon(s).

How many CFL bulbs did you purchase in TOTAL with the Duke Energy coupon(s)?

0	1	2	3	4	5	6	7-11	12+
<input type="checkbox"/>								

How many CFL bulbs would you have bought if you had not had the Duke Energy coupon(s)?

0	1	2	3	4	5	6	7-11	12+
<input type="checkbox"/>								

How many CFL bulbs have you since purchased without Duke Energy coupon(s)?

0	1	2	3	4	5	6	7-11	12+
<input type="checkbox"/>								

#### Of the CFLs you bought with the Duke Energy coupon:

0	1	2	3	4	5	6	7-11	12+
<input type="checkbox"/>								

How many CFLs are now installed?

0	1	2	3	4	5	6	7-11	12+
<input type="checkbox"/>								

For each CFL purchased with coupons that is now installed, please write in WHERE each CFL was installed, WHAT wattage the CFL is, WHAT wattage the old bulb was, and on average, HOW MANY HOURS you use that light each day.

WHERE CFL INSTALLED	CFL WATTAGE	OLD BULB WATTAGE	HOW MUCH LIGHT IS USED (Hours Each Day)
Example Living Room Floor Lamp	15Watt CFL	60Watt Incandescent	6 Hours Per Day (average)
Example Hallway Ceiling Fixture	15Watt CFL	20Watt CFL	1 Hour Per Day (average)
Bulb 1			
Bulb 2			
Bulb 3			
Bulb 4			
Bulb 5			
Bulb 6			
Bulb 7			
Bulb 8			
Bulb 9			
Bulb 10			
Bulb 11			
Bulb 12			
Bulb 13			
Bulb 14			
Bulb 15			

Have you changed the hours of use of any fixture in which you installed the CFLs?  Yes  No

If you answered yes, how did your average usage change?  Increased usage  Decreased usage

Have you removed any of the CFLs you installed?  Yes  No

If yes, how many did you remove?  1  2  3  4  5  6  7-11  12+

Why did you remove them?

Not bright enough  Did not like the light  Too slow to start  
 Burned out  Not working properly  Other

If other, please specify \_\_\_\_\_

Did you have any CFLs installed in light sockets in your house before you bought the CFL with the Duke Energy coupon?  Yes  No

If yes, about how many were already installed?  1  2  3  4  5  6  7-11  12+

How long have you been using CFL light bulbs?

Never purchased a CFL until now  1 year or less  1 to 2 years  2 to 3 years  
 3 to 4 years  4 or more years

Very Satisfied Somewhat Satisfied Not at all Satisfied

Overall, how satisfied are you with the Duke discounted CFLs?

	Often	Sometimes	Never
Do you use the Duke Energy Website?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have you added any major electrical appliances to your home in the past year?	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are you aware of the ENERGY STAR label?	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do you typically look for the ENERGY STAR label when purchasing an appliance?	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do you typically buy appliances with the ENERGY STAR label? <input type="checkbox"/> Yes <input type="checkbox"/> Some of the time <input type="checkbox"/> Never			

**CFL Purchasing**

Considering future CFL purchases, how many CFL bulbs would you purchase in the next year if...

	0	1-2	3	4	5	6	7-11	12+
They were the same price as a standard bulb?	<input type="checkbox"/>							
They were \$1.00 more than standard bulbs?	<input type="checkbox"/>							
They were \$2.00 more than standard bulbs?	<input type="checkbox"/>							
They were \$3.00 more than standard bulbs?	<input type="checkbox"/>							
They were free but you had to mail in a rebate form to get your money back?	<input type="checkbox"/>							

**General Information About Your Home**

How would you best describe the type of home in which you live?

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Detached single-family | <input type="checkbox"/> Townhouse         | <input type="checkbox"/> Condominium                    | <input type="checkbox"/> Duplex 2-family |
| <input type="checkbox"/> Apartment              | <input type="checkbox"/> Manufactured home | <input type="checkbox"/> Multi-Family (5 or more units) |  |

In what year was your home built?

- |   |                                      |  |                                      |
|---|--------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> 1959 or before | <input type="checkbox"/> 1960 - 1979 | <input type="checkbox"/> 1980 - 1989   | <input type="checkbox"/> 1990 - 1997 |
| <input type="checkbox"/> 1998 - 2003    | <input type="checkbox"/> 2004 - 2007 | <input type="checkbox"/> 2008 or later |                                      |

What is the approximate square footage (heated area) of your home?

- |  |                                      |                                      |                                      |
|--|--------------------------------------|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> Less than 500 | <input type="checkbox"/> 500-999     | <input type="checkbox"/> 1,000-1,499 | <input type="checkbox"/> 1,500-1,999 |
| <input type="checkbox"/> 2,000-2,499   | <input type="checkbox"/> 2,500-2,999 | <input type="checkbox"/> 3,000-3,499 | <input type="checkbox"/> 3,500-3,999 |
| <input type="checkbox"/> 4,000 or more | <input type="checkbox"/> Don't know  |                                      |                                      |

What range best describes your total annual household income?

- |   |   |   |   |
|---|---|---|---|
| <input type="checkbox"/> Less than \$25,000 | <input type="checkbox"/> \$25,000 to \$49,999 | <input type="checkbox"/> \$50,000-\$74,999    | <input type="checkbox"/> \$75,000-\$100,000 |
| <input type="checkbox"/> Over \$100,000     | <input type="checkbox"/> Don't know           | <input type="checkbox"/> Prefer not to answer |   |

How many people live in your home?

- |                            |                            |                            |                            |                            |                            |                            |                                    |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------------------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 or more |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------------------------------------|

Do you own or rent your home?

- |                              |                               |
|------------------------------|-------------------------------|
| <input type="checkbox"/> Own | <input type="checkbox"/> Rent |
|------------------------------|-------------------------------|

Primary heating fuel?  Electric  Gas  Oil  Propane  Other  None

Type of heating system?

Central furnace  Electric baseboard  Heat pump  
 Geo-thermal heat pump  Hot water or steam boiler  Other  Do not have

Age of heating system in years?

0-4  5-9  10-14  
 15-19  19  Don't know  Do not have

Primary cooling fuel?  Electric  Gas  Oil  Propane  Other  None

Type of cooling system?

Central air conditioner  Window Room unit air conditioner  Heat pump (for cooling)  
 Geo-thermal heat pump  Other  No cooling system

Age of cooling system in years?

0-4  5-9  10-14  
 15-19  19  Don't know  Do not have

HAVE A CHANCE TO PARTICIPATE IN THE DUKE ENERGY LIGHTING STUDY

Would you be interested in participating in a lighting study in July and August 2009?

A Duke Energy representative would place small lighting monitors on 4 or 5 light fixtures which would remain in place for 2 to 3 weeks. The monitors are smaller than the size of a bar of soap and help to measure how often lights are turned on and off during the week. The first 100 responses indicating interest will be contacted. Eligible customers that are selected will receive \$50 for participating.

If yes, you may receive a follow-up phone call about this lighting study in July.

Yes, I am interested in participating. My phone number is: \_\_\_\_\_.

My address on the front page of this survey is correct

My address is:

\_\_\_\_\_

No, I am not interested in participating

THANK YOU FOR YOUR RESPONSES

## Appendix B: CFL Coupon Non Redeemer Survey



Survey T\_Est  
123456 Does This Layout Work Rd  
Seems Like It Is. OK 55558

Dear Customer:

Duke Energy is continuously trying to improve our services for you. To help us improve the Compact Fluorescent Light bulb program, we would like your input. Please let us know about your experiences with compact fluorescent light bulbs. Some examples of CFLs are in the pictures below. If you have any questions, please contact Duke Energy at [mrearch.duke-energy.com](http://mrearch.duke-energy.com). Please return this survey by August 14, 2009.

**WE WOULD LIKE YOUR OPINION ABOUT OUR COMPACT FLUORESCENT LIGHT BULB (CFL) COUPON PROGRAM. PLEASE FILL IN THE CIRCLES COMPLETELY USING BLUE OR BLACK INK.**

**Section L** Do you recall receiving a coupon for a compact fluorescent light bulb?

Do you recall receiving Compact Fluorescent Light bulb (CFL) coupon from Duke Energy?  Yes  No

Did you give away any of your coupon to someone else to use?  Yes  No

Did you use at least one coupon yourself?  No - Continue this survey  Yes - Thank you! Please return survey.

Do you recall hearing about Compact Fluorescent Light bulb coupons from Duke Energy?  Yes  No - Skip to section 2

Why did you decide NOT to use these coupons?

Too much hassle  Do not use CFLs  Do not shop at Wal-Mart/Lowe's

Did not understand program  Thought there was a catch  Couldn't be bothered

Don't like CFL bulbs  Other \_\_\_\_\_

Did receiving the Compact Fluorescent Light bulb coupon increase your awareness of how you could save energy by using compact fluorescent light bulbs?

Yes  No - I was aware of the energy savings already

Somewhat, I was already aware, but it did help me understand their benefit better

Did the Compact Fluorescent Light bulb coupons inspire you to purchase compact fluorescent light bulbs without using the Duke Energy coupon?  No - skip to Section 2  Yes - continue

1	2	3	4	5	6	More than 6
---	---	---	---	---	---	-------------

If Yes, How many CFLs did you purchase without the coupon?  1  2  3  4  5  6  7

How influential were the following in your decision to purchase CFLs without the coupon?

Very Influential	Somewhat Influential	Not at all Influential
------------------	----------------------	------------------------

The coupon from Duke Energy

In-store CFL displays and signs

Non-in-store advertising (TV, radio, newspaper, etc.)

Sales associates at the store

CFL Brand

Other non-Duke energy advertising

Friends or family

At which store did you purchase your CFL bulb? \_\_\_\_\_

Did you purchase any of the following items at the same time you purchased the CFL? \*

Mark all that apply:

Wall or ceiling insulation  Faucet aerators  Low-flow showerhead  Weatherstripping

Caulking  Electric wall outlet gaskets  Programmable thermostat  None of these

**Section II.**

In this section of the survey, we would like to understand how you use CFLs and other energy efficient appliances.

How many CFLs are currently installed in light sockets in your home?  0  1  2  3  4  5  6  7-11  12+

How long have you been using CFL light bulbs?

- Never purchased a CFL  1 year or less  1 to 2 years  2 to 3 years  
 3 to 4 years  4 or more years

If you have purchased CFLs, overall, how satisfied are you with the CFLs you have purchased?

Very Satisfied  Somewhat Satisfied  Not at all Satisfied

Do you use the Duke Energy Website?  Often  Sometimes  Never

Have you added any major electrical appliances to your home in the past year?  Yes  No

Are you aware of the ENERGY STAR label?  Yes  No

Do you typically look for the ENERGY STAR label when purchasing an appliance?  Yes  No

Do you typically buy appliances with the ENERGY STAR label?  Yes  Some of the time  Never

**CFL Purchasing**

Considering future CFL purchases, how many CFL bulbs would you purchase in the next year if...

- |   |                       |                       |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 0   | 1-2                   | 3                     | 4                     | 5                     | 6                     | 7-11                  | 12+                   |
| <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| They were the same price as a standard bulb? <input type="radio"/>                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| They were \$1.00 more than standard bulbs? <input type="radio"/>                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| They were \$2.00 more than standard bulbs? <input type="radio"/>                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| They were \$5.00 more than standard bulbs? <input type="radio"/>                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| They were free but you had to mail in a rebate form to get your money back? <input type="radio"/> | <input type="radio"/> |

**General Information About Your Home**

How would you best describe the type of home in which you live?

- Detached single-family  Townhouse  Condominium  Duplex 2-family  
 Apartment  Manufactured home  Multi-Family (3 or more units)

In what year was your home built?

- 1959 or before  1960 - 1979  1980 - 1989  1990 - 1997  
 1998 - 2000  2001 - 2007  2008 or later

What is the approximate square footage (heated area) of your home?

- Less than 500  500-999  1,000-1,499  1,500-1,999  
 2,000-2,499  2,500-2,999  3,000-3,499  3,500-3,999  
 4,000 or more  Don't know

What range best describes your total annual household income?

- Less than \$25,000  \$25,000 to \$49,999  \$50,000-\$74,999  \$75,000-\$100,000  
 Over \$100,000  Don't know  Prefer not to answer

How many people live in your home?

1       2       3       4       5       6       7       8 or more

Do you own or rent your home?

Own       Rent

Primary heating fuel?     Electric     Gas     Oil     Propane     Other     None

Type of heating system?

Central furnace       Electric baseboard       Heat pump  
 Geo-thermal heat pump       Hot water or steam boiler       Other       Do not have

Age of heating system in years?

0-4       5-9       10-14  
 15-19       19       Don't know       Do not have

Primary cooling fuel?     Electric     Gas     Oil     Propane     Other     None

Type of cooling system?

Central air conditioner       Window Room unit air conditioner       Heat pump (for cooling)  
 Geo-thermal heat pump       Other       No cooling system

Age of cooling system in years?

0-4       5-9       10-14  
 15-19       19       Don't know       Do not have

THANK YOU FOR YOUR RESPONSES

## Appendix C: Smart Saver CFL Management Interview Instrument

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Position description and general responsibilities:

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**We are conducting this interview to obtain your opinions about and experiences with the Smart Saver CFLs program. We'll talk about the Smart Saver CFLs Program and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about an hour to complete. May we begin?**

### Program Objectives

1. In your own words, please describe the Smart Saver CFL Program's current objectives. How have these changed over time?
2. In your opinion, which objectives do you think are best being met or will be met?
3. Are there any program objectives that are not being addressed or not being addressed as well as possible or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed?
4. Should the program objectives be changed in any way due to technology-based, market-based, or management based conditions? What objectives would you change? What program changes would you put into place as a result, and how would it affect the operations of the program?

### Operational Efficiency

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

6. Please review with us how the Smart Saver CFL Program operates relative to your duties, that is, please walk us through the processes and procedures and key events that allow you do currently fulfill your duties.
7. Have any recent changes been made to your duties? If so, please tell us what changes were made and why they were made. What are the results of the change?
8. Describe the evolution of the Smart Saver CFL Program. How has the program changed since it was first started?
9. Do you have suggestions for improvements to the program that would increase participation rates or interest levels?
10. Do you have suggestions for improving or increasing energy impacts?
11. Do you have suggestion for the making the program operate more smoothly or effectively?

#### Program Design & Implementation

12. (*If not captured earlier*) Please explain how the interactions between the retailers, customers and the Smart Saver CFL management team work. Do you think these interactions or means of communication should be changed in any way? If so, how and why?
13. Describe your quality control and tracking process.
14. Are key industry experts, trade professionals or peers used for assessing what the technologies or models should be included in the program? If so, how does this work?
15. Are key industry experts and trade professionals used in other advisory roles? If so how does this work and what kind of support is obtained?
16. Describe the Smart Saver CFL retailer program orientation training and development approach. Are retailers getting adequate program information? What can be done that could help improve retailer effectiveness? Can we obtain any informational materials that are being used?
17. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?
18. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?
19. Overall, what about the Smart Saver CFL program works well and why?
20. What doesn't work well and why? Do you think this discourages participation or interest?

21. Can you identify any market, operational or technical barriers that impede a more efficient program operation?
22. In what ways can these operations or operational efficiencies be improved?
23. In what ways can the program attract more vendors?
24. In what ways can the program attract more consumer participation?
25. How do you make sure that the best information and practices are being used in Smart Saver CFL operations?
26. (*If not collected above*) What market information, research or market assessments are you using to determine the best target markets and program opportunities, market barriers, delivery mechanisms and program approach?
27. If you could change any one thing about the program, what would you change and why?
28. Are there any other issues or topics you think we should know about and discuss for this evaluation?

## Appendix D: Smart Saver CFL Retailer Management Instrument

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Position description and general responsibilities:

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**We are conducting this interview to obtain your opinions about and experiences with the Smart Saver CFL program. We'll talk about your understanding of the Smart Saver CFL Program and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about 20-30 minutes to complete. May we begin?**

### Understanding the Program

We would like to ask you about your understanding of the Smart Saver CFL program. We would like to start by first asking you to...

1. Please review for me how you are involved in the program and the steps you take in the participation process. Walk me through the typical steps you take to introduce the program to the customer, and what you do to help a customer become eligible for this program. What do you do to receive or help the customer receive the program incentive?
2. What kinds of problems or issues have come up in the Smart Saver CFL program?
3. Have you heard of any customer complaints that are in any way associated with this program? Have callbacks increased due to the program technologies?

### Program Design and Design Assistance

4. Do you feel that the proper technologies and equipment are being covered through the program?
5. Are the coupon levels appropriate?

6. Are there other technologies or energy efficient products that you think should be included in the program?

7. Are there components that are now included that you feel should not be included? What are they and why should they not be included?

### Reasons for Participation in the Program

We would like to better understand why retailers/distributors become partners in the Smart Saver CFL Program.

8. How long have you been a partner in the Smart Saver CFL Program?

9. What are your primary reasons for participating in the program? Why do you continue to be a partner?... *If prompts are needed...* Is this a wise business move for you, is it something you believe in professionally, is it that it provides a service to your customers, or other reasons?

10. Has this program made a difference in your business? How? Are your primary reasons for participation being met? Why/why not?

11. How do you think Duke can get more distributors/retailers to participate in this program?

### Program Participation Experiences

The next few questions ask about the process for participation.

12. Do you think the process could be streamlined in any way? How?

13. Do you have the right amount of materials such as information sheets, brochures or marketing materials that you need to effectively show and sell the CFLs covered by the coupons? What else do you need?

14. Overall, what about the Smart Saver CFL Program do you think works well and why?

15. What changes would you suggest to improve the program?

16. Do you feel that communications between you and Duke's program staff is adequate? How might this be improved?

17. What specific benefits do you receive as a result of participating in Duke's Smart Saver CFL Program or from selling Smart Saver CFLs?

18. What do you think are the primary benefits to the people who buy Smart Saver CFLs?

19. Are there other benefits that are important to a potential customer? What are these?

### Market Impacts and Effects

21. How do you make customers aware of the CFL Program?
22. What percent of the customers are already aware of the program before you present it to them? What percent of the customers take advantage of the program after you present it and explain it to them?
23. Are customers more satisfied with this equipment? Why or why not?
24. Do you market or sell the Smart Saver CFL differently than your other products? How?
25. What percent of your customers end up buying the CFL instead of an incandescent because of the coupon?

### Recommended Changes from the Participating Contractors

27. Are there any other changes that you would recommend to Duke Energy for their Smart Saver CFL Program that we have not already discussed?
28. If you could make any changes you wanted to the CFL program, what would you do differently?

### Standard Practice vs. Smart Saver CFL Practices

We would like to know what your presentation and sales practices were before your involvement in the Smart Saver CFL program, and how you would offer your products without the program.

29. If the program were to be discontinued, would you still offer the CFLs? If yes, would you structure pricing differently? If yes, how?
30. How did the Smart Saver CFL program change how you present and sell energy efficient light bulbs?
31. In your opinion is the Smart Saver CFL program still needed? Why?



