

# LARGE FILING SEPARATOR SHEET

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Efficiency Status Report.

**Table 17. Additional Energy Efficiency Actions Influenced by Smart Saver**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Have taken additional energy efficiency actions inspired by this program (all actions)	28.4%	31.3%	29.8%
Use more efficient light bulbs	11.1%	3.8%	7.5%
Upgrade to more efficient appliances / Energy Star	6.2%	6.3%	6.2%
Upgrade windows / doors	7.4%	5.0%	6.2%
Added insulation	6.2%	5.0%	5.6%
Weather stripping	3.7%	6.3%	5.0%
Upgrade HVAC system	0.0%	8.8%	4.3%
Install programmable thermostat	2.5%	1.3%	1.9%
Upgrade duct work	1.2%	1.3%	1.2%
HEHC / home energy audit	1.2%	1.3%	1.2%
Power Manager	1.2%	0.0%	0.6%
Unplug extra freezer or refrigerator	0.0%	1.3%	0.6%
Other (listed below)	3.7%	2.5%	3.1%

Five survey respondents mentioned “other” energy efficiency actions; their responses are listed below.

**Rebate for heat pump (N=3)**

- *Installing low-flow faucets as part of bathroom and kitchen remodeling.*
- *I've been making my family more conscious about turning out lights when they are not using them.*
- *We bought black-out curtains that we keep closed during the day.*

**Rebate for central air conditioning (N=2)**

- *We installed a new roof.*
- *We are getting ready to install insulated siding and air vents in the attic.*

The 48 respondents (29.6% of 162) who said they were influenced to do more by the Smart Saver program were also asked to rate the influence of participating in Smart Saver on these additional actions, and how much money they think they have saved from these additional energy efficiency activities. Table 18 shows the average influence ratings of the program on additional actions (on a 10-point scale where 10 is the highest influence and 1 is the least).

The sample sizes in Table 18 are too small for any given category of action to show significant differences by unit rebated (including for the overall average ratings of influence for heat pump and air conditioning rebate recipients, which are not statistically different). The overall average influence score (for all actions by all rebated units) is 4.6 on a 10-point scale, which is a moderate level of influence.



**Table 18. Average Ratings of the Influence of Smart Saver HVAC on Additional Actions**

<i>Base: respondents taking each action</i>	<b>Heat Pump</b>	<b>Central Air Conditioning</b>	<b>All Surveyed Participants</b>
Use more efficient light bulbs (N=12)	6.6	3.3	5.8
Upgrade to more efficient appliances / Energy Star (N=10)	3.0	5.6	4.3
Upgrade windows / doors (N=10)	4.3	2.5	3.6
Added insulation (N=9)	4.2	3.5	3.9
Weather stripping (N=8)	8.0	4.0	5.5
Upgrade HVAC system (N=7)	NA	4.9	4.9
Install programmable thermostat (N=3)	7.0	3.0	4.3
HEHC / home energy audit (N=2)	10.0	8.0	9.0
Upgrade duct work (N=2)	4.0	5.0	4.5
Power Manager (N=1)	8.0	NA	8.0
Unplug extra freezer or refrigerator (N=1)	NA	NA	NA
Other: We bought black-out curtains that we keep closed during the day (N=1)	10.0	NA	10.0
Other: Making my family more conscious about turning out lights when they are not using them (N=1)	5.0	NA	5.0
Other: Installing low-flow faucets as part of bathroom and kitchen remodeling (N=1)	1.0	NA	1.0
Other: Getting ready to install air vents in the attic (N=1)	NA	1.0	1.0
Other: We installed a new roof (N=1)	NA	1.0	1.0
Overall average rating of influence (all actions rated)	5.5	3.8	4.6

Note: "NA" is shown for cells in this table where there were no customers who took the action, and/or where there are no customers who provided influence ratings for the action (missing data).

Survey respondents who have taken additional energy efficiency actions inspired by participating in Smart Saver HVAC were asked if they know how much money they saved; these responses are categorized and listed below (including noting the type of unit installed, HP for heat pumps and CAC for central air conditioning). For several of these responses, customers mentioned multiple actions but only gave a savings estimate for the actions taken together (not individually).

#### **Use more efficient light bulbs (N=12)**

- \$250 per year (HP)
- \$20 per month (HP – multiple projects combined)
- \$10 per month (HP )
- \$2 per month (HP )
- I haven't had them long enough to tell. (CAC)
- I know that my A/C bill is less than it was as last year, no idea about the CFLs. (CAC)
- Don't know (N=6, five HP and one CAC)

#### **Upgrade appliances / Energy Star (N=10)**

- \$35 per month (CAC – multiple projects combined)

- \$250 per year (HP)
- *I really can't tell because I got the new heat pump and new water heater installed in the same month.* (HP)
- *Don't know* (N=7, three HP and four CAC)

**Added insulation (N=9)**

- \$1000 per year (HP – multiple projects combined)
- \$500 per year (HP – multiple projects combined)
- \$35 per month (CAC – multiple projects combined)
- \$300 per year (CAC – including savings from replacing A/C)
- \$15 per month (HP – multiple projects combined)
- *I don't have a dollar amount, but the reports Duke sends us are showing a significant difference.* (CAC – also replaced drywall)
- *We are getting ready to install insulated siding, but haven't done it yet.* (CAC)
- *Don't know* (N=2, both HP)

**Upgrade windows / doors (N=10)**

- \$500 per year (HP – multiple projects combined)
- \$35 per month (CAC – multiple projects combined)
- \$15 per month (HP – multiple projects combined)
- \$25 per year (HP)
- *I'm not sure about the money, but we're scoring better than efficient on our My Home Energy Report now.* (CAC)
- *Don't know* (N=5, three HP and two CAC)

**Weather stripping (N=8)**

- \$1000 per year (HP – multiple projects combined)
- \$75 per month (CAC – including savings from replacing A/C and furnace)
- \$10 to \$15 per month (HP)
- *Not sure, but our monthly bill now stays under \$100.* (CAC)
- *It's too soon to tell.* (CAC)
- *Don't know* (N=3, one HP and two CAC)

**Upgrade HVAC system (N=7)**

- \$75 per month (CAC – including savings from programmable thermostat and replacing A/C)
- \$50-\$60 per month (CAC)
- \$20 per month (CAC)
- *It's too soon to tell.* (CAC)

- *Don't know* (N=3, all CAC)

**Programmable thermostat (N=3)**

- *\$75 per month* (CAC – including savings from replacing A/C and furnace)
- *\$80 per month* (HP – multiple projects combined)
- *Don't know* (HP)

**Upgrade duct work (N=2)**

- *\$80 per month* (HP – multiple projects combined)
- *Don't know* (CAC)

**HEHC / Home Energy Audit (N=2)**

- *It's too soon to tell.* (CAC)
- *We had to pay for the audit.* (HP – follow-up to insulation installation)

**Power Manager (N=1)**

- *It's too soon to tell.* (HP)

**Unplug extra freezer or refrigerator (N=1)**

- *Don't know* (CAC)

**Other actions (N=5)**

- *\$20 per month* (HP – black-out curtains; multiple projects combined)
- *We are getting ready to install air vents in the attic, but haven't done it yet.* (CAC)
- *Don't know* (HP – turn lights off)
- *Don't know* (HP – installed low-flow faucets)
- *Don't know* (CAC – installed new roof)

Overall, about a third of Smart Saver participants (34.8% or 56 out of 161) added other major new electrical appliances in the past year. The most common new appliances are furnaces (14.3% or 23 out of 161), water heaters (6.8% or 11 out of 161), refrigerators (6.2% or 5 out of 161) and stoves/ovens (6.2% or 5 out of 161).

Customers who installed central air conditioning are significantly more likely to have installed other major appliances in the past year (40.0% or 32 out of 80) compared to those who installed heat pumps (29.6% or 24 out of 81; this difference is significant at  $p < .10$  using student's t-test). The main reason for this difference is that customers who upgraded their air conditioning were much more likely to also upgrade their furnace (26.3% or 21 out of 80) compared to heat pump installers (2.5% or 2 out of 81; this difference is significant at  $p < .05$  using student's t-test). Customers who installed a heat pump were also more likely to install a new refrigerator (8.6% or 7 out of 81) compared to air conditioning installers (3.8% or 3 out of 80; this difference is significant at  $p < .10$  using student's t-test).

**Table 19. Added Other Major Electrical Appliances to Home in Past Year**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Have added major electrical appliances besides rebated items in past year (all appliances)	29.6%	40.0%	34.8%
Furnace	2.5%	26.3%	14.3%
Water heater	7.4%	6.3%	6.8%
Refrigerator	8.6%	3.8%	6.2%
Stove / oven	6.2%	6.3%	6.2%
Dishwasher	3.7%	6.3%	5.0%
Clothes washer	6.2%	2.5%	4.3%
Dryer	3.7%	2.5%	3.1%
Microwave	1.2%	2.5%	1.9%
TV / home entertainment	1.2%	1.3%	1.2%
Hot tub / Jacuzzi	2.5%	0.0%	1.2%
"All appliances" replaced	1.2%	0.0%	0.6%
Other (listed below)	1.2%	3.8%	2.5%

Four surveyed customers mentioned "other" types of appliances; these are listed below.

**Rebate for heat pump (N=1)**

- *Dehumidifier*

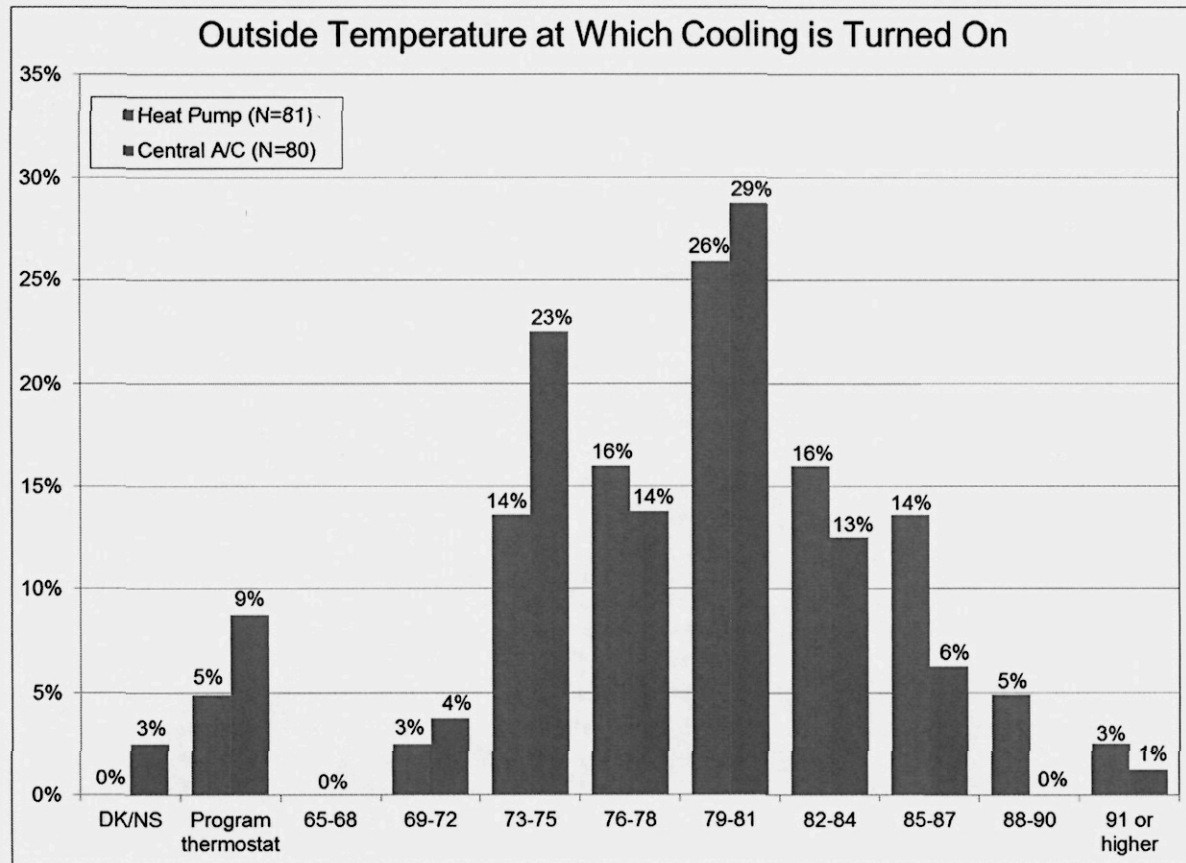
**Rebate for central air conditioning (N=3)**

- *Freezer*
- *Humidifier*
- *Water softener*

## Thermostat Settings

Figure 15 shows that the most common outdoor temperatures at which Smart Saver participants in Ohio and Kentucky turn on their cooling units are in the 79-81 degree range, which is also the median temperature at which participants turn on their cooling units (for all participants surveyed, as well as for each type of rebate separately).

Heat pump rebate recipients are more likely to wait until warmer weather before turning on their cooling units: 62.9% (51 out of 81) of heat pump rebate recipients only turn their units on when it is 79 degrees or higher outside, compared to 48.8% (39 out of 80) of central air conditioning rebate recipients (this difference is significant at  $p < .05$  using student's t-test).



**Figure 15. Temperature at Which Cooling Unit Is Turned On**

Most respondents in this survey set their thermostats to about the same temperature “before” and “after” installation of their new Smart Saver rebated unit (overall 47.8% or 93 out of 161). As seen in Table 20, another 24.2% (39 out of 161) report that they are now setting their thermostats at a higher temperature than before installing their new unit, while 10.6% (17 out of 161) report that they set their thermostats at lower temperatures since installing their new units.

Customers who installed new heat pumps are more likely to set their thermostats lower after installing the new unit (14.8% or 24 out of 81) compared to central air conditioning installers (6.3% or 5 out of 80; this difference is significant at  $p < .05$  using student’s t-test).

**Table 20. Change in Thermostat Settings Before and After Installation of New Unit**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Set thermostat at <u>same level</u> “before” and “after”	54.3%	61.3%	57.8%
Set thermostat <u>higher</u> “after” than “before”	23.5%	25.0%	24.2%
Set thermostat <u>lower</u> “after” than “before”	14.8%	6.3%	10.6%
Don't know / programmed into the thermostat / did not answer both questions	7.4%	7.5%	7.5%

The complete distribution of specific responses to both “before” and “after” questions about

thermostat settings is shown in Table 21. Overall, there were very few respondents who changed their thermostat settings after installing a new unit by more than one response category (equal to about 3 or 4 degrees Fahrenheit) – just eight respondents (5.4% of 149 who were able to give specific “before” and “after” settings) turned up their thermostats by two or more response categories (equal to 6 or 7 degrees or more), while another three respondents (2.0% of 149) turned down their thermostat by two or more response categories.

In Table 21, the black numbers on the diagonal indicate respondents who set their thermostats to the same settings “before” and “after” installing their new units, while green numbers indicate those who are setting their thermostats higher “after”, and red numbers indicate those who are setting their thermostats lower “after” installing their new units.

**Table 21. Thermostat Settings Before and After Installation of New Unit (Heat Pumps and Central Air Conditioning Combined)**

% out of 149 # of responses	Less than 65	After: 65-68	After: 69-72	After: 73-75	After: 76-78	After: 79-81	After: 82-84	After: 85-87	After: 88-90
Less than 65			0.7% 1		0.7% 1				
Before: 65-68			1.3% 2	2.0% 3					
Before: 69-72		0.7% 1	16.1% 24	14.1% 21	1.3% 2				
Before: 73-75		0.7% 1	4.7% 7	28.2% 42	4.7% 7		0.7% 1		
Before: 76-78			1.3% 2	3.4% 5	14.1% 21	0.7% 1			
Before: 79-81						3.4% 5			
Before: 82-84						0.7% 1			
Before: 85-87								0.7% 1	
Before: 88-90									

*Note: This table only includes the 149 out of 161 respondents who were able to give specific "before" and "after" thermostat settings; twelve respondents either did not answer both questions, or said it was "programmed into the thermostat" without stating the setting.*

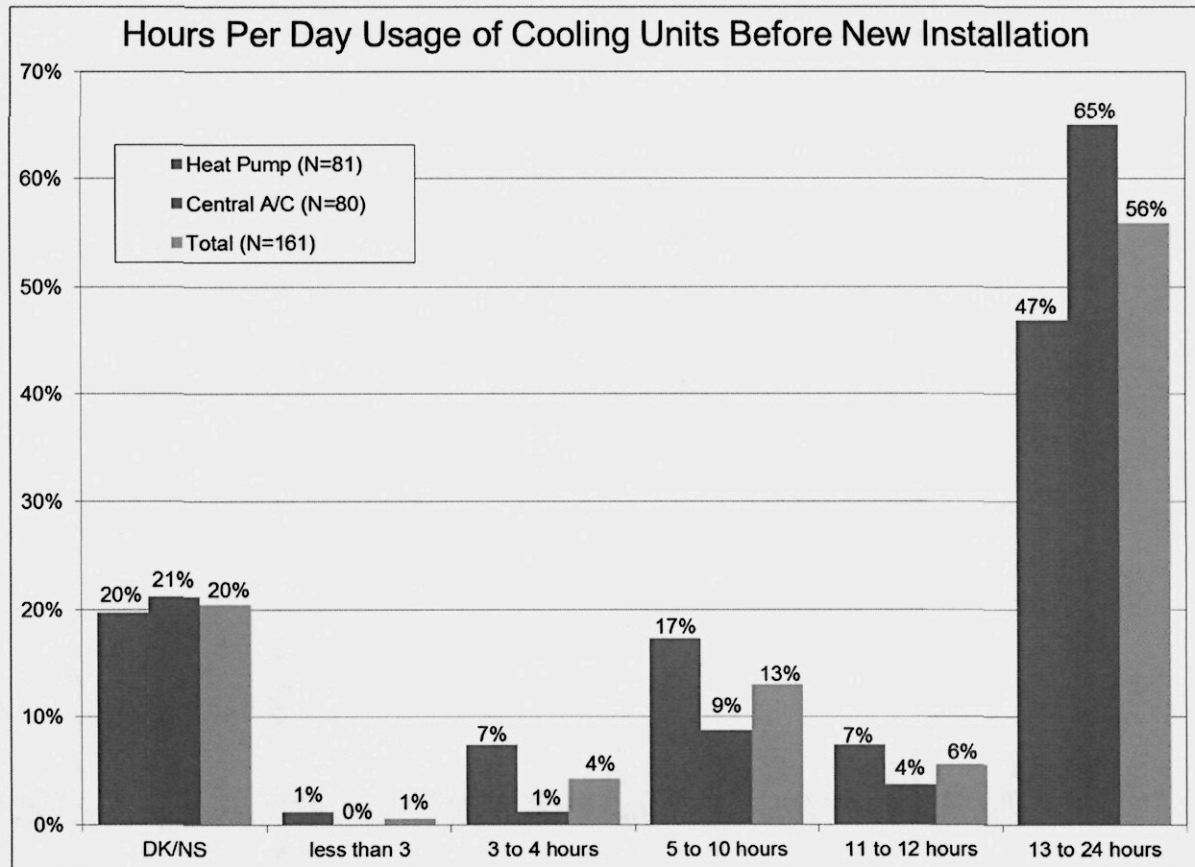
According to Table 22, only about a third (34.6% or 28 out of 81) of heat pump rebate recipients are using their units "every day" during cooling season, compared to 53.8% (43 out of 80) of air conditioner rebate recipients (this difference is significant at  $p < .05$  using student's t-test). Customers who installed heat pumps are also more likely to say they use their units "only on the hottest days" (17.3% or 14 out of 81) compared to those who installed air conditioning (10.0% or 8 out of 80; this difference is significant at  $p < .10$  using student's t-test).

**Table 22. Usage of Cooling Units**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Not at all	0.0%	0.0%	0.0%
Only on the hottest days	17.3%	10.0%	13.7%
Frequently during cooling season	11.1%	13.8%	12.4%
Most days during cooling season	33.3%	21.3%	27.3%
Every day during cooling season	34.6%	53.8%	44.1%
Don't know	3.7%	1.3%	2.5%

Figure 16 indicates that most customers (55.9% or 90 out of 161) say they had their cooling units on "13 to 24 hours per day" on average before they installed their new unit. Customers who received rebates for installing central air conditioning were using their units more often than heat pump installers: 65.0% (52 out of 80) used their units 13 or more hours per day (compared to 46.9% or 38 out of 81 heat pump installers), and only 10.0% (8 out of 80) used their units less than 10 hours per day (compared to 25.9% or 21 out of 81 heat pump installers; both of these

differences are significant at  $p < .05$  using student's t-test).



**Figure 16. Hours Per Day Usage of Cooling Units Before Installing New Unit**

Survey participants were asked whether the number of hours per day their cooling units were being used increased or decreased after installing their new equipment. The pattern of response to this question is different for heat pump and central air conditioning respondents, as seen in Table 23. Most customers who received rebates for central air conditioning say their usage stayed the same (58.8% or 47 out of 80) while about a quarter say it decreased (28.8% or 23 out of 80). However, a larger number of heat pump rebate recipients said their usage declined (46.9% or 38 out of 81) compared to the number saying it stayed the same (37.0% or 30 out of 81; these differences are significant at  $p < .05$  using student's t-test).

The average number of hours per day that usage decreased was estimated by customers at 4.6 hours per day overall (per customer whose usage decreased; though heat pump installers averaged 5.0 hours less usage per day, this is not significantly higher than the 3.8 hours per day decline among air conditioning rebate recipients). Among the three customers whose usage increased, only one provided an estimate for the number of hours of increase: one heat pump customer's usage increased by 2 hours per day.



**Table 23. Change in Average Daily Use since Replacing Cooling Unit**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Usage decreased	46.9%	28.8%	37.9%
Average decrease in hours (among those who decreased)	5.0	3.8	4.6
Usage increased	2.5%	1.3%	1.9%
Average increase in hours (among those who increased)	2.0	NA	2.0
Usage stayed the same	37.0%	58.8%	47.8%
Don't know	13.6%	11.3%	12.4%

## Participation in Other Duke Energy Efficiency Programs

Smart \$aver participants were asked if they have participated in other Duke Energy efficiency programs. Most surveyed customers report having received CFLs by mail (64.6% or 104 out of 161) and My Home Energy Reports (54.0% or 87 out of 161), with about 20% each having participated in online services, Power Manager and Home Energy House Call. Heat pump rebate recipients are more likely to have received CFLs (70.4% or 57 out of 81), and to have participated in online services (24.7% or 20 out of 81) and Personal Energy Reports (13.6% or 11 out of 81), while air conditioning installers are more likely to report receiving MyHER (60.0% or 48 out of 80; differences significant at  $p < .10$  or better using student's t-test). Surveyed customers participated in an average of 1.9 of the programs listed in Table 24, with no statistically significant difference by unit rebated.

**Table 24. Have You Participated In Any of These Duke Energy Programs**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
CFLs by mail	70.4%	58.8%	64.6%
My Home Energy Report (MyHER)	48.1%	60.0%	54.0%
Online services	24.7%	15.0%	19.9%
Power Manager	17.3%	20.0%	18.6%
Home Energy House Call (HEHC)	22.2%	15.0%	18.6%
Personal Energy Report (PER)	13.6%	6.3%	9.9%
None of the above	12.3%	13.8%	13.0%
Average number of programs above	2.0	1.8	1.9

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

Customers who have not already participated in other Duke Energy efficiency programs were asked to rate their interest in participating in these programs on a 10-point scale where "10" represents the highest level of interest. As seen in Table 25, customers expressed modest interest in Home Energy House Call (average rating 5.64 on a 10-point scale), My Home Energy Report

(average rating 5.75) and Personal Energy Reports (5.45), with somewhat higher interest in free CFLs (6.75) and lower interest in Power Manager (3.33).

The average ratings for these programs are not significantly different between heat pump and air conditioning rebate recipients.

**Table 25. Ratings of Interest in Energy Efficiency Programs by Non-Participants**

<i>Base: customers who have not participated in these programs</i>	<b>Heat Pump</b>	<b>Central Air Conditioning</b>	<b>All Surveyed Participants</b>
Home Energy House Call	5.89 (N=62)	5.42 (N=96)	5.64 (N=131)
My Home Energy Report	5.30 (N=44)	6.20 (N=44)	5.75 (N=88)
Power Manager	3.60 (N=67)	3.07 (N=70)	3.33 (N=137)
CFLs by mail	6.59 (N=27)	6.86 (N=37)	6.75 (N=64)
Personal Energy Report	5.86 (N=69)	5.08 (N=75)	5.45 (N=144)

Respondents in this survey were asked, "What other services could Duke Energy provide to help improve home energy efficiency?" Suggestions made by survey respondents are listed in Table 26; three-quarters of respondents (73.9% or 119 out of 161) made no suggestions.

The most common suggestions for services Duke Energy could offer involve providing more education and information about efficiency and conservation to customers (5.6% or 9 out of 161), followed by encouraging insulation and home shell sealing (3.7% or 6 out of 161).

**Table 26. Suggestions for Other Services Duke Energy Should Offer**

	<b>Heat Pump (N=81)</b>	<b>Central Air Conditioning (N=80)</b>	<b>All Surveyed Participants (N=161)</b>
More education / information about efficiency and conservation	3.7%	7.5%	5.6%
Encourage insulation / sealing home shell	3.7%	3.8%	3.7%
Encourage efficient lighting	2.5%	3.8%	3.1%
Incentives for more efficiency upgrades (besides cooling)	2.5%	3.8%	3.1%
Home audits	3.7%	1.3%	2.5%
Lower rates	0.0%	5.0%	2.5%
Improve metering / smart meters	2.5%	1.3%	1.9%
Encourage window upgrades	2.5%	1.3%	1.9%
Encourage green energy (solar, wind, geothermal, etc.)	2.5%	1.3%	1.9%
Credit for recycling appliances (other than Power Manager for cooling)	1.2%	1.3%	1.2%
Power line maintenance / tree trimming	1.2%	0.0%	0.6%
Other (listed below)	3.7%	6.3%	5.0%
Nothing / don't know	75.3%	72.5%	73.9%

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

Eight surveyed participants gave unique suggestions for additional services Duke Energy could offer, which are listed below.

#### **Rebate for heat pump (N=3)**

- *Duke should do their best to ensure that competing energy providers are not giving false and/or misleading information to their customers.*
- *I think that Duke Energy could make their Strike Force program better known. It's a surge protector program that I did not know they offered until it was too late and my house was struck by lightning and fried my whole heating and cooling system.*
- *Duke should provide more home energy efficiency assistance for low income customers.*

#### **Rebate for central air conditioning (N=5)**

- *I would like to see Duke Energy provide CFL disposal or recycling, maybe a mailing box that I can fill and send to Duke for proper disposal. I don't want them ending up in the landfill, and I forget to take them to the store for recycling.*
- *I'd like to see them get into the DSL business. I'd like to see internet service; I could get very interested in that, if they're competitively priced.*
- *A program that encourages people to get their furnaces and A/C checked every year for safety and burning efficiency; a program that can help get people with acquiring a generator when the power goes out so they can keep their medical equipment and freezers working.*
- *Duke could periodically supply home energy kits such as those used in the HEHC program, and offer more incentives for energy efficient home improvements.*

- *Expand the Smart Grid concept. Have pricing be dependent on the hour, and have the thermostat tell you how much it's costing with variable rate pricing. Similar to the Power Manager program, only with greater feedback.*

## Attitudes toward Energy and the Environment

Energy and environmental issues are important to Smart Saver participants, as shown in Figure 17 through Figure 20. Fully 80.7% (130 out of 161) view “environmental issues” as either “important” or “very important”, while the corresponding number for “reducing air pollution” is 83.9% (135 out of 161). A clear majority of 54.7% (88 out of 161) also view “climate change issues” as “important” or “very important”. However “reducing the rate of building new power plants” is deemed “important” or “very important” by only 45.3% (73 out of 161) of Smart Saver participants.

Figure 17 through Figure 20 show the complete distributions for these questions about the importance of environmental issues by the type of rebate received. There are no statistically significant differences by unit rebated.