## Appendix E: Data used for comparison of other states' savings

**State:** California

**Utility:** Pacific Gas & Electric

**Program:** Upstream Residential Lighting Program

**Summary:** Instant discount program

**Contact:** Terrance Pang, Sr. Program Manager, 415-973-8971, txp3@pge.com

**Link:** <http://www.accee.org/utility/6cpgereslight.pdf>

**Impacts:**

- Annual savings = 536,939,370 kWh
- Peak demand savings = 140,598 kW

**Other:** As many as 1.35 million customers

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**State:** California

**Utility:** Alameda Municipal Power

**Program:** CFL promotions

**Summary:** Rebate program

**Contact:** N/A

**Link:** [http://www.alamedamp.com/aboutus/PUB%20Reports%202009/0509/09-0518\\_7.A.%20FINAL%20General%20Manager%27s%20Report%20April%202009.pdf](http://www.alamedamp.com/aboutus/PUB%20Reports%202009/0509/09-0518_7.A.%20FINAL%20General%20Manager%27s%20Report%20April%202009.pdf)

**Impacts:**

- Gross savings = 61,425 kWh
- Greenhouse gas reduction = 43,575 lbs. CO<sub>2</sub>

**Other:** Savings are as of April 30, 2009

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**State:** California

**Utility:** Pasadena Water and Power

**Program:** Residential CFL distribution

**Summary:** Distribution of packs of CFLs

**Contact:** N/A

**Link:** [http://www.fypower.com/pdf/BPG\\_LGov5\\_LowIncome.pdf](http://www.fypower.com/pdf/BPG_LGov5_LowIncome.pdf)

**Impacts:**

- Annual energy savings = 3,068,016 kWh

**Other:** Summer of 2001

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**State:** Connecticut

**Utility:** Connecticut Municipal Electric Energy Cooperative

**Program:** Residential Efficient Products: Lighting

**Summary:** CFL distribution, CFL direct install programs, CFL school fundraisers

**Contact:** N/A

**Link:** [http://ase.org/uploaded\\_files/5686/super\\_nova/Connecticut%20Municipal%20Electric%20Energy%20Cooperative%20%28CMEEC%29.pdf](http://ase.org/uploaded_files/5686/super_nova/Connecticut%20Municipal%20Electric%20Energy%20Cooperative%20%28CMEEC%29.pdf)

**Impacts:**

- Annual energy savings = 7,668 MWh
- Lifetime savings = 53,683 MWh
- kW impact = 604

**Other:** For the year 2008

---

**State:** Idaho, Montana, Oregon, Washington

**Utility:** Northwest Energy Efficiency Alliance

**Program:** N/A

**Summary:** Implementation of CFL programs in large retail chains as well as smaller commercial locations

**Contact:** Jennifer E. Canseco, KEMA, Tami Rasmussen, KEMA, Anu Teja, NEEA

**Link:** 2009 IEPEC "A Market Transformed: But will the Impacts be Sustained?"

**Impacts:**

- Goal was to increase CFL sales in region from 750K to 1 million annually, reaching total sales of 10.8 million by 2009-reached goals in 2006

**TecMarket Works**

**Appendices**

- Total 2008 CFL sales reached 24.7 million, a 36% increase from 2007

**Other:**

- Little to no change in average CFL price from 2006 to 2008, little to no difficulty from suppliers to supply the market
- Of CFL manufacturers and retail reps interviewed in support of the study, about 1/2 reported that NEEA's withdrawal from the incentive market had no affect on their 2008 CFL sales; nearly all of the other half reported losses minimized or entirely supplanted by revenue from specialty lamp and non-rebated lamp sales

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**State:** Illinois

**Utility:** Illinois Department of Commerce and Economic Opportunity

**Program:** National change a light change the world promotion

**Summary:** Instant rebate program

**Contact:** N/A

**Link:** <http://www2.illinoisbiz.biz/StatutoryMandatedReports/07252006-2005EETRUSTFUNDREPORTwithattachment.pdf>

**Impacts:**

- 2003: 56,445 bulbs and over 3.7 million kWh
- 2004: 107,432 bulbs and over 7 million kWh
- Lifetime savings = over 75 million kWh

**Other:** From January 2003 to December 2004

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**State:** Maine, New Hampshire, Rhode Island, New York

**Utility:** N/A

**Program:** N/A

**Summary:** Collected data on CFL sales/types/availability in large retail chains and smaller locations

**Contact:** Seth E. Craig-Snell, Ph.D., Applied Proactive Technologies, Inc., Springfield, MA

**Link:** N/A

**Impacts:**

- Total number of CFLs available: Spring 2005: 31,000, Fall 2008: 185,000+, max: Fall 2006: 200,000+
- Strong growth for bare spirals: Spring 2005: 100/location, Fall 2008: 525/location
- Specialty CFL growth: 30/ location to 100+/location in same period

**Other:**

- Bare spiral CFLs accounted for minimum of 3/4 of all CFLs on market during study
  - Overall, prices have generally decreased from 2005 to 2008 on both bare spiral as well as specialty CFLs
- 

**State:** Massachusetts

**Utility:** N/A

**Program:** Massachusetts ENERGY STAR Lighting Program

**Summary:**

- Data collected from lighting product retailers in early 2008 in Massachusetts
- Data was collected on incandescent bulbs and CFLs comparing prices, incremental costs, and the affects of multi-pack vs. single pack and specialty CFLs vs. bare spiral
- Regression analysis performed from data

**Contact:** Greg Clendenning, Nexus Market Market Research, Inc., Arlington, VA; Lynn Hoefgen, Nexus Market Research, Inc., Cambridge, MA; Angela Li, National Grid, Northborough, MA; Gail Azulay, NSTAR, Boston, MA

**Link:** N/A

**Impacts:** N/A

**Other:**

- One lumen adds 0.002 to the cost of a CFL
- A flood bulb adds \$3.15 to the cost of a CFL
- An A-bulb adds \$1.74 to the cost of a CFL
- A bullet or torpedo bulb adds \$2.78 to the cost of a CFL
- A 3-way bulb adds \$2.76
- a bug bulb adds \$2.58
- a globe bulb adds \$2.27
- a candelabra bulb adds \$1.54

**TecMarket Works**

**Appendices**

- CFLs sold at Home Depot, Wal-Mart and Ace Hardware are \$0.58, \$0.84 and \$1.22 less expensive than comparable CFLs sold elsewhere, while CFLs sold at grocery stores are \$0.82 more expensive than elsewhere

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**State:** Missouri

**Utility:** AmerenUE

**Program:** Change a Light Rebate Program

**Summary:** Instant rebate coupons, product markdown efforts, and customer education efforts

**Contact:** N/A

**Link:** [http://74.125.95.132/search?q=cache:sQIn0nDoJ8EJ:www.icc.illinois.gov/e-docket/reports/view\\_file.asp%3FintIdFile%3D219110%26strC%3Dbd+EVALUATION+oF+A MERENUE%2E%80%99S+CHANGE+A+LIGHT+REBATE+PROGRAM&cd=1&hl=en&ct=c&lnk&gl=us](http://74.125.95.132/search?q=cache:sQIn0nDoJ8EJ:www.icc.illinois.gov/e-docket/reports/view_file.asp%3FintIdFile%3D219110%26strC%3Dbd+EVALUATION+oF+A MERENUE%2E%80%99S+CHANGE+A+LIGHT+REBATE+PROGRAM&cd=1&hl=en&ct=c&lnk&gl=us)

**Impacts:**

- 2003: 49,047 bulbs and 2,505,837 kWh
- 2004: 47,056 bulbs and 2,380,377 kWh
- 2005: 39,635 bulbs and 1,979,533 kWh
- Lifetime savings = 79,831,392 kWh

**Other:** N/A

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**State:** Nevada

**Utility:** Nevada Power and Sierra Pacific Power

**Program:** Residential CFL

**Summary:** Buy one get one free offer

**Contact:** Robert Balzar, Nevada Power

**Link:** <http://www.swenergy.org/programs/nevada/127.pdf>

**Impacts:** Electricity savings = 1.85 GWh/yr

**Other:** During Spring 2003

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**State:** Nevada

**Utility:** Nevada Power and Sierra Pacific Power

**Program:** Residential Lighting Program

**Summary:** Community education/outreach, CFL change-out events at non-profit organizations, promotional displays and showcasing events at retailers

**Contact:** Robert Robertson, Ecos, Portland, OR; John Hargrove, Sierra Pacific Power, Reno, NV

**Link:** N/A

**Impacts:**

- 2006: 1,026,797 CFLs sold generating 62,335,632 kWh savings
- 2007: About 2 million CFLs sold generating over 116 GWh of first year savings

**Other:** The percentage of residential sockets with energy efficient lighting has risen from 0.833% in 2003 to 7.35% in 2007 from program efforts

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**State:** New Jersey

**Utility:** New Jersey Board of Public Utilities

**Program:** Energy Star Products Program – Lighting

**Summary:** N/A

**Contact:** N/A

**Link:** <http://www.njcleanenergy.com/files/file/Library/E-STAR%20Products%20CFL%20Evaluation%20Report%20-%20Draft%20July%209%202009.pdf>

**Impacts:**

- 2004: Energy savings = 57,884 MWh; Peak demand savings = 15.7 MW
- 2005: Energy savings = 37,933 MWh; Peak demand savings = 8.7 MW

**Other:** N/A

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**State:** New York

**Utility:** Long Island Power Authority

**Program:** N/A

**Summary:** Three separate promotions, using paper coupons as well as store mark downs. CFLs were discounted \$1 per bulb

**TecMarket Works**

**Contact:** Stacey Wagner, 631-436-5765, [Swagner@keyspanenergy.com](mailto:Swagner@keyspanenergy.com)

**Link:** N/A

**Impacts:**

- 2004: 260,874 ENERGY STAR CFLs rebated
- 2005: 468,497 ENERGY STAR CFLs rebated

**Other:** N/A

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**State:** Ontario, Canada

**Utility:** Ontario Power Authority

**Program:** Every Kilowatt Counts Program

**Summary:** Coupons

**Contact:**

**Link:** [http://www.powerauthority.on.ca/Storage/96/9130\\_2007\\_Conservation\\_final\\_results\\_report\\_final\\_March\\_3-09.pdf](http://www.powerauthority.on.ca/Storage/96/9130_2007_Conservation_final_results_report_final_March_3-09.pdf)

**Impacts:**

- Summer demand savings: 4.9 MW
- First year energy savings: 132 GWh
- Lifetime energy savings: 1,060 GWh

**Other:** 2,773,186 coupons redeemed between spring and fall 2007

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**State:** Wisconsin

**Utility:** Wisconsin Department of Administration, Division of Energy

**Program:** Focus on Energy Program

**Summary:** Instant and mail-in rebates

**Contact:** N/A

**Link:** [http://www.epa.gov/RDEE/documents/WI\\_3rd\\_Party\\_MV\\_PA\\_Report.pdf](http://www.epa.gov/RDEE/documents/WI_3rd_Party_MV_PA_Report.pdf)

**Impacts:** 105,538 bulbs, 81,475 installed, 5,377,372 kWh saved

**Other:** From 2001 to 2003

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**State:** California

**Utility:** Itron

**Program:** Express Efficiency Program

**Summary:** Rebates for buying efficient equipment

**Contact:** John Cavalli, Itron

**Link:** [http://74.125.95.132/search?q=cache:VPjF9CH4EswJ:www.calmac.org/events/2\\_Express\\_Efficiency\\_Itron.ppt+2003+express+efficiency+program+evaluation+itron&cd=3&hl=en&ct=clnk&gl=us](http://74.125.95.132/search?q=cache:VPjF9CH4EswJ:www.calmac.org/events/2_Express_Efficiency_Itron.ppt+2003+express+efficiency+program+evaluation+itron&cd=3&hl=en&ct=clnk&gl=us)

**Impacts:**

- 2000: 14,046 kWh
- 2001: 41,223 kWh
- 2002: 39,985 kWh
- 2003: 31,075 kWh

**Other:** N/A

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**State:** N/A

**Utility:** Delta-Montrose Electric Association and Intermountain Energy

**Program:** N/A

**Summary:** Light bulb fundraiser, DMEA program to engage community organizations

**Contact:** Ed Thomas, Market Development Group, 970-207-8347,  
[ethomas@marketdevelop.com](mailto:ethomas@marketdevelop.com)

**Link:** N/A

**Impacts:**

- Over \$5,400 in net power purchase savings for DMEA project for first year alone
- Over 219,000 kWh saved annually by DMEA members
- Over 2,200 kW saved in avoided power demand charges
- 139 metric tons of carbon emissions reductions

**Other:** 3,044 bulbs sold during first 2 weeks of October 2005

## Appendix F: Effective Useful Life Adjustment Factor for Installed CFLs

The energy savings calculated in this study use a reduced effective useful life (EUL) for the program-incented CFLs instead of the period advertised by the manufacturers. The reduction in the EUL is consistent with the results of the EUL of CFLs used in switched environments representative of the typically residential in-door installations. The adjustment used in this report is 0.523 of the advertised EUL for the installed bulbs. This adjustment is presented in the Excel spreadsheet table below for each of the rooms in which the bulbs have been reported to be installed by the customers and the adjusted hours of use of those bulbs as indicated by the Duke Energy lighting logger study.

It is anticipated that this adjustment may be less dramatic in the future as additional studies of newly manufactured (more reliable technologies) bulbs are conducted, if the newer generation of CFLs are less impacted by in-house switching behaviors. However, at this time, the results of the California DEER Effective Useful Life Study and other research (see references below) indicate that advertised EULs are about twice what can be expected from the CFLs once installed in homes and turned on and off consistent with typical applications.

Room	Self Reported	Actual Daylength Adjusted	Actual	Difference (Self Rep - Actual)	Weight from % of self rep (seconds)	Weighted Percentage	EUL = Rated Life of Lamp (10000 hours) / Switching Degradation Factor (under unity Annual usage)	
							Actual hours	Actual hours
Basement	3.157	2.621	0.476	17.77%	0.104232	1.32%	0.276419162	
Bathroom	2.27	0.677	1.393	156.84%	0.067325	18.51%	0.025617125	
Bedroom	2.134	1.982	0.110	9.19%	0.216299	1.94%	0.422581045	
Den	.4	0.638	3.315	463.84%	0.015539	7.65%	0.010344235	
Dining Room	1.76	2.558	-0.776	-30.65%	0.049507	-1.25%	0.163796685	
Entrance	1.167	2.059	-0.932	-44.42%	0.011079	-0.55%	0.024912427	
Garage	1.209	1.105	0.103	16.71%	0.025266	0.42%	0.02769793	
Hallway	2.358	3.522	-1.164	-33.34%	0.067282	-2.27%	0.336657204	
Kitchen	4.736	3.415	1.319	30.62%	0.151719	5.35%	0.10106772	
Living Room	3.622	3.35	0.220	8.52%	0.242744	-1.44%	0.934644	
Office	3.294	9.001	-5.707	-51.40%	0.022427	-1.42%	0.201565427	
Stairway	3.6	0.536	2.952	550.95%	0.003568	2.15%	0.002129404	
		Average	9.57%	0.999595	26.39%		2.64551145	

Rated life comes from 6000 (Loves, etc 12000) / 10000 = 0.6  
 "in day" = 1.05  
 "in yr" = 1046.25  
 adj factor = 0.523  
 EUL = 5.027630  
 From California DEER EUL study

### References:

[www.deeresources.com](http://www.deeresources.com) (California's deemed database and database resource site, CFL EUL multiplier for in-door residential applications).

Proceedings of the ACEEE Summer Study, 2008, *The Dark and the Bright: Effectiveness Issues for CFL Programs*, Corina Jump, Jane Peters, Dulane Moran, James Hirsh, Shahana Samiullah,





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Oregon, WI 53575

## Memorandum

To: Ashlie Ossege, Duke Energy  
From: TecMarket Works  
Date: January 12, 2011  
Subject: Ohio CFLs, Customer Survey Results

### Findings

1. 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.
2. 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.
3. Of the CFLs redeemed with coupons, 90% in Ohio and 84% in Kentucky were reported to be installed and operating in sockets at the time of the survey.
4. Prior use of CFLs had no bearing on CFL program satisfaction ratings of CFL redeemers or likelihood of 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.
5. 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.
6. While CFL forward-looking buying habits are similar for new and previous adopters, previous adopters indicate they are more likely to replace a failed bulb with a CFL.

### CFL Coupon Redeemers

This survey focused on customers who, according to program tracking records, redeemed their CFL coupons. The survey was mailed out to customers in Ohio and in Kentucky who had redeemed their CFL coupons. Of these, 130 surveys were returned in Ohio and 41 were returned in Kentucky with usable responses.

### Participation in the Program

As seen in Table 4 nearly all of the redeemers responding to the survey (95.4% in Ohio and 92.5% in Kentucky) recall using the coupons provided by Duke Energy themselves, while some (6.9% in OH and 15% in Kentucky) recall giving at least one of their coupons away to another user.

**Table 1. Participation in the Program**

	Used Coupon themselves		Gave coupons to someone else	
	Yes	No	Yes	No
<b>OH (n=130)</b>	95.4%	4.6%	6.9%	93.1%
<b>KY (n=40)</b>	92.5%	7.5%	15%	85%
<b>Weighted</b>	<b>94.7%</b>	<b>5.3%</b>	<b>8.1%</b>	<b>91.2%</b>

<b>average</b>					
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Redeemers were asked to rate the influence several categories on their decision to purchase CFLs. These categories included:

- The Duke Energy CFL coupon,
- In-store advertising,
- Advertising that was not in-store, such as tv, radio and newspaper ads
- Other advertising
- CFL brand,
- Sales associates,
- Friends and family

Possible responses for each category were Very Influential, Somewhat Influential, and Not Influential at All.

Ninety-seven (75.2%) redeemers in Ohio and 28 (68.3%) in Kentucky found the coupon from Duke Energy to be “very influential” in their decision to purchase CFLs, indicating that the coupon was a key purchase driver. Although previous Duke Energy CFL studies have found the CFL coupon from Duke Energy to be even more influential, the coupon still seems to be the main driver in redeemers' decisions to purchase CFLs.<sup>1</sup> In-store CFL displays and signs were found to be somewhat influential, and other forms of advertising were found to be not at all influential by most redeemers. Redeemers did not find CFL branding or friends and family recommendations to be influential in their decision to purchase CFLs. As indicated in Table 5 and Figures 1 and 2, the Duke Energy coupon was the primary driver leading to the purchase of the program-induced CFL by a significant margin; however, the decision was also influenced, to a limited degree, by other events.

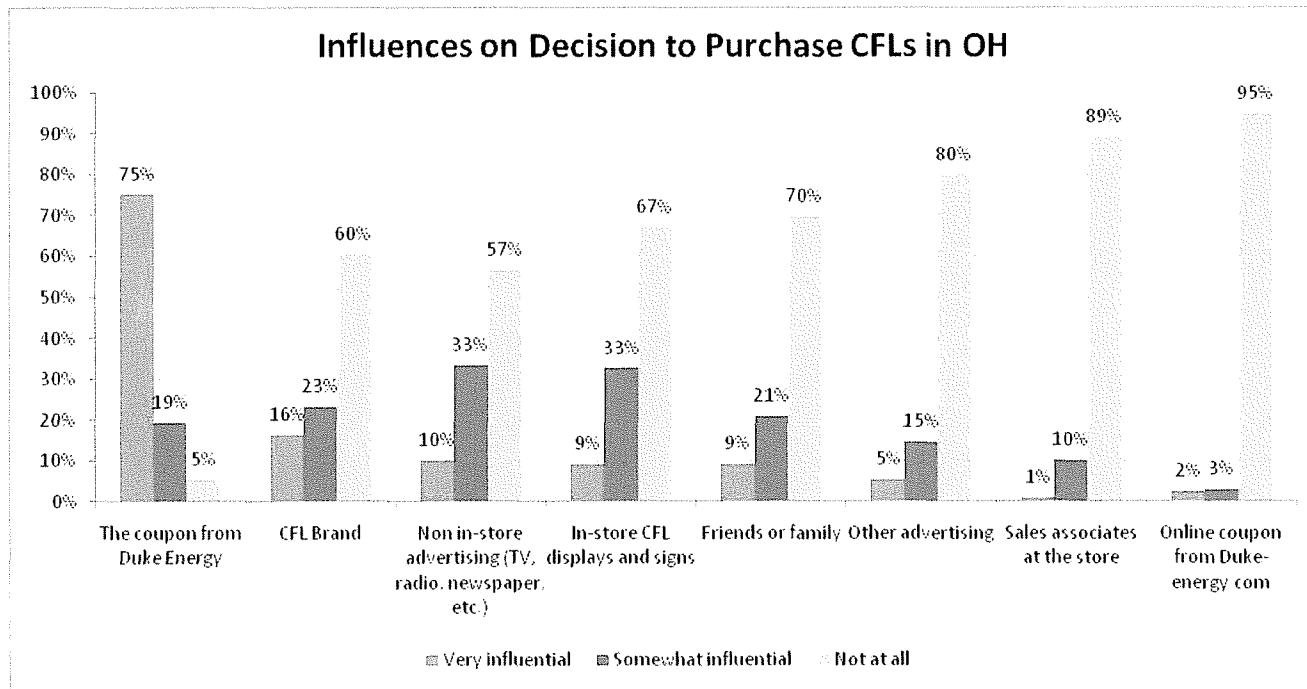
The only major difference from the July 2010 report was that 56.6% of redeemers indicated that in-store displays and 67.1% of redeemers indicated that media advertising were not at all influential in their purchasing decision. In the July 2010 report these numbers were 38.4% and 45.1% respectively.

**Table 2. Factors influencing CFL buying decision**

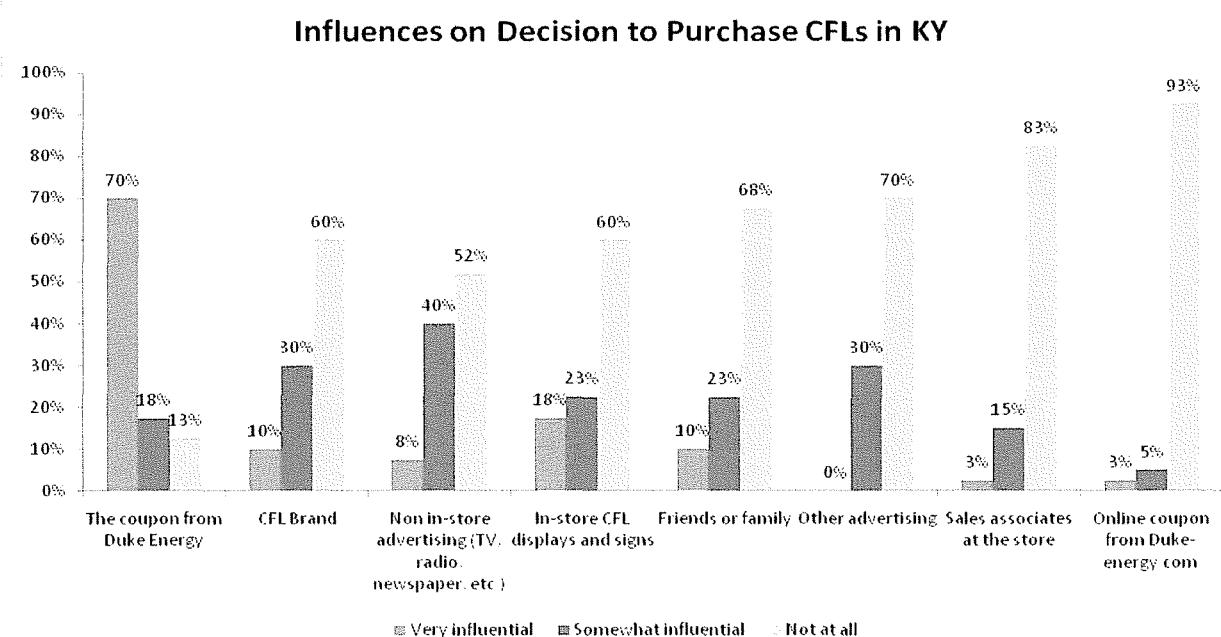
	OH			KY		
	Very influential	Somewhat influential	Not at all	Very influential	Somewhat influential	Not at all
<b>The coupon from Duke Energy</b>	97	25	7	28	7	6
	<b>75.2%</b>	<b>19.4%</b>	<b>5.4%</b>	<b>70%</b>	<b>17.5%</b>	<b>12.5%</b>
<b>CFL Brand</b>	21	30	78	4	12	24
	<b>16.3%</b>	<b>23.3%</b>	<b>60.4%</b>	<b>10%</b>	<b>30%</b>	<b>60%</b>
<b>Non in-store advertising (TV, radio, newspaper, etc.)</b>	13	43	73	3	16	21
	<b>10.1%</b>	<b>33.3%</b>	<b>56.6%</b>	<b>7.5%</b>	<b>40%</b>	<b>52.%</b>
<b>In-store CFL displays and signs</b>	12	42	75	7	9	24
	<b>9.3%</b>	<b>32.6%</b>	<b>67.1%</b>	<b>17.5%</b>	<b>22.5%</b>	<b>60%</b>

<sup>1</sup> “An Evaluation of Energy Star Products: Results of a Process and Impact Evaluation of Duke Energy’s CFL Promotion and Lighting Logger Programs” prepared for Duke Energy by TecMarket Works and Building Metrics, September 24, 2008, page 38. This study will be referenced as the “2008 study” through this report.

<b>Friends or family</b>	12	27	90	4	9	27
	<b>9.3%</b>	<b>20.9%</b>	<b>69.8%</b>	<b>10%</b>	<b>22.5%</b>	<b>67.5%</b>
<b>Other advertising</b>	7	19	103	0	12	28
	<b>5.4%</b>	<b>14.7%</b>	<b>79.9%</b>	<b>0%</b>	<b>30%</b>	<b>70%</b>
<b>Sales associates at the store</b>	1	13	115	1	6	33
	<b>0.8%</b>	<b>10.1%</b>	<b>89.1%</b>	<b>2.5%</b>	<b>15%</b>	<b>82.5%</b>
<b>Online coupon from Duke-energy.com</b>	3	4	9	1	2	37
	<b>2.3%</b>	<b>3.1%</b>	<b>94.6%</b>	<b>2.5%</b>	<b>5%</b>	<b>92.5%</b>



**Figure 1. Influences on Decision to Purchase CFLs in Ohio**



**Figure 2. Influences on Decision to Purchase CFLs in Kentucky**

As shown in the table below, the majority of redeemers in Ohio (76.7%) recalled purchasing their CFLs at Wal-Mart using the CFL coupons. In addition, redeemers also mentioned stores where they may have purchased CFL bulbs using the manufacturer's coupons. In Kentucky, however, 25% of redeemers recalled redeeming their CFLs at Wal-Mart while the same amount (25%) recalled redeeming coupons at Home Depot and 12.5% recalled redeeming their coupon at Lowe's.

In the July 2010 report only 36% of redeemers recalled purchasing CFLs at Wal-Mart and 24.4% recalled purchasing CFLs at Lowe's.

**Table 3. Location of CFL coupons redeemed**

Store	OH		KY	
	N	%	N	%
Walmart	99	76.7%	10	25%
Not specified	22	17.1%	8	20%
Home Depot	4	3.1%	10	25%
Lowe's	2	1.6%	5	12.5%
Target	1	0.8%	0	0%
Meijer	1	0.8%	1	2.5%
Ace	0	0%	2	5%
Kroger's	0	0%	4	10%

Redeemers were asked if they purchased any of the following additional items when they purchased their CFLs: wall/ceiling insulation, faucet aerators, showerheads, weather stripping, caulking, outlet gaskets, or programmable thermostats. Most redeemers did not purchase additional items when purchasing their

CFLs (80.5% in both Ohio and Kentucky). In Ohio those redeemers who did purchase additional items purchased weather stripping, caulking, outlet gaskets, wall or ceiling insulation, or a programmable thermostat. In Kentucky redeemers who purchased additional items purchased weather stripping, caulking, a low-flow showerhead, wall or ceiling information, or outlet gaskets. These numbers show little change from the July 2010 report and reflect that when program participation influences additional purchases, those typically focus on lower cost items.

**Table 4. Additional measures purchased when redeeming Duke Energy's CFL coupon**

<b>Measure</b>	<b>OH</b>		<b>KY</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
None	113	<b>86.9%</b>	36	<b>78.0%</b>
Caulking	7	<b>5.4%</b>	1	<b>2.4%</b>
Weather stripping	6	<b>4.6%</b>	1	<b>2.4%</b>
Low flow showerhead	0	<b>0.0%</b>	1	<b>2.4%</b>
Faucet aerators	0	<b>0.0%</b>	0	<b>0.0%</b>
Electric wall outlet gaskets	1	<b>0.8%</b>	1	<b>2.4%</b>
Wall or ceiling insulation	2	<b>1.5%</b>	1	<b>2.4%</b>
Programmable thermostat	1	<b>0.8%</b>	0	<b>0%</b>

### Use of CFL Coupons

Redeemers could have purchased between three and fifteen bulbs using the Duke Energy coupons. The majority of redeemers stated they purchased four or more CFLs, with just over half of redeemers (52.7% in Ohio and 48.4% in Kentucky) indicating they purchased six or more CFLs. This data indicates that not only was the Duke coupon the key driver for the purchase decision, but that purchase decisions typically involved four or more bulbs. A small number of redeemers stated that they purchased 1 or 2 CFLs. Since the CFLs eligible for the coupons were packages of 3 or 6 bulbs, these redeemers may have been describing the number of packages of CFLs they purchased, or they did not recall the number of bulbs purchased and were providing their best guess. The results are shown in Table 8.

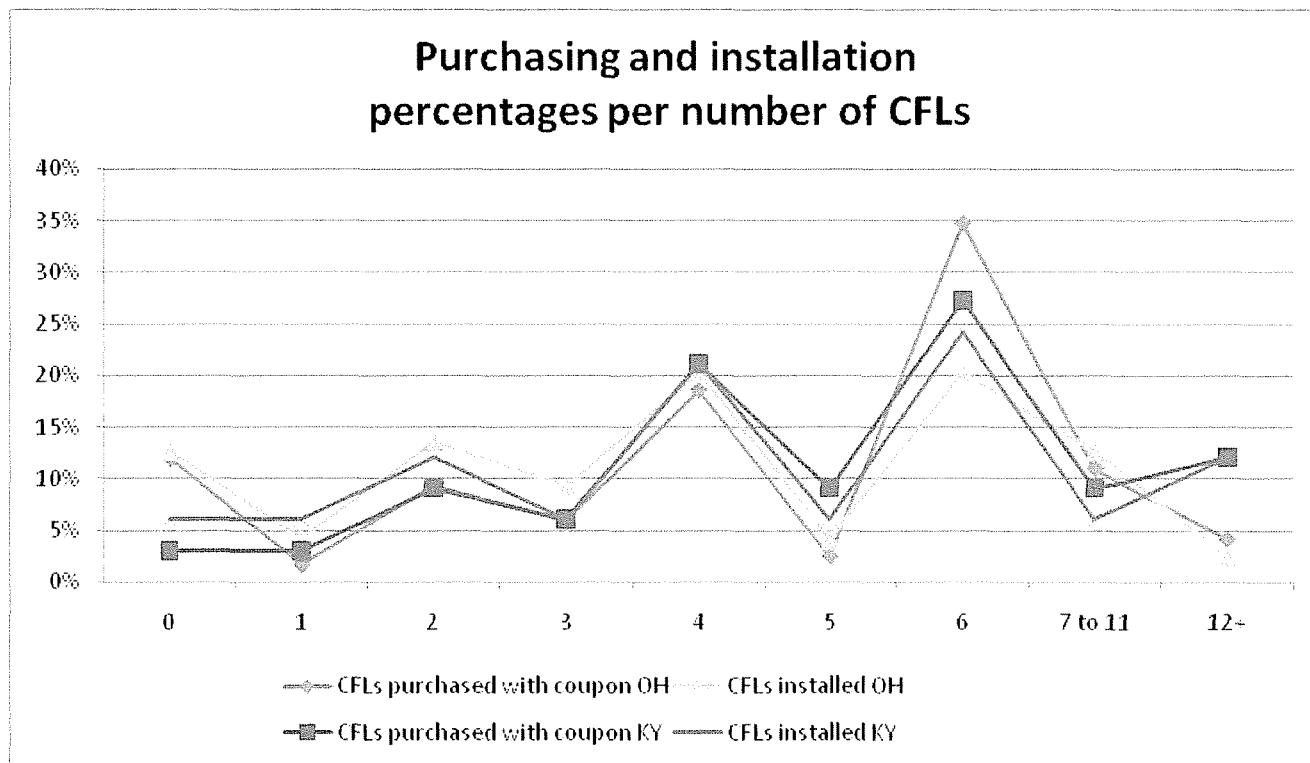
**Table 5. Number CFLs purchased, installed and stored for later use as a percentage of redeemers.**

CFLs purchased with coupon	OH	0	1	2	3	4	5	6	7-11	12+
		N	14	2	11	7	22	3	41	13
		%	<b>11.9%</b>	<b>1.7%</b>	<b>9.3%</b>	<b>5.9%</b>	<b>18.6%</b>	<b>2.5%</b>	<b>34.7%</b>	<b>4.2%</b>
KY	KY	N	1	1	3	2	7	3	9	3
		%	<b>3.0%</b>	<b>3.0%</b>	<b>9.1%</b>	<b>6.1%</b>	<b>21.2%</b>	<b>9.1%</b>	<b>27.3%</b>	<b>9.1%</b>
CFLS installed	OH	N	15	5	16	11	24	5	24	15
										3

		%	12.7%	4.2%	13.6%	9.3%	20.3%	4.2%	20.3%	12.7%	2.5%
	KY	N	2	2	4	2	7	2	8	2	4
		%	6.1%	6.1%	12.1%	6.1%	21.2%	6.1%	24.2%	6.1%	12.1%
CFLs stored for later use	OH	N	41	7	17	8	16	2	11	6	4
		%	36.6%	6.3%	15.2%	7.1%	14.3%	1.8%	9.8%	5.4%	3.6%
	KY	N	13	2	7	1	3	0	1	5	2
		%	38.2%	5.9%	20.6%	2.9%	8.8%	0.0%	2.9%	14.7%	5.9%

### CFL Installation Rates

In Ohio redeemers indicated that they had purchased 579 CFLs with coupons and of those 522 (90.2%) were installed. Two hundred thirty two (232) CFLs were purchased with coupons and 195 (84.1%) were installed in Kentucky. To obtain these numbers the 7-11 choice category was averaged to 9 bulbs and the specific numbers given by redeemers who had more than 12 CFLs were used. Along with the high installation rates Figure 8 illustrates that a high percentage of program CFLs are being put installed in sockets. These numbers show little change from the July 2010 CFL report.



**Figure 3. Number of CFLs purchased, installed and stored as a percentage of respondents**

### CFL Coupon Estimated Negative Influence

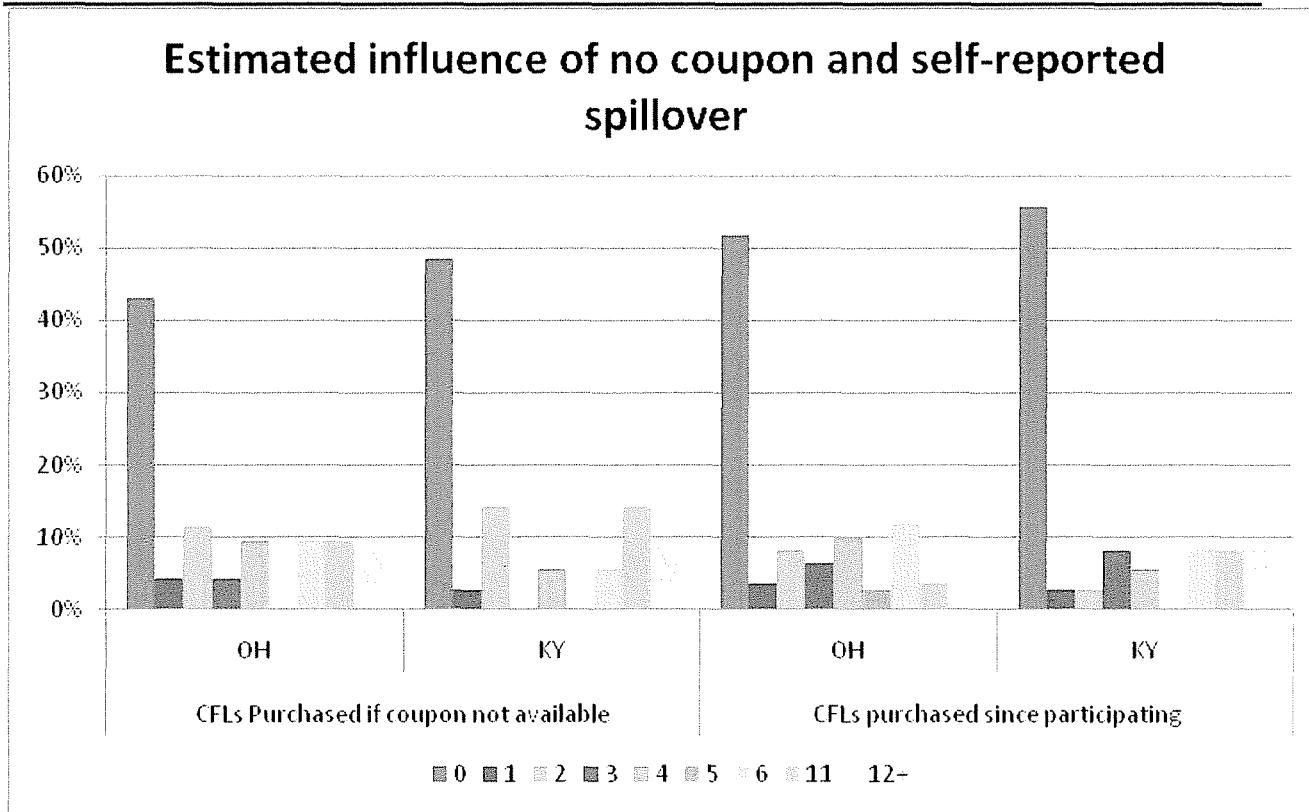
Redeemers were asked if they would have purchased any CFLs if the Duke Energy Smart \$aver® coupon had not been available, and, if so, how many.

As shown in Table 8, more than 40% (43% in Ohio and 48.6% in Kentucky) of redeemers stated that they would not have bought any CFLs if the coupon had not been available, and an even larger number of redeemers (51.8% in Ohio and 55.6% in Kentucky) stated that they have not purchased any additional CFLs since using the coupon. These two statements corroborate the previous statement made by redeemers that receiving the coupon in the mail was most influential in a participant's decision to purchase CFLs.

In the July 2010 report 33.5% percent of redeemers estimated they would have bought zero bulbs if the coupon had not been available.

**Table 6. Estimated Influence of No Coupon, Additional Purchases and CFLs given away**

		None	1	2	3	4	5	6	7-11	12+	
Estimated CFLS bought if coupon had not been available	OH	N	49	5	13	5	11	0	11	11	9
		%	<b>43.0%</b>	<b>4.4%</b>	<b>11.4%</b>	<b>4.4%</b>	<b>9.6%</b>	<b>0.0%</b>	<b>9.6%</b>	<b>9.6%</b>	<b>7.9%</b>
	KY	N	17	1	5	0	2	0	2	5	3
		%	<b>48.6%</b>	<b>2.9%</b>	<b>14.3%</b>	<b>0.0%</b>	<b>5.7%</b>	<b>0.0%</b>	<b>5.7%</b>	<b>14.3%</b>	<b>8.6%</b>
CFLs purchased since participating	OH	N	57	4	9	7	11	3	13	4	2
		%	<b>51.8%</b>	<b>3.6%</b>	<b>8.2%</b>	<b>6.4%</b>	<b>10.0%</b>	<b>2.7%</b>	<b>11.8%</b>	<b>3.6%</b>	<b>1.8%</b>
	KY	N	20	1	1	3	2	0	3	3	3
		%	<b>55.6%</b>	<b>2.8%</b>	<b>2.8%</b>	<b>8.3%</b>	<b>5.6%</b>	<b>0.0%</b>	<b>8.3%</b>	<b>8.3%</b>	<b>8.3%</b>
CFLs given away	OH	N	108	1	1	2	3	2	0	0	1
		%	<b>91.5%</b>	<b>0.8%</b>	<b>0.8%</b>	<b>1.7%</b>	<b>2.5%</b>	<b>1.7%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.8%</b>
	KY	N	32	0	0	1	1	0	0	0	1
		%	<b>91.4%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.9%</b>	<b>2.9%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.9%</b>



**Figure 4. Estimated amount of bulbs bought if no coupon had been available, and additional purchases of CFLs**

#### CFL Usage and Satisfaction

Redeemers were asked if their lighting hours of use had changed after installing CFLs. Most redeemers have not altered their use behavior after installing their CFLs; that is, 87.7% of redeemers in Ohio and 80% of redeemers in Kentucky reported that they have not changed the hours of use of light fixtures. Of those redeemers who did change their usage in Ohio, equal amounts (6.2%) reported increasing and decreasing their hours of use. In Kentucky 12.5% of redeemers reported decreasing their hours of use while 7.5% said that their hours of use had increased. This data suggests that snap-back is not associated with the Duke Energy CFL purchases - that is, customers are not using their fixtures more now that they are saving money on the use of those fixtures.