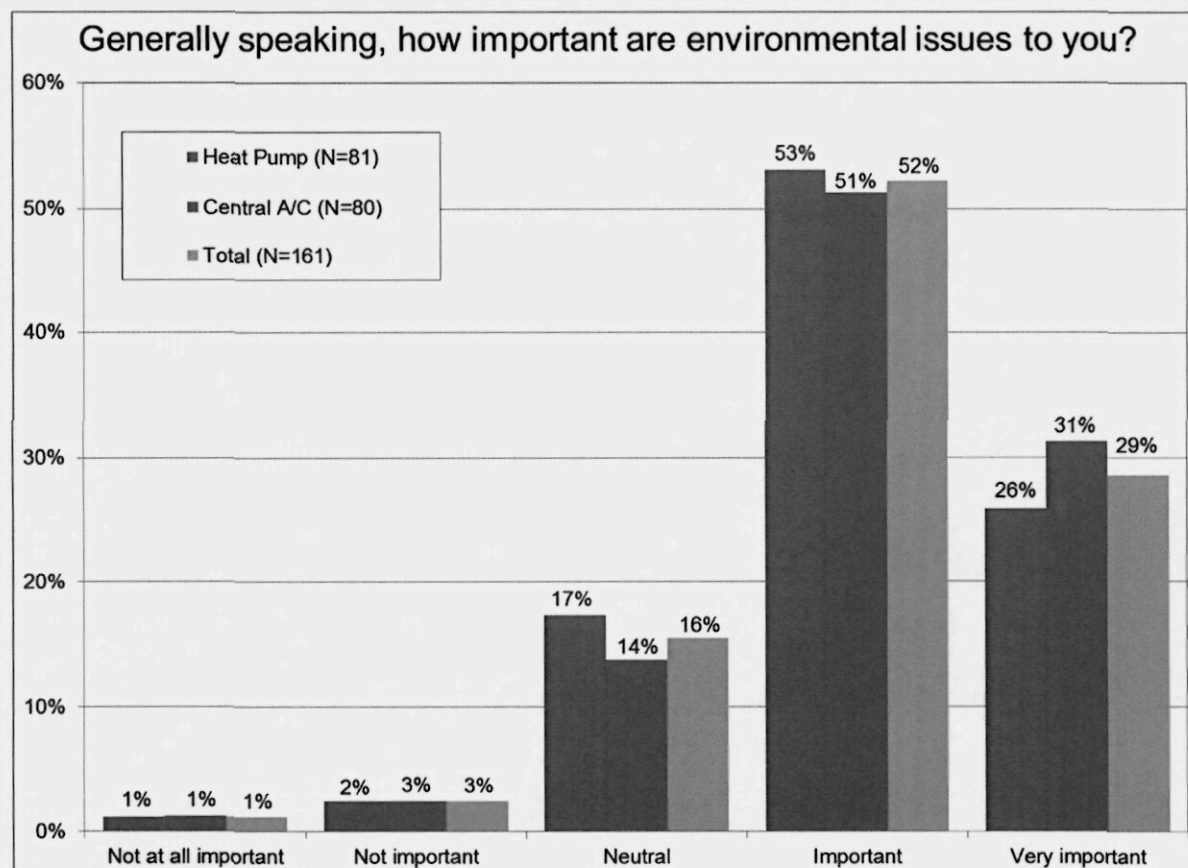


Figure 17. Importance of Environmental Issues to Respondents

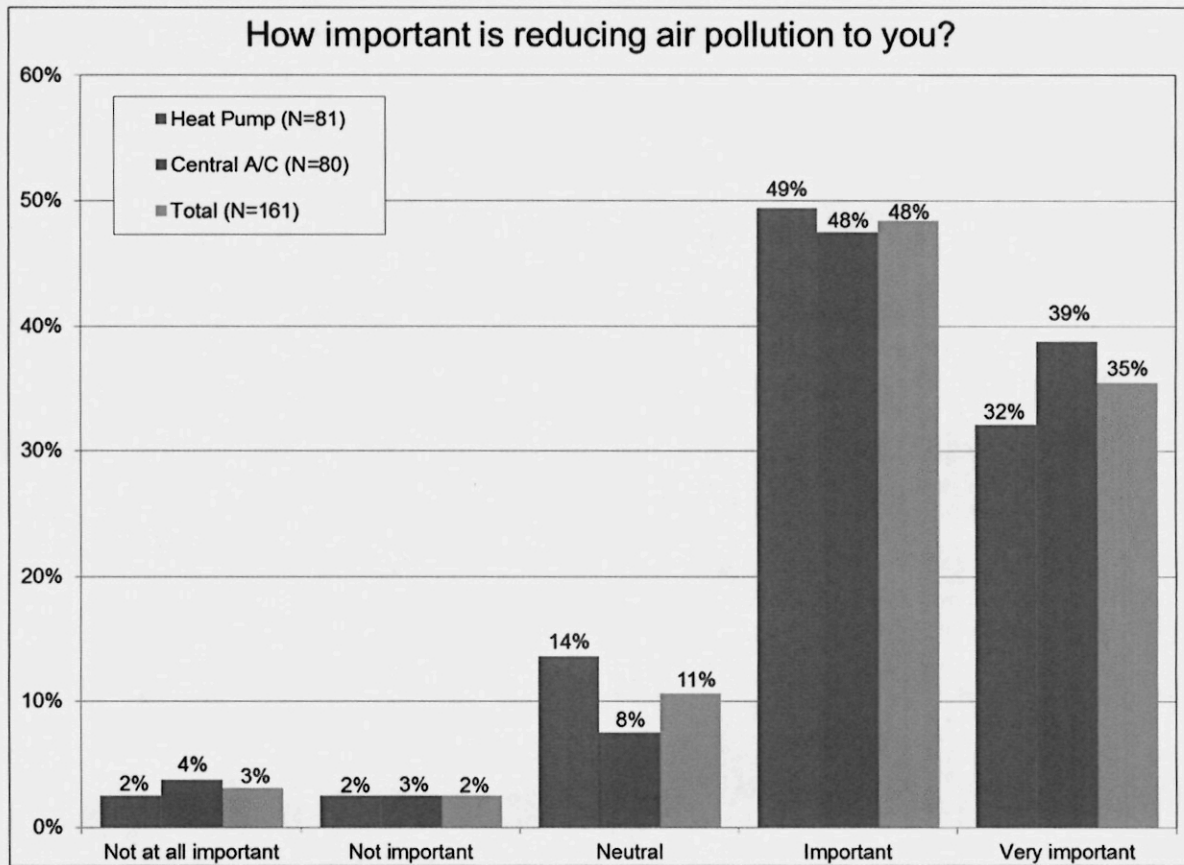


Figure 18. Importance of Reducing Air Pollution to Respondents

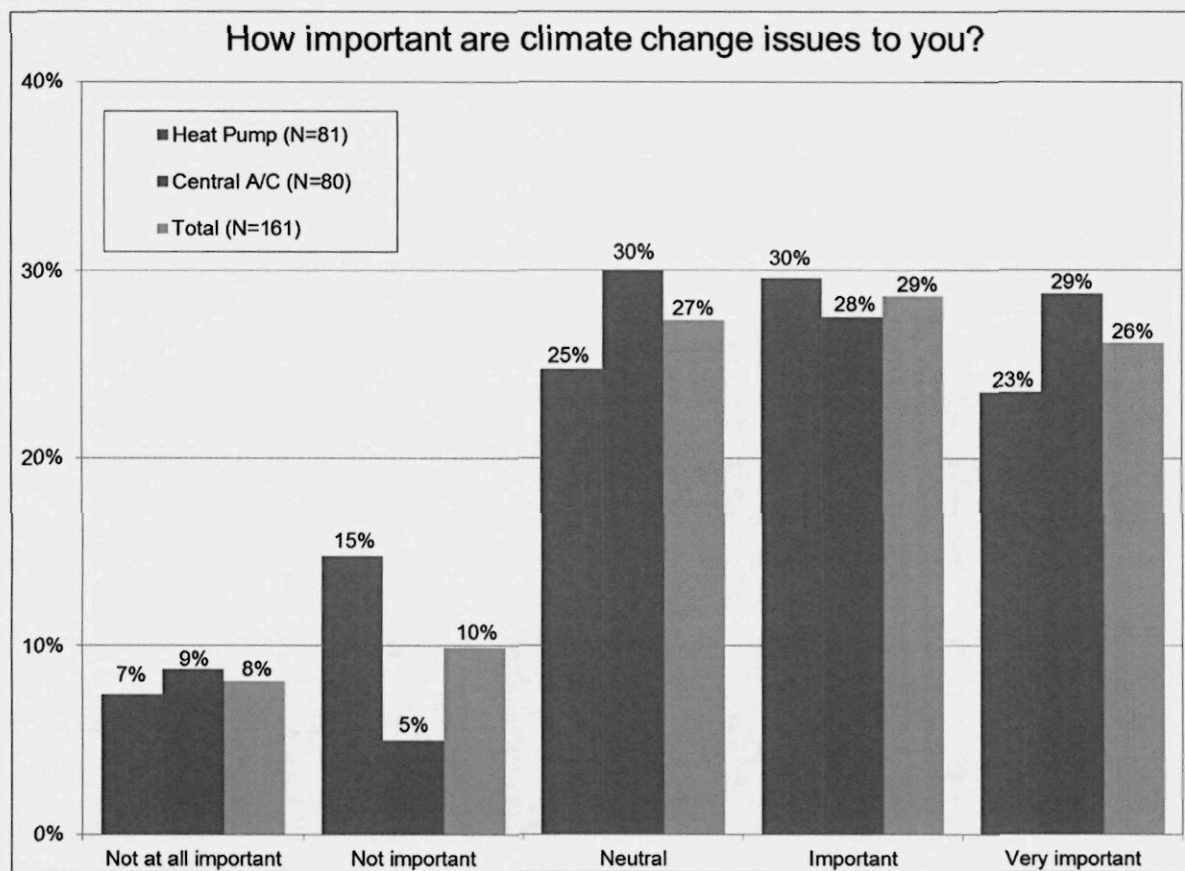
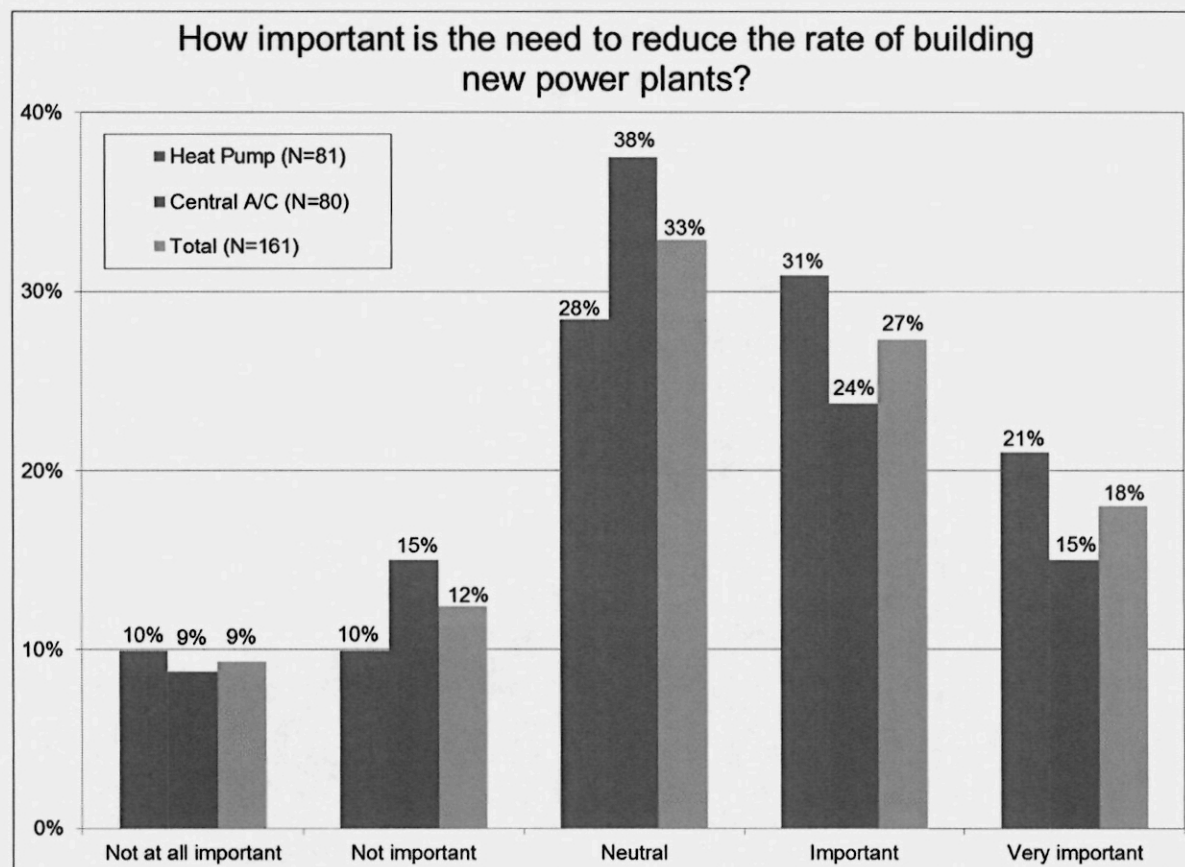


Figure 19. Importance of Climate Change Issues to Respondents



**Figure 20. Importance of Reducing Rate of Building New Power Plants to Respondents**

However, only 12.4% (20 out of 161) of Residential Smart Saver survey participants actually belong to groups or clubs with environmental missions, as seen in Table 27. Customers who received rebates for heat pumps are more likely to belong to such groups (16.0% or 13 out of 81) compared to air conditioner rebate recipients (8.8% or 7 out of 80; this difference is significant at  $p < .10$  using student's t-test).

**Table 27. Membership in Groups with Environmental Missions**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Belong to a group or club with an environmental mission	16.0%	8.8%	12.4%
Do not belong to a group or club with an environmental mission	84.0%	91.3%	87.6%

The groups and clubs these 20 respondents belong to are listed below; the number of responses adds up to more than 20 because some of these respondents claimed membership in more than one group.

- *Sierra Club* (N=4)
- *NRA / gun club* (N=3)

- *World Wildlife Fund*
- *Nature Conservancy*
- *American Whitewater*
- *Greenpeace*
- *Greater Cincinnati Energy Alliance*
- *Knights of Columbus*
- *Democratic Party*
- *Republican Party*
- *Tea Party*
- *Democracy Now*
- *Ohio PIRG*
- *Ohio Citizen Action*
- *Ohio Sportsman's Club*
- *U.S. Green Vehicle Council (USGVC)*
- *Illuminating Engineering Society (IES)*
- *American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)*
- *REI (Recreational Equipment Inc.)*
- *"I am a LEED accredited professional"*
- *"I am on a green committee at work"*
- *"My church does a lot with solar energy"*
- *"I am a Kroger employee"*
- *"I drive a Lexus hybrid"*

### Using the Duke Energy Website

A little less than half of the program participants surveyed (44.1% or 71 out of 161) have "never" visited the Duke Energy website, while about one in five (21.7% or 35 out of 161) visit the site "often" (at least once a month). There are no significant differences between customers who received Smart Saver rebates for different types of unit.

**Table 28. Frequency of Using the Duke Energy Website**

	Heat Pump (N=81)	Central Air Conditioning (N=80)	All Surveyed Participants (N=161)
Often (once a month or more)	24.7%	18.8%	21.7%
Sometimes (less than once a month)	35.8%	32.5%	34.2%
Never	39.5%	48.8%	44.1%



## Net to Gross Methodology

The net to gross ratio for the Residential Smart Saver HVAC program will be calculated and presented in the impact report. This section presents the methodology for determining the net to gross results.

The process evaluation includes participant surveys and surveys and in-depth interviews with trade allies, as presented in this report. However, the program's incentives are typically unknown to the participant. Many trade allies typically complete the application to receive the program's rebate and pass the savings on to the participating customer. In this common scenario, the participating customer is not a reliable source for freeridership information. With this program's operational structure, TecMarket Works determined that the best source for freeridership information is the trade allies. In August and September, 2013, TecMarket Works conducted a survey with 79 Ohio and Kentucky trade allies (out of 313 trade allies located in Ohio and 51 trade allies in Kentucky that participated in the HVAC program) in order to get as much information about freeridership as possible. The resulting methodology will be presented in full detail in the impact report.

## Net to Gross Battery

A short survey was fielded with partnering trade allies: all of the questions asked can be found in *Appendix C: HVAC Trade Ally Survey Instrument*, and the responses of surveyed trade allies are presented in the section of this report titled *Trade Ally Survey*.

The two key questions that are used to calculate a net to gross ratio for this program are listed below:

- *Of the energy efficient equipment that was rebated through the program, what percentage of those customers do you think would have still gone with an energy efficient model if the Duke Energy rebate were not available?*
- *Using a scale of 1 to 10, where 1 means not at all influential and 10 means very influential, how important would you say the rebate is to your customers' decision when considering all the various factors that a customer typically contemplates prior to making a purchase from your company?*

The results of the net to gross calculations will be presented in the impact report for the Residential Smart Saver HVAC program.

## Appendix A: Management Interview Instrument

Name: \_\_\_\_\_

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

Position description and general responsibilities:

\_\_\_\_\_

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

Do you have any questions for me before we begin?

### Program Description

In your own words, please describe the [STATE NAME] Smart Saver HVAC Program. In what other service territories does the program operate?

Why did Duke Energy chose to offer prescriptive incentives for trade ally-installed HVAC measures?

Why did Duke Energy decide to use a third party vendor to administer this program?

Please discuss the history and development of the program. How does this differ in the various service territories the program is offered?

What are the current program's objectives? That is, what is the program trying to accomplish (e.g. generate energy savings, installation of efficiency devices, enrollment in other programs, non-energy benefits)? In your opinion, which objectives do you think are being met or will be met? Have the objectives changed over time. If yes, how do you think they have changed??

Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? How will these changes improve the program? Would it improve customer satisfaction, lower program costs or delivery a better product to customers?

Should the program objectives be changed in any way because of market conditions, other external or internal program influences, or any other conditions that have developed since the program objectives were devised? What changes would you put into place, and how would it affect the objectives?

What are the program's energy savings goals? Over what time period? How are you performing toward these goals? Will this goal be met?

Does the program have participation goals? If so, what are they? Over what time period? How is the program performing toward these goals? Will this goal be met?

Does the program have any other goals? How are you performing toward these goals? Over what time period? Will these goals be met?

Are there any program changes that you think would improve the program's performance towards its goals and objectives?

### **Program Management and Operations**

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?

Please review with us how the Smart Saver HVAC program operates relative to your duties, that is, please walk us through the processes and procedures and key events that allow you to currently fulfill your duties.

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?

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

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

How effective is the vendor in its assigned role? What works well? What could be improved? (Repeat for each third party vendor.)

How often and in what form do you communicate with the vendors? How would you characterize your working relationships?

How do you manage and monitor or evaluate third-party involvement or performance? What do you do if trade ally performance is exemplary or below expectations?

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

### Program Measures and Incentives

Please describe the energy saving measures used by the program. How were they determined? Why were they selected?

What is a health check? What measures or steps are included? Why?

What are the eligibility requirements for each measure?

Why were systems such as through-the-wall room HP or AC, Window HP or AC, Mini Spit or Multi split HP or AC, Portable HP or AC, Evaporative AC, and natural gas furnace and boilers excluded?

What are the trade ally, customer, and builder incentive amounts in [STATE]} for each measure? Please send table with numbers for each state. How were the incentive amounts determined? What information or research was used to determine those levels? Why these amounts?

How often are incentive amounts reviewed? What criteria are used for the review? Have you changed any incentive levels? If which ones? When? By how much? And why?

### Trade Allies

What benefits does the Smart Saver HVAC program offer to potential trade allies? Why would they want to participate?

It is my understanding that GoodCents is responsible for trade ally marketing and recruiting, is this correct? How does GoodCents market to and recruit trade allies? What role does Duke Energy serve in this process?

What barriers have been encountered in trade ally marketing and recruiting efforts? How can trade ally recruitment be improved?

What are the eligibility requirements for trade allies (e.g. licenses, good standing, certifications, safety, financials, etc.)? Do requirements differ by program offering (HVAC, Health Check, Insulate and Seal)? If so, how? Do they differ by state? If so, how?

Are trade allies required to hold certain certifications such as NATE, BPI, etc.? If so, which certifications are considered acceptable (e.g. AC, Air Distribution, HVAC Analyst, AC and HP, etc.)? Do these requirements apply to the business overall or to each individual technician serving customers?

What is the trade ally screening process? Is it handled by GoodCents alone or is Duke Energy involved?

Are there criteria for continued trade ally and individual technician participation in the program? If so, what are they? How often are they reviewed?

What is the training process? How long is it? What is covered? Who teaches it? Please provide sample training materials. What is the success rate of training? What are the requirements for successful training to participate in program?

How do you track and manage trade ally interactions and field operations?

What challenges have you previously encountered with trade allies and how have they been overcome? Please describe any current challenges you are facing.

In what ways can trade ally recruitment and management be improved?

### **Customer Marketing**

Does the program have specific customer enrollment goals? How are you performing toward these goals?

Does the program have specific marketing goals? What metrics do you use? How are you performing?

What are the eligibility requirements for customers?

Please describe how you identify target markets. Which markets does this program focus on and why?

Are potential customers segmented? If so, how?

How are customers made aware of and recruited into the program?

Is marketing done by GoodCents, Duke Energy, and/or trade allies? Please explain.

Please describe the marketing plan and execution for this program. What types of marketing are used? How often?

How are marketing efforts coordinated?

Are marketing results tracked? If not, why? If so, what metrics are used? Which types of marketing are most effective? Why?

Please describe any specific marketing and or branding requirements from Duke Energy and/or GoodCents. How are trade allies instructed to deal with GoodCents and Duke Energy branding?

What happens when a customer learns about the program? How do they learn more? How do they sign up?

How are customers enrolled?

What challenges have you previously encountered with marketing and how have they been overcome? Please describe any current challenges you are facing.

In what ways can program marketing be improved?

### **Call Center Operations**

Please describe the role of the call center in the operation of this program.

What are your service level agreements? What are the metrics used (call handle time, etc.)?

Please describe the call center reporting process. How is the call center performing?

How does Duke Energy oversee and maintain call quality? What types of issues have been uncovered? How have these been addressed?

What challenges have you previously encountered with call center operations and how have they been overcome? Please describe any current challenges you are facing.

In what ways can call center operations be improved?

### **Incentive Presentation to Customers and Measure Installation**

Please describe a typical interaction between customers and trade allies, including initial visit, repeat visits, measure performance/installation, and follow up, including paperwork.

How are trade allies trained to present the measures and associated incentives to customers? Are they presented one at a time or as a bundle? Are steps for presentation to customers standardized or left flexible? Why?

Has any testing been done on the most effective ways to encourage customer participation? If so, what was done and what were the results? If not, why?

What types of challenges or difficulties might be encountered during a customer interaction (technical, customer service, etc.) How are trade allies trained to deal with these difficulties?

What kind of paperwork is required by the customer? What paperwork is required on the part of the trade ally? Please provide samples.

Do you perform post-installation measure verification? If so, please describe that process. How frequently is it used? If not, why? What alternatives are used?

How are trade allies instructed to deal with customer satisfaction? Is customer satisfaction measured? If so, how? If not, why?

How overall quality assurance maintained? What types of issues have been uncovered? How have these been addressed?

What other challenges have you previously encountered with trade ally/customer interactions and how have they been overcome? Please describe any current challenges you are facing.

In what ways can trade ally/customer interactions be improved?

### **Incentive Processing**

Please describe how incentives are processed from start to finish.

In what form are customer and trade ally payments issued?

How long does it typically take for the customer to receive payment? How long does it take for the trade ally to receive payment?

How are numbers of incentives and amounts reported to Duke Energy? How often are reports filed? Please describe the report and provide a sample.

How is compensation for incentive amounts handled between the two organizations?

How is quality assurance handled during incentive processing? What issues have been uncovered and how were they resolved?

What other challenges have you previously encountered with incentives and how have they been overcome? Please describe any current challenges you are facing.

In what ways can incentive processing be improved?

**Data Systems and Management**

Please describe the systems and processes used to track, measure, analyze and report on program performance.

What metrics are used for to report program performance?

Please describe the reporting process that GoodCents uses to inform Duke Energy. What types of reports are provided? How often? Please provide samples.

Does GoodCents provide an online portal or other means that Duke Energy can access this information directly? If so, please describe it.

**Measurement and Verification**

How does Duke Energy track and attribute energy savings?

Please describe the measurement and verification process used for this program.

What types of data is GoodCents required to collect and maintain?

Is measurement and verification part of the compensation plan for GoodCents administration of the program?

**Vendor Assessment**

(If not captured earlier) Please explain how the interactions between Duke Energy and vendors work.

How effective are vendors in their assigned roles? What works well? What could be improved? (Repeat for each vendor.)

Do you think these interactions should be changed in any way? If so, how and why?

How often and in what form do you communicate with Duke Energy and vendors? How would you characterize your working relationships?

Are key industry experts, trade professional or peer used to identify program enhancements, cost reduction opportunities or process improvements? If so, how does this work?

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

**Overall Strengths, Needs, and Suggestions**

Overall, what about the [STATE NAME] program works well and why?

What doesn't work well and why? Do you think this discourages customer acceptance or the quality of the offer to the customer?

Do you have suggestions for improvements to the program that would increase offer quality, customer interest or lower costs?

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

Do you have suggestions for improving or increasing energy impacts?

**Operational, Market & Technical Barriers and Suggestions**

What information, research or assessments are you using to identify barriers to implementation and develop more effective ways to deliver this program?

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

Anything on the horizon that you think will impact the energy savings generated by this program?

In what ways can program operations or operational efficiencies be improved?

**Closing Suggestions and Comments**

If you could change anything else about the program, what would you change and why?  
Are there any other issues or topics you think we should know about and discuss for this evaluation?

Is there anyone else that I should speak with to better complete this evaluation?



## Appendix B: Trade Ally Interview Instrument

*Target 10 in OH & KY (each)*

*Use four attempts at different times of the day and different days before dropping from contact list. Call times are from 9:00 a.m. to 5:00 p.m. EPT, Monday - Friday.*

*Note: Only read words in bold type.*

*for answering machine 1st through penultimate attempts:*

Hello, my name is \_\_\_\_\_ and I am calling with a survey about the Duke Energy Smart Saver HVAC rebate program that your company participates in. I'm sorry I missed you. I'll try again another time.

*for answering machine - Final Attempt:*

Hello, my name is \_\_\_\_\_ and I am calling with a survey about the Duke Energy Smart Saver HVAC program that your company participates in. I'm sorry I missed you. This is my last attempt at reaching you, my apologies for any inconvenience.

*if person answers*

Hello, my name is \_\_\_\_\_. May I please speak with \_\_\_\_\_ or whoever helps to coordinate your company's participation in the Duke Energy Smart Saver HVAC rebate program?

I am calling on behalf of Duke Energy to conduct an interview to obtain your opinions about and experiences with Duke Energy's Residential Smart Saver program. **We are not selling or promoting anything, there are no wrong answers, and your responses to our questions will be combined with other responses and used to help us make improvements to the program.**

We'll talk about your understanding of the Residential Smart Saver Program and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about 45 minutes to complete. May we begin?

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

We initially have some brief quantitative questions to ask you. After these we'd like to discuss some other questions where we'd appreciate hearing your insights and opinions.

### Identification

Surveyor Name \_\_\_\_\_

Survey ID \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_  
Phone \_\_\_\_\_  
Email \_\_\_\_\_

1. What is your best estimate regarding the number of customers per year that your company serves who participate in the Smart Saver program? \_\_\_\_\_

Comments: \_\_\_\_\_

2. What percentage of these Smart Saver buyers your company works with do you think are replacing failed units? \_\_\_\_\_

Comments: \_\_\_\_\_

3. What percentage of the Smart Saver buyers do you think are replacing older equipment that is still functioning, but less efficient? \_\_\_\_\_

Comments: \_\_\_\_\_

4. What percentage of your total high efficiency equipment sales were rebated through the Smart Saver program last year? \_\_\_\_\_

Comments: \_\_\_\_\_

5. Of the energy efficient equipment that was rebated through the program, what percentage of those customers do you think would have still gone with an energy efficient model if the Duke Energy rebate were not available? \_\_\_\_\_

Comments: \_\_\_\_\_

6. What percentage of customers would you estimate were aware of the rebate for high efficiency equipment prior to contacting your company? \_\_\_\_\_

Comments: \_\_\_\_\_

7. What percentage of customers would you estimate decide to install a lower efficiency model after being made aware of the rebate for high efficiency equipment? \_\_\_\_\_

Comments: \_\_\_\_\_

8. Using a scale of 1 to 10, where 1 means not at all influential and 10 means very influential, how important would you say the rebate is to your customers' decision when considering all the various factors that a customer typically contemplates prior to making a purchase from your company?

( ) 1

...

- ( ) 10  
( ) DK/NS

*If less than 8,*

9. Why do you give that response? \_\_\_\_\_

10. What other factors are commonly more influential than the rebate in a customer's decision to purchase the high efficiency unit from your company?

*Do Not Read. Allow for Any Response.*

- ☐ Overall purchase price
- ☐ Payment options
- ☐ Equipment operating cost
- ☐ Equipment efficiency rating
- ☐ Equipment warranty
- ☐ Labor warranty
- ☐ Service contract
- ☐ Equipment reputation/brand
- ☐ Your company's reputation/brand
- ☐ Duke Energy reputation/brand
- ☐ Sales person influence
- ☐ Recommendation or referral *ask: From whom*
- ☐ Monthly utility bill reduction
- ☐ Tax credits
- ☐ Other utility or manufacturer rebates
- ☐ Other
- ☐ DK/NS

11. Using a scale of 1 to 10, where 1 means not at all helpful and 10 means very helpful, how useful would you say the rebate is to your company's ability to sell high efficiency equipment?

- ( ) 1  
...  
( ) 10  
( ) DK/NS

*If less than 8,*

12. Why do you give that response? \_\_\_\_\_

13. On a scale from 1-10, with 1 indicating that you are very dissatisfied, and 10 indicating that you are very satisfied, please rate your satisfaction with the Smart Saver HVAC Rebate Program

- ( ) 1  
...  
( ) 10  
( ) DK/NS

*If less than 8,*

14. Why do you give that response? \_\_\_\_\_

*Understanding the Program*

Now we would like to ask you about your understanding of the Smart Saver program. We would like to ask 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 help a customer become eligible for this program and what 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 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 incentive levels appropriate? How do they impact the choice by the customers of the higher efficient equipment?
6. Are there other technologies or energy efficient systems 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 contractors become partners in the Smart Saver Program.

9. How long have you been a partner in the Smart Saver Program?
10. 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, does it provide a service to your customers, do you want to build a relationship with Duke Energy, or other reasons?
11. Has this program made a difference in your business? How?