Seventy four percent (74%) of redeemers in Ohio and 77.5% of redeemers in Kentucky reported that they have not removed any of the CFLs they installed. Of those redeemers who have removed a CFL that they had installed, over half (59.5%) in Ohio and all (100%) in Kentucky did so because the bulb had burned out.

Bulb removals that were reported were similar to those in the July 2010 report. The number of redeemers who removed at least one program CFL in OH for this report is 26% compared to 16% in the July 2010 report. The reasons for removal were similar to the July 2010 report.

**Table 7. Lighting hours of use changes in OH and KY**

	OH				KY	
	Increased	Decreased	No change	Increased	Decreased	No change
Fixture hours of use	8	8	114	3	5	32
	<b>6.2%</b>	<b>6.2%</b>	<b>87.7%</b>	<b>7.5%</b>	<b>12.5%</b>	<b>80%</b>

**Table 8. CFLs bought with coupon and subsequently removed**

Number of bulbs	0	1	2	3	4	5
OH	N	97	9	14	7	2
	%	74.0%	6.9%	10.7%	5.3%	1.5%
KY	N	31	5	2	1	0
	%	77.5%	12.5%	5.0%	2.5%	0%

**Table 9. Reasons for removing coupon CFLs**

	Reasons for removal	Burned out	Not bright enough	Too slow to start	Did not like the light	Other
OH	N	19	8	3	2	2
	% of all bulbs removed	55.9%	23.5%	8.8%	5.9%	5.9%
KY	N	9	0	0	0	0
	% of all bulbs removed	100%	0%	0%	0%	0%

The specific responses for “other” reasons of removal in Ohio were that one redeemer had a dimmer switch and another wanted a three-way bulb.

#### Previously installed CFLs

Not quite half of redeemers in each state (60.9% in OH and 47.5% in KY) stated they already had at least one CFL installed in their house before purchasing bulbs with Duke Energy coupons, and just over half of redeemers stated they had not already had CFLs installed. Of those redeemers who indicated that they had already installed a CFL, 59.8% had already installed 2, 3, or 4 bulbs, that is while they were already users, the level of use was small, representing only a few sockets per home. That is, these customers had not been previously transformed by other market pressures to be dedicated CFL users.

In the July 2010 report only 44.1% of redeemers indicated they had previously installed CFLs, representing a jump of 15.8% over the year between assessments. The percentage of respondents with 12+ pre-installed CFLs also increased to 17.3% from 8.3%. CFLs continue to penetrate the market with new adopters moving to CFLs and significantly more new adaptors moving to CFLs via Duke Energy programs. Duke is moving the market forward with respects to CFL first us adopters and increased adoption from previous adopters.

**Table 10. Pre-installed CFLs**

CFLs pre-installed?	OH		KY		
	Yes		No	Yes	No
	75	48	19	21	
	60.9%	39.1%	47.5%	52.5%	

**Table 11. Numbers and percentages of pre-installed CFLs**

Number of bulbs pre-installed	1	2	3	4	5	6	7-11	12+

	N	8	13	11	15	2	4	5	13
OH	% of respondents with pre-installed CFLs (n=75)	10.7%	17.3%	14.7%	20%	2.7%	5.3%	6.7%	17.3%
	<b>% of all surveyed (n=130)</b>	<b>6.2%</b>	<b>10%</b>	<b>8.5%</b>	<b>11.5%</b>	<b>1.5%</b>	<b>3.1%</b>	<b>3.8%</b>	<b>10%</b>
KY	N	3	7	3	0	1	1	5	5
	% of respondents with pre-installed CFLs (n=19)	15.7%	36.8%	15.8%	0%	5.7%	5.7%	26.3%	26.3%
	<b>% of all surveyed (n=40)</b>	<b>7.5%</b>	<b>17.5%</b>	<b>7.5%</b>	<b>0%</b>	<b>2.5%</b>	<b>2.5%</b>	<b>12.5%</b>	<b>12.5%</b>

In addition to the number of pre-installed CFLs, redeemers were asked how long they had been using CFLs before using the Duke Energy coupon. Responses included:

- Never purchased until now
- 1 year or less
- 1-2 years
- 2-3 year
- 3-4 years
- 4 or more years

As seen in **Table 15** below, 40.4% of redeemers in OH and 43.2% of redeemers in KY indicate that they have been using CFLs for more than two years and 28.4% of redeemers in Ohio and 21.6% of redeemers in KY indicate that this is their first time using a CFL. This data suggests that CFL saturation is still low within the coupon redeeming population prior to the use of the Duke Energy coupon.

**Table 12. Time since first purchase of CFLs in OH and KY**

	Never purchased until now	1 year or less	1-2 Years	2-3 Years	3-4 Years	4 or more years
OH	36	11	28	27	10	14
	<b>28.6%</b>	<b>8.7%</b>	<b>22.2%</b>	<b>21.4%</b>	<b>7.9%</b>	<b>11.1%</b>
KY	8	4	9	8	5	3
	<b>21.6%</b>	<b>10.8%</b>	<b>24.3%</b>	<b>21.6%</b>	<b>13.5%</b>	<b>8.1%</b>

Redeemers were asked to rate their satisfaction with the CFLs redeemed with their Duke Energy coupon. Ninety eight percent (98.3%) of redeemers in Ohio and 97.2% of redeemers in Kentucky are at least somewhat satisfied and 75.8% of redeemers in Ohio and 72.2% of redeemers in Kentucky were very satisfied with their CFLs.

**Table 13. CFL satisfaction in OH and KY**

		Very Satisfied	Somewhat satisfied	Not at all satisfied
OH	N	91	27	2
	%	<b>75.8%</b>	<b>22.5%</b>	<b>1.7%</b>
KY	N	26	9	1
	%	<b>72.2%</b>	<b>25%</b>	<b>2.8%</b>

When CFL satisfaction was tallied for only those redeemers who removed the CFLs purchased with the Duke Energy coupon, 100% (3 of 3) of redeemers in Kentucky and 50% (9 of 18) of redeemers in Ohio indicated they were very satisfied with their Duke Energy CFLs. In Ohio 45% (8 of 18) of redeemers who removed a CFL indicated that they were somewhat satisfied with the CFLs. This is twice the percentage of “somewhat satisfied” responses in the overall survey population and nearly a third of all the “somewhat satisfied” responses in Ohio, indicating that bulb removal, as would be expected, has a negative correlation with CFL satisfaction in Ohio. Time since first installation of CFLs had no impact on satisfaction levels suggesting that long-time users are not more or less satisfied with their CFLs than are new users. Satisfaction levels are unchanged since the July 2010 report.

### **Future CFL Purchases**

Redeemers were asked to consider their future CFL purchases and identify how many CFLs they would expect to purchase in the next year if CFLs were offered at a certain price compared to a standard (incandescent) bulb. The prices offered were:

- The same price as a standard bulb
- \$1 more than a standard bulb
- \$2 more than a standard bulb
- \$3 more than a standard bulb

Redeemers were also asked how many CFLs they would purchase if they were free, but required a mail-in rebate form.

Results are shown for Ohio in Table 16 and for Kentucky in **Table 17** below and illustrated in figures 5 through 7. With CFLs being offered at the same prices as a standard bulb, 94.5% of redeemers in Ohio and 96.9% of redeemers in Kentucky will purchase at least one CFL, and 69.6% of redeemers in Ohio and 84.4% of redeemers in Kentucky indicated they would purchase four or more. More than 75% of redeemers in Ohio and Kentucky indicated they would purchase at least one CFL bulb if the price per bulb was \$1 more. When the price reaches \$2 more 50% of redeemers in Ohio and 59.6% of redeemers in Kentucky indicate they would not purchase CFL bulbs. This indicates that customers are expecting CFL prices that are comparable to incandescent lighting.

If the CFL bulbs are free with a rebate form, 84.2% of redeemers in Ohio and 92.9% of redeemers in Kentucky said that they would purchase at least one CFL. Since these percentages are lower than the percentages for CFLs at the same price as incandescent bulbs in both states, this suggests that 10% to 15% of redeemers may be experiencing a barrier other than price when deciding to purchase CFLs.

For example, some customers may not be at all interested in purchasing CFLs due to size, slow illumination, aesthetics or the quality of light and would not purchase CFLs regardless of price or price difference. In addition, for some of these redeemers the hassle of the rebate process may outweigh other advantages of purchasing CFLs; for example, 10 (9.9%) redeemers in Ohio and 2 (7.4%) redeemers in Kentucky stated they would purchase CFLs at a price equal to standard bulbs but would not obtain them if they were free through the use of a rebate.

All percentages were similar to the July 2010 report except for the number of redeemers who would purchase zero CFLs if the price was \$3 more than incandescent bulbs. This number is 12% higher than the 2010 report. (70.3% compared to 58.3%).

**Table 14. Hypothetical CFL buying habits in Ohio under 4 different pricing scenarios**

	Number of bulbs	0	1-2	3	4	5	6	7-11	12+
They were the same price as a standard bulb?	N	6	20	5	11	7	15	13	25
	%	5.9%	19.6%	4.9%	10.8%	6.9%	14.7%	12.7%	24.5%
They were \$1.00 more than standard bulbs?	N	22	11	8	14	6	9	11	11
	%	23.9%	12.0%	8.7%	15.2%	6.5%	9.8%	12.0%	12.0%
They were \$2.00 more than standard bulbs?	N	45	14	7	7	6	5	1	5
	%	50.0%	15.6%	7.8%	7.8%	6.7%	5.6%	1.1%	5.6%
They were \$3.00 more than standard bulbs?	N	64	6	6	3	3	3	1	5
	%	70.3%	6.6%	6.6%	3.3%	3.3%	3.3%	1.1%	5.5%
They were free but you had to mail in a rebate form to get your money back?	N	16	12	7	10	6	11	12	27
	%	15.8%	11.9%	6.9%	9.9%	5.9%	10.9%	11.9%	26.7%

**Table 15. Hypothetical CFL buying habits in Kentucky under 4 different buying scenarios**

	0	1-2	3	4	5	6	7-11	12+	
They were the same price as a standard bulb?	N	1	3	1	7	5	3	5	7
	%	3.1%	9.4%	3.1%	21.9%	15.6%	9.4%	15.6%	21.9%
They were \$1.00 more than standard bulbs?	N	7	3	1	3	3	5	6	2
	%	23.3%	10.0%	3.3%	10.0%	10.0%	16.7%	20.0%	6.7%
They were \$2.00 more than standard bulbs?	N	16	1	2	2	2	2	2	0
	%	59.3%	3.7%	7.4%	7.4%	7.4%	7.4%	7.4%	0.0%
They were \$3.00 more than standard	N	18	3	2	1	0	1	2	0
	%	66.7%	11.1%	7.4%	3.7%	0.0%	3.7%	7.4%	0.0%

<b>bulbs?</b>									
<b>They were free but you had to mail in a rebate form to get your money back?</b>	N	2	0	3	2	3	4	5	10
	%	7.1%	0.0%	10.7%	7.1%	10.7%	14.3%	17.9%	34.5%

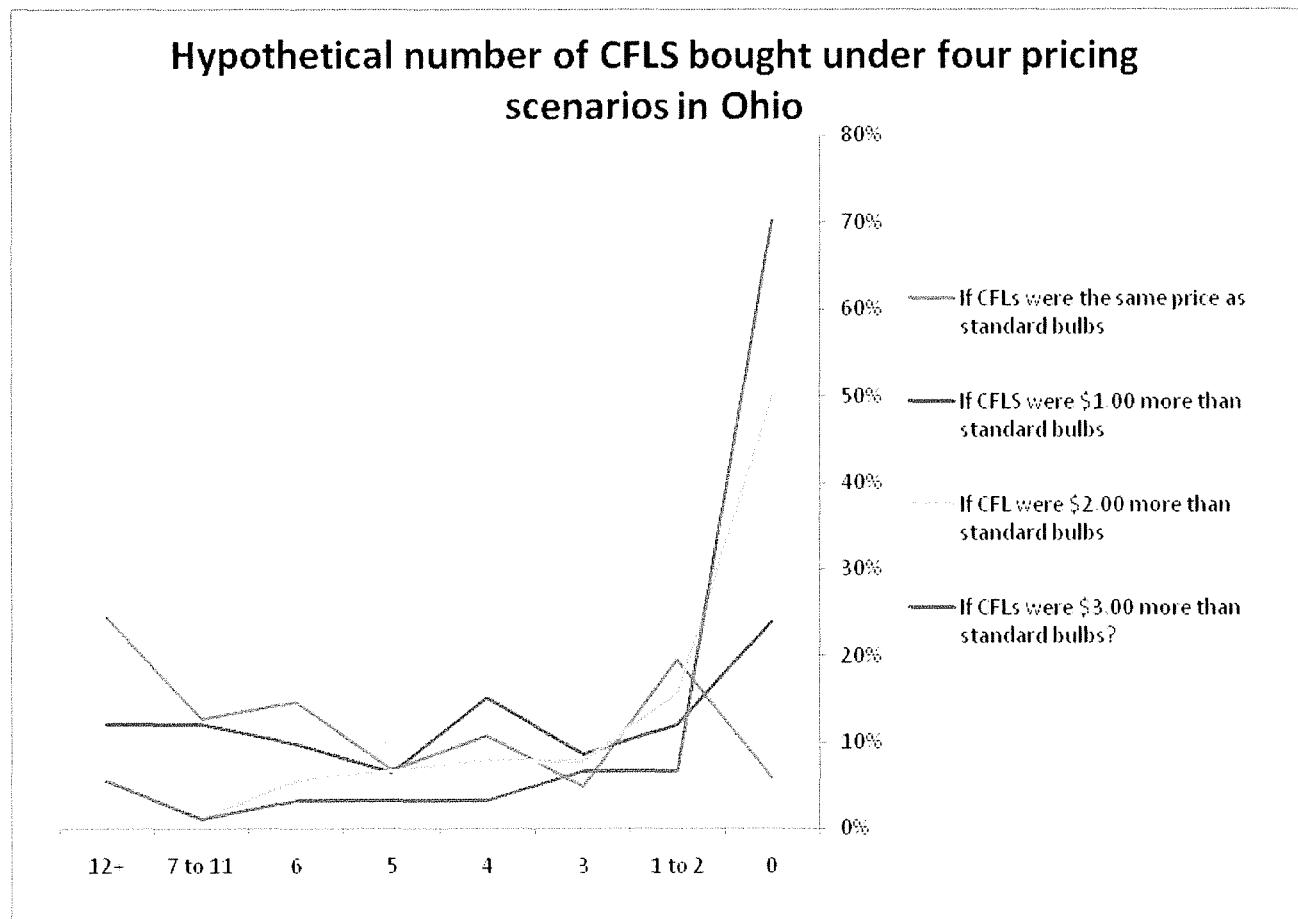


Figure 5. Hypothetical CFL pricing scenarios in Ohio

## Hypothetical number of CFLS bought under four pricing scenarios in Kentucky

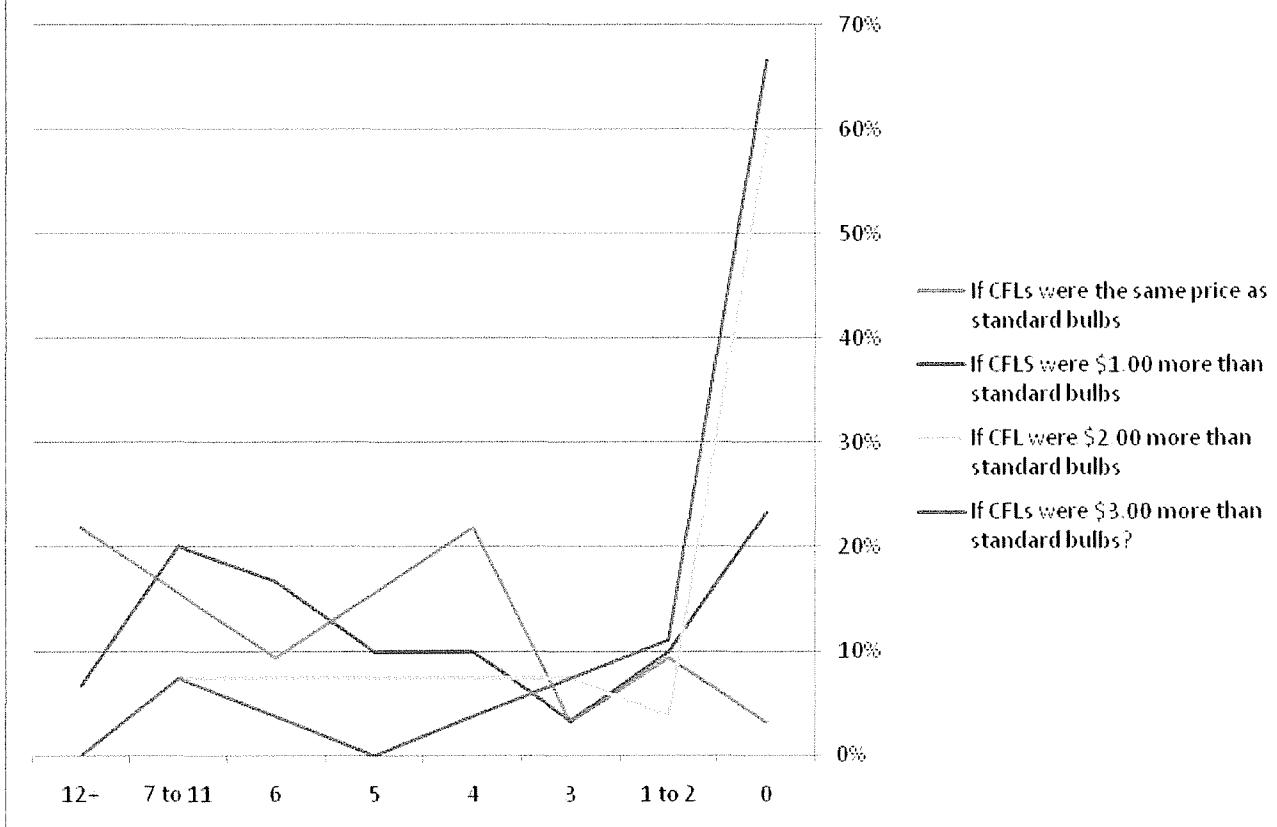


Figure 6. Hypothetical pricing scenarios in Kentucky

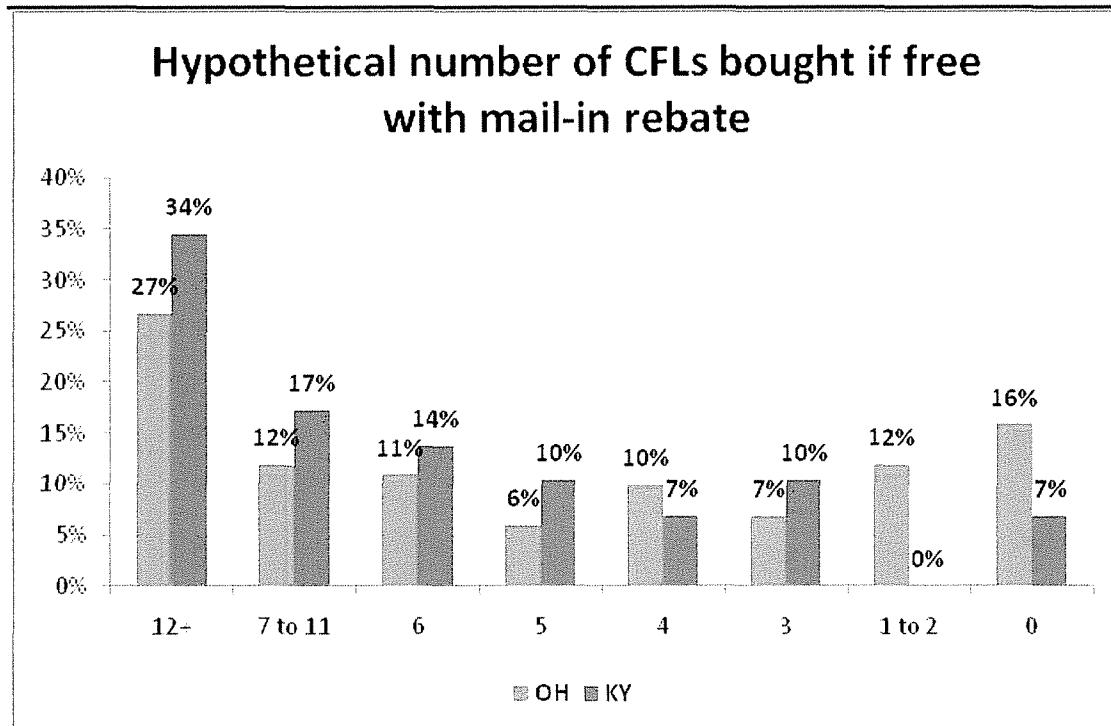


Figure 7. Hypothetical CFLs bought with free rebate in OH and KY

#### Influence of program CFLs on redeemer confidence and future use of CFLs

Redeemers were asked a series of five questions to determine the influence of program CFLs on their confidence in CFLs and their likelihood of buying CFLs in the future.