- 12. How do you think Duke Energy can get more contractors to participate in this program?**

*Program Participation Experiences*

The next few questions ask about the process for submitting participation forms and obtaining the incentive payments.

- 13. Do you think the process could be streamlined in any way? How?**
- 14. How long does it take between the time that you apply for your incentive, to the time that you and your customer receive the payments? Is this a reasonable amount of time? What should it be? Why?**
- 15. Do you have the right amount of materials such as forms, information sheets, brochures or marketing materials that you need to effectively show and sell your Smart Saver<sup>®</sup> heat pumps and air conditioners? What else do you need?**
- 16. Overall, what about the Smart Saver Program do you think works well and why?**
- 17. What changes would you suggest to improve the program?**
- 18. Do you feel that communications between you and Duke Energy's Smart Saver program staff is adequate? How might this be improved?**
- 19. What benefits do you receive as a result of participating in Duke Energy's Smart Saver Program or from selling Smart Saver items?**
- 20. What do you think are the primary benefits to the people who buy a Smart Saver appliance? Are there other benefits that are important to a potential customer?**

*Market Impacts and Effects*

- 21. How do you make customers aware of the Program?**
- 22. Are customers more satisfied with this equipment? Why or why not?**
- 23. Do you have fewer calls or more calls to correct problems with the Smart Saver appliances?**
- 24. Do you market or sell the Smart Saver equipment differently than your other equipment? How?**
- 25. What percent of Smart Saver buyers do you think are replacing older equipment that is still functioning, but less efficient? What percent of Smart Saver buyers do you think are replacing failed units?**

26. Other than the energy efficient heat pumps and air conditioners, has the program influenced you to carry other energy efficient equipment that is not rebated through the program?
- a. *If yes, what do you now carry?*
  - b. *If yes, About how many of these units did you install/sell in the last year?*
27. Do you bundle air conditioners with any other efficiency options?
- a. *If yes, what percent?*
28. Has the program influenced your decision to market or sell more high efficiency equipment than you would have without the program?
- a. *If yes, To what extent?*
29. We would like to know what your practices were before you became a partner in the program, and what you would offer your customers without the program.
30. There are no plans to terminate the program, but we would like to know how the program affects trade allies. If the program were to be discontinued, would you still offer the same energy efficient equipment options?
31. If the program were not offered, how would you structure pricing differently to make up for the program loss?
32. In your opinion is the Smart Saver program still needed? Why?

*Recommended Changes from the Participating Trade Allies*

33. Are there any other changes that you would recommend to Duke Energy for their Program not already discussed?

## Appendix C: HVAC Trade Ally Survey Instrument

Target 80 in IN, 80 in OH&KY (combined)

Use four attempts at different times of the day and different days before dropping from contact list. Call times are from 9:00 a.m. to 5:00 p.m. EPT, Monday - Friday.

Note: Only read words in bold type.

for answering machine 1st through penultimate attempts:

Hello, my name is \_\_\_\_\_ and I am calling with a survey about the Duke Energy Smart Saver HVAC rebate program that your company participates in. I'm sorry I missed you. I'll try again another time.

for answering machine - Final Attempt:

Hello, my name is \_\_\_\_\_ and I am calling with a survey about the Duke Energy Smart Saver HVAC program that your company participates in. I'm sorry I missed you. This is my last attempt at reaching you, my apologies for any inconvenience.

if person answers

Hello, my name is \_\_\_\_\_. May I please speak with \_\_\_\_\_ or whoever helps to coordinate your company's participation in the Duke Energy Smart Saver HVAC rebate program?

I am calling on behalf of Duke Energy to conduct a contractor survey to get feedback about your company's experiences with the program. We are not selling or promoting anything, there are no wrong answers, and your responses to our questions will be combined with other responses and used to help us make improvements to the program.

The survey only has 10 questions and will take just 3 or 4 minutes.

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

### Identification

Surveyor Name \_\_\_\_\_  
Survey ID \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_  
Zip \_\_\_\_\_  
Phone \_\_\_\_\_  
Email \_\_\_\_\_

1. What is your best estimate regarding the number of customers per year that your company serves who participate in the Smart Saver program? \_\_\_\_\_

Comments: \_\_\_\_\_

2. What percentage of these Smart Saver buyers your company works with do you think are replacing failed units? \_\_\_\_\_

Comments: \_\_\_\_\_

3. What percentage of the Smart Saver buyers do you think are replacing older equipment that is still functioning, but less efficient? \_\_\_\_\_

Comments: \_\_\_\_\_

4. What percentage of your total high efficiency equipment sales were rebated through the Smart Saver program last year? \_\_\_\_\_

Comments: \_\_\_\_\_

5. Of the energy efficient equipment that was rebated through the program, what percentage of those customers do you think would have still gone with an energy efficient model if the Duke Energy rebate were not available? \_\_\_\_\_

Comments: \_\_\_\_\_

6. What percentage of customers would you estimate were aware of the rebate for high efficiency equipment prior to contacting your company? \_\_\_\_\_

Comments: \_\_\_\_\_

7. What percentage of customers would you estimate decide to install a lower efficiency model after being made aware of the rebate for high efficiency equipment? \_\_\_\_\_

Comments: \_\_\_\_\_

8. Using a scale of 1 to 10, where 1 means not at all influential and 10 means very influential, how important would you say the rebate is to your customers' decision when considering all the various factors that a customer typically contemplates prior to making a purchase from your company?

( ) 1

...

( ) 10

( ) DK/NS

*If less than 8,*

9. Why do you give that response? \_\_\_\_\_



**10. What other factors are commonly more influential than the rebate in a customer's decision to purchase the high efficiency unit from your company?**

*Do Not Read. Allow for Any Response.*

- ☐ Overall purchase price
- ☐ Payment options
- ☐ Equipment operating cost
- ☐ Equipment efficiency rating
- ☐ Equipment warranty
- ☐ Labor warranty
- ☐ Service contract
- ☐ Equipment reputation/brand
- ☐ Your company's reputation/brand
- ☐ Duke Energy reputation/brand
- ☐ Sales person influence
- ☐ Recommendation or referral *ask: From whom*
- ☐ Monthly utility bill reduction
- ☐ Tax credits
- ☐ Other utility or manufacturer rebates
- ☐ Other
- ☐ DK/NS

**11. Using a scale of 1 to 10, where 1 means not at all helpful and 10 means very helpful, how useful would you say the rebate is to your company's ability to sell high efficiency equipment?**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*If less than 8,*

**12. Why do you give that response?** \_\_\_\_\_

**13. On a scale from 1-10, with 1 indicating that you are very dissatisfied, and 10 indicating that you are very satisfied, please rate your satisfaction with the Smart Saver HVAC Rebate Program**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*If less than 8,*

**14. Why do you give that response?** \_\_\_\_\_

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

## Appendix D: Sample Rebate Application Form

Rebate applications are similar for Ohio and Kentucky.



Smart Saver\*

### Ohio Residential Smart Saver Incentive Application – HVAC Install

#### Preliminary Information

Whom should we contact with questions? ☐ Customer ☐ Contractor ☐ Builder Total Project Cost: \$ \_\_\_\_\_

#### Incentive Recipient

If Builder Submission, who should receive the Incentive?

☐ Builder ☐ Other: \_\_\_\_\_ (Place name here and address in mailing address below)

If rental property, the landlord will receive the Incentive. Please provide the landlord's name below:

\_\_\_\_\_ (Place name here and address in mailing address below)

#### Customer Information (All information must match the information on the utility bill)

Duke Energy Electric Account #: \_\_\_\_\_

Customer Name on Duke Energy Account: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Email: \_\_\_\_\_

How did you hear about this program (mailing, email, web, contractor, word of mouth, etc.)? \_\_\_\_\_

☐ By providing my email address, I acknowledge that I'm signing up to receive email messages from Duke Energy.

#### Installation Address

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City: \_\_\_\_\_

State, Zip Code: \_\_\_\_\_

Phone: ( ) \_\_\_\_\_

#### Mailing Address (☐ Same as Installation Address)

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City: \_\_\_\_\_

State, Zip Code: \_\_\_\_\_

Alternate Phone: ( ) \_\_\_\_\_

#### Trade Ally Information

Company Name: \_\_\_\_\_ ☐ Payee Contact Person: \_\_\_\_\_ ☐ Payee

Mailing Address 1: \_\_\_\_\_ Telephone: ( ) \_\_\_\_\_

Mailing Address 2: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

City, State, Zip: \_\_\_\_\_ Email: \_\_\_\_\_

#### Application Checklist

☐ Complete all sections ☐ Agree to Terms & Conditions ☐ Include Invoice ☐ Submit within 90 days of installation

Send signed application and all required documents to:

Smart Saver Incentive Program, P.O. Box 525, Snelville, GA 30078

Or Fax: 1.866.728.8293 Or Email: [incentives@dukeressmartsaver.com](mailto:incentives@dukeressmartsaver.com)

Questions? Visit [duke-energy.com/smartsaver](http://duke-energy.com/smartsaver) or call 1-866-785-6209.

#### Terms and Conditions

I have read and hereby agree to the Program Requirements as stated on the Smart Saver Trade Ally Registration Form on file with Duke Energy. I hereby certify that the information contained on this application is true and accurate to the best of my knowledge.

Trade Ally Signature \_\_\_\_\_

Date \_\_\_\_\_

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Smart Saver®

## Ohio Residential Smart \$aver Incentive Application – HVAC Install

New Unit									
Air Conditioner / Heat Pump	New Construction / Replacement	Make - Outdoor Unit	Model Number - Outdoor Unit	Serial Number - Outdoor Unit	Make - Indoor Unit	Model Number - Indoor Unit	Serial Number - Indoor Unit		
AHRJ Number of System	SEER	EER	HSPF	COP	Open or Closed Loop	Back-up Fuel	ECM Present?	Date Installed and Operable	Number of Tons

Replaced Unit						
Air Conditioner / Heat Pump / Gas Furnace	Make - Outdoor Unit	Model Number - Outdoor Unit	Serial Number - Outdoor Unit	Make - Indoor Unit	Model Number - Indoor Unit	Serial Number - Indoor Unit

AHRJ Number of System	SEER	EER	HSPF	COP	AFUE	Number of Tons	Approximate System Age

**Home Characteristics:**
 Residence Type: ☐ Single Family Detached ☐ Townhome/Condo ☐ Multi-family (2-4 Units) ☐ Multi-family (5+ Units)

Year of Construction: \_\_\_\_\_

Heated Square Footage of Home: \_\_\_\_\_

Number of HVAC Systems in Home: \_\_\_\_\_

Number of stories above grade: \_\_\_\_\_

Foundation Type: ☐ Slab ☐ Crawlspace ☐ BasementDuct Location: ☐ Attic ☐ Unconditioned Basement/Crawlspace ☐ Conditioned Basement/Closed Crawlspace

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Smart Saver®

## Ohio Residential Smart \$aver Incentive Application – HVAC Install

### Instructions

**Important:** The application must be submitted within 90 days of project completion. Incomplete or illegible applications will not be processed and will be returned to the submitting party for correction. Also, specialized or contractors' forms will not be accepted in lieu of this application form.

Please review all items listed below prior to the submission of this application:

1. Complete all parts of the incentive applications. Note the following required information that is often overlooked:
  - a. Customer information as shown on your electric bill including account number and name.
  - b. Trade Ally signature
  - c. Serviced measure information in the chart on page 2 (other charts or tables are not acceptable).
2. Additional information about this program and other programs offered by Duke Energy may be found by:
  - a. Visiting the program website at [duke-energy.com/smartsaver](http://duke-energy.com/smartsaver).
  - b. Calling the program at 1-866-785-6209.
  - c. Emailing the program at [incentives@dukeressmartsaver.com](mailto:incentives@dukeressmartsaver.com)
3. Make a copy of all application documents for your records.

### Program Rules and Equipment Eligibility Requirements

1. Work must be completed by a participating contractor. If you do not have a contractor, please visit [duke-energy.com/smartsaver](http://duke-energy.com/smartsaver) to view a list of participating contractors.
2. Customer must be served under a Duke Energy residential electric rate and have an active electric account with Duke Energy to qualify for the incentive.
3. All installed measures must be new. No refurbished measures will be accepted.
4. The approved incentive will be processed and mailed within 45 days of the application's receipt.
5. All applications are subject to on-site inspection and payment will be mailed after the passed inspection (if inspection was required).
6. Incentive checks will only be mailed to the customer's or Trade Ally's mailing address as indicated on this application.
7. The amount and availability of incentives are subject to change. The program funding is limited and available on a first come, first served basis.
8. Only one account number per application is accepted. If upgrades are made across multiple account numbers, separate applications must be submitted to reflect the quantities associated with each account number.
9. Leased equipment is not eligible.
10. The incentive recipient assumes all responsibilities for any tax consequences resulting from incentive payment.
11. Incentives may not exceed the cost of the installed measures.
12. An additional program available from Duke Energy is the Power Manager program. You've taken an important step in lowering your energy bills. Learn how you can save even more with Power Manager. Visit [duke-energy.com/powermanager.asp](http://duke-energy.com/powermanager.asp) to see how.
13. Attach the required AHRI certification indicating the SEER efficiency level of the installed heat pump or air conditioner. See [www.ahridirectory.org](http://www.ahridirectory.org).
14. HVAC dealer, dealer sales representative or builder must fill out the Participating Trade Ally Registration form prior to or in conjunction with their first incentive application.

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## Appendix E: Participant Survey Instrument

*Need to know this regarding customer:*

- [technology] type of equipment - air conditioner or heat pump

- [date] approximate date of participation

*NOTE: the program provided a \$300 dollar incentive amount per unit. Retrofit incentives consisted of a \$200 incentive to the customer and a \$100 incentive to the trade ally. But a builder of new construction got the entire \$300 incentive.*

### Equipment

- ☐ Heat Pump
- ☐ Central Air Conditioner

### State

- ☐ Ohio
- ☐ Kentucky

### Info

Surveyor Name \_\_\_\_\_

Survey ID \_\_\_\_\_

Date \_\_\_\_\_

*for answering machine 1st through penultimate attempts*

**Hello, my name is \_\_\_\_\_ and I am calling with a survey about the rebate that you received from Duke Energy's Smart Saver program. I'm sorry I missed you. I'll try again another time.**

*for answering machine - Final Attempt*

**Hello, my name is \_\_\_\_\_ and I am calling with a survey about the rebate that you received from Duke Energy's Smart Saver program. This is my last attempt at reaching you, my apologies for any inconvenience.**

*if person answers*

**Hello, my name is \_\_\_\_\_ and I am calling in regard to the rebate that you received from Duke Energy's Smart Saver program. The purpose of this call is to ask you a few questions about your purchase and your satisfaction with the application and rebate. We are not selling anything. Your answers will be confidential, and will help us to make improvements to the program to better serve others. If you qualify for the survey it will take about 20-30 minutes, but when we are done with the survey I will confirm your address and we will send you \$20 for your time. May we begin?**

**1. Our records indicate that you participated in the Smart Saver Program in [date] and that you installed [air conditioner or heat pump] through the program and received an incentive for your purchase. Do you recall participating in this program?**

- ☐ Yes
- ☐ No

☐ DK/NS

**This program was provided through Duke Energy. In this program, you purchased an energy efficient [air conditioner or heat pump]. In exchange for purchasing the energy efficient option, Duke Energy provided you with a rebate check for \$200.**

**1a. Do you remember participating in this program?**

- ☐ Yes  
☐ No  
☐ DK/NS

*If No or DK/NS terminate interview politely, mark as 'Unaware' on the calling sheet, and proceed to next participant.*

**2. How did you become aware of the Smart Saver Program?**

*Mark all that apply.*

- ☐ Duke Energy sent me a brochure  
☐ Duke Energy website.  
☐ A contractor or salesperson I was working with told me about the program  
☐ I saw an ad in... \_\_\_\_\_  
☐ Other \_\_\_\_\_  
☐ DK/NS

**3. When you first heard about the program and considered taking advantage of the offer, did you do any additional investigation to confirm the program's offering, or was the information you had adequate to make a participation decision?**

*Mark all that apply.*

- ☐ The information was adequate  
☐ Didn't need to confirm/Nothing  
☐ Went to the web site  
☐ Called or emailed Duke Energy  
☐ Called or emailed a contractor  
☐ Called or emailed a salesperson  
☐ Other \_\_\_\_\_  
☐ DK/NS

*If they did do any additional investigation, ask:*

**3a. How well did this work for you, were you able to acquire a more complete understanding of the program?**

- ☐ Yes  
☐ No  
☐ DK/NS

**4. Did you have additional questions that were not answered? Were there questions that you were unable to answer or information that you were unable to obtain?**

- ☐ Yes

- ☐ No
- ☐ DK/NS

*If YES to question 4,*

4a. What were they? \_\_\_\_\_

**5. Who filled out the program incentive forms?**

- ☐ I did
- ☐ Someone from my family did
- ☐ Contractor
- ☐ Salesperson
- ☐ Someone from Duke Energy
- ☐ Other \_\_\_\_\_

*If they filled it out themselves.*

**5a. Was the incentive form easy to understand?**

- ☐ Yes
- ☐ No
- ☐ DK/NS

*If the incentive form was not easy to understand, ask*

**5b. Do you remember what it was that was not clear or which part of it was difficult?**

\_\_\_\_\_

**6. Who submitted the forms to Duke Energy?**

- ☐ I did
- ☐ Someone from my family did
- ☐ The contractor
- ☐ The salesperson
- ☐ Someone from Duke Energy
- ☐ Other \_\_\_\_\_

**7. Did you have any problems receiving the rebate?**

- ☐ Yes
- ☐ No
- ☐ I didn't receive a rebate
- ☐ Rebate was provided to the retailer OR through lower unit cost
- ☐ DK/NS

*If Yes, they did have problems receiving the rebate, ask*

**7a. Please explain the problem and how it was resolved. Was it resolved to your satisfaction?**

\_\_\_\_\_

**8. Did you also receive a state or federal tax credit or rebate for the unit you installed?**

- ☐ Yes

- ☐ No  
☐ DK/NS

**8b. If the price of the equipment you purchased was \$300 more, which of the following three responses best represents what would have occurred: You would have purchased the same make and model, you would have considered a less expensive model, or you would have probably purchased a less expensive model?**

- ☐ Would have purchased the same make and model  
☐ Would have considered a less expensive model  
☐ Would have probably purchased a cheaper model  
☐ DK/NS

**9. Have you taken any additional energy efficiency actions since you participated in Duke Energy's Smart Saver program?**

- ☐ Yes  
☐ No  
☐ DK/NS

*If yes to question 9, ask 9a-9c (repeat up to four times)*

**9a1. What have you done?** \_\_\_\_\_

**9b1. How much money do you think you have saved as a result?**

*if they do not specify a time period, ask follow up and record in the same box*

**Is that how much you have saved in total, per month or per year?** \_\_\_\_\_

**9c1. When customers have experience with energy efficiency programs or products they sometimes make similar decisions to continue the energy savings in other parts of their homes or work places. On a scale from 1-10, with 1 indicating that the Smart Saver program was not at all influential, and 10 indicating that the program was very influential, please rate the level of influence that your participation in Smart Saver had on taking this action**

- ☐ 1  
...  
☐ 10  
☐ DK/NS

**9a2. Have you done anything else?**

- ☐ Yes (*record answer*) \_\_\_\_\_  
☐ No

**9b2. How much money do you think you have saved as a result?**

*if they do not specify a time period, ask follow up and record in the same box*

**Is that how much you have saved in total, per month or per year?)** \_\_\_\_\_



9c2. On a scale from 1-10, with 1 indicating that the Smart Saver program was not at all influential, and 10 indicating that the program was very influential, please rate the level of influence that your participation in Smart Saver had on taking this action

☐ 1

...

☐ 10

☐ DK/NS

9a3. Have you done anything else?

☐ Yes *record answer* \_\_\_\_\_

☐ No

9b3. How much money do you think you have saved as a result?

*if they do not specify a time period, ask follow up and record in the same box*

Is that how much you have saved in total, per month or per year?) \_\_\_\_\_

9c3. On a scale from 1-10, with 1 indicating that the Smart Saver program was not at all influential, and 10 indicating that the program was very influential, please rate the level of influence that your participation in Smart Saver had on taking this action

☐ 1

...

☐ 10

☐ DK/NS

I would like to ask you a few questions about your home and air conditioner usage. The answers to these questions will help Duke Energy better estimate the energy savings resulting from your high efficiency air conditioner or heat pump upgrade.

10. Is your home built over a

☐ crawlspace,

☐ slab on grade or a

☐ basement

☐ Other \_\_\_\_\_

☐ DK/NS

11. Does the duct work in your home run primarily through

☐ interior walls

☐ crawlspace

☐ attic, or the

☐ basement

☐ Other \_\_\_\_\_

☐ DK/NS

12. At what outside temperature do you tend to turn on the air conditioner?

☐ < 65 degrees

☐ 65-68 degrees

- ☐ 69-72 degrees
- ☐ 73-75 degrees
- ☐ 76-78 degrees
- ☐ 79-81 degrees
- ☐ 82-84 degrees
- ☐ 85-87 degrees
- ☐ 88-90 degrees
- ☐ 91-94 degrees
- ☐ 95-97 degrees
- ☐ 98-100 degrees
- ☐ > 100 degrees
- ☐ It's programmed into the thermostat.
- ☐ DK/NS

**13. Before you got your new [air conditioner or heat pump], At what temperature did you normally have your thermostat set to during the summer?**

- ☐ < 65 degrees
- ☐ 65-68 degrees
- ☐ 69-72 degrees
- ☐ 73-75 degrees
- ☐ 76-78 degrees
- ☐ 79-81 degrees
- ☐ 82-84 degrees
- ☐ 85-87 degrees
- ☐ 88-90 degrees
- ☐ 91-94 degrees
- ☐ 95-97 degrees
- ☐ 98-100 degrees
- ☐ > 100 degrees
- ☐ It's programmed into the thermostat.
- ☐ DK/NS
- ☐ Not applicable

**14. Since getting your new [air conditioner or heat pump], at what temperature do you normally have your thermostat set to during the summer?**

- ☐ < 65 degrees
- ☐ 65-68 degrees
- ☐ 69-72 degrees
- ☐ 73-75 degrees
- ☐ 76-78 degrees
- ☐ 79-81 degrees
- ☐ 82-84 degrees
- ☐ 85-87 degrees
- ☐ 88-90 degrees
- ☐ 91-94 degrees
- ☐ 95-97 degrees

- ☐ 98-100 degrees
- ☐ > 100 degrees
- ☐ It's programmed into the thermostat.
- ☐ DK/NS

15. How often do you use your [air conditioner or heat pump]? Would you say you use it ...

*Read all choices until customer answers*

- ☐ Not at all
- ☐ Only on the hottest days
- ☐ Frequently during the cooling season
- ☐ Most days during the cooling season
- ☐ Everyday during the cooling season
- ☐ DK/NS

16. How many hours per day did you have your {equipment - air conditioner or heat pump} turned on during the summer before you installed the new unit?

- ☐ Less than 1
- ☐ 1 to 2
- ☐ 3 to 4
- ☐ 5 to 10
- ☐ 11 to 12
- ☐ 13 to 24
- ☐ DK/NS

17. Did the average hours of daily use increase, decrease or stay the same since you replaced the unit?

- ☐ Increased *ask* How many hours per day did it increase? \_\_\_\_\_
- ☐ Decreased *ask* How many hours per day did it decrease? \_\_\_\_\_
- ☐ Stayed the same
- ☐ DK/NS

18. How often do you use the Duke Energy website?

- ☐ Often (once a month or more)
- ☐ Sometimes (less than once a month)
- ☐ Never

19. Have you added any major electrical appliances besides your new [air conditioner or heat pump] to your home in the past year?

- ☐ Yes
- ☐ No

*If YES to q19, ask*

19a. What appliance(s) did you install in the past year? \_\_\_\_\_

20. Have you participated in the past, or currently a participant in any of the following Duke Energy programs

*(read all, and check all that apply)*

- ☐ Power Manager
- ☐ Home Energy House Call
- ☐ My Home Energy Report
- ☐ Personal Energy Report
- ☐ CFLs shipped to your home
- ☐ Online services
- ☐ none of the above

*For programs not checked in q20 (except for "online services"), ask the following*

**On a scale from 1-10, with 1 indicating not at all interested and 10 indicating very interested, please rate your interest in Duke Energy providing the following program(s)**

*if "Power Manager" is NOT checked in q20, ask*

**21. A program that provides bill credits in exchange for allowing Duke Energy to temporarily cycle your air conditioning unit during periods of high use**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*if "Home Energy House Call" is NOT checked in q20, ask*

**22. A program in which an assessor comes to your house, suggests energy efficiency improvements, and Duke Energy provides certain low-cost improvement materials for free.**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*if "My Home Energy Report" is NOT checked in q20, ask*

**23. A program that provides an ongoing comparison of your energy use with that of people who live in similar homes**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*if "Personal Energy Report" is NOT checked in q20, ask*

**23b. A program that provides personalized energy analysis and ways to save energy and money by filling out a few questions about your home either online or by mail**

- ☐ 1
- ...
- ☐ 10
- ☐ DK/NS

*if "CFLs shipped to your home" is NOT checked in q20, ask*

23c. A program that provides free CFLs mailed directly to your home

☐ 1

...

☐ 10

☐ DK/NS

24. What other services could Duke Energy provide to help improve home energy efficiency? \_\_\_\_\_

25. Generally speaking, how important are environmental issues to you? Would you say they are...

*(read all and select one answer)*

☐ Very Important

☐ Important

☐ Neutral

☐ Not Important, or

☐ Not At All Important

26. How important are climate change issues to you? Would you say they are...

*(read all and select one answer)*

☐ Very Important

☐ Important

☐ Neutral

☐ Not Important, or

☐ Not At All Important

27. How important is reducing air pollution to you? Would you say it is...

*(read all and select one answer)*

☐ Very Important

☐ Important

☐ Neutral

☐ Not Important, or

☐ Not At All Important

28. How important is the need to reduce the rate of building new power plants? Would you say it is...

*(read all and select one answer)*

☐ Very Important

☐ Important

☐ Neutral

☐ Not Important, or

☐ Not At All Important

29. Are you a member of any groups or clubs that have environmental missions?

☐ Yes *Ask Which ones?* \_\_\_\_\_

☐ No

( ) DK/NS

**30. One of the objectives that the program would like to meet over the next year is to increase participation. Can you think of things that the program can do to help increase participation or help increase interest from people like yourself?**

*(do not read list)*

- ☐ Increase general advertising
- ☐ Include more information with monthly bills
- ☐ Increase involvement with contractors/vendors
- ☐ Include more community outreach and community events
- ☐ Increase advertising in trade media
- ☐ Present the program in trade or associated meetings
- ☐ Offer larger incentives
- ☐ Offer incentives on other items/include other items
- ☐ Have program staff call residential customers
- ☐ Make the process more streamlined for customers
- ☐ Make the process more streamlined for contractors/vendors
- ☐ Other \_\_\_\_\_

**31. During your participation process, did you need to contact Duke Energy to obtain information about the program?**

- ☐ Yes
- ☐ No
- ☐ DK/NS

*If yes to question 31, ask*

**31a. Were your questions or needs handled effectively by Duke Energy?**

- ☐ Yes
- ☐ No
- ☐ DK/NS

*If no to question 31a,*

**31b. How might this be improved?** \_\_\_\_\_

**32. Overall, what did you like most about the Smart Saver Program?** \_\_\_\_\_

**33. What did you like least?** \_\_\_\_\_

**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.**

*(Note This question is not asked when the answer to q7 "Did you have any problems receiving the rebate?" is "I did not receive a rebate check".)*

**How would you rate your satisfaction with...**

**34. The amount of the rebate provided by the program**

☐ 1

...

☐ 10

☐ DK/NS

*If 7 or less to question 34, ask*

**34a. What could have been done to make this better?** \_\_\_\_\_

*(Note: This question is only asked when the answer to q5 "Who filled out the program incentive forms?" is "I did")*

**How would you rate your satisfaction with...**

**35. The ease of filling out the form to receive the rebate.**

☐ 1

...

☐ 10

☐ DK/NS

*If 7 or less to question 35, ask*

**35a. What could have been done to make this better?** \_\_\_\_\_

*(Note: This question is not asked when the answer to q7 "Did you have any problems receiving the rebate?" is "I did not receive a rebate check".)*

**How would you rate your satisfaction with...**

**36. The time it took to receive your rebate check**

☐ 1

...

☐ 10

☐ DK/NS

*If 7 or less to question 36, ask*

**36a. What could have been done to make this better?** \_\_\_\_\_

**How would you rate your satisfaction with...**

**37. The number and kind of technologies covered in the program**

☐ 1

...

☐ 10

☐ DK/NS

*If 7 or less to question 37, ask*

**37a. What could have been done to make this better?** \_\_\_\_\_

**How would you rate your satisfaction with...**

**38. The information you were provided explaining the program**

- ☐ 1  
...  
☐ 10  
☐ DK/NS

*If 7 or less to question 38, ask*

38a. What could have been done to make this better? \_\_\_\_\_

39. If you were rating your overall satisfaction with Duke Energy's Smart Saver program, would you say you were

- ☐ Very Satisfied  
☐ Somewhat Satisfied  
☐ Neither Satisfied nor Dissatisfied  
☐ Somewhat Dissatisfied  
☐ Very Dissatisfied  
☐ Don't Know

39a. Why do you give it that rating? \_\_\_\_\_

How would you rate your satisfaction with...

39b. Using the 1 to 10 scale, how would you rate your overall satisfaction with this Smart Saver program that pays rebates for purchasing an efficient [air conditioner or heat pump]?

- ☐ 1  
...  
☐ 10  
☐ DK/NS

*If 7 or less to question 39b, ask*

39c. Why were you less than satisfied with this program? \_\_\_\_\_

How would you rate your satisfaction with...

40. Using the 1 to 10 scale, how would you rate your overall satisfaction with Duke Energy?

- ☐ 1  
...  
☐ 10  
☐ DK/NS

*If 7 or less to question 40, ask*

40a. Why were you less than satisfied with Duke Energy? \_\_\_\_\_

Finally, we have some general demographic questions...

d1. In what type of building do you live?

- ☐ Single-family home, detached construction  
☐ Single family home, factory manufactured/modular  
☐ Single family, mobile home



- ☐ Row House
- ☐ Two or Three family attached residence-traditional structure
- ☐ Apartment (4 + families)---traditional structure
- ☐ Condominium---traditional structure
- ☐ Other \_\_\_\_\_
- ☐ Refused
- ☐ DK/NS

**d2. What year was your residence built?**

- ☐ 1959 and before
- ☐ 1960-1979
- ☐ 1980-1989
- ☐ 1990-1997
- ☐ 1998-2000
- ☐ 2001-2007
- ☐ 2008-present
- ☐ DK/NS

**d3. How many rooms are in your home (excluding bathrooms, but including finished basements)?**

- ☐ 1-3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10 or more
- ☐ DK/NS

**d4. Which of the following best describes your home's heating system?**

*Mark all that apply.*

- ☐ None
- ☐ Central forced air furnace
- ☐ Electric Baseboard
- ☐ Heat Pump
- ☐ Geothermal Heat Pump
- ☐ Other \_\_\_\_\_

**d5. How old is your heating system?**

- ☐ 0-4 years
- ☐ 5-9 years
- ☐ 10-14 years
- ☐ 15-19 years
- ☐ 19 years or older
- ☐ DK/NS

☐ Do not have

**d6. What is the primary fuel used in your heating system?**

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ DK/NS

**d7. What is the secondary fuel used in your primary heating system, if any?**

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ None
- ☐ DK/NS

**d8. Do you use one or more of the following to cool your home?**

*(Mark all that apply)*

- ☐ None, do not cool the home
- ☐ Heat pump for cooling
- ☐ Central air conditioning
- ☐ Through the wall or window air conditioning unit
- ☐ Geothermal Heat pump
- ☐ Other \_\_\_\_\_
- ☐ DK/NS

**d9. How many window-unit or "through the wall" air conditioner(s) do you use?**

- ☐ None
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8 or more
- ☐ DK/NS

**d10. What is the fuel used in your cooling system?**

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane

- ☐ Other \_\_\_\_\_
- ☐ None
- ☐ DK/NS

**d11. How old is your cooling system?**

- ☐ 0-4 years
- ☐ 5-9 years
- ☐ 10-14 years
- ☐ 15-19 years
- ☐ 19 years or older
- ☐ DK/NS
- ☐ Do not have

**d12. What is the fuel used by your water heater?**

*(Mark all that apply)*

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ No water heater
- ☐ DK/NS

**d13. How old is your water heater?**

- ☐ 0-4 years
- ☐ 5-9 years
- ☐ 10-14 years
- ☐ 15-19 years
- ☐ More than 19 years
- ☐ DK/NS

**d14. What type of fuel do you use for indoor cooking on the stovetop or range?**

*(Mark all that apply)*

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ No stovetop or range
- ☐ DK/NS

**d15. What type of fuel do you use for indoor cooking in the oven?**

*(Mark all that apply)*

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil

- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ No oven
- ☐ DK/NS

**d16. What type of fuel do you use for clothes drying?**

*(Mark all that apply)*

- ☐ Electricity
- ☐ Natural Gas
- ☐ Oil
- ☐ Propane
- ☐ Other \_\_\_\_\_
- ☐ No clothes dryer
- ☐ DK/NS

**d17. About how many square feet of living space are in your home?**

*(Do not include garages or other unheated areas)*

*Note: A 10-foot by 12 foot room is 120 square feet*

- ☐ Less than 500
- ☐ 500 to 999
- ☐ 1000 to 1499
- ☐ 1500 to 1999
- ☐ 2000 to 2499
- ☐ 2500 to 2999
- ☐ 3000 to 3499
- ☐ 3500 to 3999
- ☐ 4000 or more
- ☐ DK/NS

**d18. Do you own or rent your home?**

- ☐ Own
- ☐ Rent

**d19. How many levels are in your home (not including your basement)?**

- ☐ One
- ☐ Two
- ☐ Three

**d20. Does your home have a heated or unheated basement?**

- ☐ Heated
- ☐ Unheated
- ☐ No basement

**d21. Does your home have an attic?**

- ☐ Yes
- ☐ No

d22. Are your central air/heat ducts located in the attic?

- ☐ Yes
- ☐ No
- ☐ N/A

d23. Does your house have cold drafts in the winter?

- ☐ Yes
- ☐ No

d24. Does your house have sweaty windows in the winter?

- ☐ Yes
- ☐ No

d25. Do you notice uneven temperatures between the rooms in your home?

- ☐ Yes
- ☐ No

d26. Does your heating system keep your home comfortable in winter?

- ☐ Yes
- ☐ No

d27. Does your cooling system keep your home comfortable in summer?

- ☐ Yes
- ☐ No

d28. Do you have a programmable thermostat?

- ☐ Yes
- ☐ No

d28b. How many thermostats are there in your home?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more
- ☐ DK/NS

d29. What temperature is your thermostat set to on a typical summer weekday afternoon?

- ☐ Less than 69 degrees
- ☐ 69-72 degrees
- ☐ 73-78 degrees
- ☐ Higher than 78 degrees
- ☐ Off
- ☐ DK/NS

d30. What temperature is your thermostat set to on a typical winter weekday afternoon?

- ☐ Less than 67 degrees
- ☐ 67-70 degrees
- ☐ 71-73 degrees
- ☐ 74-77 degrees
- ☐ 78 degrees or higher
- ☐ Off
- ☐ DK/NS

d31. Do you have a swimming pool, hot-tub or spa?

- ☐ Yes
- ☐ No

*Read all answers until they reply*

d32. Would a two-degree increase in the summer afternoon temperature in your home affect your comfort...

- ☐ Not at all
- ☐ Slightly
- ☐ Moderately, or
- ☐ Greatly

d33. How many people live in this home?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8 or more
- ☐ Prefer not to answer

d34. How many of them are teenagers? (age 13-19)

*If they ask why: Explain that teenagers are generally associated with higher energy use.*

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8 or more
- ☐ Prefer not to answer

d35. How many persons are usually home on a weekday afternoon?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8 or more
- ☐ Prefer not to answer

**d36. Are you planning on making any large purchases to improve energy efficiency in the next 3 years?**

- ☐ Yes
- ☐ No
- ☐ DK/NS

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

**d37. What is your age group?**

*Read all.*

- ☐ 18-34
- ☐ 35-49
- ☐ 50-59
- ☐ 60-64
- ☐ 65-74
- ☐ Over 74
- ☐ Prefer not to answer

**d38. Please indicate your annual household income.**

*Read all.*

- ☐ Under \$15,000
- ☐ \$15,000-\$29,999
- ☐ \$30,000-\$49,999
- ☐ \$50,000-\$74,999
- ☐ \$75,000-\$100,000
- ☐ Over \$100,000
- ☐ Prefer Not to Answer

**That completes our survey. As I mentioned at the start, we'd like to send you a check for \$20 for your time. Should we send it to [name] at [address]?**

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_

Zip \_\_\_\_\_

There's an additional component to this study, as well. If you participate in a study, you will receive a \$50 Visa Gift card. We are looking for residential customers to participate in a study in which a Duke Energy representative will visit homes for 20 to 30 minutes and install logging equipment on your air conditioning or heat pump system. A portable logger device will be installed on your outdoor AC unit, at the circuit breaker box, and/or at the indoor furnace or air handler depending on system configuration, and will measure electricity consumption of your system and the outdoor temperature. The equipment will be left in place for approximately 3 weeks and will not interfere with the function or use of your air conditioning or heat pump in any manner. After the equipment is removed by Duke Energy Contractors, you will receive a \$50 Visa gift card about 4-6 weeks later.

We plan on conducting this study in August. Are you interested in participating?

☐ Yes

☐ No

*If yes*

Great, thank you! We will have someone call you in the next week or two to schedule the initial visit.

Is this the best phone number to call about the logger study?

*enter complete phone number here* \_\_\_\_\_

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



## Appendix F: Ohio Participants' Reasons for Program Satisfaction Ratings

Ohio survey respondents were asked why they gave the ratings they gave for their level of satisfaction with the Smart Saver HVAC program. The responses to this satisfaction rating question can be found in "Program Satisfaction Ratings in Ohio" on page 92.

One central air conditioner rebate recipient did not provide a program satisfaction rating, and therefore did not have an explanation for their rating. The responses of the remaining 68 heat pump rebate recipients and 70 central air conditioner rebate recipients surveyed in Ohio are listed below, categorized by satisfaction rating and rebated unit.

### **"Very Dissatisfied", received rebate for central air conditioner (N=2)**

- *I didn't receive the rebate.*
- *I never got a rebate.*

### **"Somewhat Dissatisfied", received rebate for heat pump (N=1)**

- *The application needs to be more streamlined and organized. If there was a website to keep track of each application, that would make more sense. It would be much easier if all of the information was in one place and I could easily look up the status of the application. Duke needs to find a way to make this Smart Saver program easier to take advantage of and streamline the application process. Right now, it is a big waste of time, and the incentive does not pay for all of the inconvenience and time involved.*

### **"Neither Satisfied Nor Dissatisfied", received rebate for heat pump (N=6)**

- *I didn't know anything about the program, so I had no expectations.*
- *I haven't thought about the program enough to rate it one way or another.*
- *I was going to purchase those heat pumps anyway; the price and rebate really had no effect on me.*
- *I was satisfied with my experience but the program is something I just haven't thought about.*
- *The rebate could be more, but I am happy to get something.*
- *There were countless delays and many hoops to jump through regarding the paperwork.*

### **"Neither Satisfied Nor Dissatisfied", received rebate for central air conditioner (N=3)**

- *I thought the program was pretty average. There wasn't anything that was bad about the program but there really wasn't anything awesome about it either.*
- *If I wouldn't have been shopping for an A/C, I would not know that the program even exists.*
- *It's been nearly two years since we did the program, so I really don't remember as much about the program as I would have liked for doing this survey. I can't even remember if we got a rebate check or not. I think that I would have given the program a more favorable rating if I could have remembered it better.*

**“Somewhat Satisfied”, received rebate for heat pump (N=21)**

- *I always think that there can always be ways for improvement, ways to be better. I was not aware of this program previously, and if it was not for my contractor informing me of the Smart Saver program I might have missed out on that opportunity to save some money. General awareness of the program needs to be improved.*
- *I think there should be more heating and cooling units that could qualify for the Smart Saver rebate. I'm pretty sure that one of my new units did not qualify for the Smart Saver, but I'm not sure which one.*
- *I am somewhat satisfied because, while the program itself was OK, I don't think my new heat pump is nearly as efficient as I expected it to be.*
- *I was somewhat satisfied because the program is good business for all involved, but we did have some delays receiving the check, and there was vendor confusion over the amount of the rebate.*
- *I was somewhat satisfied because there should have been more information provided about the program plus energy efficiency suggestions.*
- *It's a good program, but there could have been more information provided before I was even considering upgrading my system. It would have been better to have known about the program and rebate ahead of time, I had no idea I qualified for the rebate until I had already bought the system. If more people knew about the program, they might get a new system sooner than without knowing about the rebate, or they might get a better system because they will know that they will be saving money.*
- *I was somewhat satisfied because I wasn't aware of the program previously and what it included.*
- *I was somewhat satisfied because of the relatively low amount of the rebate offer.*
- *I was somewhat satisfied because of the small amount of rebate.*
- *I was somewhat satisfied because the amount of rebate was relatively low.*
- *I was somewhat satisfied because, while the program serves its purpose by helping people purchase high efficient units, the amount of rebate could be slightly higher.*
- *Of course, it would be better if the rebate was larger, but overall, my satisfaction has been met.*
- *I was happy to get a rebate.*
- *I am just happy to get a rebate*
- *I just thought everything went well, it was very easy for me to take advantage of.*
- *I was mostly satisfied because the contractor did everything for me. Participation was easy.*
- *I was somewhat satisfied because I needed a new heat pump and the rebate was just icing on the cake.*
- *I was somewhat satisfied because the incentive seemed like a nice unexpected bonus when I was forced to buy a new system.*
- *The rebate was helpful in the cost of my heat pump.*

- *There was nothing that made me upset about the program, but nothing made me rave about it either.*
- *Don't know*

**"Somewhat Satisfied", received rebate for central air conditioner (N=16)**

- *I had to call Duke Energy several times before receiving my rebate check.*
- *I had to contact Duke directly when we were not getting answers from the contractor who was supposed to have submitted the paperwork. It took us a year to get paid.*
- *I liked that Duke Energy offers a rebate for getting an energy efficient A/C, but the rebate check took a few months to get to us.*
- *I really like that the new A/C is so efficient that it keeps the house cooler and keeps the bills down, but the rebate amount should have been more because the cost of the new unit was so high.*
- *I would have liked to have had my new gas furnace qualify for the rebate.*
- *Instead of a one-time rebate, I would like see a program that provided a decrease in my monthly bill over the course of the year after purchasing a new unit: say, 10% one month, 20% the following, and so on. A bill reduction would be much better for people who work.*
- *The only improvement I suggest is that if it was a larger rebate it would have been nicer. I suggest maybe increasing the rebate to \$300 for the customer.*
- *If the program offered more money for the rebate, the better it would be. I like that Duke Energy was giving money to customers for purchasing a product that was bought from any heating and air companies.*
- *The only way it could have been better would be to have the rebate be a percentage of the overall cost, like 10% of the overall cost of the unit would have been really nice, but I am happy to get anything back really.*
- *The rebate wasn't as high enough.*
- *The rebate was easy to get, but it could have come quicker.*
- *I'd like to see Duke accept credit cards without a fee for services.*
- *I liked getting a rebate.*
- *I liked that the rebate helped keep the cost of getting a new A/C down.*
- *The program only covered certain A/C, when it could have covered more A/C that were just as efficient.*
- *Don't know*

**"Very Satisfied", received rebate for heat pump (N=43)**

- *I liked getting a rebate and that the process was easy. I found the information about the program on your website and hadn't heard about it through other means. More advertising is all this program could need to be more successful.*
- *I was very satisfied, but also had many problems with the rebate processing.*
- *I was very satisfied because my contractor processed the rebate for me, though I do think the amount of the rebate could be higher.*
- *It was an efficient program and it was free for the taking. Also, it had no impact on what I was going to do anyhow, I was going to get a new heating and cooling system and it just so happened that I was eligible for the rebate.*
- *The rebate is something that Duke doesn't have to provide but it really helped because I'm on a fixed income and I had to borrow money to get the new heat pump and water heater.*
- *I like money, and I like this follow-up call for improvements to the program. I think that it's a good program.*
- *Duke Energy doesn't have to provide a rebate, but they do. Filling out the rebate was easy and only took about 5-10 minutes.*
- *I appreciate that Duke is showing a commitment to reducing energy usage and providing customers with an incentive for doing so.*
- *I did not expect anyone to help me pay for my furnace, it was an unexpected benefit.*
- *I got a discount that I didn't even know about for something I was buying anyhow. It was an easy program to take advantage of and it's a good idea to encourage people to upgrade their heating or cooling systems to more efficient ones.*
- *I thought the program was proactive on Duke Energy's and the contractor's part. I liked that I really did not have to do anything to get the rebate besides buy a qualifying system. I'm so glad my contractor told me about it.*
- *I was very satisfied because of the ease of participation and the rebate. (N=2)*
- *I was very satisfied because Duke sent out an inspector to verify the installation of our new heat pump. After that, I liked that the rebate arrived two weeks later.*
- *I was very satisfied because I liked getting the rebate, and also I appreciate how Duke energy efficiency programs help me save money.*
- *I was very satisfied because I wasn't expecting any sort of incentive, so it was a nice bonus.*
- *I was very satisfied because it put money in my pocket and the new heat pump has lowered my energy bills.*
- *I was very satisfied because it was nice to get a rebate for updating my equipment. I appreciate that Duke is making efforts to save money and energy.*
- *I was very satisfied because of the ease of participation. The contractor filled out all of the paperwork for me.*
- *I was very satisfied because of the ease of participation and the information provided.*
- *I was very satisfied because of the simplicity of participation and the quick rebate.*

- *I was very satisfied because the incentive was a nice bonus.*
- *I was very satisfied because the program helped us purchase an efficient system that keeps our bills low.*
- *I was very satisfied because the program helps save money, does the right thing, and provides an incentive.*
- *I was very satisfied because the program is a great idea that saves money and helps people reduce energy consumption.*
- *I was very satisfied because the program promotes energy efficiency, and I liked getting the rebate.*
- *I was very satisfied because the program saved me money.*
- *I was very satisfied by the program because it saved us money.*
- *I was very satisfied because the program was quite informational. I had no misgivings.*
- *I was very satisfied mainly because of the simplicity of participation. The incentive and its turnaround were reasonable.*
- *I was very satisfied, mainly because I am so pleased with my new heat pump. The incentive was just a bonus.*
- *It was easy to participate. It was a win-win situation. There was an incentive to participate.*
- *It was free money, the overall cost came down on our unit which was great!*
- *It was an opportunity to get a rebate for something I was going to do anyhow. I needed to get a new heating and cooling system and I was rewarded for making an energy efficient decision.*
- *The program was easy and it was money in my pocket. The rebate was a fair amount of money for what it was trying to do, which is get customers to upgrade to an efficient system. I got to make a better choice on the heat pump that I installed because I knew I could save some money on the heat pump from the rebate.*
- *The program was so easy because the salesman did all things required to get the rebate for me.*
- *I got the rebate.*
- *The rebate was helpful.*
- *I am just happy to get any kind of rebate.*
- *I was very satisfied because the entire process went very smoothly.*
- *It seems like a great program.*
- *I was very satisfied because I had no problems whatsoever.*
- *It worked for me. It was a proper fit.*

**"Very Satisfied", received rebate for central air conditioner (N=46)**

- *You usually don't get money back from Duke, usually you send them money.*
- *I got the rebate money and it was so easy to participate; I really had no idea that we were involved until we got a check in the mail.*
- *I didn't have to do much and received money I wasn't expecting.*
- *The contractor had filled out the forms and submitted them without telling me about the program, so I was excited to get the rebate at all.*
- *While we were filling out the contract to purchase the new unit I was informed about the program. It's always a pleasant surprise to receive a rebate. We were really close to the deadline of participating with the program so it encouraged us to make up our minds to purchase the new unit quickly.*
- *It was basically free money for something I was planning to do already.*
- *Duke just seems very helpful, like if I call them about the bill or a problem. They're always so good on the phone.*
- *It was easy, saved us money, and I got the check right away. Overall it was very good.*
- *I didn't know about it and it was like free money. The people I contracted with did 90% of work and all I had to do was sign my name.*
- *I felt like the program was explained well and a benefit to us as well.*
- *I like that it helped reduce the cost of the A/C unit and the rebate arrived in a reasonable amount of time.*
- *I like that the new A/C saves money for me every month. It's a good program because it encourages people to get a more efficient unit than they might have without the program.*
- *I like that the program helps the environment by getting people to conserve energy.*
- *I like the rebate and that it encourages people to purchase more efficient models than they would have purchased.*
- *I liked the program, the rebate, and that our monthly bill is lower now.*
- *It was easy to understand, did not require a great deal of input on my part, and I received my money quickly.*
- *I think it's nice Duke is helping us to cut our usage.*
- *I think just having the program overall helps people to make choices to purchase units which they might not have gotten otherwise, and the information that they mail out about efficiency is very helpful.*
- *I think that Duke's trying to encourage people to use energy more judiciously, and I applaud that.*
- *I am using less electricity with my new equipment, plus received the rebate and tax credit.*
- *I was very satisfied because of the clear communications provided, the program delivered as promised, and there were no surprises.*
- *I was very satisfied because the amount of the incentive was adequate, I received it quickly, and contractor did all the necessary paperwork.*

- *There was nothing I had to do, the contractor did it all. They worked with Duke. I was surprised the check came so soon, so there must be good communications between Duke and the contractor.*
- *The program encouraged me to get an energy efficient machine and helped with paying for it*
- *The program was a cost savings to me and it also provided environmental benefits by encouraging me to purchase high efficiency heating and air conditioning.*
- *I was very satisfied because the paperwork was easy, the information provided was sufficient, and the dealer was helpful.*
- *It was there and efficiently-handled regarding the rebates and it was nice to find I would get a rebate for choosing a high-efficiency unit.*
- *It's a well-run program that encourages people to install energy efficient A/C units so we can save power.*
- *It was nice to get the money.*
- *It was nice to get the rebate.*
- *I guess because they gave me a rebate.*
- *The rebate is a good idea.*
- *It has an incentive.*
- *It helps reduce my monthly cost on energy.*
- *I was very satisfied because I didn't have to do anything. It was easy.*
- *It was easy.*
- *It was uncomplicated and wasn't a hassle or time consuming.*
- *It is a very nice program. Getting something back is always good.*
- *I was very satisfied because the whole process went smoothly and there were no problematic issues.*
- *I was very satisfied because everything went quite smoothly.*
- *I think it was a good program, easy to use.*
- *I had no problems with it.*
- *I liked everything about the program.*
- *I have no suggestions for improvement.*
- *I give this rating because I am very satisfied.*
- *Don't know*

## Appendix G: Household Characteristics and Demographics

TecMarket Works surveyed 161 participants about their homes and households (136 respondents in Ohio and 25 respondents in Kentucky). Additional descriptive data is provided in this appendix.

In what type of building do you live? \* State

			State		Total
			Ohio	Kentucky	
In what type of building do you live?	Single-family home, detached construction	Count	126	20	146
		% within State	92.6%	80.0%	90.7%
	Single family home, factory manufactured/modular	Count	1	1	2
		% within State	0.7%	4.0%	1.2%
	Row House	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Two or Three family attached residence-traditional structure	Count	1	1	2
		% within State	0.7%	4.0%	1.2%
	Condominium---traditional structure	Count	6	3	9
		% within State	4.4%	12.0%	5.6%
	Other: "Landominium"	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%



## What year was your residence built? \* State

			State		Total
			Ohio	Kentucky	
What year was your residence built?	1959 and before	Count	24	3	27
		% within State	17.6%	12.0%	16.8%
	1960-1979	Count	45	6	51
		% within State	33.1%	24.0%	31.7%
	1980-1989	Count	26	1	27
		% within State	19.1%	4.0%	16.8%
	1990-1997	Count	24	5	29
		% within State	17.6%	20.0%	18.0%
	1998-2000	Count	6	3	9
		% within State	4.4%	12.0%	5.6%
	2001-2007	Count	10	6	16
		% within State	7.4%	24.0%	9.9%
	2008-present	Count	1	1	2
		% within State	0.7%	4.0%	1.2%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many rooms are in your home (excluding bathrooms, but including finished basements)? \* State

			State		Total
			Ohio	Kentucky	
How many rooms are in your home (excluding bathrooms, but including finished basements)?	4	Count	3	1	4
		% within State	2.2%	4.0%	2.5%
	5	Count	14	2	16
		% within State	10.3%	8.0%	9.9%
	6	Count	15	6	21
		% within State	11.0%	24.0%	13.0%
	7	Count	24	4	28
		% within State	17.6%	16.0%	17.4%
	8	Count	27	7	34
		% within State	19.9%	28.0%	21.1%
	9	Count	18	2	20
		% within State	13.2%	8.0%	12.4%
	1-3	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	10 or more	Count	34	3	37
		% within State	25.0%	12.0%	23.0%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

Which of the following best describes your home's heating system?	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
None	0 0.0%	0 0.0%	0 0.0%
Central forced air furnace	68 50.0%	16 64.0%	84 52.2%
Electric Baseboard	0 0.0%	0 0.0%	0 0.0%
Heat Pump	62 45.6%	8 32.0%	70 43.5%
Geothermal Heat Pump	9 6.6%	1 4.0%	10 6.2%
Other: solar	1 0.7%	0 0.0%	1 0.6%

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

#### How old is your heating system? \* State

			State		Total
			Ohio	Kentucky	
How old is your heating system?	0-4 years	Count	133	23	156
		% within State	97.8%	92.0%	96.9%
	5-9 years	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	10-14 years	Count	1	2	3
		% within State	0.7%	8.0%	1.9%
	DK/NS	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## What is the primary fuel used in your heating system? \* State

			State		Total
			Ohio	Kentucky	
What is the primary fuel used in your heating system?	Electricity	Count	63	8	71
		% within State	46.3%	32.0%	44.1%
	Natural Gas	Count	69	17	86
		% within State	50.7%	68.0%	53.4%
	Oil	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Propane	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Other: "solar"	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	DK/NS	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## What is the secondary fuel used in your primary heating system, if any? \* State

			State		Total
			Ohio	Kentucky	
What is the secondary fuel used in your primary heating system, if any?	Electricity	Count	28	5	33
		% within State	20.6%	20.0%	20.5%
	Natural Gas	Count	6	0	6
		% within State	4.4%	0.0%	3.7%
	Propane	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
	Other: "geothermal"	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Other: "geothermal and wood stove"	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	None	Count	96	20	116
		% within State	70.6%	80.0%	72.0%
	DK/NS	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

Do you use one or more of the following to cool your home?	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
None, do not cool the home	0	0	0
	0.0%	0.0%	0.0%
Heat pump for cooling	64	9	73
	47.1%	36.0%	45.3%
Central air conditioning	67	15	82
	49.3%	60.0%	50.9%
Through the wall or window air conditioning unit	0	0	0
	0.0%	0.0%	0.0%
Geothermal Heat pump	8	1	9
	5.9%	4.0%	5.6%
Other: fans	1	1	2
	0.7%	4.0%	1.2%
DK/NS	0	0	0
	0.0%	0.0%	0.0%

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

## How many window-unit or through the wall air conditioner(s) do you use? \* State

			State		Total
			Ohio	Kentucky	
How many window-unit or through the wall air conditioner(s) do you use?	1	Count	5	0	5
		% within State	3.7%	0.0%	3.1%
	None	Count	131	25	156
		% within State	96.3%	100.0%	96.9%
Total		Count	136	25	161
		% within State	100.0%	100.0%	100.0%

	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
What is the fuel used in your cooling system?			
	133	24	157
Electricity	97.8%	95.7%	97.5%
	1	1	2
Natural Gas	0.7%	4.0%	1.2%
	0	0	0
Oil	0.0%	0.0%	0.0%
	0	0	0
Propane	0.0%	0.0%	0.0%
	2	0	2
Other: geothermal	1.5%	0.0%	1.2%
	0	0	0
None	0.0%	0.0%	0.0%
	1	0	1
DK/NS	0.7%	0.0%	0.6%

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

## How old is your cooling system? \* State

			State		Total
			Ohio	Kentucky	
How old is your cooling system?	0-4 years	Count	136	25	161
		% within State	100.0%	100.0%	100.0%
		Count	136	25	161
		% within State	100.0%	100.0%	100.0%

What is the fuel used by your water heater?	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
	70	13	83
Electricity	51.5%	52.0%	51.6%
	63	13	76
Natural Gas	46.3%	52.0%	47.2%
	0	0	0
Oil	0.0%	0.0%	0.0%
	2	0	2
Propane	1.5%	0.0%	1.2%
	2	0	2
Other: geothermal	1.5%	0.0%	1.2%
	0	0	0
No water heater	0.0%	0.0%	0.0%
	1	0	1
DK/NS	0.7%	0.0%	0.6%

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

#### How old is your water heater? \* State

			State		Total
			Ohio	Kentucky	
How old is your water heater?	0-4 years	Count	55	13	68
		% within State	40.4%	52.0%	42.2%
	5-9 years	Count	35	6	41
		% within State	25.7%	24.0%	25.5%
	10-14 years	Count	26	6	32
		% within State	19.1%	24.0%	19.9%
	15-19 years	Count	6	0	6
		% within State	4.4%	0.0%	3.7%
	More than 19 years	Count	4	0	4
		% within State	2.9%	0.0%	2.5%
	DK/NS	Count	10	0	10
		% within State	7.4%	0.0%	6.2%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

What type of fuel do you use for indoor cooking on the stovetop or range?	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
Electricity	111 81.6%	22 88.0%	133 82.6%
Natural Gas	23 16.9%	3 12.0%	26 16.1%
Oil	0 0.0%	0 0.0%	0 0.0%
Propane	1 0.7%	0 0.0%	1 0.6%
Other	0 0.0%	0 0.0%	0 0.0%
No stovetop or range	0 0.0%	0 0.0%	0 0.0%
DK/NS	1 0.7%	0 0.0%	1 0.6%

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

What type of fuel do you use for indoor cooking in the oven?	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
Electricity	118 86.8%	23 92.0%	141 87.6%
Natural Gas	17 12.5%	2 8.0%	19 11.8%
Oil	0 0.0%	0 0.0%	0 0.0%
Propane	0 0.0%	0 0.0%	0 0.0%
Other	0 0.0%	0 0.0%	0 0.0%
No oven	0 0.0%	0 0.0%	0 0.0%
DK/NS	1 0.7%	0 0.0%	1 0.6%