The specific categories to rate were:

- Confidence to use CFLs in the future
- Coupon's influence to in choosing CFLs in the future
- Confidence in performance of CFLs bought with the coupon to meet expectations
- Likelihood of buying CFLs in the future
- Likelihood to use a CFL if you had to change a lightbulb

Each category had five ratings for redeemers to choose from:

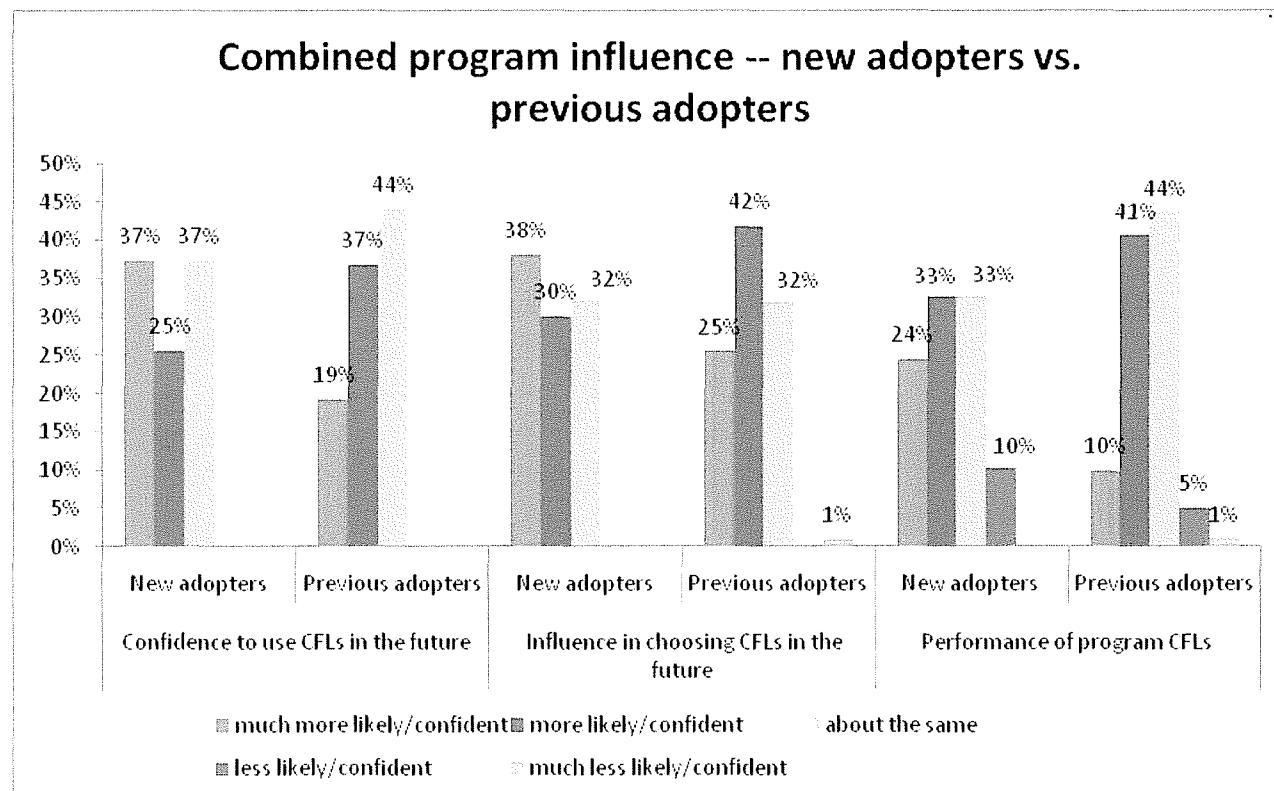
- Much more likely/confident/better
- More likely/confident/better
- About the same
- Less likely/confident or worse
- Much less likely confident or worse

Results are summarized in Figures 8 and 9 below. OH and KY results were combined to provide a more reliable sample size for new adopters.

Overall, new adopters rated their confidence in CFLs, influence of the program, and performance of CFLs higher than redeemers who had used CFLs previously. However, when combining the ratings of "about the same" or higher, new adopters and previous adopters had very similar total percentages in all

categories. This suggests that the program has a positive influence on the confidence level of new adopters of CFLs and does not negatively affect the opinions of previous adopters.

Figure 9 shows that new adopters and previous adopters are equally as likely to purchase CFLs in the future, however, 8% more (37% compared to 29%) of previous adopters are likely to replace a failed bulb with a CFL (rather than a standard bulb) than new adopters. That is, new adopters are still testing the waters, while past users are more comfortable with continued use and may have a higher degree of acceptance that some CFL bulbs will fail, than non-previous adopters. This suggests that while previous adopters may have a higher freeridership rating, they are also more likely to deliver savings via higher installation and continued use rates.



**Figure 8. Forward looking influence of program in OH and KY combined. N=110 for previous adopters. N=50 for new adopters.**

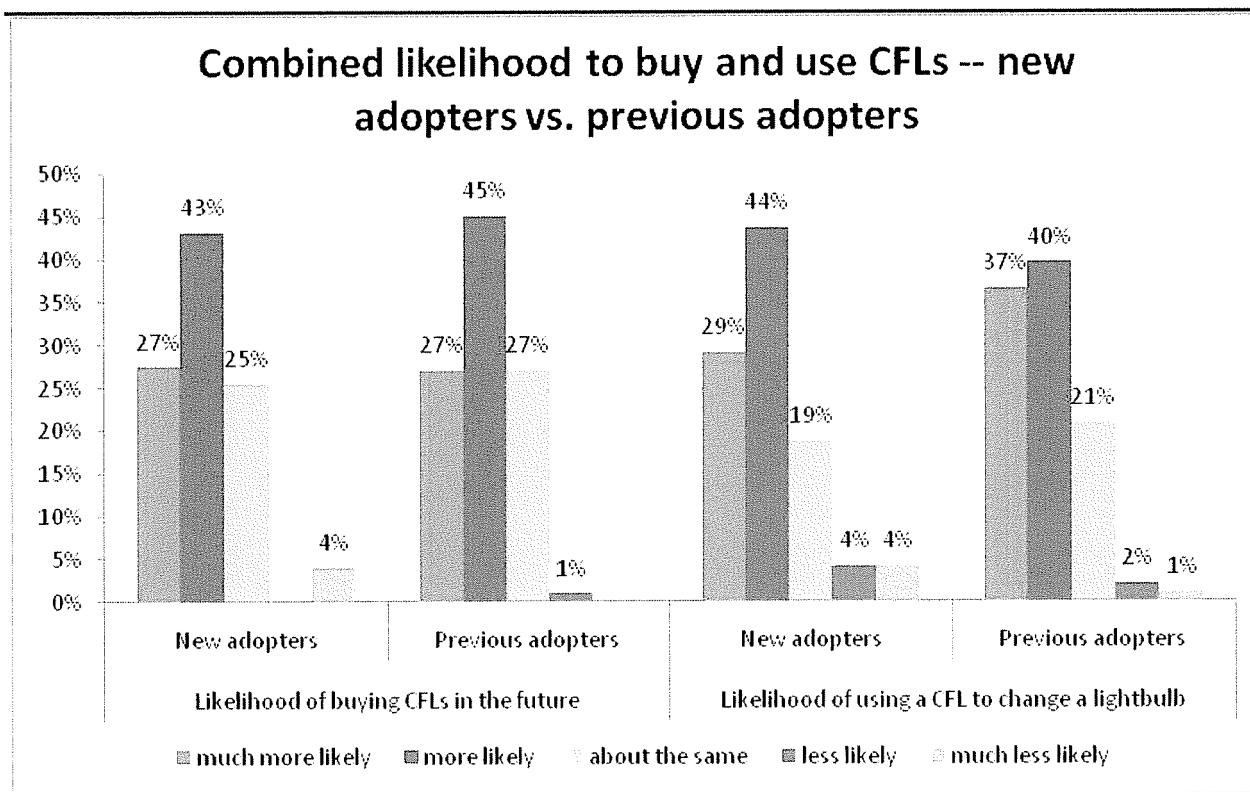


Figure 9. Forward-looking influence of program on buying and replacing habits in OH and KY combined. N=110 for previous adopters. N=50 for new adopters.

## CFL Coupon Redeemer Survey



Survey Test  
123456 Does This Layout Work Rd  
Seems Like It Is OK 55555

Dear Customer:

Duke Energy is continuously trying to improve our services for you. To help us improve the Compact Fluorescent Light bulb program, we would like your input. Please let us know what you think about the compact fluorescent light bulbs (CFLs) you purchased through our coupon promotion. Some examples of CFLs are in the pictures below. If you have any questions, please contact Duke Energy at [inresearch@duke-energy.com](mailto:inresearch@duke-energy.com).



### WE WOULD LIKE YOUR OPINION ABOUT OUR COMPACT FLUORESCENT LIGHT BULB (CFL) COUPON PROGRAM. PLEASE FILL IN THE CIRCLES COMPLETELY USING BLUE OR BLACK INK.

Do you recall receiving Compact Fluorescent Light bulb (CFL) coupons from Duke Energy?  Yes  No

Did you give away any of your coupons to someone else to use?  Yes  No

Did you use at least one coupon yourself?  Yes – Continue this survey  No – Thank you. Please return survey.

#### How influential were the following in your decision to purchase CFL(s)?

	Very Influential	Somewhat Influential	Not at all Influential
The coupon from Duke Energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In-store CFL displays and signs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-in-store advertising (TV, radio, newspaper, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sales associates at the store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CFL Brand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other advertising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends or family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

At which store did you purchase your CFL bulbs using the Duke Energy coupons? \_\_\_\_\_

Did you purchase any of the following items at the same time you purchased the CFLs with the Duke Energy coupons? Mark all that apply

- |   |   |  |   |
|---|---|--|---|
| <input type="checkbox"/> Wall or ceiling insulation | <input type="checkbox"/> Faucet aerators              | <input type="checkbox"/> Low flow showerhead     | <input type="checkbox"/> Weatherstripping |
| <input type="checkbox"/> Caulking                   | <input type="checkbox"/> Electric wall outlet gaskets | <input type="checkbox"/> Programmable thermostat | <input type="checkbox"/> None of these    |

#### In this section of the survey, we would like to understand how you have used the CFL packs you purchased with the coupon(s).

How many CFL bulbs did you purchase in TOTAL with the Duke Energy coupon(s)?  1  2  3  4  5  6  7-11  12+

How many CFL bulbs would you have bought if you had not had the Duke Energy coupon(s)?  0  1  2  3  4  5  6  7-11  12+

How many CFL bulbs have you since purchased without Duke Energy coupon(s)?  0  1  2  3  4  5  6  7-11  12+

#### Of the CFLs you bought with the Duke Energy coupons:

0  1  2  3  4  5  6  7-11  12+

How many CFLs are now installed?  0  1  2  3  4  5  6  7-11  12+

For each CFL purchased with coupons that is now installed, please write in WHERE each CFL was installed, WHAT wattage the CFL is, WHAT wattage the old bulb was, and on average, HOW MANY HOURS you use that light each day.

WHERE CFL INSTALLED	CFL WATTAGE	OLD BULB WATTAGE	HOW MUCH LIGHT IS USED (Hours Each Day)
Example Living Room Floor Lamp	13Watt CFL	60Watt Incandescent	6 Hours Per Day (average)
Example Hallway Ceiling Fixture	15Watt CFL	100Watt CFL	1 Hour Per Day (average)
Bulb 1			
Bulb 2			
Bulb 3			
Bulb 4			
Bulb 5			
Bulb 6			
Bulb 7			
Bulb 8			
Bulb 9			
Bulb 10			
Bulb 11			
Bulb 12			
Bulb 13			
Bulb 14			
Bulb 15			

Have you changed the hours of use of any fixture in which you installed the CFLs?  Yes  No

If you answered yes, how did your average usage change?  Increased usage  Decreased usage

Have you removed any of the CFLs you installed?  Yes  No

1	2	3	4	5	6	7-11	12+
<input type="radio"/>							

If yes, how many did you remove?  0  1  2  3  4  5  6  7-11  12+

Why did you remove them?

<input type="radio"/> Not bright enough	<input type="radio"/> Did not like the light	<input type="radio"/> Too slow to start
<input type="radio"/> Burned out	<input type="radio"/> Not working properly	<input type="radio"/> Other

If other, please specify: \_\_\_\_\_

Did you have any CFLs installed in light sockets in your house before you bought the CFLs with the Duke Energy coupon?  Yes  No

1	2	3	4	5	6	7-11	12+
<input type="radio"/>							

If yes, about how many were already installed?  0  1  2  3  4  5  6  7-11  12+

How long have you been using CFL light bulbs?

<input type="radio"/> Never purchased a CFL until now	<input type="radio"/> 1 year or less	<input type="radio"/> 1 to 2 years	<input type="radio"/> 2 to 3 years
<input type="radio"/> 3 to 4 years	<input type="radio"/> 4 or more years		

Very Satisfied      Somewhat Satisfied      Not at all Satisfied

Overall, how satisfied are you with the Duke discounted CFLs?

	Often	Sometimes	Never
Do you use the Duke Energy Website?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you added any major electrical appliances to your home in the past year?	<input type="radio"/>	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Are you aware of the ENERGY STAR label?	<input type="radio"/>	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Do you typically look for the ENERGY STAR label when purchasing an appliance?	<input type="radio"/>	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Do you typically buy appliances with the ENERGY STAR label? <input type="radio"/> Yes <input type="radio"/> Some of the time <input type="radio"/> Never			

#### CFL Purchasing

Considering future CFL purchases, how many CFL bulbs would you purchase in the next year if...

	0	1-2	3	4	5	6	7-11	12+
They were the same price as a standard bulb?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>					
They were \$1.00 more than standard bulbs?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>					
They were \$2.00 more than standard bulbs?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>					
They were \$3.00 more than standard bulbs?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>					
They were free but you had to mail in a rebate form to get your money back?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>					

#### General Information About Your Home

How would you best describe the type of home in which you live?

- |  |   |  |                                       |
|--|---|--|---------------------------------------|
| <input type="radio"/> Detached single-family | <input type="radio"/> Townhouse         | <input type="radio"/> Condominium                    | <input type="radio"/> Duplex 2-family |
| <input type="radio"/> Apartment              | <input type="radio"/> Manufactured home | <input type="radio"/> Multi-Family (5 or more units) |                                       |

In what year was your home built?

- |  |                                   |                                     |                                   |
|--|-----------------------------------|-------------------------------------|-----------------------------------|
| <input type="radio"/> 1959 or before         | <input type="radio"/> 1960 - 1979 | <input type="radio"/> 1980 - 1989   | <input type="radio"/> 1990 - 1997 |
| <input checked="" type="radio"/> 1998 - 2000 | <input type="radio"/> 2001 - 2007 | <input type="radio"/> 2008 or later |                                   |

What is the approximate square footage (heated area) of your home?

- |                                     |                                   |                                   |                                   |
|-------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <input type="radio"/> Less than 500 | <input type="radio"/> 500-999     | <input type="radio"/> 1,000-1,499 | <input type="radio"/> 1,500-1,999 |
| <input type="radio"/> 2,000-2,499   | <input type="radio"/> 2,500-2,999 | <input type="radio"/> 3,000-3,499 | <input type="radio"/> 3,500-3,999 |
| <input type="radio"/> 4,000 or more | <input type="radio"/> Don't know  |                                   |                                   |

What range best describes your total annual household income?

- |  |  |  |  |
|--|--|--|--|
| <input type="radio"/> Less than \$25,000 | <input type="radio"/> \$25,000 to \$49,999 | <input type="radio"/> \$50,000-\$74,999    | <input type="radio"/> \$75,000-\$100,000 |
| <input type="radio"/> Over \$100,000     | <input type="radio"/> Don't know           | <input type="radio"/> Prefer not to answer |  |

How many people live in your home?

- |                         |                         |                         |                         |                         |                         |                         |                                 |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------------------------|
| <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 | <input type="radio"/> 7 | <input type="radio"/> 8 or more |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------------------------|

Do you own or rent your home?

- |                           |                            |
|---------------------------|----------------------------|
| <input type="radio"/> Own | <input type="radio"/> Rent |
|---------------------------|----------------------------|

Primary heating fuel?  Electric  Gas  Oil  Propane  Other  None

Type of heating system?

Central furnace  Electric baseboard  Heat pump  
 Geo-thermal heat pump  Hot water or steam boiler  Other  Do not have

Age of heating system in years?

0-4  5-9  10-14  
 15-19  19  Don't know  Do not have

Primary cooling fuel?  Electric  Gas  Oil  Propane  Other  None

Type of cooling system?

Central air conditioner  Window Room unit air conditioner  Heat pump (for cooling)  
 Geo-thermal heat pump  Other  No cooling system

Age of cooling system in years?

0-4  5-9  10-14  
 15-19  19  Don't know  Do not have

HAVE A CHANCE TO PARTICIPATE IN THE DUKE ENERGY LIGHTING STUDY

Would you be interested in participating in a lighting study in July and August 2009?

A Duke Energy representative would place small lighting monitors on 4 or 5 light fixtures which would remain in place for 2 to 3 weeks. The monitors are smaller than the size of a bar of soap and help us measure how often lights are turned on and off during the week. The first 100 returned surveys indicating interest will be contacted. Eligible customers that are selected will receive \$50 for participating.

If yes, you may receive a follow-up phone call about this lighting study in July.

Yes, I am interested in participating. My phone number is: \_\_\_\_\_.

My address on the front page of this survey is correct.

My address is:

\_\_\_\_\_

No, I am not interested in participating.