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



	State		Total (N=161)
	Ohio (N=136)	Kentucky (N=25)	
<b>What type of fuel do you use for clothes drying?</b>			
	113	24	137
Electricity	83.1%	96.0%	85.1%
	21	1	22
Natural Gas	15.4%	4.0%	13.7%
	0	0	0
Oil	0.0%	0.0%	0.0%
	1	0	1
Propane	0.7%	0.0%	0.6%
	0	0	0
Other	0.0%	0.0%	0.0%
	0	0	0
No clothes dryer	0.0%	0.0%	0.0%
	1	0	1
DK/NS	0.7%	0.0%	0.6%

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

## About how many square feet of living space are in your home? \* State

			State		Total
			Ohio	Kentucky	
About how many square feet of living space are in your home?	500 to 999	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
	1000 to 1499	Count	20	3	23
		% within State	14.7%	12.0%	14.3%
	1500 to 1999	Count	14	3	17
		% within State	10.3%	12.0%	10.6%
	2000 to 2499	Count	32	5	37
		% within State	23.5%	20.0%	23.0%
	2500 to 2999	Count	17	1	18
		% within State	12.5%	4.0%	11.2%
	3000 to 3499	Count	16	3	19
		% within State	11.8%	12.0%	11.8%
	3500 to 3999	Count	6	2	8
		% within State	4.4%	8.0%	5.0%
	4000 or more	Count	6	2	8
		% within State	4.4%	8.0%	5.0%
	DK/NS	Count	23	6	29
		% within State	16.9%	24.0%	18.0%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Do you own or rent your home? \* State

			State		Total
			Ohio	Kentucky	
Do you own or rent your home?	Own	Count	135	25	160
		% within State	99.3%	100.0%	99.4%
	Rent	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many levels are in your home (not including your basement)? \* State

			State		Total
			Ohio	Kentucky	
How many levels are in your home (not including your basement)?	One	Count	46	12	58
		% within State	33.8%	48.0%	36.0%
	Two	Count	82	11	93
		% within State	60.3%	44.0%	57.8%
	Three	Count	7	2	9
		% within State	5.1%	8.0%	5.6%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does your home have a heated or unheated basement? \* State

			State		Total
			Ohio	Kentucky	
Does your home have a heated or unheated basement?	Heated	Count	98	18	116
		% within State	72.1%	72.0%	72.0%
	Unheated	Count	18	4	22
		% within State	13.2%	16.0%	13.7%
	No basement	Count	19	3	22
		% within State	14.0%	12.0%	13.7%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does your home have an attic? \* State

			State		Total
			Ohio	Kentucky	
Does your home have an attic?	Yes	Count	112	18	130
		% within State	82.4%	72.0%	80.7%
	No	Count	23	7	30
		% within State	16.9%	28.0%	18.6%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Are your central air/heat ducts located in the attic? \* State

			State		Total
			Ohio	Kentucky	
Are your central air/heat ducts located in the attic?	Yes	Count	19	2	21
		% within State	14.0%	8.0%	13.0%
	No	Count	93	16	109
		% within State	68.4%	64.0%	67.7%
	Not applicable	Count	24	7	31
		% within State	17.6%	28.0%	19.3%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does your house have cold drafts in the winter? \* State

			State		Total
			Ohio	Kentucky	
Does your house have cold drafts in the winter?	Yes	Count	26	2	28
		% within State	19.1%	8.0%	17.4%
	No	Count	109	23	132
		% within State	80.1%	92.0%	82.0%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does your house have sweaty windows in the winter? \* State

			State		Total
			Ohio	Kentucky	
Does your house have sweaty windows in the winter?	Yes	Count	27	3	30
		% within State	19.9%	12.0%	18.6%
	No	Count	108	22	130
		% within State	79.4%	88.0%	80.7%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Do you notice uneven temperatures between the rooms in your home? \* State

			State		Total
			Ohio	Kentucky	
Do you notice uneven temperatures between the rooms in your home?	Yes	Count	66	8	74
		% within State	48.5%	32.0%	46.0%
	No	Count	69	17	86
		% within State	50.7%	68.0%	53.4%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does your heating system keep your home comfortable in winter? \* State

			State		Total
			Ohio	Kentucky	
Does your heating system keep your home comfortable in winter?	Yes	Count	134	25	159
		% within State	98.5%	100.0%	98.8%
	No	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

**Does your cooling system keep your home comfortable in summer? \* State**

			State		Total
			Ohio	Kentucky	
Does your cooling system keep your home comfortable in summer?	Yes	Count	131	25	156
		% within State	96.3%	100.0%	96.9%
	No	Count	4	0	4
		% within State	2.9%	0.0%	2.5%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

**Do you have a programmable thermostat? \* State**

			State		Total
			Ohio	Kentucky	
Do you have a programmable thermostat?	Yes	Count	117	21	138
		% within State	86.0%	84.0%	85.7%
	No	Count	18	4	22
		% within State	13.2%	16.0%	13.7%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many thermostats are there in your home? \* State

			State		Total
			Ohio	Kentucky	
How many thermostats are there in your home?	1	Count	117	24	141
		% within State	86.0%	96.0%	87.6%
	2	Count	15	1	16
		% within State	11.0%	4.0%	9.9%
	3	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	4 or more	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
	DK/NS	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## What temperature is your thermostat set to on a typical summer weekday afternoon? \* State

			State		Total
			Ohio	Kentucky	
What temperature is your thermostat set to on a typical summer weekday afternoon?	69-72 degrees	Count	32	4	36
		% within State	23.5%	16.0%	22.4%
	73-78 degrees	Count	97	20	117
		% within State	71.3%	80.0%	72.7%
	Higher than 78 degrees	Count	6	1	7
		% within State	4.4%	4.0%	4.3%
	DK/NS	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## What temperature is your thermostat set to on a typical winter weekday afternoon? \* State

			State		Total
			Ohio	Kentucky	
What temperature is your thermostat set to on a typical winter weekday afternoon?	Less than 67 degrees	Count	9	2	11
		% within State	6.6%	8.0%	6.8%
	67-70 degrees	Count	76	14	90
		% within State	55.9%	56.0%	55.9%
	71-73 degrees	Count	31	5	36
		% within State	22.8%	20.0%	22.4%
	74-77 degrees	Count	14	1	15
		% within State	10.3%	4.0%	9.3%
	78 degrees or higher	Count	2	1	3
		% within State	1.5%	4.0%	1.9%
	DK/NS	Count	4	2	6
		% within State	2.9%	8.0%	3.7%
Total	Count		136	25	161
	% within State		100.0%	100.0%	100.0%

## Do You Have a swimming pool, hot-tub or spa? \* State

			State		Total
			Ohio	Kentucky	
Do You Have a swimming pool, hot-tub or spa?	Yes	Count	27	2	29
		% within State	19.9%	8.0%	18.0%
	No	Count	108	23	131
		% within State	79.4%	92.0%	81.4%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Count		136	25	161
	% within State		100.0%	100.0%	100.0%



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

			State		Total
			Ohio	Kentucky	
Would a two-degree increase in the summer afternoon temperature in your home affect your comfort	Not at all	Count	34	7	41
		% within State	25.0%	28.0%	25.5%
	Slightly	Count	37	7	44
		% within State	27.2%	28.0%	27.3%
	Moderately, or	Count	44	6	50
		% within State	32.4%	24.0%	31.1%
	Greatly	Count	20	5	25
		% within State	14.7%	20.0%	15.5%
	Not specified	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many people live in this home? \* State

			State		Total
			Ohio	Kentucky	
How many people live in this home?	1	Count	16	5	21
		% within State	11.8%	20.0%	13.0%
	2	Count	70	13	83
		% within State	51.5%	52.0%	51.6%
	3	Count	19	2	21
		% within State	14.0%	8.0%	13.0%
	4	Count	21	3	24
		% within State	15.4%	12.0%	14.9%
	5	Count	7	1	8
		% within State	5.1%	4.0%	5.0%
	6	Count	1	1	2
		% within State	0.7%	4.0%	1.2%
	7	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
Prefer not to answer		Count	1	0	1
		% within State	0.7%	0.0%	0.6%
Total		Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many of them are teenagers? \* State

			State		Total
			Ohio	Kentucky	
How many of them are teenagers?	0	Count	116	20	136
		% within State	85.3%	80.0%	84.5%
	1	Count	10	4	14
		% within State	7.4%	16.0%	8.7%
	2	Count	9	1	10
		% within State	6.6%	4.0%	6.2%
	Prefer not to answer	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## How many persons are usually home on a weekday afternoon? \* State

			State		Total
			Ohio	Kentucky	
How many persons are usually home on a weekday afternoon?	0	Count	16	1	17
		% within State	11.8%	4.0%	10.6%
	1	Count	46	13	59
		% within State	33.8%	52.0%	36.6%
	2	Count	55	8	63
		% within State	40.4%	32.0%	39.1%
	3	Count	8	3	11
		% within State	5.9%	12.0%	6.8%
	4	Count	8	0	8
		% within State	5.9%	0.0%	5.0%
	5	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	Prefer not to answer	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
Total	Count		136	25	161
	% within State		100.0%	100.0%	100.0%

## Are you planning on making any large purchases to improve energy efficiency in the next 3 years? \* State

			State		Total
			Ohio	Kentucky	
Are you planning on making any large purchases to improve energy efficiency in the next 3 years?	Yes	Count	35	8	43
		% within State	25.7%	32.0%	26.7%
	No	Count	91	17	108
		% within State	66.9%	68.0%	67.1%
	DK/NS	Count	10	0	10
		% within State	7.4%	0.0%	6.2%
	Count		136	25	161
	% within State		100.0%	100.0%	100.0%

## What is your age group? \* State

			State		Total
			Ohio	Kentucky	
What is your age group?	18-34	Count	16	1	17
		% within State	11.8%	4.0%	10.6%
	35-49	Count	19	4	23
		% within State	14.0%	16.0%	14.3%
	50-59	Count	27	5	32
		% within State	19.9%	20.0%	19.9%
	60-64	Count	21	1	22
		% within State	15.4%	4.0%	13.7%
	65-74	Count	35	11	46
		% within State	25.7%	44.0%	28.6%
	Over 74	Count	14	2	16
		% within State	10.3%	8.0%	9.9%
	Prefer not to answer	Count	4	1	5
		% within State	2.9%	4.0%	3.1%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Please indicate your annual household income \* State

			State		Total
			Ohio	Kentucky	
Please indicate your annual household income	Under \$15,000	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
	\$15,000-\$29,999	Count	5	2	7
		% within State	3.7%	8.0%	4.3%
	\$30,000-\$49,999	Count	9	2	11
		% within State	6.6%	8.0%	6.8%
	\$50,000-\$74,999	Count	24	4	28
		% within State	17.6%	16.0%	17.4%
	\$75,000-\$100,000	Count	19	5	24
		% within State	14.0%	20.0%	14.9%
	Over \$100,000	Count	30	2	32
		% within State	22.1%	8.0%	19.9%
	Prefer Not to Answer	Count	48	10	58
		% within State	35.3%	40.0%	36.0%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Is your home built over a: \* State

			State		Total
			Ohio	Kentucky	
Is your home built over a:	crawlspace,	Count	2	0	2
		% within State	1.5%	0.0%	1.2%
	slab on grade or a	Count	13	2	15
		% within State	9.6%	8.0%	9.3%
	basement	Count	114	21	135
		% within State	83.8%	84.0%	83.9%
	Other: "another	Count	3	0	3
	condominium"	% within State	2.2%	0.0%	1.9%
	Other: "basement	Count	3	0	3
	and crawlspace"	% within State	2.2%	0.0%	1.9%
	Other: "basement	Count	0	2	2
	and slab"	% within State	0.0%	8.0%	1.2%
	DK/NS	Count	1	0	1
		% within State	0.7%	0.0%	0.6%
Total		Count	136	25	161
		% within State	100.0%	100.0%	100.0%

## Does the duct work in your home run primarily through: \* State

			State		Total
			Ohio	Kentucky	
Does the duct work in your home run primarily through:	interior walls	Count	33	6	39
		% within State	24.3%	24.0%	24.2%
	crawlspace	Count	3	0	3
		% within State	2.2%	0.0%	1.9%
	attic, or the	Count	10	0	10
		% within State	7.4%	0.0%	6.2%
	basement	Count	73	17	90
		% within State	53.7%	68.0%	55.9%
	other (listed below)	Count	13	0	13
		% within State	9.6%	0.0%	8.1%
	DK/NS	Count	4	2	6
		% within State	2.9%	8.0%	3.7%
	Total	Count	136	25	161
		% within State	100.0%	100.0%	100.0%

Thirteen respondents in Ohio mentioned "other" places their duct work runs through:

- *Through the slab (N=3)*
- *Basement and walls (N=3)*
- *Basement and attic (N=2)*
- *Interior walls & attic*
- *Ceilings*
- *Basement & floors*
- *Between first and second floors*
- *Crawlspace & basement*

Final Report

# Process Evaluation of the 2013 Power Manager® Program in Ohio

Prepared for  
**Duke Energy**

139 East Fourth Street  
Cincinnati, OH 45201

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Submitted by

Nick Hall, Dave Ladd,  
and John Roth

Subcontractor:

Carol Yin  
Yinsight, Inc.

TeoMarket Works  
165 West Netherwood Road  
Oregon, WI 53575  
(608) 835-3855





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## Executive Summary

### Significant Findings from Management Interviews

- Power Manager® Ohio enrolled more participants than the previous year, enabled in part through program outreach and new telemarketing efforts.
- The improvements to the customer-specific direct mail campaign included the use of mailing zones for better geographic coordination with their installation vendor, the use of probability models to identify customers with a higher propensity to participate, revamped direct mail collateral that is coordinated with a web-based video, and a more secure business reply card that is preprinted with a bar code identifying the customer.
- Power Manager was also able to test a new marketing channel (i.e. outbound calling) that Duke Energy considers a resounding success in terms of cost per participant acquisition and in terms of addressing customer participation questions. The outbound calling was so successful that it became the focus of the remainder of the marketing and outreach campaign, replacing the direct mail efforts it was intended to supplement. Duke Energy still plans to use direct mail in the future, because not all customers prefer to be called.
- Power Manager Ohio has switched from MISO<sup>1</sup> to PJM, but this switch has been invisible to Duke Energy's customers. As part of that switch, Duke Energy has successfully tested their ability to bid Power Manager's capacity into PJM's energy market.

### Significant Findings from Participant Surveys

- The participant survey is conducted after the cooling season and is primarily designed to cover program-level topics such as awareness, enrollment and household demographics. The event survey (summarized in the next section) is conducted on and immediately following Power Manager device activation events and high-temperature days without activation events, and is primarily designed to accurately measure customer perceptions and behaviors as they relate to activation events. Some event-related questions are asked in both surveys, however due to the recency effect (event surveys are done within 27 hours of events) and quasi-experimental design (events are compared to non-events), the event survey presents a more realistic profile of event-related behaviors and perceptions. Participant survey responses to comparable event-related questions measure the persistence of how events are recalled by customers after the cooling season (when air conditioners are not in use nor having their devices activated).
- Most participants surveyed (96%) were personally involved in the decision to join the Power Manager program; only one surveyed participant (1%) had joined Power Manager after they moved into a home where the device had been installed by a previous occupant.
  - See *Participation Drivers* on page 24.
- Most surveyed participants who could recall how they first became aware of the program found out about it through mailings from Duke Energy (77%). No other source was mentioned by more than 5% of surveyed participants. We expect this finding to change as the direct-contact (telephone) marketing approach obtains more participants.
  - See *Participation Drivers* on page 24.

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<sup>1</sup> Midcontinent Independent System Operator, Inc.

- The primary benefits which surveyed participants recall from program promotions are saving money (57%), reducing power outages (36%), and saving energy (20%).
  - See *Recalling Promoted Program Benefits* on page 25.
- The main reasons surveyed participants cited for joining the program are for saving money through lower bills (29%), saving energy (20%), reducing power outages (19%) and bill credits (13%). Overall, 76% of participants recalled reading about their main reason for joining the program in the program brochure. The Duke Energy marketing approach is expertly tailored to the reasons that motivate customers to enroll.
  - See *Recalling Promoted Program Benefits* on page 25.
- About half of the participants surveyed (48%) do not know how many Power Manager activation events to expect per year. Among those who were able to answer the question, the most common response is that the device is activated "as needed based on demand" (32%).
  - See *Expectations of Power Manager Events* on page 36.
- Most surveyed participants (64%) do not know how much they should expect to receive in bill credits for participating in the program. Among those that were able to answer this question, the average estimated amount of bill credits was \$35 per year and the median estimate was \$20. Only 14% said are sure they have received a bill credit for Power Manager in the past year, while 55% do not know if they have received bill credits and 30% say they are sure they have not received bill credits (in fact, all of these participants did have credits on their bills).
  - See *Expectations of Monetary Incentives for Participation* on page 37.
- Two-thirds (67%) of surveyed participants are aware that their device had been activated since they joined the program. However, when asked to estimate the number of activation events which occurred in 2013, 74% did not know. Among those who were able to answer the question, the average estimated number of events was 1.6 and the median estimate was one event. The actual number of Power Manager activation events in Ohio during 2013 was six (not including one test event).
  - See *Awareness and Response to Activation* on page 39.
- There is typically someone at home on a weekday afternoon in 68% of households surveyed, although only 14% recalled being at home during a Power Manager event in 2013. Among those who recalled being at home during an activation event, 67% (6 out of 9) reported a decline in comfort ratings during the event. Overall mean comfort ratings among those who recalled being at home during an event were 9.0 before the event and 7.1 during the event (on a 10-point scale where "10" is most comfortable). Every participant who reported a decline in comfort blamed rising outdoor temperatures (100%), while only one (17% of 6) also blamed the Power Manager device activation for contributing to their discomfort. Only one participant (1%) reported that they had power outage issues on a day when they believed Power Manager had been activated, though none of the surveyed participants blamed a power outage for their decline in comfort during an event.
  - See *Awareness and Response to Activation* on page 39.
- Among the 14% of participants who recalled being at home during at least one activation event in 2013, the average estimate for the number of times during the year Power Manager activations made them uncomfortable was 1.2 times, and the median estimate was one time.

- See *Awareness and Response to Activation* on page 39.
- The most common response by participants during events is to use fans to keep cool (40% of those at home during an event), while 20% adjusted their thermostats (turning it down by an average of 2.0 degrees among the two participants who made adjustments). All other actions in response to events were taken by no more than 10% of surveyed participants.
  - See *Awareness and Response to Activation* on page 39.
- In spite of the results above which indicate very low awareness of device activation, only 25% of participants say that there is anything unclear to them about the program, and only 3% have contacted Duke Energy to find more out about the program.
  - See *Understanding the Program and Getting More Information* on page 38.
- When asked why Power Manager activation events happen when they do, 70% said it was due to peak demand for energy, 26% said it was during the hottest part of the day, and 13% said it was because there are fewer people at home.
  - See *Reasons for the Power Manager Program and Activation Events* on page 44.
- About half (48%) of the participants surveyed use their air conditioning every day during the cooling season; 65% are using their air conditioners (AC) before 5 p.m. on a typical weekday, and 96% typically use their AC after 5 p.m. Most participants (65%) have had their AC units serviced since joining program.
  - See *Air Conditioner Usage* on page 49.
- Eighty-six percent of participants said environmental issues (in general) were "important" or "very important" to them. Among three specific environmental issues that were asked about, the most important to respondents was reducing air pollution ("important" or "very important" to 88%), with still positive but more mixed ratings for the importance of climate change issues (71%) and building fewer power plants (48%).
  - See *Importance of Environmental Issues to Participants* on page 30.
- When asked about their awareness of other Duke Energy programs, 65% of participants could name at least one other Duke Energy program. The programs with the highest awareness are the CFL programs (35%), the Home Energy House Call program (28%) and My Home Energy Report (17%).
  - See *Awareness of Other Duke Energy Programs* on page 48.
- Most Power Manager program participants (72%) would be interested in a similar program that would cycle water heaters or other equipment. Sixteen percent are not interested because their water heaters use natural gas, while the remaining 12% are unsure and would need more information before making a decision.
  - See *Interest in Other Potential Energy Efficiency Programs* on page 61.
- Participants give high satisfaction ratings for Power Manager: on a 10-point scale where "10" is most satisfied, satisfaction with the process of enrolling in the program is 9.5 (among participants involved in enrollment), and overall satisfaction with the Power Manager program is 9.1. When asked to rate their likelihood of recommending Power Manager to others, the mean rating was 8.7. Overall satisfaction with Duke Energy is also high at 8.6.
  - See *Program Satisfaction* on page 45 and *Satisfaction with Duke Energy* on page 59.

## Significant Findings from Event Surveys

- The event survey is conducted during the cooling season, on and immediately after days when the Power Manager device is activated, and on and after high-temperature days on which Power Manager was not activated. The event survey is designed to provide accurate data on event-related behavior by interviewing participants within 27 hours of the event (or high-temperature non-event). The participant surveys (summarized in the previous section) are conducted after the end of the cooling season and are designed to cover program-level topics such as awareness, enrollment and household demographics.
- Only 40% of Event participants and 27% of Non-Event participants surveyed are aware that Power Manager has been activated since they joined the program. The most frequently cited reasons for being aware of Power Manager activation events were “air conditioner shuts down” followed by “home temperature rises”.
  - See *General Awareness of Device Activations* on page 67.
- Sixty percent of Event participants and 52% of Non-Event participants were at home during the Power Manager activation event or non-event high temperature day which triggered the Event or Non-Event survey.
  - See *Home Occupancy During Power Manager Activation* on page 65.
- Among Event participants who were home during a Power Manager activation event, only 13% (6 of 48) were aware that the activation had occurred. Among Non-Event participants who were at home on a high-temperature day when devices were not activated, only one (6% of 17) believed that their Power Manager had been activated. Among both Event and Non-Event groups, 71% were not sure if their device had been activated.
  - See *Awareness of Power Manager Device Activation in the Past Seven Days* on page 72.
- Among participants who were at home and were able to give comfort ratings for “before” and “during” the event or non-event high temperature day, 30% of those in the Event group reported a decline in comfort ratings, compared to none (0%) of those in the Non-Event group (a statistically significant difference).
  - See *Changes in Comfort and Comfort Drivers* on page 76.
- The amount of the decline in comfort ratings was also larger during activation events: On a 10-point scale, the Event participants’ mean comfort ratings fell by 0.7 points overall during the activation event, versus an average increase of 0.3 points in the Non-Event group. Among only those participants who reported a decline in comfort, the average decline was 2.5 for the Event group (13 Event participants reported a decline in comfort) while there were no Non-Event participants who reported a decline in comfort.
  - See *Changes in Comfort and Comfort Drivers* on page 76.
- When asked to describe the cause of their decrease in comfort on the day of the activation event or non-event high temperature day, 77% of Event participants blamed “rising temperatures”, while only 15% blamed a Power Manager device activation. Since none of the Non-Event participants reported a decline in comfort, they were not asked to give a reason for their decline in comfort.
  - See *Participant Perceptions Relative to Comfort Change* on page 79.
- The outdoor high temperature has an effect on decreasing comfort, but not as much effect as the presence of a Power Manager activation event.

- See *Age of Air-Conditioner and Change in Comfort Levels During Event: Controlling for Outdoor High Temperatures* on page 89.
- During the activation event or non-event high temperature day, 4% of Event participants adjusted their thermostat settings, compared to 24% of Non-Event participants; however, while Event participants turned their thermostats down by an average of 2.5 degrees, three of the four Non-Event participants who adjusted their thermostats turned the temperature up by an average of 3.3 degrees (the fourth Non-Event participant turned their AC from "off" to "77 degrees"). Overall, 38% of participants turned on fans, which was the most common action taken.
  - See *Thermostat Adjustments and Use of Fans and Other Ways to Keep Cool* on page 82.
- Satisfaction with this program is high: Mean satisfaction ratings on a 10-point scale (were "10" is most satisfied) are 8.65 among Event participants and 8.3 among Non-Event participants. Using the same scale, participants were also willing to recommend the program with mean scores of 8.2 for both Events and Non-Events. Satisfaction with Duke Energy overall was similarly high, with mean scores of 8.6 for Events and 8.7 for Non-Events.
  - See *Respondent Satisfaction and Willingness to Recommend the Program* on page 91.
- Participants were also asked to rate their overall satisfaction with the program using a 5-point Likert scale; seventy-eight percent reported being "very satisfied" or "somewhat satisfied" with the program while only 2% reported being "somewhat dissatisfied" and none (0%) reported being "very dissatisfied". Another 10% of surveyed participants did not answer the question.
  - See *Respondent Satisfaction and Willingness to Recommend the Program* on page 91.
- There are no significant differences in reported declines in comfort between customers enrolled in the 1.0 kW curtailment option and those enrolled in the 1.5 kW option, for both Event and Non-Event participants.
  - See *Curtailment kW Option and Change in Comfort Levels During Event* on page 90.
- It is not possible to compare satisfaction or comfort ratings by the ending time of activation events for Ohio in 2013, since all surveyed events ended at the same time (5:00 p.m.).
  - See *Satisfaction with Power Manager and Comfort Ratings by Activation Event End Time* on page 97.

## Introduction and Purpose of Study

The purpose of this process study was to evaluate participant behavior, awareness of, and satisfaction with Duke Energy's Power Manager<sup>®</sup> Program as it was administered in Ohio.

## Summary of the Evaluation

The evaluation was conducted by TecMarket Works and Yinsight, Inc. The interview and survey instruments were developed by TecMarket Works and Yinsight. The customer survey was administered and analyzed by TecMarket Works. Yinsight conducted in-depth interviews with program managers and trade allies.

## Researchable Issues

1. Determine what percentage of program participants are aware of the occurrence of individual program events.
  - Only 10.0% (8 out of 80) of participants in the Event group correctly reported that there had been a Power Manager event within the last week, while 3.0% (1 out of 33) of the participants in the Non-Event group believed there had been a Power Manager event (though there was no activation event for this group; the difference between Event and Non-Event participants is not statistically significant). See *Summary of Event Awareness, Declines in Comfort and Blaming Power Manager* on page 80.
2. Determine whether customer comfort or discomfort during a Power Manager event is affecting participant behavior.
  - Only 16.3% (13 out of 80) of participants in the Event group reported a decline in comfort during the Power Manager event, while none of the Non-Event participants (0 out of 33) reported a decline in comfort on a high-temperature non-event day (statistically significant difference at  $p < .05$ ). Three-quarters (75.0% or 36 out of 48) of Event participants who were at home during the Power Manager event took no action in response. Only 4.2% (2 out of 48) of Event participants at home during the activation event turned down the temperature on their air conditioning by an average of 2.5 degrees apiece. See *Behaviors During Event Activation* on page 82.
3. Determine overall participant satisfaction with the Power Manager program.
  - In the full participant survey, respondents' mean overall satisfaction rating for Power Manager is 9.10 on a 10-point scale where "10" means very satisfied. In the Event survey, Event respondents' mean satisfaction rating is 8.65, while the mean satisfaction rating for Non-Event respondents is 8.27 (this difference is not statistically significant). See *Program Satisfaction* on page 45 for participant surveys and *Respondent Satisfaction and Willingness to Recommend the Program* on page 91 for Event and Non-Event surveys.
4. Determine whether recommendations could be made to improve the program's design or operations.



TecMarket Works finds that this program is effectively managed and well marketed with few customer issues that require adjustment to program designs or operations. Customers are satisfied with this program and are not experiencing significant comfort or participation-related issues. The program is providing the power savings needed at critical high-demand periods, helping keep all residential rates lower than what they would need to be without the program. While a number of participants are unsure of what monetary credits or payments they are receiving, we do not find this to be an issue that rises to the level of a recommendation for program changes or for added participant communications.

At this time TecMarket Works is not providing any program design or operational recommendations to change a well-designed and operating program. However, we do offer the following coordination recommendation that can serve as a benefit to Duke Energy's customers and to the Ohio residential prescriptive programs.

### **Recommendation**

During the time that program switches are installed or repaired a contractor is sent to each home to complete the necessary installation or maintenance efforts. At this time the contractor is examining the switching equipment as it operates on each air conditioner. Because the participant population has a significant number of older air conditioner units being cycled and because older units can be identified at the time of switch installation or maintenance, we recommend that Duke Energy consider developing a door-hanger that presents the benefits of upgrading to a new high efficiency air conditioner. This hanger could then be left on the door of participants that have an older inefficient unit, such as units that are SEER 12 or lower. The door-hanger could provide program information and present the enrollment process. The population of participants with older inefficient units represents a segment of customers who are more likely to be considering replacing their units and can be convinced to both do so earlier than planned and at the same time move up to a more efficient unit.

## Description of Program

Duke Energy offers the Power Manager (PM) voluntary residential demand response program to their customers who are homeowners with central air conditioning (AC) units with outside compressors that can be controlled by Duke Energy's load control technology. During the months May through September on non-holiday weekdays, Duke Energy may cycle PM participants' ACs off and on for a period of time.

The PM program allows customers to select a target load reduction of either 1.0 kW or 1.5 kW. During an event, ACs on the 1.5 kW option would be cycled off for a few minutes longer over a 30 minute period than the 1.0 kW ACs. Customers with more than one central AC unit must have all units controlled in order to participate.

There are two types of events that may be implemented for PM, economic and emergency. Economic events may be called by Duke Energy when energy demand and/or prices are so high that curtailing energy use during this period would allow Duke Energy to save money, with the savings passed on to customers in the form of Power Manager incentives. Emergency events can be called by the PJM Regional Transmission Organization when high energy usage on hot days or other conditions threaten the reliability of the transmission system. For such an event, participants' ACs would be cycled off and on for the duration of the Power Manager emergency event.

Power Manager participants are allowed to opt out of one event per calendar month, by notifying Duke Energy 24 hours in advance through a toll free number.

At the time of enrollment, customers choose whether to have the AC cycled to achieve a 1.0 kW or 1.5 kW reduction. They are given a one-time incentive of \$25 for choosing the 1.0 kW option and \$35 for choosing the 1.5 kW option. For each event, participants are given an incentive depending upon the price of energy that day and the duration of the event, with a guaranteed minimum incentive each season of \$5 for participants in the 1.0 kW option and \$8 for participants in the 1.5 kW option. This incentive is given, through a bill credit, even if no events are called. In the cases where customers have more than one AC unit, incentives are given for each AC unit (all AC units must be enrolled). The incentives appear as a credit on their Duke Energy bill statement within the next month or two.

Participants who sign up but become reluctant to continue participating at these levels of reduction may be offered a 0.5 kW option in an effort to retain them on the program.

## Program History

Power Manager Ohio was first offered as a pilot in 2007, and formally launched in 2008. The incentives have remained the same since that time. Power Manager's incentive structure provides an initial enrollment incentive with smaller incentives based upon event participation.

## Program Status

Power Manager Ohio had an enrollment objective of 3,805 new switch installations in 2013, which they exceeded. In total, they installed 3,812 new switches in 2013.

**Program Participation**

<b>Power Manager Program</b>	<b>Year-end 2013 Participation</b>
Customers	43,928
Devices	46,497

# Methodology

## Overview of the Evaluation Approach

### Management Interviews

In depth interviews were conducted with the Duke Energy program manager, three Duke Energy program staff members conducting the marketing efforts, two representatives from Eaton (formerly Cooper), and two representatives from GoodCents. These interviews were conducted in September and October of 2013, using interview guides developed by the evaluation team (see *Appendix A: Management Interview Instrument*). These management interviews were conducted by Yinsight, a subcontractor to TecMarket Works.

### Full Participant Surveys

TecMarket Works developed a customer survey for the Power Manager Program participants, which was implemented in October and November of 2013 after they experienced control events over the summer of 2013.

The complete survey was conducted with a random sample of 69 Power Manager participants in Ohio. The responses from the 69 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*.

### Event and Non-Event Surveys

TecMarket Works conducted after-event phone surveys (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 switches used by Duke Energy. The surveys were launched as soon as possible following the end of the control event (at 5 p.m. Eastern) and continued over a 27 hour period with all call attempts made during regular surveying hours (10:00 a.m. to 8:00 p.m. Eastern Daylight Time, Monday through Saturday). For example, if a control event occurred on a Monday, calling hours for that particular event were:

- Monday 5 p.m.-8 p.m. Eastern
- Tuesday 10 a.m.-8 p.m. Eastern

Event surveys followed events occurring on July 15, July 17 and July 18, September 10 and September 11, 2013 (there was also an activation event on July 16, however no surveys were completed in Ohio for this event). TecMarket Works surveyed a total of 80 participants in Ohio. The survey can be found in *Appendix C: Event Survey Instrument*.

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 indicated in red text, as shown in *Appendix D: Non-Event Survey Instrument*). This survey was conducted on non-event days when the outdoor high temperature was 89°F or hotter. On and following the high temperature dates of August 27, August 30 and September 9, 2013, TecMarket Works surveyed a total of 33 Power Manager participants in Ohio.

The schedule of Power Manager event days and non-event high temperature days used for this survey in Ohio is shown in Table 1, along with the high temperatures and heat indexes for those dates.<sup>2</sup>

**Table 1. Schedule of Events and Non-Event High Temperature Days in Ohio**

Event ID	State	Type	Event Date	Event Hours	Date of Survey	High temp	Heat Index
OH-event1	OH	Event	15-Jul-13	2:30 to 5 p.m.	15-Jul-13	91	95
OH-event1	OH	Event	15-Jul-13	2:30 to 5 p.m.	16-Jul-13		
OH-event2	OH	Event	16-Jul-13	2:30 to 6 p.m.	Not surveyed	93	97
OH-event3	OH	Event	17-Jul-13	2:30 to 5 p.m.	17-Jul-13	93	101
OH-event4	OH	Event	18-Jul-13	2:30 to 5 p.m.	18-Jul-13	93	98
OH-event4	OH	Event	18-Jul-13	2:30 to 5 p.m.	19-Jul-13		
OH-nonevent1	OH	Non	27-Aug-13	NA	27-Aug-13	90	95
OH-testevent <sup>3</sup>	OH	Event	28-Aug-13	2:30 to 4 p.m.	Not surveyed	95	
OH-nonevent2 <sup>4</sup>	OH	Non	30-Aug-13	NA	30-Aug-13	89	91
OH-nonevent2	OH	Non	30-Aug-13	NA	31-Aug-13		
OH-nonevent3	OH	Non	9-Sep-13	NA	9-Sep-13	90	93
OH-event5	OH	Event	10-Sep-13	2:30 to 5 p.m.	10-Sep-13	91	102
OH-event5	OH	Event	10-Sep-13	2:30 to 5 p.m.	11-Sep-13		
OH-event6	OH	Event	11-Sep-13	1:30 to 5 p.m.	11-Sep-13	89	95
OH-event6	OH	Event	11-Sep-13	1:30 to 5 p.m.	12-Sep-13		

<sup>2</sup> High temperatures in Table 1 are taken from historical data for Cincinnati at wunderground.com. Heat index readings for survey days were recorded from Weather.com for Cincinnati on the days surveyed.

<sup>3</sup> Event held as part of a PJM test. Test events are not included in the total number of events, nor are the participants surveyed for these test events.

<sup>4</sup> Nine surveys were completed on August 30 and 31 for "Non-Event #2", though these customers were surveyed within three days of a 90-minute test activation event on August 28. These nine surveys are reported as regular Non-Events to bolster the small sample size for the Non-Event group (without Non-Event #2, there would be only 24 Non-Event surveys for 2013 in Ohio). The responses of the nine customers surveyed on August 30 and 31 do not differ significantly from other Non-Event respondents on key measures (none of these nine customers were aware of their device being activated in the past seven days, and none reported a decline in comfort on the non-event survey day).

## **Data Collection Methods, Sample Sizes, and Sampling Methodology**

### **Management Interviews**

In depth interviews were conducted by phone with the Duke Energy program manager, three Duke Energy program staff members conducting the marketing efforts, two representatives from Eaton (formerly Cooper), and two representatives from GoodCents. This includes all intended interviews.

### **Full Participant Surveys**

From the list of customers, 675 participants were called between October 1 and October 9, 2013, and a total of 69 usable telephone surveys were completed yielding a response rate of 10.2% (69 out of 675).

### **Event and Non-Event Surveys**

From the list of customers, 873 participants were called after events and non-event high temperature days between July 15, 2013 and September 12, 2013, and a total of 113 usable telephone surveys were completed yielding an overall response rate of 12.9% (113 out of 873). Of the 113 completed interviews, 80 were completed for Events and 33 for Non-Events.<sup>5</sup>

## **Expected and achieved precision**

### **Full Participant Surveys**

The survey sample methodology for the full participant survey had an expected precision of 90% +/- 9.2% and an achieved precision of 90% +/- 9.9%.

### **Participant Event Surveys**

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

### **Participant Non-Event Surveys**

The survey sample methodology had an expected precision of 90% +/- 9.2% and an achieved precision of 90% +/- 14.3%.

## **Number of completes and sample disposition for each data collection effort**

### **Management Interviews**

In depth interviews were conducted by phone with the Duke Energy program manager, three Duke Energy program staff members conducting the marketing efforts, two representatives from Eaton (formerly Cooper), and two representatives from GoodCents. This includes all intended interviews.

<sup>5</sup> Due to the sampling design of this survey, reporting the number of calls and response rate separately by Event and Non-Event would not be accurate. Event and Non-Event survey calls are made using the same participant list, and in some cases calls to the same participants may be attempted for both Event and Non-Event surveys. The only difference between Event and Non-Event participants is whether they are surveyed after an activation event or a high-temperature day without an activation event.

### Full Participant Surveys

The Full Participant survey was conducted using a random sample from 42,626 Power Manager participants in Ohio. There were 69 customers willing to participate in the survey, which was conducted from October 1 to October 9, 2013.

### Event Surveys

The Event surveys were conducted on and following Power Manager device activation events that occurred between July 15 and September 12, 2013. TecMarket Works surveyed a total of 80 Power Manager participants.

### Non-Event Surveys

The non-event surveys were conducted on and following the high temperature dates of August 27, August 30 and September 9, 2013. TecMarket Works surveyed a total of 33 Power Manager participants.

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

There is a potential for social desirability bias<sup>6</sup> but the customer has no vested interest in their reported program participation, so, this bias is expected to be minimal.

### Snapback and Persistence

The theoretical additional energy and capacity used by customers that may occur from implementing an energy efficiency product is often called “snapback.” There is little to no literature or snapback analysis within the evaluation industry that has been able to identify a snapback condition.

In this process evaluation, survey participants were asked if they had adjusted the thermostat on their air conditioners during an event or non-event cycle. Two Event participants reported setting a lower thermostat temperature during the cycle, and one Non-Event participant reported turning their air conditioner on during a high-temperature day when there was no activation event. (See *Thermostat Adjustments* on page 82.)

## Evaluation Dates

Evaluation Component	Dates of Surveys/Interviews
Management Interviews	9/10/13 – 10/25/13
Full Participant Surveys	10/1/13 – 10/9/13
Event Surveys	7/15/13 – 9/12/13
Non-Event Surveys	8/27/13 – 9/9/13

<sup>6</sup> Social desirability bias occurs when a respondent gives a false answer due to perceived social pressure to “do the right thing.”

## Management Interview Findings

### Program Objective

In 2013, Power Manager Ohio had a larger enrollment objective than in 2012. Power Manager's initial enrollment objective was 1,805. However, due to the success they had in reaching that number, Duke Energy decided to increase that objective by 2,000 in March of 2013. The installation vendor reports that they were given the objective of installing 3,805 new switches for 2013, and exceeded that for a total of 3,960 new switches.

### Program Design and Implementation

#### Outreach: Direct Mail

The direct mail campaign has historically formed the backbone of marketing for Power Manager, and will continue to do so in the future. But Duke Energy has been developing new ways to enhance their overall outreach efforts through new channels and new marketing collateral.

In 2013, Duke Energy's direct mail marketing included three new elements: the use of new marketing materials, use of probability modeling to target customers, and the use of geographic mailing zones. Duke Energy reports that their direct mail materials were revamped in March of 2012, and have been in use for the 2013 program year. The new brochure was designed to avoid heavy blocks of text and referred the reader to an explanatory video on Duke Energy's website. The campaign manager reports that they have seen an increase in enrollment since using these materials, as well as customer traffic to the website, particularly during the event season.

*Among the changes were a simplified and more secure business reply card, with customer information linked to a unique bar code so that the customer did not have to fill in their address or account information.*

In 2013, the program manager divided Ohio into 9 mailing zones, following the county boundaries. Power Manager direct mail brochures are dropped to selected mailing zones so that new switch installations could be coordinated efficiently with the switch replacement efforts. The Power Manager campaign manager reported that Duke Energy's market research division conducted analyses to identify customers with the highest propensity of participating. Similar to other energy efficiency program participants, those most likely to participate in Power Manager were customers who skewed toward the more educated and older segments with more disposable income. The campaign manager reported that direct mail sent to these customers would yield a 1 to 1.5% higher rate of return compared to the general population. This direct mail approach using mailing zones had not been used previously, and the program staff member reports this approach has improved program efficiency.

The direct mail campaign is conducted in two phases. The program brochure is first sent out, and after a few weeks a postcard reminder is sent out. In addition to these mailers, Duke Energy also sends a seasonal mailer at the beginning of the event season just to remind customers of the approaching season, so that customers do not become alarmed if their AC cycles off.



Due to the success of outbound calling in Duke Energy's other Power Manager states, Duke Energy began following up the mailers sent to the first zone with an outbound phone call. A program staff member reports that they found the outbound calling was so much more effective that for the remainder of the campaign they focused on the outbound calls. They had originally planned to send direct mail to all mailing zones, but ended after mailing to two, in favor of the calling campaign. They found that the outbound calling's effectiveness was independent of whether or not the customer had received a mailer, and indeed, that customers had low awareness of whether or not they received a mailer.

From past experience, the timing of these campaigns is important. Power Manager generally conducts two campaigns during a year, once in the spring in March or April, and once in October after the end of the event season. In Ohio, the program staff reported that they started mailing to one zone at the beginning of the year, and to a second zone after that. The direct mail portion ended in February, but Duke Energy continued with the calling campaign due to its success.

#### **Outreach: Email**

In 2013, Duke Energy planned two email campaigns, one in March and another in September. Despite the success and low cost of the email campaign, a Duke Energy staff member reports that the email channel is limited by the fact that it is only sent to customers who have signed up for online account access, and who have indicated they would be willing to receive emails from Duke Energy. Due to the low cost of this channel, Power Manager plans to conduct another email campaign in the spring of 2014.

#### **Outreach: Telemarketing**

A program staff member reports that the outbound calling messaging focused on customer comfort. Customers were asked how frequently they were at home during the day. Customers that were not home during the day sometimes were offered the 1.5 kW option, because the longer cycling time would not affect customer comfort; customers that were at home during the day were offered the 1.0 kW option. However, the program staff mentioned that the 1.5 kW option was not emphasized, due to the increased possibility of customer discomfort. In addition to the risk of discomfort, the Power Manager program found that customers on the 1.5 kW option who called to cancel were generally fixed in their opinion and that very few agreed to continue participating at the lower 1.0 kW option. As the staff member reports, *"We would rather have them on the 1 kW option than gamble on the 1.5 kW option."* As noted in previous evaluation reports for this program, TecMarket Works agrees that Duke Energy should not push the 1.5 kW option because of the expectation of increased dissatisfaction rates, higher participant drop-out rates, increased probability of customer switch-overrides, and the increased probability of not acquiring the needed demand reduction from those 1.5 kW customers.

Duke Energy attributes the success of the outbound calling campaign to the fact that concerns can be addressed by the caller: *"Power Manager is a difficult product for people to understand. I think the [call center] people at the end of the phone line make the difference."*

The outbound calling efforts have also been relatively inexpensive. A program staff reports that because the calls are made by the third party call center, it has the benefit of not impacting Duke Energy's internal human resources. Duke Energy has worked very closely with CustomerLink, the third party vendor that provides both the call center and outbound calling services. A

program staff member reports that some of the common questions and concerns include the following:

- How long the cycle lasts,
- How hot their house gets during an event,
- Is it safe for their AC,
- What happens if they think something is wrong,
- Can they cancel, and
- Some customers do not believe that Duke Energy would pay them to participate.

Duke Energy reports that the close working relationship enabled them to make changes to the call script and to test new messages and responses. A staff member from Duke Energy will also regularly listen in on the calls, and provide positive feedback when one caller finds a particularly good way to present information. The ability to test customer receptiveness to messages also enabled Duke Energy to select the most effective short messages from the outbound calling efforts for use in the new direct mail collateral.

The program manager reported that these outbound calling efforts were affected by the trend for customers to drop their landline service in favor of using their cell phone. In response to that trend, Duke Energy tried a pilot using cell phones within their Power Manager implementation in the state of Kentucky. In this pilot, the program manager reports that Duke Energy was very careful to be sensitive to customers who may not welcome contact via their cell phone, and were careful not to pressure them in any way to participate. However, the program manager reports that they had better customer participation from the calls to cell phones than from calls to landlines, with no customer complaints about receiving the call on their cell phones. The program manager considered the outbound calling campaign by cell phone and by landline phone to both be successes. The lessons learned in Kentucky are being used in Ohio as well as the other states in which Duke Energy offers Power Manager.

Because this outbound calling channel is relatively new, Duke Energy will continue to evaluate its effectiveness after the event season. One metric they will monitor is the drop-out rate, or "stickiness". A Duke Energy program staff member reports that the program normally experiences a 20% drop-out rate with the direct mail and email efforts. Based upon that, the program staff estimates that a drop-out rate of 25% may trigger an assessment of the value of outbound calling. However, the relatively low cost of making outbound calls will be factored in to any decisions.

Duke Energy expects to continue marketing through all these channels, because they allow the customer to receive multiple exposures to the Power Manager program. However, due to the effectiveness of the outbound calling efforts, the program manager reports that they will use that as the primary channel as long as they see continued success.

### **Cross Program Referrals**

In 2013, Power Manager was promoted through the MyHER program across all five states in which Duke offered these programs. However, Duke Energy does not track how many participants have been channeled to Power Manager by MyHER. The marketing project manager also reports that Power Manager has successfully targeted customers who had participated in the

Residential Smart Saver HVAC program in the past, and may target these customers again in the future.

## Enrollment

Customers always had the option of enrolling in the Power Manager program via mail or telephone. In late 2011, Duke Energy enhanced their online enrollment process. This allowed them to establish a direct secure connection with the customer. The customer's enrollment information is securely passed to the installation vendor (*GoodCents*); who is able to then transmit the information directly and automatically to their work management system.

A Duke Energy program staff member reports that the drop-out rate for Power Manager is generally around 2%, but that they expect fewer drop-outs this year due to the milder summer season.

## Installation

GoodCents is the third party vendor that helps with the implementation of the program. GoodCents maintains the Power Manager participant database for Duke Energy. After the customer enrolls, GoodCents installs the switch within 3-6 weeks, depending upon the volume of the enrollments within the same time period.

Once GoodCents completes the installation, they send a file to Duke Energy containing the customer's account number and the amount of the one-time credit, which Duke Energy then applies to the customer's next bill. When events are called, Duke Energy calculates the amount of the credit for each of the Power Manager options when the energy prices are reconciled at the end of each month. GoodCents then takes these amounts, applies them to the appropriate customer records, and sends the file back to Duke Energy who then applies the credits to the next bill. The Duke Energy program manager reports that they provide a single credit covering all events during the previous billing period. Specifics on the event days, durations and credit amounts for each event are not provided.

## Emergency and Economic Events

### Event Calls

Power Manager Ohio has no formal maximum number of events per season, but it is closely coordinated with Power Manager Kentucky, which is limited to 10 events per season by tariff.

The decision to call an economic event is made with the consensus of representatives of several groups. Duke Energy's DSM Analytics team monitors a set of data on a daily basis. These data include the heat index, the forecast load, and the price of meeting that load. If the indicators suggest that there is an opportunity to save money for both Duke Energy and their residential customers, then the DSM Analytics team convenes a meeting of representatives across several of Duke Energy's business units to decide whether or not an event should be called. This group includes the Power Manager program manager and representatives from the Midwest energy trading group, the DSM Analytics team, the call center, and the meteorology group. In this meeting, the Power Manager program manager sees his role as that of the advocate for the residential customer, so that the customer's satisfaction and experience during the cycling period

is kept in mind for these economic events. If the representatives agree that an economic event is worthwhile, then the DSM Analytics team initiates the event. At the time of these interviews, Duke Energy called six events in Ohio for 2013.

## Technology & Vendors

In 2013, Power Manager Ohio's field technicians were allocating resources between installation of new switches and on completing a switch firmware upgrade project. GoodCents is the vendor providing the field technicians who install, upgrade, and remove switches. The vendor reports that they were asked to begin a project to upgrade almost 3,000 switches with a firmware issue that was identified in 2012. Duke Energy and Eaton (formerly Cooper) worked together to develop and implement an approach to achieve, from these flawed firmware switches, results similar to the Target Cycle methodology used by all the properly configured switches. GoodCents was directed by Duke Energy to upgrade the firmware of affected switches pending results of several summers worth of events and subsequent evaluations of the impacts provided by the flawed switches. At the time of these interviews Duke Energy was in the process of deciding whether to continue conducting the firmware upgrade or use the approach implemented in 2012. This issue did not affect the achievement of Duke Energy's overall objectives.

Eaton provides the switches, and reports that they hold periodic calls with Duke Energy on the status of the switch orders and shipments.

Duke Energy works closely with their vendors and by all accounts the vendors are appreciative of Duke Energy's expertise in this program. When asked if there were any unexpected surprises during the year, one vendor said *"With [the program manager's level of experience], it's really tough to surprise him with anything."*

Eaton reports that the Power Manager program manager maintains a positive atmosphere, and that the team members communicate well with one another, *"It's so nice and efficient, things get done quickly and easily."* GoodCents agrees and one project manager reports, *"I have the luxury of working with a lot of demand response programs throughout North America, and Duke Energy rates up there with being a cooperative customer."*

## Demand Response Analytics

Duke Energy's DSM Analytics team conducts two ongoing research efforts in support of the Power Manager program. The first is a switch operability study, in which field technicians gather data used to estimate the percentage of switches that are in working order. The switch operability study is conducted every two or three years. In March of 2013, a random sample of 150 households with 158 switches was selected from the population of Power Manager participants in Ohio and Kentucky with Cannon LCR4700 load control switches. The sample size was designed to target at relative 5% precision at 90% confidence level. The scan data was collected for all Cannon switches at sample households at the end of July. Five households were dropped from the study: three due to access problems and two that had no data due to data logger in the switches were not on. The final study size included 153 load control switches from 145 households.

The second ongoing research effort is the AC duty cycle study. The 2013 Power Manager M&V sample in Ohio and Kentucky consists of 146 households with 154 air-conditioner (AC) units. This includes 120 households from Ohio and 26 households from Kentucky. The 2013 Ohio and Kentucky M&V sample is representative of the PM population within the two states. The sample is designed to target at 10% relative precision at 90% confidence level with additional households to compensate for potential loss of sample due to data issues or removal of the switch through the summer.

Switches included in this study are not included in the event calls. The air conditioning cycling data for this group is used as the “normal” duty cycle and serves as the baseline against which Power Manager impacts are measured. This study is concluded every year after the end of the event season.

### **Program improvements**

Power Manager has implemented a number of improvements to program operations. In addition to the easier enrollment process described earlier, Duke Energy has also developed techniques to improve data storage.

### **Data Warehouse**

At the time of these interviews, Duke Energy is also in the process of designing a database to warehouse customer data. That was expected to be completed by the end of October, and would remove the need to manually enter customer data. The need for the automated process was motivated in part by the merger with Progress Energy, and the need to track more participants.

### **Program opportunities**

The success of the outreach efforts through new channels has been a pleasant surprise to Duke Energy. In the upcoming year, the program staff report that they are excited to follow up on the results with analyses to help them better understand their customers. These studies would be conducted in collaboration with Duke Energy’s market research division. Some of the analyses they may conduct include trying to identify characteristics of customers who responded to the outbound calling campaign but not to the direct mail campaign. Also, Duke Energy plans to follow up with customers who indicated that they currently were not interested but may be interested later on.

### **Summary**

In 2013, Duke Energy has increased their marketing efforts and enrolled more participants as a result. The objective of 1,805 new switch installations was increased after that objective was met at a lower cost-per-acquisition than originally anticipated. The ease with which the first objective was met should be attributed to the investments that Duke Energy has made in developing the marketing materials and in exploring new outreach channels. From interviews with the marketing campaign staff, it is clear that Duke Energy was able to quickly test, identify, and replicate successful practices in outbound calling. Power Manager Ohio participants also benefit from lessons learned by the program staff during the implementation of Power Manager in other states in Duke Energy’s territory.

The implementation of the marketing campaign demonstrates that Duke Energy actively seeks to identify the most cost efficient way to run the program, and that they can respond nimbly when an opportunity arises, such as in the case of the success of the outbound marketing campaign. The evaluation has no recommendations to make regarding the marketing efforts because the marketing staff is clearly seeking opportunities to use the data they have gathered in better understand customer needs.

Based upon these findings, the evaluation team suggests that another full process evaluation of Power Manager Ohio may not be needed for another two or three years, in the absence of major changes to the program's design or implementation. We suggest that Duke Energy continue to monitor customer satisfaction from year to year; any major change to customer satisfaction would also signal that a process evaluation may be needed sooner rather than later.

## Participant Survey Results

TecMarket Works completed telephone surveys with 69 randomly selected program participants in Ohio. This section presents the results from these surveys. The survey instrument can be found in *Appendix B: Participant Survey Instrument*.

The results from the 69 completed surveys are presented below, and additional household descriptive information and participant comments can be found in *Appendix E: Participant Survey Customer Descriptive Data*.

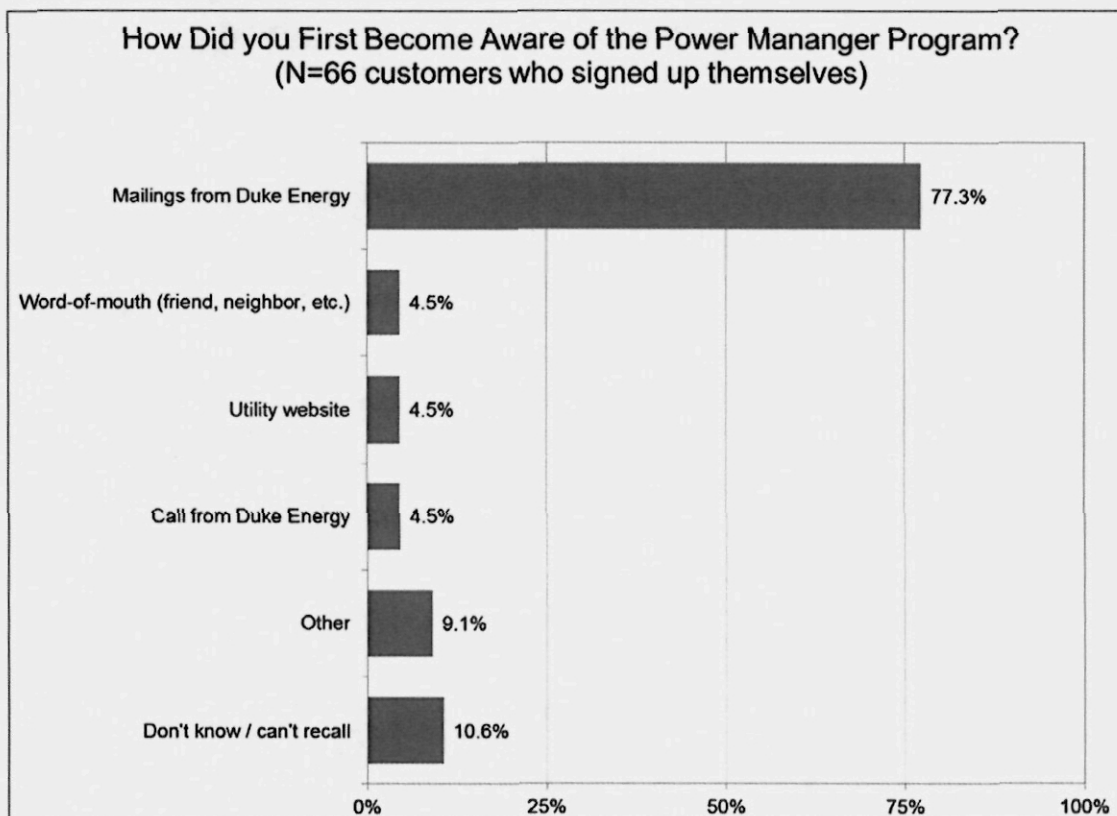
### Participation Drivers

The vast majority (95.7% or 66 out of 69) of Power Manager program participants surveyed in Ohio were involved with the decision to participate in the Power Manager Program, as shown in Table 2. One participant (1.4% of 66) joined the program when they moved into a home where Power Manager had been installed by a previous occupant, and two (2.9% of 66) were not sure ("don't know").

**Table 2. Were you involved in the decision to participate in Duke Energy's Power Manager program?**

	Ohio	
	N	Percent (N=69)
No	0	0.0%
Yes	66	95.7%
It was already installed when I moved in	1	1.4%
Don't know	2	2.9%

Figure 1 shows that most participants recalled first hearing about the Power Manager program through mailings from Duke Energy (77.3% or 51 out of 66 participants who were involved in the decision to join the program). About one participant in ten who signed up for the program themselves (10.6% or 7 out of 66) could not recall where they first learned about the program. Relatively few participants surveyed learned of the program through word of mouth (4.5% or 3 out of 66) or the Duke Energy web site (4.5% or 3 out of 66).



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

*Note: percentages total to more than 100% because respondents could name multiple sources.*

Six participants (9.1% of 66) mentioned “other” sources of awareness of the program. These sources are listed below.

- *I received an email from Duke Energy. (N=2)*
- *From the Home Energy Comparison Report.*
- *When I called Duke Energy about free CFLs and the Personalized Energy Report.*
- *Duke was out doing some meter repair at my home and the service person told me about the program.*
- *It was either a television promotion or somebody who was going door to door with info about the program.*

### Recalling Promoted Program Benefits

Participants were asked to recall what program benefits were originally promoted to them to get them to join the program. The results are presented in Table 3; the most commonly recalled benefits have to do with saving money (overall mentioned by 56.5% or 39 out of 69). The other frequently-mentioned benefits are managing peak demand and preventing outages (36.2% or 25 out of 69) and conserving energy (20.3% or 14 out of 69). Six participants (8.7% of 69) could



not recall any promoted benefits, and three (4.3% of 69) were not involved in the decision to participate in the program.