THANK YOU FOR YOUR RESPONSES



# Process Evaluation of the 2010 and 2011 PowerShare® Program in Kentucky

Final Report

Prepared for  
Duke Energy

139 East Fourth Street  
Cincinnati, OH 45201

October 26, 2011

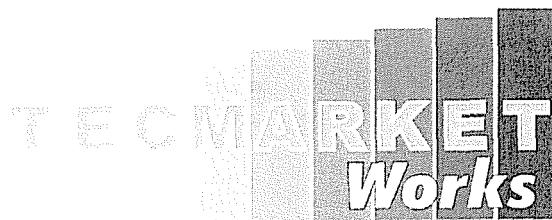
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(608) 835-8855



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## Summary of Findings

The 2010-2011 PowerShare® Kentucky program is a complex program whose delivery requires fast decision-making and tight coordination across Duke Energy's different divisions. The Duke Energy program management and staff appear to have all the challenges well in hand. Although there have been a number of staff changes in recent years, the program is running smoothly and has successfully made a number of improvements to streamline its processes. The Duke Energy PowerShare Kentucky program managers and staff have also taken a very proactive stance in preparing the program for a number of upcoming changes, the most immediate of which is the move to the PJM Regional Transmission organization.

PowerShare Kentucky customers have a high regard for the program and for their Duke Energy account managers in particular. The account managers play a key role in helping customers understand the program's benefits and its required commitments. The PowerShare program relies on accurate communication of information and the customers report that Duke Energy is doing a good job in communicating the program requirements and relaying the call for events. However, because of the seasonal nature of the PowerShare program, a few customers in their first year of participation have identified some ways in which Duke Energy can help them increase their level of engagement with the program.

## Recommendations

**RECOMMENDATION 1:** If Duke Energy's notification system allows customer to designate their preference for method of contact, Duke Energy should consider reviewing with customers at the beginning of each event seasons their preferences. Duke Energy should also remind customers who choose more than one method that the notification system will escalate by using different methods of making contact until the customers respond.

**RECOMMENDATION 2:** Duke Energy should consider providing customers with a summary sheet that highlights the program's key components and their company's specific commitment in their agreement. Duke Energy should also consider developing a process flow chart that illustrates the sequence of events during an event day, starting with the identification of event conditions, notification of customers, and the different paths to settlement should the customer choose to reduce load or buy through.

**RECOMMENDATION 3:** Duke Energy should consider developing a one-page explanation of the PowerShare program aimed at executive-level decision makers who may not have the technical background to understand electric industry jargon. Duke Energy can informally test this material with the intended target audience, namely executives who may not be familiar with the electric industry.

**RECOMMENDATION 4:** If not already being done, Duke Energy should track the discrepancy between the estimated buy-through prices provided to customers prior to an event compared with the settled buy-through price. If customers become concerned that there are repeated discrepancies that are not in the customers' favor, Duke Energy

account managers will need to manage customers' future expectations better. Duke Energy may wish to ask account managers to remind customers about the volatility of market prices, and perhaps be able to provide past data on the tracked discrepancies. The past data should show that while sometimes the discrepancy is in the customers' favor, sometimes it is not. TecMarket Works is not recommending that Duke Energy be asked to take responsibility for predicting prices on the energy market. However, tracking the discrepancies may allow Duke Energy to anticipate customers' concerns and manage expectations before customers perceive any problems. Customers might also be reminded that PowerShare is intended to buffer customers from the energy market's price volatility by giving them advance notice to curtail their energy use.

**RECOMMENDATION 5:** If the account managers are not already doing so, Duke Energy should consider following-up with first year PowerShare participants to review their fixed and firm level load reduction commitments. Duke Energy should also consider providing customers with the ability to adjust their commitments for the next event season, while experience of the current event season is still fresh in their minds. This will allow customers to provide feedback to Duke Energy on whether their load reduction commitments were easily achieved, just right, or too onerous.

**RECOMMENDATION 6:** Duke Energy should consider reviewing PowerShare customer bills to see if there are ways to improve the transparency of the buy-through charges and capacity premium credits. While space limitations on the monthly bills would not allow full details to be included on each bill, Duke Energy might consider including reminders on the bill to go to the EPO website. The EPO website contains detailed graphs that explicitly tie the information about the settlement incentive with their confirmation of load reduction. This reminder may help PowerShare customers to remember to refer to the website where they can clearly see the link between actions they take to reduce load and the associated costs or benefits.

**RECOMMENDATION 7:** If the account managers are not already doing this on a consistent basis, Duke Energy can consider asking current customers if they would be willing to share their honest experiences with prospective customers, so that the account managers could have a ready list of companies willing to speak with other companies. Duke Energy may also want to look at past participation records. If there is favorable data such as 1) a large proportion of customers in the prospects' sector do participate, or 2) there is an increasing trend in participation in a prospect's sector, that information may help persuade the prospect to participate.

## **Introduction**

This document presents the evaluation report for Duke Energy's PowerShare® Program as it was administered in Kentucky.

The evaluation was conducted by the TecMarket Works evaluation team. The survey instruments were developed by TecMarket Works. Yinsight (a TecMarket Works subcontractor) conducted the in-depth interviews with program management and program participants.

### **Methodology: Management Interviews**

TecMarket Works developed the interview protocol for the PowerShare® Program management which was implemented in August and September of 2011. The full interview guide can be found in Appendix A: Program Manager Interview Instrument.

### **Methodology: Participant Interviews**

TecMarket Works developed a customer survey for the PowerShare® Program participants, which was implemented in August and September of 2011 after they experienced control events over the summer of 2011.

The evaluation team attempted interviews with a census of PowerShare participants and were able to complete surveys with a sample of 10 participants in Kentucky. These participants were surveyed by Yinsight. The survey can be found in Appendix B: Participant Survey Instrument.

## Section 1: Program Operations

This process evaluation of the 2010-2011 PowerShare® Kentucky program has several purposes. First, this process evaluation is intended to help identify areas where the program may be improved, drawing upon the insights of Duke Energy staff across different divisions and upon the insights of a sample of participating customers. Second, this report will document program operations for future reference, including ways in which the program has addressed and overcome past program challenges.

### Interviewees

For this process evaluation, the evaluation team conducted in-depth interviews with six Duke Energy managers and program staff members at different levels of responsibility for the program. The evaluation team also conducted short interviews (20 minutes) with ten commercial and industrial customers who participated in the 2010 and 2011 PowerShare Kentucky program. The findings from each of these sets of interviews will be discussed in turn.

### Program Background

PowerShare is a demand response program designed to reduce non-residential customers' energy use during periods of high energy prices or during periods when high energy usage would cause energy supplies across the transmission and distribution system to drop to near-critical levels. In both these situations, the PowerShare program allows Duke Energy to purchase capacity from their customers by paying their commercial and industrial customers to reduce their energy demand, thus increasing the available energy supply.

### PowerShare Program Objectives

The PowerShare Kentucky program has multiple objectives and associated benefits. PowerShare gives commercial and industrial customers an opportunity to lower their energy cost by receiving capacity premium payments for providing Duke Energy additional energy capacity. Their participation also allows participants to have advance notice of periods of high energy prices and thus be able to make the best financial decision for their company. During periods of high energy prices, participants have the option of reducing load and receiving an event incentive for each kW reduced, to generate their own electricity and control their energy costs, or to "buy through" and pay for electricity to be delivered by Duke Energy at a real time market based price.

Duke Energy's demand response program portfolio also includes a residential component, the Power Manager® program. These demand response programs benefit all of Duke Energy's customers by avoiding the costs of building new power plants or purchasing peak energy in the market. This yields lower energy prices for all customers during peak demand periods, and allows Duke Energy customers to reduce their carbon footprint through curtailing energy use. On a wider scale, Duke Energy's demand response programs help to increase the reliability of the electricity transmission and distribution system, and to mitigate risk of blackouts.

## PowerShare Kentucky

KY has had a large reserve margin for several years. As a result, Duke Energy has decided not to build un-needed capacity. In 2012, Duke Energy Kentucky will be migrating from the MISO (Midwest Independent Transmission System Operator) energy market to the PJM energy market. PJM has a different set of requirements in order for demand response programs to be used for capacity. Duke Energy has been planning for the new requirements. For example, MISO provided Duke Energy with eight hours advance notice for emergency events and Duke Energy contracted with customers for 6 hours notice, but PJM will provide two hours' notice. Duke Energy instituted the change to a 90-minute advance notice period to be effective January 1, 2012. Another requirement that PJM makes is that customers must be willing to be exposed to 10 emergency events, instead of the five that MISO requires. Duke Energy has adopted this requirement in the 2011-2012 contracts.

Duke Energy staff reports that this change has not impacted the willingness of new participants to enroll in the PowerShare program. However, it is also true that emergency events are very rarely called by MISO.

## PowerShare Operations

**Marketing.** The PowerShare program is promoted mainly by Duke Energy account managers. Account managers speak to large business customers on a one-to-one basis to determine whether they are suitable candidates for participating. All Duke Energy staff members who were interviewed unanimously agreed that PowerShare was not a program that could be accurately promoted with marketing collateral alone. Account managers need to have an in-depth conversation with the customer, strategizing on what that customer might be able to do to reduce load. For some customers this may entail reducing lighting or HVAC usage, for others this may entail turning off a production line, or turning on a generator.

**Enrollment.** To qualify for PowerShare, nonresidential customers must be able to curtail a minimum of 100 kW and have an interval meter. Once a customer has decided to participate, a Duke Energy account manager assists the customer with the online enrollment process. If the customer does not have an interval meter that can be interrogated over a phone line, Duke Energy will arrange for the meter to be installed.

Customers in the Midwest participate on a year-to-year contract, running from fiscal year June 1st through May 31st. Duke Energy staff reports that every state in their service territory has seen increased participation, from both the perspective of number of companies and total capacity. At the time of these interviews in September 2011, there were 18 new Kentucky participants in Call Option, all of them in the 10/10 option. This enrollment rate is higher than what Duke Energy set as a goal; Kentucky currently has excess capacity and thus is not being marketed heavily.

## Economic vs. Emergency Events

PowerShare participants agree to be exposed to two types of events: emergency events and economic events. Emergency events are determined entirely by MISO. MISO will call an event when there is a critical shortage in energy supply or when unusual events threaten the reliability of the electrical grid. When MISO determines that an event must be called, they give Duke

Energy eight hours advance notice. Duke Energy must then pass on the emergency event call to customers with six hours advance notice. However, due to the desire to begin adapting operations to PJM's requirements, Duke Energy instituted a plan in 2011 to provide customers with 90 minutes advance notice starting January 1, 2012 to meet PJM's two hour advance notice window.

Economic events are called by Duke Energy on days when high forecasted load coincides with high energy prices. During these times, Duke Energy can call an economic event and pay PowerShare participants a pre-arranged price that is lower than what is on the energy market. This benefits all Duke Energy customers by buffering them from unusually high and volatile prices on the energy market. Duke Energy managers report that they convene a meeting of stakeholders to discuss these considerations each time an economic event is considered.

## **PowerShare Call Option**

**Proforma baseline.** Customers can select both the number of events their company is capable of meeting, as well as how much capacity to provide for each event. Customer's capacity for demand response is determined against their proforma baseline load shape, calculated based upon past energy usage. Customers can choose to reduce energy use on either a firm level or a fixed level against their proforma baseline. A firm level reduction commitment is a commitment to reduce down to a specific kW usage (e.g. customers may commit to reduce energy usage to a firm level of 600 kW or below). A fixed level reduction commitment is a commitment to reduce a certain kW relative to the customer's load shape (e.g. customers may commit to reducing energy usage by a fixed 400 kW, against their proforma).

The number of economic and emergency events is determined by the PowerShare option the customers agree to. All of these combinations are offered under the PowerShare Call Option umbrella, and all include an exposure to 10 emergency-only events. Duke Energy pays an annual capacity premium depending on the number of events and the curtailment capacity to which a customer commits. This capacity premium is paid over 12 months and shows up as a line item labeled "PowerShare credit" on the customer's monthly bill. If customers respond to an event call by curtailing, they are paid an additional event incentive credited to their monthly bill after settlement.

Customers can choose to commit to the following Call Options, with an increase in the number of emergency events in 2011.

**Table 1. PowerShare 2010 Options**

Call Option Program	Number of Events	Capacity Premium Credit
0/5	5 emergency events only	\$10/kW per year
5/5	5 economic events and 5 emergency events	\$15/kW per year
10/5	10 economic events and 5 emergency events	\$25/kW per year

**Table 2. PowerShare 2011 Options**

Call Option Program	Number of Events	Capacity Premium Credit
0/10	10 emergency events only	\$12/kW per year
5/10	5 economic events and 10 emergency events	\$18/kW per year
10/10	10 economic events and 10 emergency events	\$25/kW per year

In addition to Call Option, customers may also sign up for a purely voluntary program called Quote Option. Prior to each event, Duke Energy agrees to provide Quote Option customers with a price per kW, using the EPO website to accept bids. Because this is purely voluntary, customers are not paid any annual capacity premium credit but neither do they incur any penalties if they do not respond to an event call.

Duke Energy program managers were asked whether PowerShare annual capacity premiums were priced at the right level to entice commercial and industrial customers to participate. Duke Energy program managers believed that raising the annual capacity premium would entice more customers to participate, but also pointed out that Kentucky currently had excess capacity. Paying for additional capacity may only serve to increase program costs without yielding additional kW benefits.

## Event Calls

Duke Energy's Retail Energy Desk (RED) monitors several indicators to determine whether conditions may warrant an event. These indicators include a heat index (factoring in temperature and humidity) during the summer months, a load forecast and a peak forecast. If the load forecast is within 7% of the peak forecast, and energy market prices reach a certain threshold, then conditions may be ideal for considering an economic event.

To determine whether an economic event is called or not, the RED convenes a meeting of stakeholders. This group may include up to 20 different people, including account managers, account manager executives, production managers, production managers' supervisors, technical support staff and Duke Energy upper management. Customer needs and satisfaction are a concern, and account managers are sometimes reluctant to agree to a disruption of their customer's production capabilities. Other factors include how likely it would be for another event to be called in the near future. A Duke Energy staff member reports that some of the most difficult efforts to attain consensus occurred during a week in which every day could have been an event day and three economic events were called, "*but every one of those event days met the criteria.*"

In Kentucky and the rest of the Midwest service territories, the PowerShare Call Option economic program is limited to a maximum of three event calls per week and no more than two consecutive days of events. The RED team attempts to target the three peak load days when every day of a week meets the criteria for an event. Emergency events, however, may be called by MISO without any constraints.

**Initiating the event.** Once the decision has been made to call an event, the Business Service Center enters information in a notification system developed by Varolii. Varolii contacts customers through a series of escalation rules for which method of communication to use. Notifications cease as soon as the customer responds. One improvement planned for the future is the addition of SMS texting as a notification method. Another improvement being planned is the capability to choose a preferred method of communication. In 2011, the Business Service Center has had to update customer contact information in Varolii manually. An enhancement being made for future event seasons is the development of a method to automatically update all Varolii records when Duke Energy account managers update their customers' contact information in Salesforce, a customer relationship management tool. All interviewees agreed that aside from the constant challenge of maintaining updated contact information, they are satisfied with Varolii's notification process and results.

**EPO Curtailment module.** For PowerShare, Duke Energy uses Schneider Electric's proprietary Energy Profiler Online (EPO) software system. Customer meter data and proformas are routinely imported in the system. Through EPO, the RED can update energy prices for events and the system also displays the customers' load compared to their proforma the day after the event. Settlement information is calculated in EPO after the final energy prices are provided by MISO and imported into the system. Although the MISO real time LMPs are available the day after an event, the total buy-through price includes other MISO charges such as the RSG<sup>1</sup>. Detailed settlement information is displayed in EPO for the customer after the buy-through price components are imported. The event credits/charges are exported to the Duke Energy billing system and appear on the customer's bill in the month following the PowerShare event(s).

Duke Energy has been working with Schneider Electric to improve the reporting capabilities of EPO. One Duke Energy manager reports that a new version has been developed and it will be launched and tested after the 2011 event season is over. The new version contains the ability to report event-specific information. The existing version of EPO allows Duke Energy to pull up reports on individual customers' load shed during events, but the new version allows aggregation across customers by event.

Past evaluation studies have reported that Duke Energy staff had been unable to retrieve reports from EPO easily. This year, Duke Energy reports that several improvements have been made to EPO's reporting capabilities. PowerShare staff now has the ability to pull reports on load reduction by event, as well as by customer.

## Reducing Load

Customers can choose to reduce load in one of two ways: If customers do not have generation capability, they can curtail load by shifting production schedules or turning off equipment. If customers have generation capability, they could choose to generate their own electricity instead of using electricity purchased from Duke Energy. MISO has strict requirements for generation. In addition to RTO requirements, Duke Energy program managers report that recent

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<sup>1</sup> The RSG (revenue sufficiency guarantee) compensates generators for their costs to produce energy in order to meet real time need. These costs are not known until generation is required, and MISO requires 6-7 days to settle those charges before passing them on to utilities.

EPA requirements<sup>2</sup> for use of diesel generators will also impact the ability of customers to use generation to reduce load, but that requirement is still being clarified.

# Energy Pricing for Economic Events

**Buy-through price for economic program.** The PowerShare program is intended to buffer all customers from potentially volatile energy prices during peak periods. However, customers may decide for economic reasons to risk the volatility of the energy market and pay the buy-through price, rather than reduce load. Customers may choose to buy through for many reasons, including a need to operate equipment to meet production goals. The buy through price is calculated based upon the real time price of energy plus RSG fees and administrative fee from Duke Energy.

Duke Energy provides Call Option participants with an estimate of the buy through price on the morning of the event. This estimate is an hourly price, based on “day ahead” prices. Duke Energy does not update that estimate. Instead, customers can obtain the real time prices on the day of the event directly from MISO on their website. Although that real time price is posted after the hour is over, this still allows customers to monitor the most current information. Customers can make an economic decision to buy through for all or part of the event.

**Penalty for emergency events.** Although no emergency events have been called in 2011, customers who do not reduce load in response to an emergency event face removal from the program. These removals are determined on a case-by-case basis. For the energy used during an emergency event, customers pay the real energy price plus a penalty. This penalty includes RSG fees from MISO and an administrative charge from Duke Energy. In addition, the customer forfeits the monthly premium for non-compliance during an emergency event.

## **2011 Events**

At the time of these interviews in September of 2011, there have been 7 economic event calls in Kentucky in 2011. The July 22<sup>nd</sup> event also included a call to Quote Option participants.

## **Settlement**

For economic events, Duke Energy provides advance notice to participants prior to 4:30 pm the day before. At that time, Duke Energy also provides customers with a pro forma load shape based upon their previous day's usage. That pro forma load shape is used as the baseline energy use for calculating settlements. The customer's energy use during the event call is reflected in the daily meter reading. Settlements for event incentives are done on a monthly basis. The accounts take approximately one week after an event to settle, largely because Duke Energy must wait 6-7 days for MISO to provide the actual price components for that day.

<sup>2</sup>EPA made the RICE NESHPAP (Reciprocating Internal Combustion Engines National Emission Standards for Hazardous Air Pollutants) ruling in February of 2010, with a compliance deadline of May 3rd, 2013.

## Management

Unlike past evaluations of this program, all Duke Energy staff now report that Duke Energy is providing them with enough time and resources to adequately manage the program. One manager reported that although monitoring conditions and running events took up the majority of time during the summer event season, management took advantage of the off season to plan for future program needs. While program operations during events is still time-constrained, Duke Energy managers now report that increases in staffing have been made since the last evaluation study. One PowerShare staff member reported that while his tasks were still very time constrained, it was because they were focused on providing a fast turnaround on event data so that customers could review their energy usage after events.

The biggest challenge reported by Duke Energy's retail energy staff is the need to schedule meetings for both PowerShare and Power Manager, which is Duke Energy's residential demand response program. Sometimes, the same system operations staff are required to attend both PowerShare and Power Manager meetings. One Duke Energy staff member says while they could all use more hours in the day on event days, "*Duke Energy has streamlined the process as much as anyone could*".

## Past Recommendations

A number of recommendations were made during the evaluation of the 2009 PowerShare program. Program managers were asked to provide a response to each recommendation at that time, explaining what they planned to do if they adopted the recommendation, or why they did not feel a recommendation was appropriate. There have been no new circumstances that are affecting Duke Energy's response to those recommendations. Those recommendations and Duke Energy's responses are documented below.

Past Recommendation 1. Via cooperative interaction between Duke Energy and the Public Utility Commission of Ohio, focus efforts on automating and streamlining PowerShare Program structures and operations, including integration with Smart Grid and web-based customer impact potential screening initiatives.

Duke Energy response: "We have not engaged any effort with the PUCO around streamlining the program and are not aware of any value that would be derived from the interchange. We have again, improved participation in PowerShare for 2011, without needing to get smaller customers. However, we have begun work on piloting Automated Demand Response in the DEO territory, which will: help find more cost effective ways to engage smaller/commercial customers as well as give a good view toward the next generation of DR--and including potential impacts of Smart Grid."

Past Recommendation 2: Investigate the marketing and enrollment success of the BRMs and identify if there are performance variances and identify the cause of performance variances if found. Determine if additional training or coaching is needed to increase successful enrollment performance so that the program's cost effectiveness is maintained or improved. TecMarket Works is not concluding that there is a training or expertise issue with the BRMs, but is suggesting that this recommendation be explored to determine if this condition is an issue, or if the enrollment variance is a function of client assignments.

Duke Energy response: "We created a new brochure and revamped the training that was conducted with the Account Managers in December 2010. In addition, weekly conference calls were held to discuss progress and share best practices. The feedback from account managers was very favorable and we increased customer load on the program by over 20% in 2011."

Past Recommendation 3: Continue to work with the contracted support vendors to identify and implement streamlined communication approaches, and more automated analysis and reporting practices. Assess the ability of the operational practices for the PowerShare Program to be molded after other similar programs if that will lead to lower costs or smoother operations. If this is not the case, continue to work with the current technical support vendor to focus on the operational needs of the PowerShare Program and Duke Energy's specific operational needs rather than focusing on operational improvements that can be adapted by other clients. Work with the current vendor to determine their level of commitment and anticipated cost structure to help establish operational systems that require less labor and staff intensity in the longer term for the Duke Energy program. Discuss the costs and labor issues with the vendor to reach an agreement on the scope, focus, timing and intensity of the vendor support. This may require more intensive short term focus as operational systems are adjusted and deployed.

Duke Energy response: "We have been receiving improved service from the key vendor in our IT area thus far in 2011 and we are reaching solutions on several areas that will streamline our processes for reporting, etc."

Past Recommendation 4: Develop clear program materials to be shared with participants and BRMs that explain the tariff concept in a way that customers can understand what it is and why it is applied to the payments they receive for those events and contacts to which this condition applies. Train the BRMs in how to present and discuss this topic with the participant and potential participant in order to avoid price expectation confusion.

Duke Energy response: "We created a new brochure and revamped the training that was conducted in December 2010. The feedback from account managers was very favorable and we increased customer load on the program by over 20% in 2011."

Past Recommendation 5: Lead an effort across the Duke Energy PowerShare team to try to set common M&V and financial impact analysis and reporting metrics that can simplify the amount of time spent on individual stakeholder analysis and reporting requirements. Involve the Midwest Independent Transmission System Operators (MISO), the system operators, the commission staffs, the power planners and internal Duke Energy program and financial managers. Focus on establishing common reporting and analysis requirements that meet the needs of all key stakeholders.

Duke Energy response: "There is a low probability of ever accomplishing getting a standard set of rules across the five states Duke Energy operates. However, we have been implementing an improved event reporting processes that should help this activity."

Past Recommendation 6: Examine the meter-based load response conditions that occur after a load reduction event to determine if there are participants who experience increased demand changes because of the load call. If these conditions are found, consider moving these customers off the program, or adjusting their rate structure to an on-peak/off-peak rate. If these conditions are found to be problematic for a significant number of program participants, consider training BRMs to work with participants to identify strategies for screening these customers prior to an enrollment offer or help the participant identify strategies for minimizing load increases at the end of the control period.

Duke Energy response: ‘We are not aware of any customer issues on this front. If this actually occurred, we would work with the customer to make an appropriate adjustment to their billing demand. To our knowledge, we have not received any requests from customers on this issue.’”

## **Future Program Changes**

Duke Energy is proactively identifying and anticipating future changes to the program. As described earlier, Duke Energy has adopted PJM requirements for demand response programs even though the migration to PJM will not occur until January 1, 2012. In addition to issues related to the migration, integrated resource planners have forecasted a future need for greater capacity in Kentucky. Duke Energy program managers reported that they will be increasing enrollment efforts over the next few years in anticipation of that future need.

Duke Energy is also pilot testing a concept for automated demand response PowerShare option that would be targeted to customers in commercial office building spaces. The pilot is currently being conducted in Ohio, and program staff are evaluating whether it would be appropriate for the other states in which Duke Energy offers a PowerShare program.

Another challenge that Duke Energy will be addressing in the coming years is a new EPA regulation that affects how frequently diesel generators can be used.

Duke Energy staff also plays an active role in the demand response community, such as participating in the National Town Meeting that is held by the Association for Demand Response and Smart Grid. This allows them to share program innovations that Duke Energy has developed and to continually monitor ongoing discussions at peer utilities to identify new market sectors and program participation requirements.

## Section 2: Participant Interview Results

Interviews were conducted with 10 Duke Energy Kentucky PowerShare® customers who participated in PowerShare in 2010 and 2011. These customers come from a variety of sectors, including medical, educational, and manufacturing. Customers were asked to describe their experiences during the application process, during events, and with post-event settlement. These customers<sup>3</sup> include those who enrolled for less than a year to some who had been participating for several years.

These 10 companies do not constitute a statistically significant sample. The size of the sample does not support any conclusions that would generalize to the rest of the PowerShare participants. These interviews are intended as an opportunity to capture a few qualitative observations from PowerShare Kentucky customers.

### Enrollment

Aside from two customers who inherited management of their PowerShare programs, all customers credited Duke Energy account managers as being the one who first made them aware of the program and its benefits. This is to be expected, given that Duke Energy is marketing the program primarily through account managers.

Most of the customers interviewed participated primarily for economic reasons. One company, an educational institution, reported that the actual cost savings were very small given their budget, but they participated to “*show the community and university we are serious about reducing our usage, and doing our part to curtail energy use.*” A second company also reported that their primary motivation for participating was to “*do their part to lighten demand*”. Two other companies cited environmental concerns as a secondary reason for participating. One of these companies reported that their company reviews their sustainability efforts on an annual basis and that participating in PowerShare was partly motivated by that. The other company reported that while their primary reason for participating was economic, “*Environmentally it seemed to be the right thing to do...as long as it's not too costly to do the right thing.*”

One customer reported that during enrollment discussions with their account manager, they found that their base load was very difficult to calculate due to the inherent variability of their energy usage. While they were appreciative of their account manager’s efforts in trying to help them establish a more accurate proforma, in the end they decided their business really could not support a reliable method of making this calculation. Given that, they were puzzled that their account manager estimated that they would be able to reduce their usage by a fixed level of 800 kW during events, given that their proforma had such variability. They reported that in future years, they would probably ask to “*back [the fixed level commitment] off, to give us some breathing room.*” They found it difficult to meet that level of reduction.

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<sup>3</sup> One customer, not included in the 10, did not complete the interview because he reported that although he had been getting event notices, he did not know what they were for and never responded. For that particular customer’s company, there was another contact person listed who had been also receiving event notices, but the evaluation team was not able to reach that person despite multiple attempts.

## Customer Engagement with the Program

Customers had varying degrees of familiarity with the details of their PowerShare agreement. Six of the 10 customers interviewed were aware of the Call Option program their company had selected. Four of them specifically mentioned 10/10, or 10 economic and 10 emergency events, while two only remembered that they had committed to 20 events per year. The remaining customers were not sure.

Customers all reported that they were notified of events through phone calls, emails and faxes. When asked how they preferred to be notified, all customers said they liked emails, and six of them also wanted to be notified by other methods in addition to emails. One customer explained he really liked the written record that emails provide. Aside from email, customers reported different preferences depending on whether they were likely to be at their desks and email accessible.

**RECOMMENDATION:** If Duke Energy's notification system allows customer to designate their preference for method of contact, Duke Energy should consider reviewing with customers at the beginning of each event seasons their preferences. Duke Energy should also remind customers who choose more than one method that the notification system will escalate by using different methods of making contact until the customers respond.

## Obtaining information about PowerShare

Customers unanimously lauded the excellent work of their account representatives in providing information about PowerShare, and for taking their time to walk them through the program if necessary. Customers were asked specifically to rate how easy it was for them to understand the PowerShare incentive structure. A 10-point rating scale was used, with 1 indicating "extremely difficult" and 10 indicating "extremely easy". Ratings varied widely: Four customers gave a rating of 8 or higher. One customer declined to answer because his company ended participation when incentive became too low relative to his changed financial requirements. Of the remaining five customers, one reported difficulty understanding how base loads were calculated, two reported difficulty understanding the buy through price calculation, and two attributed the difficulty to their unfamiliarity with demand response programs in general. One of these customers reported, "[Duke Energy's account manager] did a great job explaining. If it weren't for her, I wouldn't have understood it."

Customers recalled asking a variety of questions about the language of the PowerShare agreement, the event incentive rates in the past, number of events called in past years, and how many consecutive days, events might be called. Despite their attempts to predict their likelihood of having events, one customer said he "*walked away from the initial meeting*" with his account manager with the expectation that there were not likely to be many outages because energy usage would be decreased during this down economy. He reported being surprised when events were called, and he called his account manager to find out "*what had changed*." He did report that his account manager was able to explain the need to call events.

## Marketing and Printed Materials

When asked how Duke Energy might improve the informational materials, three customers requested a summary sheet highlighting the program's key components. Two other customers made a related request, for someone from Duke Energy to contact them at the beginning of the event season to provide a refresher on what their company had agreed to achieve. One customer reported that he had independently already made that request of their account representative, and were very pleased with the time their account representative spent answering their questions.

**RECOMMENDATION:** Duke Energy should consider providing customers with a summary sheet that highlights the program's key components, and their company's specific commitment in their agreement. Duke Energy should also consider developing a process flow chart that illustrates the sequence of events during an event day, starting with the identification of event conditions, notification of customers, and the different paths to settlement should the customer choose to reduce load or buy through.

Another customer reported that while he was able to understand the printed PowerShare materials without problems, his upper management did not have the technical background necessary to understand the printed materials without an account manager present to answer questions. He suggested that PowerShare might develop some materials "*targeted to the executive suite*". While Duke Energy currently has a one-page explanation of PowerShare (for another state, Ohio), it seems to contain industry jargon that some customers might not fully understand, such as "Curtailment is implemented when...a regional event is necessary."

**RECOMMENDATION:** Duke Energy should consider developing a one-page explanation of the PowerShare program aimed at executive-level decision makers who may not have the technical background to understand electric industry jargon. Duke Energy can informally test this material with the intended target audience, namely executives who may not be familiar with the electric industry.

In summary, the participant responses showed that they had widely diverse information needs, but that in almost every case their Duke Energy account manager were able to satisfy their questions.

## Reviewing the Forecasted Load

Most customers did use the forecasted load appropriately. That is, those who were making a financial decision reported they would review it before the event and estimate the business case for reducing, and those whose decisions were driven primarily by a need to serve clients may review it before and after an event to estimate the financial damages of their decision to buy through.

## Buy Through Pricing

One customer, who participated in PowerShare primarily to reduce operating costs, reported that the estimated buy through price that he was given prior to the event seemed very different from the settled price, sometimes by a factor of 4. He also mentioned that because he was not given the settled buy-through price until several days after the event, if another event is called before that time he was unable to "*have a good idea of what the buy through price is.*" This customer

seemed to be trying to use the delta between estimated and settled buy through prices of earlier events to help adjust his own impressions of whether future estimates of buy-through prices were likely to be equally accurate. He reported that because there was such a large discrepancy between the estimated and settled prices, his decisions to buy through on events turned out to have cost him more than if he had chosen to reduce. Duke Energy staff report that the account managers are instructed to encourage customers to obtain the real time prices from MISO's website on the day of the event, because the estimated buy through price can only be an estimate. While this customer's experience is not necessarily representative of all PowerShare customers' experiences, it may indicate a need for Duke Energy to address customer expectations about the inherent uncertainty of estimated buy through prices.

**RECOMMENDATION:** If not already being done, Duke Energy should track the discrepancy between the estimated buy-through prices provided to customers prior to an event compared with the settled buy-through price. If customers become concerned that there are repeated discrepancies that are not in the customers' favor, Duke Energy account managers will need to manage customers' future expectations better. Duke Energy may wish to ask account managers to remind customers about the volatility of market prices, and perhaps be able to provide past data on the tracked discrepancies. The past data should show that while sometimes the discrepancy is in the customers' favor, sometimes it is not. Tracking the discrepancies may allow Duke Energy to anticipate customers' concerns and manage expectations before customers perceive any problems. Customers might also be reminded that PowerShare is intended to buffer customers from the energy market's price volatility by giving them advance notice to curtail their energy use.

## **Effort to Reduce**

Customers were asked how difficult it was for them to reduce energy usage. As might be expected, their responses varied widely, depending on the stability their energy needs. Customers were also asked if they would be able to reduce a larger load than they agreed to. Two customers reported that because it was their first year of PowerShare participation, they purposefully committed to a smaller load than they thought was achievable so that they could test how well their expectations for reducing load matched reality. Others reported they had committed their entire capacity. The variability of responses is not surprising, given that the sample was drawn across different sectors. But it may be important to note that nine of the 10 customers declined to participate in at least one event; six customers declined all the events. Of the nine who declined an event, four made a decision based on financial reasons (e.g. cheaper to buy through than to generate), the others declined because they had to meet client needs (e.g. building needed to be occupied, clients were visiting the facility, they were in the middle of a maintenance project). Within that last category, one customer reported that their method of reducing load required generation, however they could not tolerate the exhaust fumes from the generator if the wind conditions were not favorable.

Although Duke Energy account managers were not interviewed for this process evaluation, it is likely that they have a clear grasp of whether their assigned customers are able to reduce load easily, and whether their customers were being conservative when they selected their fixed level and firm level reduction commitments. At least half of the customers interviewed were in their

first year of participation, and at the time of these interviews in September of 2011, the summer event season had not concluded.

**RECOMMENDATION:** If the account managers are not already doing so, Duke Energy should consider following-up with first year PowerShare participants to review their fixed and firm level load reduction commitments. Duke Energy should also consider providing customers with the ability to adjust their commitments for the next event season, while experience of the current event season is still fresh in their minds. This will allow customers to provide feedback to Duke Energy on whether their load reduction commitments were easily achieved, just right, or too onerous.

Customers were also asked if they were interested in an automated demand response program. Duke Energy is currently pilot testing an automated demand response program in Ohio, targeted to office buildings. Only one of the customers interviewed for the PowerShare Kentucky program had an office building, but he was not interested in an automated demand response program. Only one customer indicated he may be interested in a program that would allow Duke Energy to “pull the trigger”, if all other event parameters such as the time and duration could be determined by the customer, perhaps the day before.

## Satisfaction Ratings

**Table 3. Satisfaction with PowerShare Incentives (1 to 10 satisfaction scale)**

	Incentive Levels	Event Time Window	Method of Confirming Load Reduced	Time to Receive Incentive	Amount of Incentive Received
Mean	8.10	6.50	7.50	6.33	6.80
st. dev.	1.66	1.94	1.55	2.88	1.79
N	10	10	7	6	5

Customers were asked to rate their satisfaction on different aspects of the PowerShare program. Ratings were on a scale of 1 to 10, with 1 indicating “extremely dissatisfied” and 10 indicating “extremely satisfied.” Table shows ratings of satisfaction with PowerShare incentives.

Customers were satisfied with the level of incentives offered by the program (8.10 rating), but not as satisfied with their specific incentive payments (6.80), nor the time it took to receive them (6.33). Some customers did not respond to the incentive questions because they were not able to reduce load in response to event calls. One primary reason customers were not able to reduce load was because they had clients on site or needed to continue production to meet client demands. These customers gave lower satisfaction ratings for the event time window (6.5), but they seemed to understand that the event time window needed to be during their peak periods. Two of them joked that a better time window for them would be night time or weekends. Some customers did not provide ratings because they had problems receiving their incentives. Two customers reported they had just received their first event incentive payment (at the time of the interviews in September of 2011). One customer reported that he had not yet received an event incentive. One customer reported that one of his accounts was missing a month’s event

incentive payment, and said “*I feel I need to watch the bills. [But Duke Energy] makes right on it, I’m not worried.*”

Duke Energy reports that there are separate line items in the monthly bills showing the monthly PowerShare premium credit and any buy through charges. However, at least one customer seems not to have noticed these. This customer reported that PowerShare buy through costs were not clearly shown on the bill: “*It isn’t broken out on the bill. It just looks like a normal bill. You can tell there’s a pattern showing the event: it’s slightly elevated in terms of cost per kW. But if I weren’t looking for it, I wouldn’t be able to detect it.*” This customer also reported they were not receiving their monthly capacity premium credit. While customers’ ratings showed somewhat higher satisfaction (7.5) with Duke Energy’s method of confirming the load they reduced, one customer reported they never received any confirmation of their reduction and wondered if it might have been in an email that was not received. While not directly assessed, customer satisfaction with Duke Energy’s method of confirming load reduction may be linked to the event incentives that were (or were not) perceived to have been received. Duke Energy staff members report that details of all event incentive or buy through calculations should accessed through EPO.

**RECOMMENDATION 6:** Duke Energy should consider reviewing PowerShare customer bills to see if there are ways to improve the transparency of the buy-through charges and capacity premium credits. While space limitations on the monthly bills would not allow full details to be included on each bill, Duke Energy might consider including reminders on the bill to go to the EPO website. The EPO website contains detailed graphs that explicitly tie the information about the settlement incentive with their confirmation of load reduction. This reminder may help PowerShare customers to remember to refer to the website where they can clearly see the link between actions they take to reduce load and the associated costs or benefits.

**Table 4. Satisfaction with PowerShare Program Information (1 to 10 satisfaction scale)**

	Ease of Application	Info Explaining Program	Technical Expertise of Duke Energy Staff	Time for Duke Energy to Respond	Overall Satisfaction with PowerShare	Overall Satisfaction with Duke Energy
Mean	8.50	8.15	9.10	9.15	8.22	8.60
st. dev.	1.20	1.33	1.29	1.16	1.20	0.97
N	8	10	10	10	9	10

Table shows customers’ satisfaction ratings with other aspects of the program. Customers were unanimous in their agreement that Duke Energy’s account managers did an excellent job answer technical questions, addressing all of their concerns in detail, and even in helping them revise their proforma when it was clear that the proforma was not representative of the customer’s energy use. These are reflected in the high satisfaction with the technical expertise of Duke Energy staff (9.10) and in their high satisfaction with the time it took for Duke Energy staff to respond to their concerns (9.15). Customers had moderate satisfaction with the ease of applying for the program (8.5) and with the information they were provided explaining the program (8.15). In their comments, customers mentioned that they needed Duke Energy account

managers to fully explain the program, and that the printed materials were not written for a non-technical audience.

Overall, Duke Energy Kentucky customers rated their satisfaction with the PowerShare program 8.22, and their satisfaction with Duke Energy overall higher at 8.60.

It is important to note that many of these customers are experiencing their first year of PowerShare events and that it is rarely easy for customers to reduce load during peak periods. Compared to years in which no events were called, it would not be unexpected to see some of the challenges of responding to event calls being reflected in these ratings. A more accurate view of customer satisfaction will develop after customers have had longer experience with the program and with the natural fluctuations in temperatures from event season to event season. Future satisfaction surveys with long-term customers should be designed to prime customers' recall of both seasons where there have been few event calls and seasons where there have been several event calls.