**Table 3. Participants' Recalled Program Benefits**

<i>To the best of your ability, could you please tell me what the promoted benefits of the program were?</i>	Count	Percent (N=69)
Saving money – total mentions:	39	56.5%
- bill credit for activation	18	26.1%
- incentive payment for joining	12	17.4%
- lower bills / saving money in general	19	27.5%
Reduce outages / manage peak demand	25	36.2%
Conserve energy / use less electricity	14	20.3%
Helping the environment	4	5.8%
People are usually not home during activations	4	5.8%
Build fewer power plants	1	1.4%
Unique reasons (listed below)	2	2.9%
Don't know / not specified	6	8.7%
Not involved in decision to join program	3	4.3%

*Note: responses total to more than 100% because respondents could mention multiple benefits.*

Two participants (2.9% of 69) recalled unique benefits of the program. These benefits are listed below.

- *I think there was a special deal for one month. I'm not sure. My wife takes care of the bill.*
- *I also heard something about lightning? But I am not sure if that is with this program or something else.*

In addition to asking about the benefits of the program, TecMarket Works also asked participants for the main reason they joined the Power Manager program, as seen in Table 4. The most commonly cited main reasons for joining the program were to save money on energy bills (29.0% or 20 out of 69), to save energy (20.3% or 14 out of 69) and avoiding power outages (18.8% or 13 out of 69). Another 13.0% (9 out of 69) said the main reason they joined was for the bill credits.

**Table 4. Main Reasons for Participation in Power Manager**

<i>What was the main reason why you chose to participate in this program?</i>	Count	Percent (N=69)
To save money (through lower utility bills)	20	29.0%
To save energy	14	20.3%
To help Duke Energy avoid power shortages	13	18.8%
For the bill credits	9	13.0%
To help the environment	4	5.8%
I don't use the AC very much	2	2.9%
For the sign-up incentive	2	2.9%
Usually not home when events occur	1	1.4%
Other (listed below)	1	1.4%
Don't know / not specified	0	0.0%
Not involved in decision to join program	3	4.3%

One participant (1.4% of 69) offered a unique reason for participating in the program, which is listed below.

- *I knew that the program would not interfere with my family's lifestyle.*

Four participants (5.8% of 69) mentioned “helping the environment” as their main reason for participating in the program. These customers were asked to specify what it was about the environment that they wished to help; their answers are listed below.

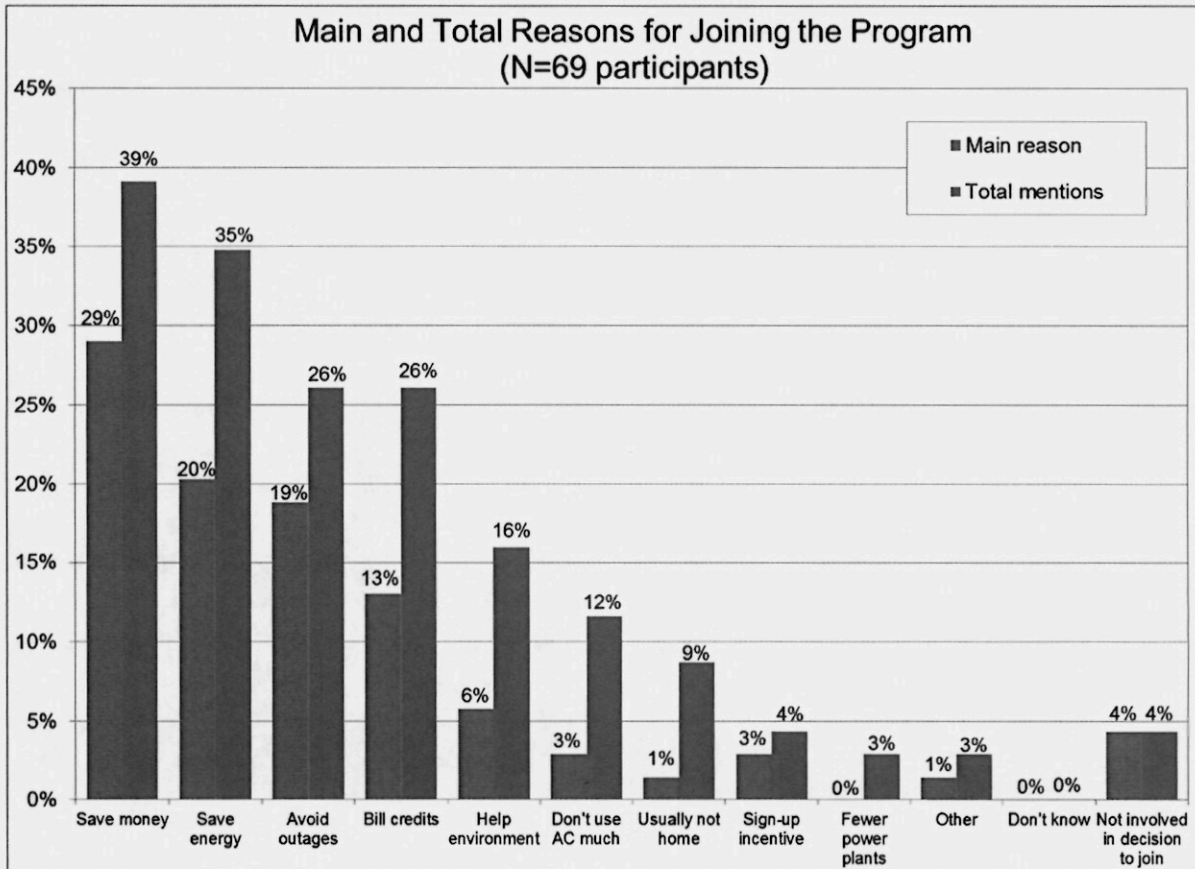
- *Because we have a big house and high usage and we wanted to use less.*
- *Using less energy helps the environment by conserving resources.*
- *To reduce air pollution.*
- *To reduce the need for deplete-able natural resources.*

After respondents gave their main reason for participating in Power Manager, TecMarket Works asked them if they recalled reading about that benefit or reason in the program brochure; Table 5 summarizes their responses. Only six respondents (9.1% of 66 who were involved in the decision to join the program and could name a main reason for joining) did not remember the brochure, and none (0.0% of 69) said they did not receive the brochure. Overall, about three-quarters of participants surveyed (75.8% or 50 out of 66) remembered reading about the benefits they cited in the program brochure. Differences between the percentages of customers recalling reading about each particular benefit in the brochure are not statistically significant at the  $p < .10$  level.

Table 5. Main Reason for Participation: Read in Program Brochure

Count and percentage of those mentioning reason	Do you recall reading about this benefit on the program brochure?					Total (N=69)
	No	Yes	Do not remember brochure	Did not get brochure	Don't Know	
To save money (through lower utility bills)	2 10.0%	16 80.0%	2 10.0%	0 0.0%	0 0.0%	20 100%
To save energy	1 7.1%	9 64.3%	2 14.3%	0 0.0%	2 14.3%	14 100%
Helping Duke avoid power shortages/outages	0 0.0%	9 69.2%	2 15.4%	0 0.0%	2 15.4%	13 100%
For the bill credits	0 0.0%	8 88.9%	0 0.0%	0 0.0%	1 11.1%	9 100%
To help the environment	0 0.0%	3 75.0%	0 0.0%	0 0.0%	1 25.0%	4 100%
For the sign-up incentive	0 0.0%	2 100%	0 0.0%	0 0.0%	0 0.0%	2 100%
I don't use the AC very much	0 0.0%	1 50.0%	0 0.0%	0 0.0%	1 50.0%	2 100%
Usually not home when events occur	0 0.0%	1 100%	0 0.0%	0 0.0%	0 0.0%	1 100%
Other reasons (listed above)	0 0.0%	1 100%	0 0.0%	0 0.0%	0 0.0%	1 100%
Don't know reason / not involved in joining program	NA	NA	NA	NA	NA	3
<b>Total (valid N=66)</b>	<b>3</b> 4.5%	<b>50</b> 75.8%	<b>6</b> 9.1%	<b>0</b> 0.0%	<b>7</b> 10.6%	-

After asking for the main reason they joined the program and whether they recalled reading about it in the program brochure, TecMarket Works asked if there were any other reasons participants joined the program. The combined results (total times mentioned as "main reason" or "other reason") are presented in Figure 2. As with the main reason for joining the program, the most mentioned reason overall is saving money on bills (39.1% or 27 out of 69), though saving energy comes in a close second when "other reasons" are included (34.8% or 24 out of 69). Two participants (2.9% of 69) mentioned building fewer power plants as an "other reason" for joining the program, though none of the survey participants mentioned this as their "main reason".



**Figure 2. Main Reasons and Total Mentions of Reasons for Joining the Program**

Note: "Total mentions" adds to more than 100% because multiple responses were allowed per participant.

In addition to the "other" main reasons for joining the program given by one participant (listed after Table 4), one more participants offered an additional "other" reasons for participating in the program which is listed below.

- *Minimal disruptions.*

Four surveyed customers said "helping the environment" was the main reason they joined the program, and they were asked to specify what about the environment concerned them (these responses are listed after Table 4). Seven more participants said "helping the environment" was a reason they joined Power Manager, but not the main reason. These customers were also asked to specify what about the environment concerns them; these responses are listed below.

- *To conserve natural resources and reduce pollution.*
- *To save resources.*
- *To lessen our carbon footprint.*
- *To help prevent the need for building new power plants.*

- *It evens out the energy usage, not having that heavy peak usage.*
- *Somehow we wouldn't notice any difference and, in general, it would just save energy.*
- *We wanted to be conscientious energy users.*

Surveyed participants were also asked if the "other reasons" (besides their main reason) for joining the program were covered in the program brochure. Table 6 shows the five top reasons for participating in the program (combined "main reasons" and "other reasons") and whether the customers read about these reasons in the program brochure. Customers who gave "helping the environment" as a reason for participating in the program are less likely to say they read about these benefits in the program brochure (54.5% or 6 out of 11) compared to "saving money" (77.8% or 21 out of 27), "saving energy" (75.0% or 18 out of 24) and "bill credits" (88.9% or 16 out of 18; differences significant at  $p < .10$  or better using student's t-test). Most of the customers who joined the program "to help the environment" and who did not recall reading about this in the brochure were unsure about whether this was in the brochure or not (36.4% or 4 out of 11 "don't know"); for each of the top five reasons for joining the program, fewer than 10% of respondents said they were sure their reason for joining the program was not in the brochure (percentages saying "no").

**Table 6. All Reasons for Participation: Read in Program Brochure**

Count and percentage of those mentioning reason	Do you recall reading about this benefit on the program brochure?					Total Recalling Reason
	No	Yes	Do not remember brochure	Did not get brochure	Don't Know	
To save money (through lower utility bills)	2 7.4%	21 77.8%	2 7.4%	0 0.0%	2 7.4%	27 100.0%
To save energy	2 8.3%	18 75.0%	2 8.3%	0 0.0%	2 8.3%	24 100.0%
Helping Duke avoid power shortages/outages	0 0.0%	13 72.2%	2 11.1%	0 0.0%	3 16.7%	18 100.0%
For the bill credits	1 5.6%	16 88.9%	0 0.0%	0 0.0%	1 5.6%	18 100.0%
To help the environment	1 9.1%	6 54.5%	0 0.0%	0 0.0%	4 36.4%	11 100.0%

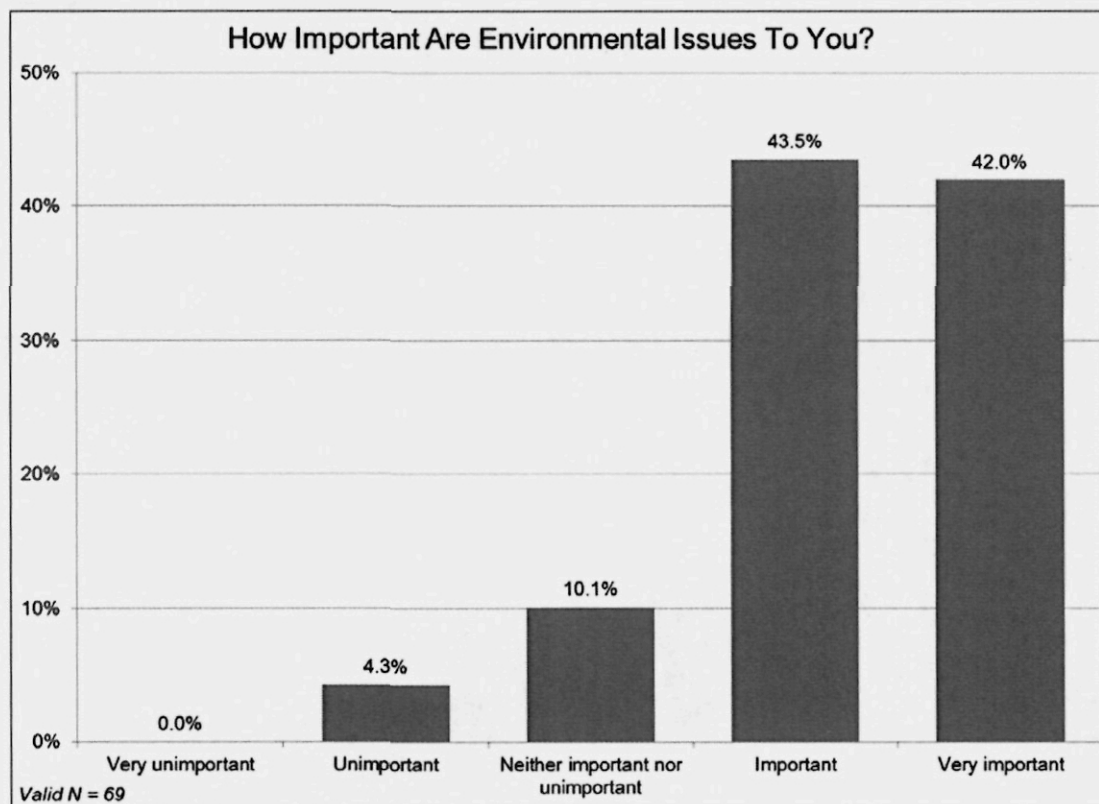
*Note: the count of reasons recalled is greater than the number of participants surveyed because participants could recall multiple reasons.*

### Importance of Environmental Issues to Participants

TecMarket Works asked participants to rate the importance of environmental issues in general, as well as three specific environmental issues. These results are shown in Figure 3 through Figure 6.

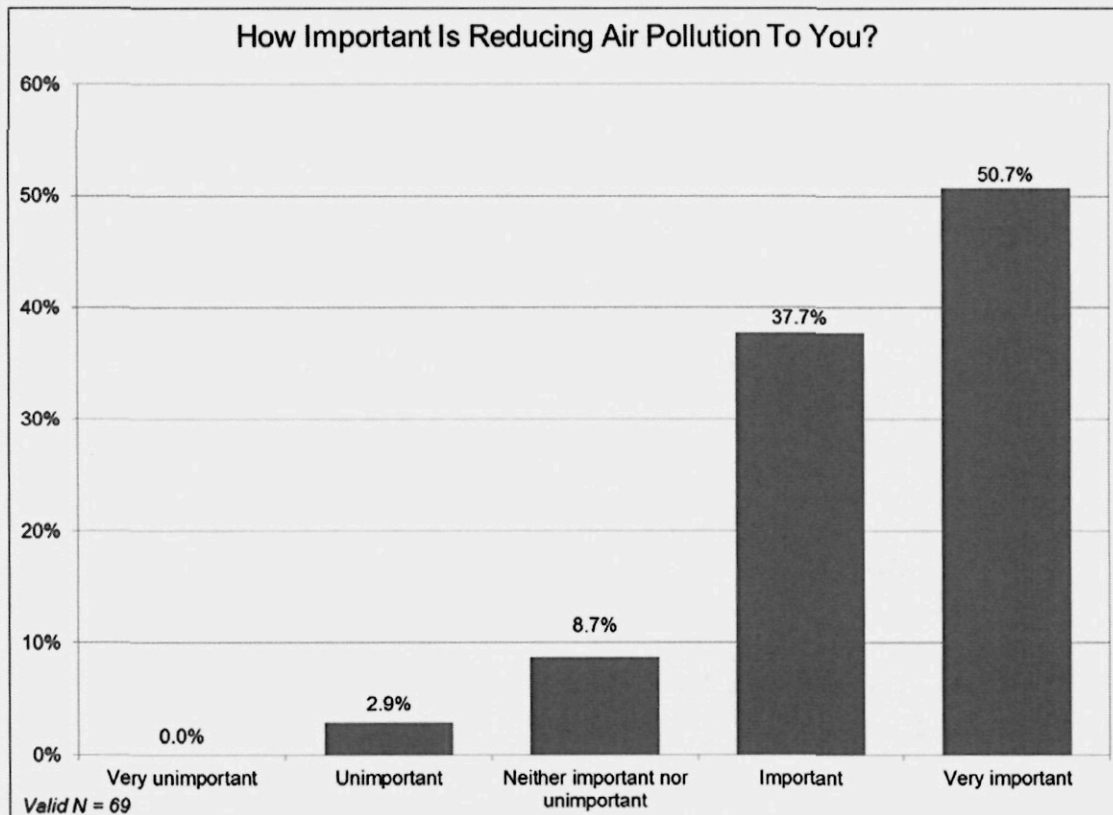
A large majority (85.5% or 59 out of 69) of Power Manager participants surveyed indicated that environmental issues are either "important" or "very important" to them. Only three (4.3% of 69)

of the participants surveyed said environmental issues were “unimportant” and none said environmental issues were “very unimportant.”



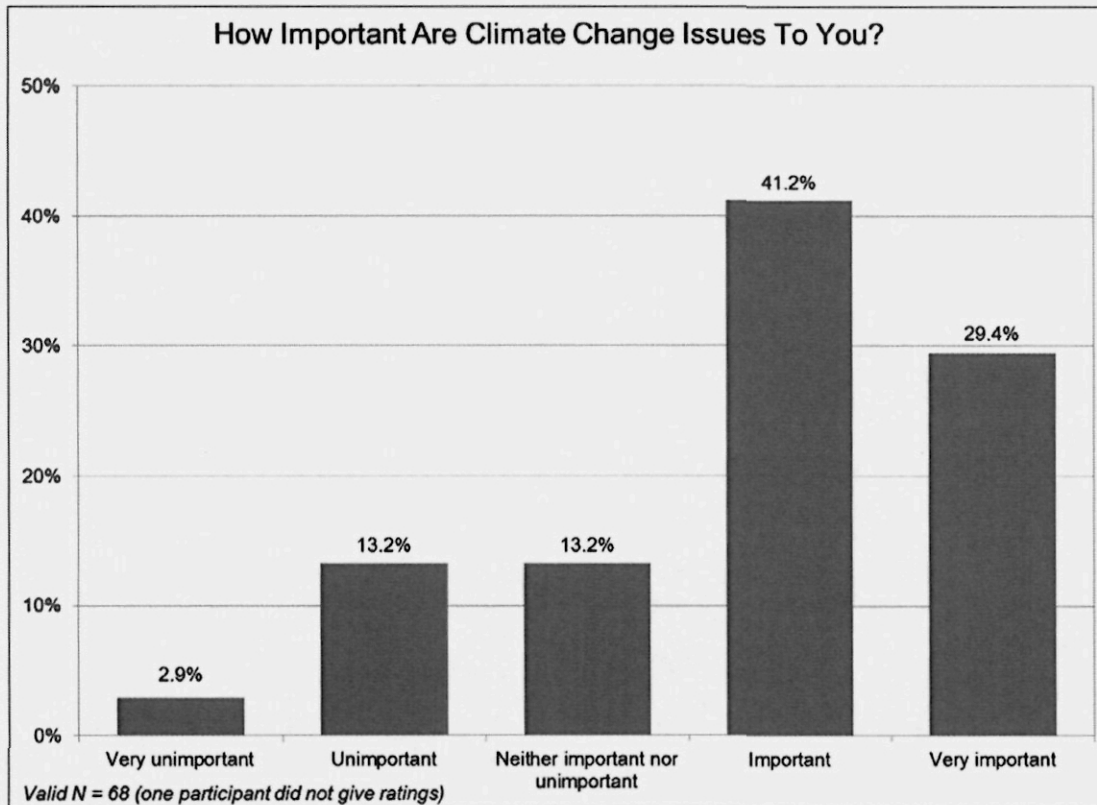
**Figure 3. Importance of Environmental Issues to Power Manager Participants**

Reducing air pollution is the most important environmental issue to participants among the three specific issues that were asked about. As seen in Figure 4, a very large majority of 88.4% of participants surveyed (61 out of 69) said that reducing air pollution was “important” or “very important.” Only two (2.9% of 69) of the participants surveyed in Ohio said reducing air pollution is “unimportant” and none said it was “very unimportant.”



**Figure 4. Importance of Reducing Air Pollution to Power Manager Participants**

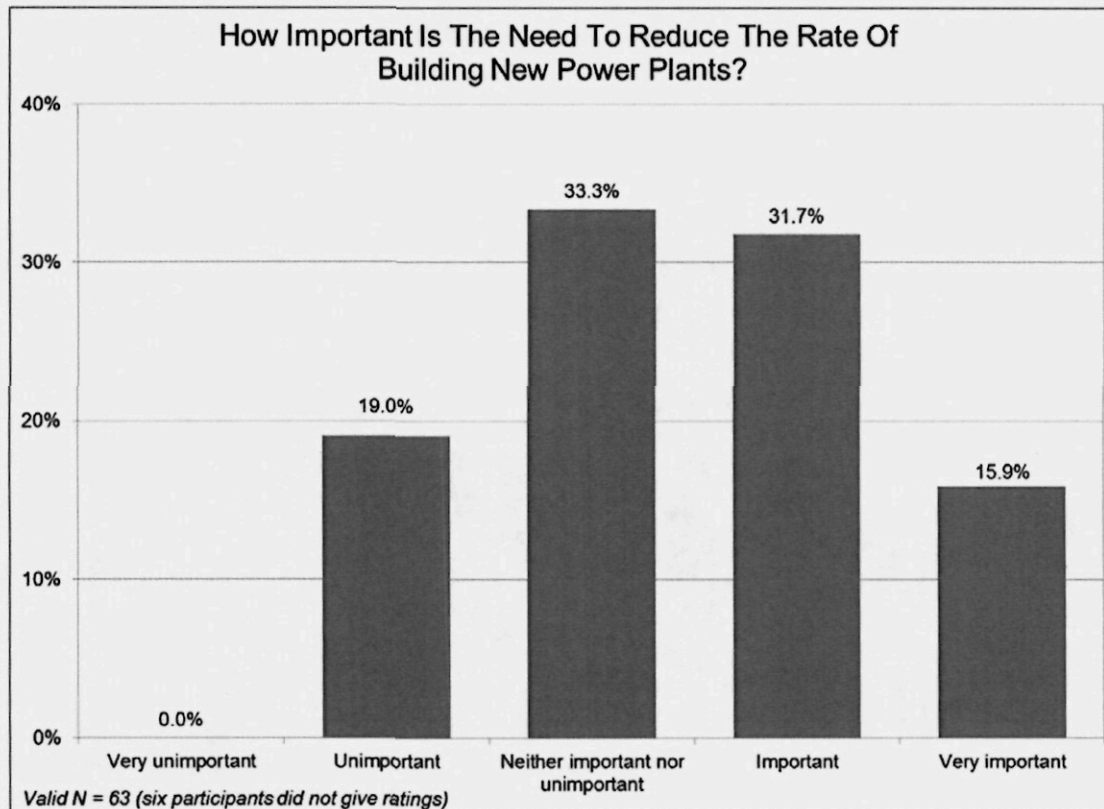
When TecMarket Works asked about the importance of climate change issues, opinion was more divided but a clear majority still said these issues are “important” or “very important” (70.6% or 48 out of 68). About one in six survey participants (16.2% or 11 out of 68) think climate change issues are “unimportant” or “very unimportant.”



**Figure 5. Importance of Climate Change Issues to Power Manager Participants**

When respondents were asked how important it was to reduce the need for new power plants, opinions varied more than for the other two specific environmental issues TecMarket Works asked about. Only 15.9% (10 out of 63) describe this issue as “very important” with another 31.7% (20 out of 63) saying it is “important.” Though only 19.0% (12 out of 63) say reducing the need for more power plants is “unimportant” and none say it is “very unimportant”, another 33.3% (21 out of 63) say it is “neither important nor unimportant.”





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

While environmental issues are important to the majority of Power Manager participants, only six of those surveyed (8.7% of 69) are members of a group or club that has an environmental mission.

**Table 7. Membership in Environmental Organizations**

Are you a member of any groups or clubs that have environmental missions?	Count	Percent (N=69)
Yes	6	8.7%
No	63	91.3%
Don't Know	0	0.0%

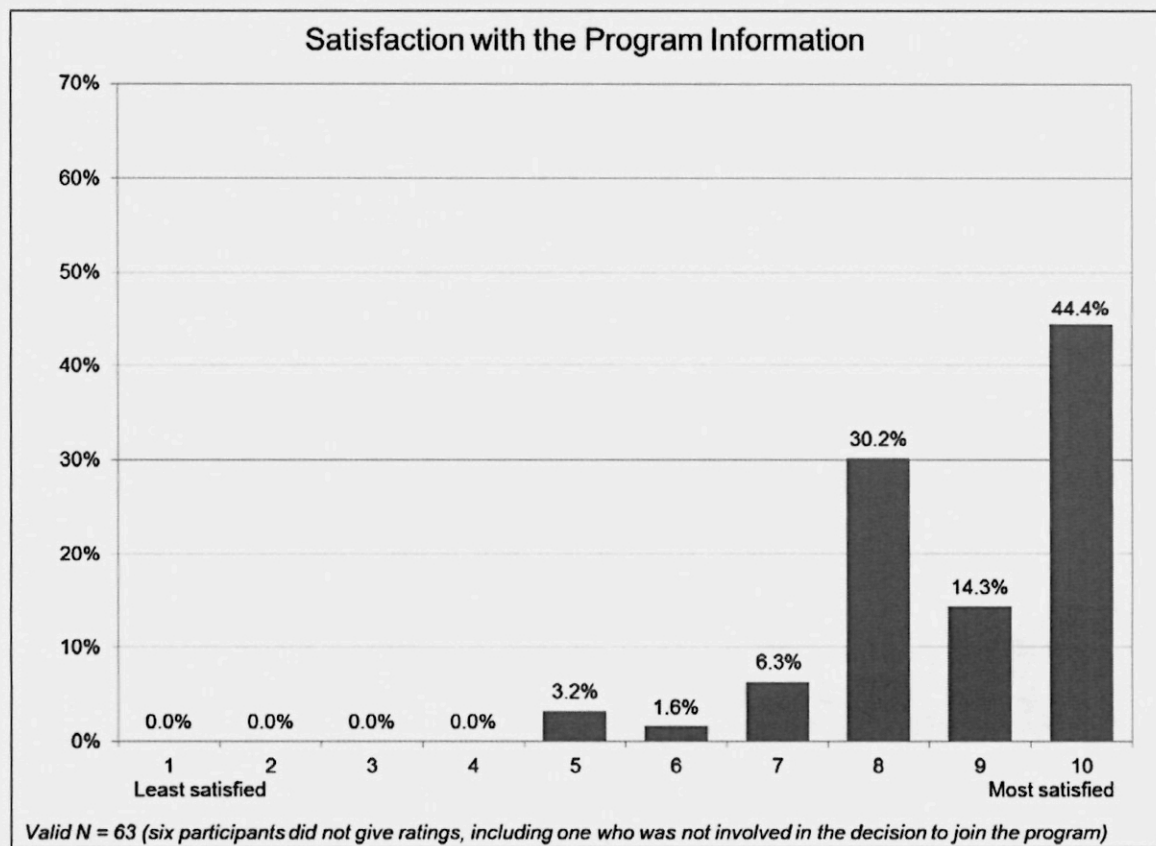
If respondents indicated that they were a member of an organization with an environmental mission, they were asked for the name of the organization. The organizations mentioned by these six respondents are listed below (the list totals to more than six because some respondents mentioned multiple organizations).

- *Sierra Club* (N=2)
- *Arbor Day Foundation* (N=2)
- *Environmental Defense Fund*

- *Natural Resources Defense Council (NRDC)*
- *National Wildlife Federation*
- *Ohio Environmental Council*
- *National Rifle Association*
- *A couple trusts that stress environmentalism.*
- *I'm a geologist, and I have worked as an environmental geologist for my entire career.*

### 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 8.84 on a 10-point scale with “10” indicating that they are “very satisfied”. Only 11.1% (7 out of 63 participants who answered the question) rated the program information a “7” or less on a 10-point scale, and nearly half (44.4% or 28 out of 63) rated the program information a “10 out of 10”. The complete distribution is shown in Figure 7.



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

If a respondent rated their satisfaction with the program information at “7” or lower, TecMarket Works asked them why they were less than satisfied. Seven participants surveyed (11.1% of 63 participants who answered the question) gave ratings of “7” or less, and their reasons for their lower satisfaction scores are listed below.

- *I could use more detailed information about the benefits of the program and the possible consequences for non-participation such as brownouts, etc.*
- *I was confused about what would happen. I don't understand how the device is saving energy.*
- *The information could have been clearer about how the program works and how often the device would be activated.*
- *I don't really know what the savings are on a monthly basis.*
- *Someone called me about the program and explained it better.*
- Don't know / don't remember (N=2)

### 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 half of participants surveyed (47.8% or 33 out of 69) didn't know how many control events to expect. Among participants who were able to give an answer, most correctly indicated that Power Manager is activated "as needed, based on demand and/or temperature" (31.9% or 22 out of 69) or "less than 10 times per year" (10.1% or 7 out of 69).