## Suggestions

Customers were asked to share thoughts on how Duke Energy might increase participation from companies such as theirs. A few customers gave generic suggestions that Duke Energy should conduct more marketing, with one mentioning advertisements on utility bills. Two customers mentioned that while they were going through their own decision-making process, they had wanted to know what their peers' experiences were with the program. One customer reported that their account manager had made arrangements for them to speak to other customers in the same sector, and that they found that "*really helpful*". Another customer mentioned that they would like to know what Duke Energy's other customers were choosing, and suggested that perhaps Duke Energy could present information without specifying the names of the companies. For example, Duke Energy might do this by telling prospective participants what percentage of Duke Energy customers were currently participating in PowerShare.

**RECOMMENDATION:** If the account managers are not already doing this on a consistent basis, Duke Energy can consider asking current customers if they would be willing to share their honest experiences with prospective customers, so that the account managers could have a ready list of companies willing to speak with other companies. Duke Energy may also want to look at past participation records. If there is favorable data such as 1) a large proportion of customers in the prospects' sector do participate, or 2) there is an increasing trend in participation in a prospect's sector, that information may help persuade the prospect to participate.

Most customers had no suggestions to make. They reported that the account managers have been doing an excellent job explaining the program. One customer summarizes, "*I think it's a neat program, I like the way it's run...I think it seems to go fairly well.*"

## Appendix A: Program Manager Interview Instrument

Interviewer: \_\_\_\_\_ Date of Interview: \_\_\_\_\_ Interview method: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Position description and general responsibilities:

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**We are conducting this interview to obtain your opinions about and experiences with the PowerShare Program for the state of [insert state] as it was implemented between the dates of [insert start date of program period under evaluation] and [insert end date of program period]. We'll talk about the Program and its objectives, your thoughts on improving the program and its participation rates. As you may know, due to regulatory requirements Duke Energy needs to conduct periodic evaluations whether they are needed or not. Today's interview will take about an hour to complete. May we begin?**

### Program Overview

1. In your own words, please briefly describe the PowerShare [State] Program's objectives.  
Are there any objectives at the participant level? What are they?  
Are there any objectives at the state portfolio level?  
Are there any objectives at the company level, across all the PowerShare states?
2. In your own words please describe how the PowerShare Program works and go over its design, marketing and operational approaches. Walk us through the participatory steps starting with a customer who knows nothing about the program.
3. Please explain the different PowerShare options that are available to Duke Energy customers in the state of [insert state] along with their incentives.
4. Please describe your role and scope of responsibility in detail. What is it that you are responsible for as it relates to this program? When did you take on this role?
5. Do you feel that Duke Energy has provided you with enough time and resources to adequately manage this program? Did you receive the support that you need to manage this program? What else is needed?

6. Please describe for me the roles and responsibilities of vendors that are supporting Duke Energy's PowerShare program in the state of [insert state]?
7. Are there any changes you would like to see in the vendors' roles or responsibilities, that would improve the PowerShare program's operations?

### **Objectives**

8. Have the PowerShare's objectives changed in the last year or so, and if so how? Why?
9. In your opinion, which objectives do you think are being, or will be, met?
10. Since the program objectives were devised, have there been any changes in external influences (such as market conditions) or internal influences that have affected the PowerShare program's operations?
11. Should the current objectives be revised in any way because of these changes that developed since the program objectives were devised? What changes would you put into place, and how would it affect the objectives?
12. Are there any pre-existing conditions that are associated with the program in the state of [insert state] or the market that are not being addressed or that you think should have more attention? If yes, which conditions are they? How should these conditions be addressed? What should be changed? How do you think these changes will increase program participation or impacts?

### **Incentives**

13. Do you think the incentives offered through the PowerShare Program are adequate enough to entice the C&I community to enroll in the program? Why or why not?
14. Do you think the customers understand the incentive levels and how they are calculated? Have there been any issues relating to the customers understanding the incentive approach or confusion over what they are paid? What can be done to minimize this confusion?
15. If Duke were able to change the incentive level for each event, how do you think this would impact PowerShare's ability to acquire power reductions? In other words, do you think customers have additional ability to shed load that could be tapped if the incentives were increased?

### **Marketing**

16. What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program? Are there any changes to the program marketing that you think would increase participation?

17. Do you think the materials and information presented to the C&I community about the PowerShare Program provides a complete enough picture for them to understand the potential importance of the program to them and their operations and the incentive or participatory benefits of the program?
18. In the state of [insert state], are there specific customer types (business types) or market segments that you think Duke Energy should focus more effort on enrolling? What are they? How should PowerShare approach them with this program?
19. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?
20. What are the key market or operational barriers that impede a more efficient program operation or limit obtainable impacts?
21. What market information, research or market assessments are you using to identify market or segment-level barriers, and develop more effective or targeted operational mechanisms?

### **Overall PowerShare Management**

22. Describe the use of any internal or outside program advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use these resources? What do you use them for?
23. Do you think there should be changes made to the structure of the participation options?  
*For instance, in Kentucky's 2007 evaluation of the program, a company can opt for "quote" or "call" participation. Being "call" involves mandatory interruption, but only 2 companies enrolled. 20 companies enrolled in the optional "quote" group – but only 1 participated in the single event in 2007.*
24. (*Midwest only: Duke OH and KY will be with PJM instead of MISO.*) Given the RTO changes for 2012, how will the PowerShare program need to adapt? What operational or administrative changes will be necessary due to the change in RTOs from MISO to PJM?

### **Event calls**

25. How do you track, manage, and monitor or evaluate customer response to the event calls?
26. For customers who do not shed as much load as anticipated, do you know why customers did not shed enough load?
27. Can you describe for me a picture of how customers react to a call? How fast do they learn of a call, what determines what they can do, how fast can they react?

28. Given that PowerShare customers have different capabilities to react to an event depending upon their work volumes, production schedules, etc., how does PowerShare capture needed savings within the different customer conditions and capabilities in the market?
29. How do you know if they reached their load shifting objectives?
30. What is the quality control, tracking and accounting process for determining how well control and control strategies work at the customer level and at the program level?
31. Are there any market segments or customer types that the program is now serving that are not able to provide the load shed within the timelines and notification systems used today? What would you suggest should be done about this customer segment?

## **UPDATE ON CONSIDERATION OF PAST EVALUATION RECOMMENDATIONS**

In the evaluation of the 2009 PowerShare program, there were a number of findings and associated recommendations. In this last part of our interview, I'd like to ask you for an update on what Duke's response to the recommendations were. I understand that there has not been very much time since the recommendations were made, but we would like to document any plans for responding to the recommendations.

### **Recommendation 1**

Via cooperative interaction between Duke Energy and the Public Utility Commission of Ohio, focus efforts on automating and streamlining PowerShare Program structures and operations, including integration with Smart Grid and web-based customer impact potential screening initiatives.

### **Recommendation 2**

Investigate the marketing and enrollment success of the BRMs and identify if there are performance variances and identify the cause of performance variances if found. Determine if additional training or coaching is needed to increase successful enrollment performance so that the program's cost effectiveness is maintained or improved. TecMarket Works is not concluding that there is a training or expertise issue with the BRMs, but is suggesting that this recommendation be explored to determine if this condition is an issue, or if the enrollment variance is a function of client assignments.

### **Recommendation 3**

Continue to work with the contracted support vendors to identify and implement streamlined communication approaches, and more automated analysis and reporting practices. Assess the ability of the operational practices for the PowerShare Program to be molded after other similar programs if that will lead to lower costs or smoother operations. If this is not the case, continue to work with the current technical support vendor to focus on the operational needs of the PowerShare Program and Duke Energy's specific operational needs rather than focusing on operational improvements that can be adapted by other clients. Work with the current vendor to determine their level of commitment and anticipated cost structure to help establish operational systems that require less labor and staff intensity in the longer term for the Duke Energy

program. Discuss the costs and labor issues with the vendor to reach an agreement on the scope, focus, timing and intensity of the vendor support. This may require more intensive short term focus as operational systems are adjusted and deployed.

#### **Recommendation 4**

Develop clear program materials to be shared with participants and BRMs that explain the tariff concept in a way that customers can understand what it is and why it is applied to the payments they receive for those events and contacts to which this condition applies. Train the BRMs in how to present and discuss this topic with the participant and potential participant in order to avoid price expectation confusion.

#### **Recommendation 5**

Lead an effort across the Duke Energy PowerShare team to try to set common M&V and financial impact analysis and reporting metrics that can simplify the amount of time spent on individual stakeholder analysis and reporting requirements. Involve the Midwest Independent Transmission System Operators (MISO), the system operators, the commission staffs, the power planners and internal Duke Energy program and financial managers. Focus on establishing common reporting and analysis requirements that meet the needs of all key stakeholders. Focus resources on establishing more automated analysis practices when possible. Consider the relative costs and benefits of multiple approaches, including hiring additional part-time, seasonal or full time reporting staff, contracting reporting requirements to skilled service suppliers, and automation options. Consider increasing the allowable overhead and administrative costs to implement the program and contract or hire additional analysis and reporting analysts and reporting staff if these other efforts are not successful or cost effective.

#### **Recommendation 6**

Examine the meter-based load response conditions that occur after a load reduction event to determine if there are participants who experience increased demand changes because of the load call. If these conditions are found, consider moving these customers off the program, or adjusting their rate structure to an on-peak/off-peak rate. If these conditions are found to be problematic for a significant number of program participants, consider training BRMs to work with participants to identify strategies for screening these customers prior to an enrollment offer or help the participant identify strategies for minimizing load increases at the end of the control period.

32. Overall, what about the PowerShare Program works well and why?
33. What doesn't work well and why? Do you think this discourages participation?
34. In what ways can the PowerShare Program's operations be improved?
35. If you could change any part of the program what would you change and why?
36. Are there any other issues or topics you think we should know about and discuss for this evaluation?

## Appendix B: Participant Survey Instrument

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Title: \_\_\_\_\_

Hello, my name is \_\_\_\_\_. I am calling on behalf of Duke Energy to conduct a customer satisfaction interview about the PowerShare program. May I speak with \_\_\_\_\_ please?

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

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

Call 1: Date: \_\_\_\_\_, Time: \_\_\_\_\_  AM or  PM  
Call back 2: Date: \_\_\_\_\_, Time: \_\_\_\_\_  AM or  PM  
Call back 3: Date: \_\_\_\_\_, Time: \_\_\_\_\_  AM or  PM

Contact dropped after third attempt.

We need your help. Duke Energy has given us your name as someone who might be able to share some of your experiences with the PowerShare Program. We are not selling anything. We would like to conduct a short interview that will take about 15-20 minutes and all your answers will be kept confidential. This information will enable Duke to make improvements to the program and the application process. Would you be able to help us?

### Establishing Questions

ES-0. Would you please tell me what your company does, and what your role is in your company? \_\_\_\_\_

ES-1. Our records indicate that your company participated in the PowerShare Program. Do you recall participating in this program?

1.  Yes, begin  
2.  No,  
99.  DK/NS

Skip to Q2.

1a. “PowerShare is Duke Energy’s demand-response program developed to reward your business for adjusting energy consumption levels during peak time periods.”

- Do you remember participating in this program?  
1.  Yes, [Go to ES-2].  
2.  No,

Total Population

Total Capacity

99.  DK/NS

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

ES-2. If 2010 only participant, skip this question. In which option or options did your company enroll?

Kentucky: 2011-2012

- 0 Economic/10 Emergency
- 5 Economic/10 Emergency
- 10 Economic/10 Emergency
- QuoteOption

Ohio: 2011-2012

- 0 Economic/10 Emergency
- 5 Economic/10 Emergency
- 10 Economic/10 Emergency
- 15 Economic/10 Emergency
- QuoteOption

Southeast:

- a)  Mandatory Curtailment Option
- b)  Voluntary Curtailment Option
- c)  Generator Option
- d)  Call Option

### Information-Gathering Phase

INFO-1. How did you become aware of the PowerShare Program?

- a)  Duke Energy sent me a brochure
- b)  A Duke Energy representative told me about it
- c)  Duke Energy website.
- d)  I saw an ad in \_\_\_\_\_
- e)  Other \_\_\_\_\_
- f)  DK/NS

INFO-2. At the time you became aware of the program and were considering whether or not to participate, did you do any additional investigation to confirm the program's participation requirements and program benefits, or was the information you had enough for you to make a participation decision?

- a)  The information received was adequate
- b)  Didn't need to confirm/ already knew about it
- c)  Went to the program or Duke Energy web site
- d)  Called or emailed a Duke Energy contact
- e)  Other: \_\_\_\_\_
- f)  DK/NS

If c, d, e, f, g:

INFO-3. Were you able to get the information you needed about the program's participation requirements and benefits?

1.  Yes    2.  No    99.  DK/NS

INFO-4. While you were deciding whether or not you wanted to participate, did you have additional questions for Duke Energy that were not answered?

1. No (continue to INFO-5)  
2. Yes (continue to INFO-4a)

INFO-4a. Were you able to get the answers you needed?

1. No  
2. Yes

INFO-4b. What were you asking about?

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INFO- 5: Would you please rate for me how easy it was for you to understand the PowerShare incentive structure on a scale of 1 to 10, with one being extremely difficult and 10 being extremely easy?

1    2    3    4    5    6    7    8    9    10

[If rating was less than 8:] What could Duke Energy do to make the incentive structure easier for customers to understand?

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## Decision Making

DM-1. What was the primary reason that you decided to participate? [If the customer participated in more than one option:] Why did your company choose to participate in each of these options?

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## Participation in an Event

EV-1. Can you tell me, how many PowerShare events has your business been asked to respond to this year?

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EV-2a. How were you notified of the event?

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EV-2b. How do you prefer to be notified about future events?

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EV-3. Did you decide to reduce energy use for every event, or did you decide to decline one or more events?

EV-3a. [If customer did reduce] On the occasions you chose to reduce, why did you choose to?

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EV-3b. [If customer did reduce] Do you think you would have been able to reduce more? Why or why not?

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EV-3c. [If customer declined to reduce] Why did you decline to reduce energy usage?

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## **Forecasted Loads**

EV-4 As you know, Duke Energy provides a forecasted load pattern to you the day before an event to help in your decision making process. Do you review that load shape....

1. Before participating in a Curtailment Event? Never, Rarely, Sometimes, Always
2. During or immediately after a Curtailment Event? Never, Rarely, Sometimes, Always
3. Sometime after a Curtailment Event but before the bill comes? Never, Rarely, Sometimes Always
4. After the monthly bill comes? Never, Rarely, Sometimes, Always

EV-5 I'd like to ask how achievable your targeted level of load reduction is. Would you say the targeted level of load reduction you currently have with Duke Energy is ....

1. Much less than you can provide
2. Less than you can provide
3. About right for your company
4. More than you want to provide
5. Much more than you want to provide
6. Don't know.

## Automated Demand Response

EV-6. How interested would you be in using an automated method to curtail load that would respond to a signal from Duke Energy about a curtailment event? In this type of structure Duke Energy would send a signal to a piece of control equipment installed at your site, such as on an HVAC compressor, fan, temperature set-point unit or equipment control system that would automatically make an adjustment that would reduce energy use for that piece of equipment at that time. The incentive would then be based on the energy that would be saved from the equipment being automatically controlled by the Duke Energy signal. The customer would not have to make any adjustments themselves because it would have automatically occurred at the time the signal was sent. Would you be:

1. Not at all interested in this approach,
2. Slightly interested
3. Somewhat interested
4. Very interested

EV-6a. If not at all interested: What are your concerns about this type of an approach?

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EV-6b. If interested (2-4 above) What are the primary reasons that you would be interested in this type of a control approach?

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## Improvements

Impr-1. One of the objectives that the PowerShare program would like to see over the next year is increased participation of businesses like yours. Can you think of things that the program can do to help increase participation or help increase interest from people like yourself?

- a.  Increase general advertising
- b.  Increase advertising in trade media
- c.  Present the program in trade or associated meetings
- d.  Offer larger incentives
- e.  Offer incentives on other items/include other items
- f.  Have program staff call small C&I customers
- g.  Make the process more streamlined for customers
- h.  Make the process more streamlined for contractors
- i.  Increase number of events
- j.  Decrease number of events
- k.  Offer participation with events during certain months
- l.  Other: \_\_\_\_\_

Impr-2. At any time during your application process, did you need to contact Duke Energy to obtain information, or ask about progress on the application, or to obtain any other help, assistance or information?

1.  Yes    2.  No    99.  DK/NS

If yes, Impr 2-a. Were your questions or needs effectively handled by the Duke Energy?

1.  Yes    2.  No    99.  DK/NS

Impr 2b. How might this be improved?

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### **Aggregation of Accounts (Carolinas Only)**

Impr-3. How interested would you be in aggregating your accounts together, for PowerShare purposes only, in order to optimize load curtailment strategies across several Duke Energy accounts? Would you be:

- a. Not at all interested
- b. Slightly interested
- c. Somewhat interested
- d. Very interested

Impr-4. Overall, what about the PowerShare Program works well and why?

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Impr-5. What doesn't work well and why?

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Impr-6. Do you review your proforma loads prior to events?

If so, do you find them useful?

### **Satisfaction**

We would like to ask you a few questions about your satisfaction with the program. For these questions we would like you to rate your satisfaction using a 1 to 10 scale where a 1 means that you are very dissatisfied with the program and a 10 means that you are very satisfied.

How would you rate your satisfaction with:

Sat-1. The incentive levels provided by the program

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

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Sat-2. The ease of applying for the program

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

---

Sat-3. The time window in which you were required to reduce your load

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

---

Sat-4. Duke Energy's method for confirming how much load you reduced?

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

---

Sat-5. The time it took for you to receive your incentive

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

---

Sat-6. The amount of your incentive

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

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Sat-7. The technical expertise of Duke Energy staff

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask: What could have been done to make this better?*

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Sat-8. The time it took for Duke Energy staff to respond to any questions or address any issues.

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask:* What could have been done to make this better?

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Sat 9. The information you were provided explaining the program

1      2      3      4      5      6      7      8      9      10

*If score is 8 or less ask:* What could have been done to make this better?

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Sat 10. Considering all aspects of the program, how would you rate your overall satisfaction with the PowerShare Program?

1      2      3      4      5      6      7      8      9      10

*Sat-10a. If score is 8 or less ask:* What could have been done to make your experience better, or have we already covered it?

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Sat 11. How would you rate your overall satisfaction with Duke Energy?

1      2      3      4      5      6      7      8      9      10

*Sat-11a. If score is 8 or less ask:* Why are you less than satisfied with Duke Energy?

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Sat-12. Are there any other thoughts or comments you would like to share with Duke management about the PowerShare program, that we have not discussed already?

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Duke Energy Kentucky  
4580 Olympic Blvd.  
Erlanger, Kentucky 41018

KY.P.S.C. Gas No. 2  
Ninth Revised Sheet No. 62  
Cancels and Supersedes  
Eighth Revised Sheet No. 62  
Page 1 of 1

**RIDER DSMR**  
**DEMAND SIDE MANAGEMENT RATE**

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 61 of this Tariff.

The DSMR to be applied to residential customer bills is (\$0.053372) per hundred cubic feet.

A Home Energy Assistance Program (HEA) charge of \$0.10 will be applied monthly to residential customer bills through September 2014.

The DSMR to be applied to non-residential service customer bills is \$0.00 per hundred cubic feet.

Issued by authority of an Order by the Kentucky Public Service Commission \_\_\_\_\_  
dated in Case No.\_\_\_\_\_

Issued:

Effective:

Issued by Julie Janson, President



Duke Energy Kentucky  
4580 Olympic Blvd.  
Erlanger, KY 41018

KY.P.S.C. Electric No. 2  
Ninth Revised Sheet No. 78  
Cancels and Supersedes  
Eighth Revised Sheet No. 78  
Page 1 of 1

**RIDER DSMR**  
**DEMAND SIDE MANAGEMENT RATE**

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 75 of this Tariff.

The DSMR to be applied to residential customer bills is \$0.001295 per kilowatt-hour.

A Home Energy Assistance Program (HEA) charge of \$0.10 will be applied monthly to residential customer bills through September 2014.

The DSMR to be applied to non-residential distribution service customer bills is \$0.001060 per kilowatt-hour.

The DSMR to be applied for transmission service customer bills is \$0.000430 per kilowatt-hour.

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