**Table 8. Participant Recall of How Often Duke Energy Said it Would Activate the Power Manager Device**

How often per year did Duke Energy say it would activate the Power Manager device?	Count	Percent (N=69)
As needed / based on demand and/or temperature	22	31.9%
Less than 10 times per year	7	10.1%
10 or more times per year	0	0.0%
Every day / whenever AC is on	2	2.9%
Other (listed below)	2	2.9%
Duke Energy never said how often	2	2.9%
I did not read the program information / already installed when I moved in	1	1.4%
Don't know / can't recall	33	47.8%

Two survey participants gave "other" descriptions of how often they expected Power Manager to be activated, which are listed below.

- *I thought it was activated once and that was it. I didn't really know they turned it off and on. They said once it was installed that they would do everything and I wouldn't have to worry about it.*
- *Either once a day or once a month. I'm really not sure.*

### 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 shown in Table 9; more than half of participants were unable to provide an estimate ("don't know" 63.8% or 44 out of 69). Among the 22 respondents that provided specific annual dollar amounts, answers ranged from \$1 to \$200 per year with a mean of \$35 and median of \$20.

**Table 9. Expected Bill Credits for Participating in Power Manager**

What's your best estimate of how many dollars you will receive in yearly bill credits?	Count	Percent (N=69)
Less than \$10	4	5.8%
\$10 to \$24.99	9	13.0%
\$25 to \$50	6	8.7%
More than \$50	3	4.3%
Other (listed below)	3	4.3%
Don't know	44	63.8%

Three survey participants gave "other" descriptions of how much they expect in annual bill credits for participating in Power Manager; these are listed below.

- *Fifteen percent of the bill.*
- *\$25 for setting it up, and then some more but I'm not sure how much.*
- *I didn't expect any, so I never looked.*

When participants were asked if they have received any bill credits for their Power Manager program participation during 2013, a majority of 55.1% (38 out of 69) said that they did not know, while only about one in seven respondents (14.5% or 10 out of 69) were sure that they have received bill credits, and the remaining 30.4% (21 out of 69) believe that they have not received any bill credits this year.<sup>7</sup>

**Table 10. Participant Awareness of Bill Credits Received**

Have you received any bill credits this year from Duke Energy for participating in this program?	Count	Percent (N=69)
Yes	10	14.5%
No	21	30.4%
Don't Know	38	55.1%

The ten Ohio participants who recalled receiving bill credits during 2013 were asked how many times they noticed Power Manager credits on their bill: four participants recall noticing the credits once, three participants recall noticing them twice, one participant noticed the credits three times, and the other two respondents could not recall how many times. On average, these participants recalled noticing the bill credits 1.6 times apiece.

<sup>7</sup> Duke Energy confirmed that all surveyed participants are in fact receiving credits on their bills for activation events.

### Understanding the Program and Getting More Information

Despite the uncertainty of many of the participants over bill credits and control events, a minority of survey respondents indicated that anything about the program was unclear to them. Only 24.6% (17 out of 69) of participants surveyed had questions about how the program works.

**Table 11. Participant Understanding of How the Program Works**

<i>Is anything unclear to you about how the program works?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	17	24.6%
No	50	72.5%
Don't Know	2	2.9%

Respondents who indicated that they were unclear on something about the program were asked what was unclear. The responses of the 17 participants who were unclear on something are categorized and listed below; about half of these questions relate to the bill credits.

#### **Bill credits / billing-related (N=9)**

- *I am unclear about the compensation offered and the number of times per year that the device will be activated.*
- *I am unclear as to the amount of bill credits, and the number of times per year that device will be activated.*
- *We never really saw the credits on the bill. I think there needs to be more emphasis on highlighting those credits so we can see when the device was activated. Also, I can't tell how or when the device is activated.*
- *I am unsure how the bill credits work.*
- *I didn't know there was anything like bill credits. But I'd just as soon let Duke Energy control the energy when they need to avoid brownouts or blackouts.*
- *I thought we only received a sign-up bonus and no other bill credits.*
- *Where are the bill credits?*
- *I am unclear about how they would implement benefits in bill reduction.*
- *I want to know where the savings are, and who are they going to?*

#### **Other questions (N=8)**

- *I am unclear about how the device works and how it saves energy.*
- *I am unclear about how the device itself works.*
- *I don't understand what makes the device work.*
- *I don't understand the activation.*
- *It's been a while since we joined the program in 2008. I would like more information.*
- *I'd like to be re-informed about this program.*



- *I don't know everything about the program, but I don't really care about it either.*
- *I am unclear about most of the program. I don't remember reading anything about the program or signing up for it.*

Only two surveyed participants surveyed (2.9% of 69) contacted Duke Energy to find out more about the Power Manager program, as seen in Table 12.

**Table 12. Did you ever call or email Duke Energy to find out more about the Power Manager® Program?**

<i>Did you ever contact Duke Energy to find out more about the program?</i>	Count	Percent (N=69)
Yes	2	2.9%
No	66	95.7%
Don't Know	1	1.4%

Both of the respondents who contacted Duke Energy about Power Manager said that they did so by telephone. They were also asked to give satisfaction ratings for the ease of reaching a Duke Energy representative, and for how well the representative responded to their questions. On a 10-point scale where 10 means "very satisfied", one respondent gave a "9" for the ease of reaching a Duke Energy rep, while the other gave a rating of "6" (this customer explained their relatively low rating for the ease of reaching customer service as follows: *"I had trouble getting in contact with a representative who actually had information about the Power Manager program; the first couple of representatives I was transferred to were not knowledgeable about the program."*) These customers' ratings for how the Duke Energy representative responded to their questions were a "9" and an "8" on the same 10-point scale, where "10" means the highest level of satisfaction.

## Awareness and Response to Activation

Two-thirds of participants surveyed (66.7% or 46 out of 69) are aware that their Power Manager device has been activated since they joined the program, however more than a quarter (26.1% or 18 out of 69) did not know whether it has been activated and 7.2% (5 out of 69) believe that it has not been activated at all.

**Table 13. Awareness of Power Manager Activation Since Joining the Program**

<i>Has Duke Energy activated the Power Manager device since you joined the program?</i>	Count	Percent (N=69)
Yes	46	66.7%
No	5	7.2%
Don't Know	18	26.1%

Table 14 indicates that in Ohio, about half of participants surveyed (50.7% or 35 out of 69) did not know how to tell if their Power Manager device has been activated. The only reason for participants being aware of an activation that is cited by more than 10% of participants surveyed is "home temperature rises" (15.9% or 11 out of 69).

**Table 14. Reason for Awareness of Power Manager Activations**

<i>How do you know when the device has been activated?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Home temperature rises	11	15.9%
Bill credits	5	7.2%
AC shuts down	6	8.7%
Light on the meter is on	6	8.7%
Contact or notification from Duke Energy (other than bill)	4	5.8%
Light on AC unit flashes	1	1.4%
Lower bills	2	2.9%
Unique reasons (listed below)	7	10.1%
Don't know / not aware	35	50.7%

*Note: Multiple responses were allowed per participant.*

Seven participants (10.2% of 69) offered unique reasons for their awareness of Power Manager activation. These participants' responses are listed below.

- *I can hear the AC clicking on and off.*
- *The AC is not running as much on hot days.*
- *The fan is running without cool air and the humidity rises.*
- *The fan goes into cycling mode.*
- *My Rottweiler starts to pant from becoming overheated.*
- *They put a box on my AC.*
- *When I see the technician come out and go to the box.*

TecMarket Works next asked participants how many times they believe Power Manager has been activated during 2013. A large majority (73.9% or 51 out of 69) said they do not know and did not offer a guess, as seen in Table 15. Among the participants who estimated a specific number of activation events, the mean number of activations reported is 1.6 and the median number of activations is one. Most of the participants who were able to answer this question (72.2% or 13 out of 18) said that there were between one and five Power Manager activation events in 2013. Four respondents (22.2% of 18, or 5.8% of 69 overall) believed there had been no activation events in 2013.

A total of six control events actually occurred in Ohio during the 2013 cooling season<sup>8</sup>. The participant surveys reported here were all interviewed in October, three to four weeks after the last activation events of the season.

<sup>8</sup> During the 2013 cooling season, general population device activations occurred in Ohio on July 15, July 16, July 17, July 18, September 10 and September 11. See Table 1. *Schedule of Events and Non-Event High Temperature Days in Ohio* on page 10.

**Table 15. Perceived Number of Power Manager Activations in 2013**

<i>About how many times did Duke Energy activate your Power Manager device in 2013?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Zero	4	5.8%
1 to 5 times	13	18.8%
6 to 9 times	1	1.4%
10 or more times	0	0.0%
"every day" or "every week"	0	0.0%
Don't Know	51	73.9%

Most participants do not know how many times their units have been activated, with many not sure if they have been activated at all. However, 68.1% of participants surveyed (47 out of 69) report that someone is usually home on weekday afternoons during the summer, and only 29.0% of respondents (20 out of 69) said that no one is usually home during this time.

**Table 16. Participants at Home on Weekday Afternoons in the Summer**

<i>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?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	47	68.1%
No	20	29.0%
Don't know	2	2.9%

When TecMarket Works asked participants if they were home during any of the control events, most (75.4% or 52 out of 69) did not know. Although two-thirds of participants say there is usually someone at home on weekday afternoons in the summertime (see Table 16), only about one participant in seven (14.5% or 10 out of 69) was sure that someone was at home during an activation event during the recent summer, as seen in Table 17.<sup>9</sup>

**Table 17. Number of Occupants at Home During Power Manager Device Activation**

<i>Were you or any members of your household home when Duke Energy activated your Power Manager device this past summer?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	10	14.5%
No	7	10.1%
Don't know	52	75.4%

<sup>9</sup> The discrepancy between 68.1% of participants reporting that "someone is usually at home on weekday afternoons" and only 14.5% reporting that "someone was at home during a Power Manager event this summer" mirrors the results of the Event survey, where 60.0% of Event participants were at home during actual events, but only 12.5% of those at home were aware that there had been an event. See *Home Occupancy During Power Manager Activation* on page 62 and *Awareness of Power Manager Device Activation in the Past Seven Days* on page 69.



TecMarket Works then asked the 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.

Six of the nine participants (66.7%) who were at home during an event and answered both comfort questions reported a decline in comfort during the Power Manager activation event. These declines in comfort ratings ranged from 1 to 5 points (on a 10-point scale), with an average decrease of 1.89 points on a 10-point scale.

**Table 18. Comfort Ratings Before and During Control Events (All Respondents At Home During Event)**

	Rating before event (N=9)	Rating during event (N=9)	Change
Mean	9.00	7.11	-1.89
Median	9.00	8.00	-1.00

*Note: one participant who was at home during an event did not provide both comfort ratings and is not included in this table.*

Table 18 shows that across all nine respondents who recall being at home during an event and gave both comfort ratings, the average decline in comfort ratings was 1.89 points (from 9.00 to 7.11), a difference which is statistically significant ( $p < .05$  using student's t-test). Among just the six participants whose comfort ratings declined, average comfort ratings fell from 9.00 before the event to 6.17 after the event (also significant at  $p < .05$  using student's t-test), as seen in Table 19. For the three customers whose comfort ratings did not decline, the average comfort ratings were 9.00, both before and during the activation event.

**Table 19. Comfort Ratings Before and During Control Events (Only Respondents Who Reported a Decline in Comfort)**

	Rating before event (N=6)	Rating during event (N=6)	Change
Mean	9.00	6.17	-2.83
Median	9.00	6.50	-2.50

All of the participants who indicated that they felt less comfortable during the period of activation blamed “rising temperature” for their decline in comfort (100.0% or 6 out of 6). Two participants also blamed “rising humidity” (33.3% of 6) and only one customer surveyed (16.7% of 6) blamed Power Manager, at least in part, for their decline in comfort.

**Table 20. Causes of Comfort Decline During Power Manager Activation Events**

<i>What do you feel caused your decrease in comfort?</i>	<b>Count</b>	<b>Percent (N=6)</b>
Rising temperature	6	100.0%
Rising humidity	2	33.3%
Power Manager	1	16.7%
Power outage	0	0.0%
Don't know	0	0.0%

*Note: Multiple responses were allowed per participant.*

TecMarket Works also asked participants to estimate how many times over the most recent cooling season their comfort level was negatively affected by Power Manager activation; results are shown in Table 21. Forty percent (4 out of 10 who recall being at home during an event) said that their comfort was never affected, while 50.0% (5 out of 10) said there were one to five events that affected their comfort and one respondent (10% of 10) was not sure. Across all ten participants who recalled being home during at least one event during the past year, the mean number of times their comfort was affected was 1.2 and the median was 1.0.

**Table 21. Perception of Power Manager Affecting Level of Comfort**

<i>Thinking about this summer, how many times do you think the activation of Power Manager affected your level of comfort?</i>	<b>Count</b>	<b>Percent (N=10)</b>
Zero	4	40.0%
1 to 5 times	5	50.0%
6 or more times	0	0.0%
Don't know	1	10.0%

Only one surveyed participant (1.4% of 69) said they had a power outage on a day when they believed Power Manager had been activated (though as seen in Table 19, none of the participants surveyed blamed power outages for a decline in comfort during an activation event). Another 30.4% (21 out of 69) of participants were not sure if there was a power outage ("don't know"), as seen in Table 22.

**Table 22. Power Outages During Power Manager Events**

<i>Did you experience any power outage issues on any of the days that Duke Energy activated your Power Manager device?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	1	1.4%
No	47	68.1%
Don't know	21	30.4%

TecMarket Works also asked participants if they recalled doing anything to keep cool during the control event; these responses are shown in Table 23. Two respondents (20.0% of 10 who recalled being at home during an event) recalled trying to keep cool during the event by adjusting their thermostats; both set their thermostats lower, one by one degree and the other by three degrees, for an average of 2.0 degrees apiece. Forty percent of participants who were at home

during an event either turned on fans (20.0% or 2 out of 10) or already had fans running during the event (20.0% or 2 out of 10). The vast majority of participants surveyed (80.0% or 8 out of 10) took no further actions and continued their normal activities during the activation event.

**Table 23. Actions Taken During Power Manager Activation Events**

	Count	Percent (N=10)
Adjusted thermostat settings	2	20.0%
Did not adjust thermostat settings	8	80.0%
Turned on fans	2	20.0%
Already had fans running	2	20.0%
Did not turn on fans	6	60.0%
Other actions: wore less clothing	1	10.0%
Other actions: closed blinds / shades	1	10.0%
Other actions: nothing (continued normal activities)	8	80.0%

### Reasons for the Power Manager Program and Activation Events

TecMarket Works asked 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 24. About two-thirds of participants surveyed (69.6% or 48 out of 69) mentioned peak energy demand, while high outdoor temperatures were mentioned by 26.1% (18 out of 69), and 13.0% (9 out of 69) mentioned that it was a time of day when fewer people are at home. Only one surveyed participant (1.4% of 69) could not give a reason ("don't know").

**Table 24. Perceived Reasons for Power Manager Activations**

<i>Why do you think Duke Energy activates your Power Manager device on summertime weekdays during the afternoon as opposed to other times of the year?</i>	Count	Percent (N=69)
Peak demand	48	69.6%
Hottest time of day	18	26.1%
Fewer people are home	9	13.0%
To avoid outages / brown-outs	1	1.4%
AC is only used during the summer	2	2.9%
Unique responses (listed below)	5	7.2%
Don't know	1	1.4%

*Note: Multiple responses were allowed per participant.*

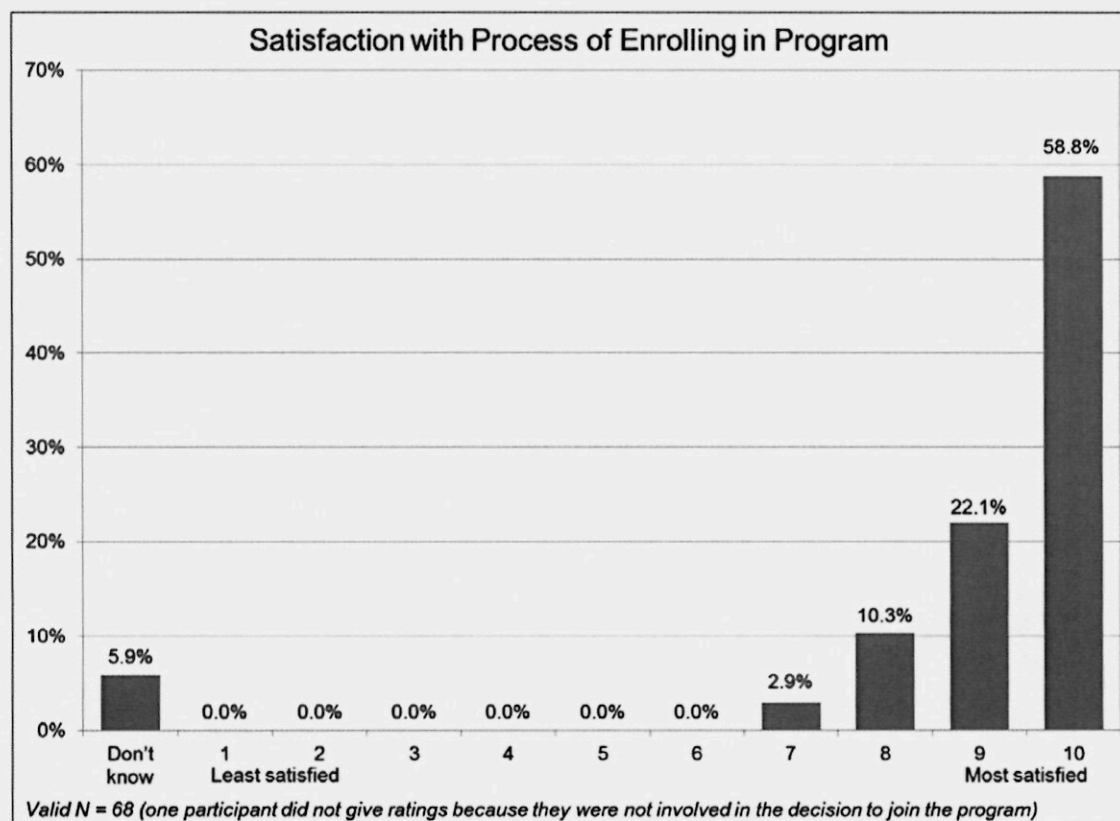
Five participants (7.2% of 69) gave unique reasons why Power Manager activation events occur when they do. These reasons are listed below.

- *Activating the device on weekends could be inconvenient for customers that have visiting guests, etc.*

- *Duke activates the device on summertime afternoons because that's what the program contract stipulates.*
- *During those times, residential energy demand is less than that of businesses.*
- *I would assume that's the best time for energy savings.*
- *Because it's hottest at that point of the day and year.*

## Program Satisfaction

Respondents indicate a high level of satisfaction with the enrollment process of the Power Manager program, as shown in Figure 8. Among survey participants who were involved in the decision to enroll in the program, the mean satisfaction score with the enrollment process is 9.45 on a 10-point scale where “10” means very satisfied. Most participants gave the highest possible “10 out of 10” score for their satisfaction with the enrollment process (58.8% or 40 out of 68 who enrolled in the program themselves). Only two of the surveyed participants (2.9% of 68) gave the enrollment process a rating of “7” on a 10-point scale, and none rated the program at “6” or lower.

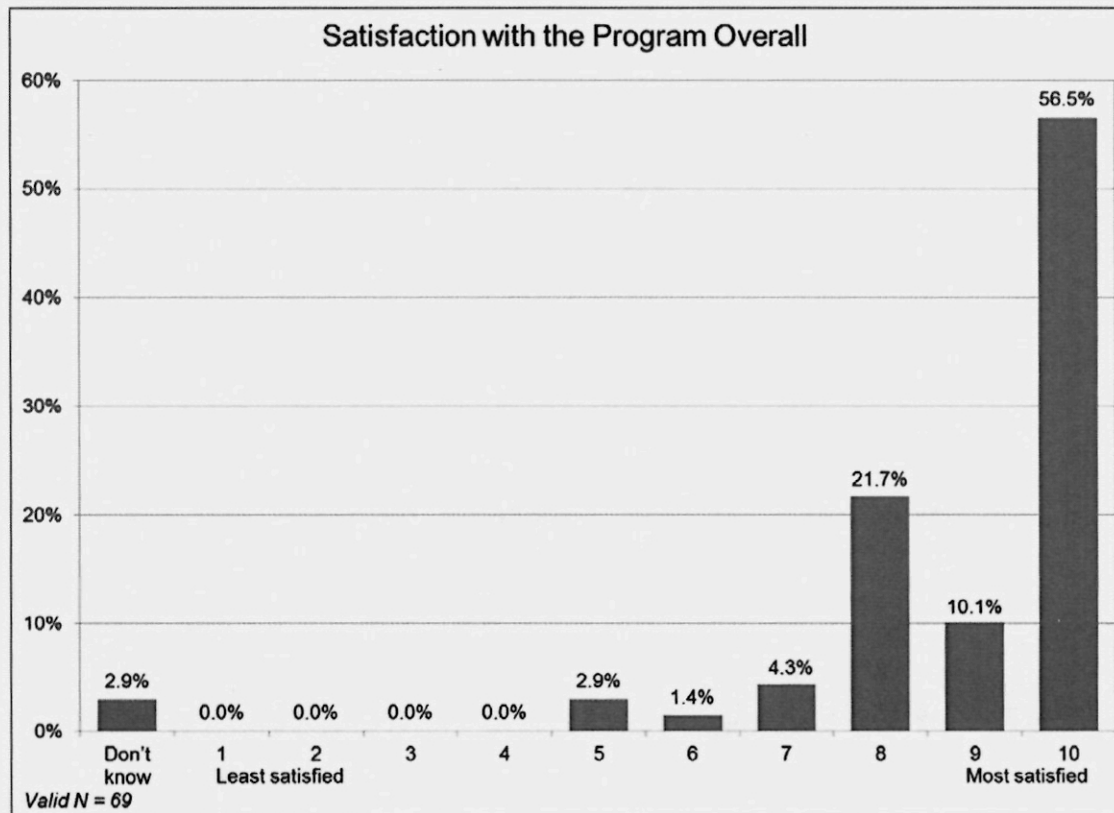


**Figure 8. Satisfaction with Power Manager's Enrollment Process**

Two participants in Ohio (2.9% of 68) rated their satisfaction with the enrollment process at “7” or less on a 10-point scale where “10” means highest satisfaction. These participants were asked why they were less than satisfied with the enrollment process; these responses are listed below.

- *They had to come out a couple different times to replace the device.*
- *Actually, I am very satisfied.*

Participants were also asked to give a satisfaction rating for the Power Manager program overall; the distribution of responses is shown in Figure 9.<sup>10</sup> The mean rating is 9.10 on a 10-point scale, with more than half of participants (56.5% or 39 out of 69) rating the program a “10 out of 10” overall, and only 8.7 % (6 out of 69) give the program a rating of “7” or less.



**Figure 9. Overall Satisfaction with the Power Manager Program**

The six respondents who rated their satisfaction with the program overall at “7” or lower were asked to give reasons for their low scores. These responses are listed below.

- *The bill credits are not large enough. I'm disappointed with the minimal savings; I thought I'd save more. I expected to see over the course of the summer at least another \$10 in savings, I think I've saved less than \$2 this year.*
- *The bill credits are not large enough. I would have not chosen to participate in the program myself; the device was already installed when I moved in. I understand why*

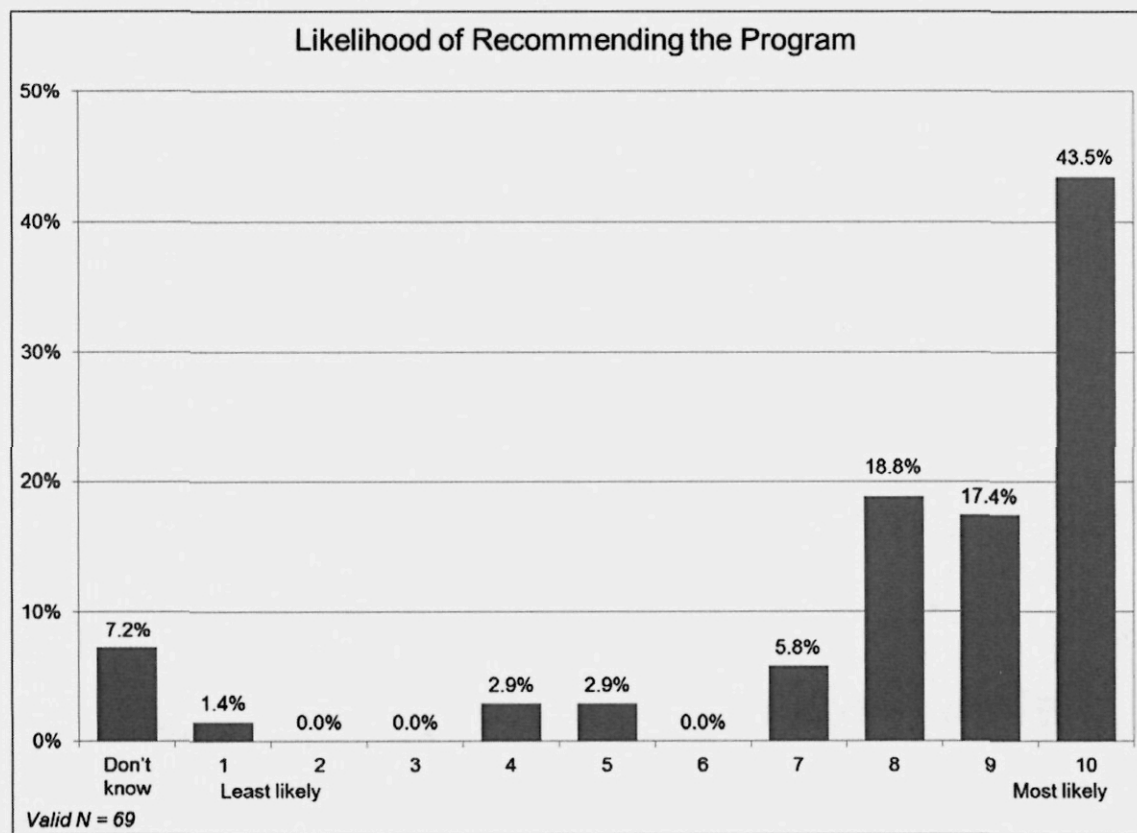
<sup>10</sup> Ohio customers in the participant survey were not asked the 5-point Likert version of the program satisfaction question, however this question was asked in the event survey. See *Respondent Satisfaction and Willingness to Recommend the Program* on page 88.



*the program is important and helps others, but I don't really get any immediate benefits from participating.*

- *The bill credits are not large enough. I thought the AC was turning on and off too often.*
- *I didn't receive the initial incentive payment.*
- *I need more information about the program.*
- *I'm neutral because I don't really know what it is doing for me.*

Participants were also asked to rate the likelihood that they would recommend Power Manager to others on a 10-point scale; this distribution is shown in Figure 10. The mean rating given by respondents is 8.73, with 43.5% (30 out of 69) giving "10 out of 10" scores and only 13.0% (9 out of 69) rating their likelihood of recommending the program at "7" or lower.



**Figure 10. Recommending the Power Manager Program to Others**

The nine respondents who gave ratings of "7" or lower for their likelihood of recommending the program were asked to give a reason for their low scores. Their responses are listed below.

- *I would recommend the program, but I wouldn't go out of my way to do so.*

- *I don't really think about it. If someone were to mention it, I'd talk about it. I wouldn't go out of my way to talk about it. I would suggest that they have some kind of incentive if they want us to do this, like mention it to five friends and get \$10.*
- *I thought that the program would save us more money on our bills, but it's really only a dollar or two once in a while.*
- *Ultimately, I find the financial benefit is minimal. Besides the low amount of savings I have no complaints on how the rest of the program operates.*
- *I understand the need for the program; it's just not something I find beneficial for myself or on the entire demand for power.*
- *I'm neutral because I don't really know what it's doing for me.*
- *I would need more information about the program before I could heartily recommend it to anyone.*
- *I don't know anything about the program and I don't remember signing up for it.*
- *I don't know anything about the program. I forgot that I was signed up for it.*

### Awareness of Other Duke Energy Programs

TecMarket Works asked participants if they were aware of any other Duke Energy programs. A majority of participants (65.2% or 45 out of 69) were able to name at least one program, with the most-mentioned Duke Energy programs being the CFL program (34.8% or 24 out of 69) followed by Home Energy House Call (27.5% or 19 out of 69) and My Home Energy Report (17.4% or 12 out of 69). All of the other Duke Energy programs were mentioned by fewer than 10% of participants surveyed.

**Table 25. Awareness of Other Duke Energy Programs**

<i>What other Duke Energy programs or services have you heard of that help customers save energy?</i>	<b>Count</b>	<b>Percent (N=80)</b>
CFL Program	24	34.8%
Home Energy House Call	19	27.5%
My Home Energy Report	12	17.4%
Winter heating assistance	3	4.3%
Appliance Recycling	3	4.3%
Personalized Energy Report	2	2.9%
Low Income Weatherization / Low Income Programs	2	2.9%
Energy Star Homes	0	0.0%
Smart \$aver (other than CFL)	0	0.0%
Unique responses (listed below)	2	2.9%
Don't know / none	24	34.8%

*Note: Multiple responses were allowed per participant.*

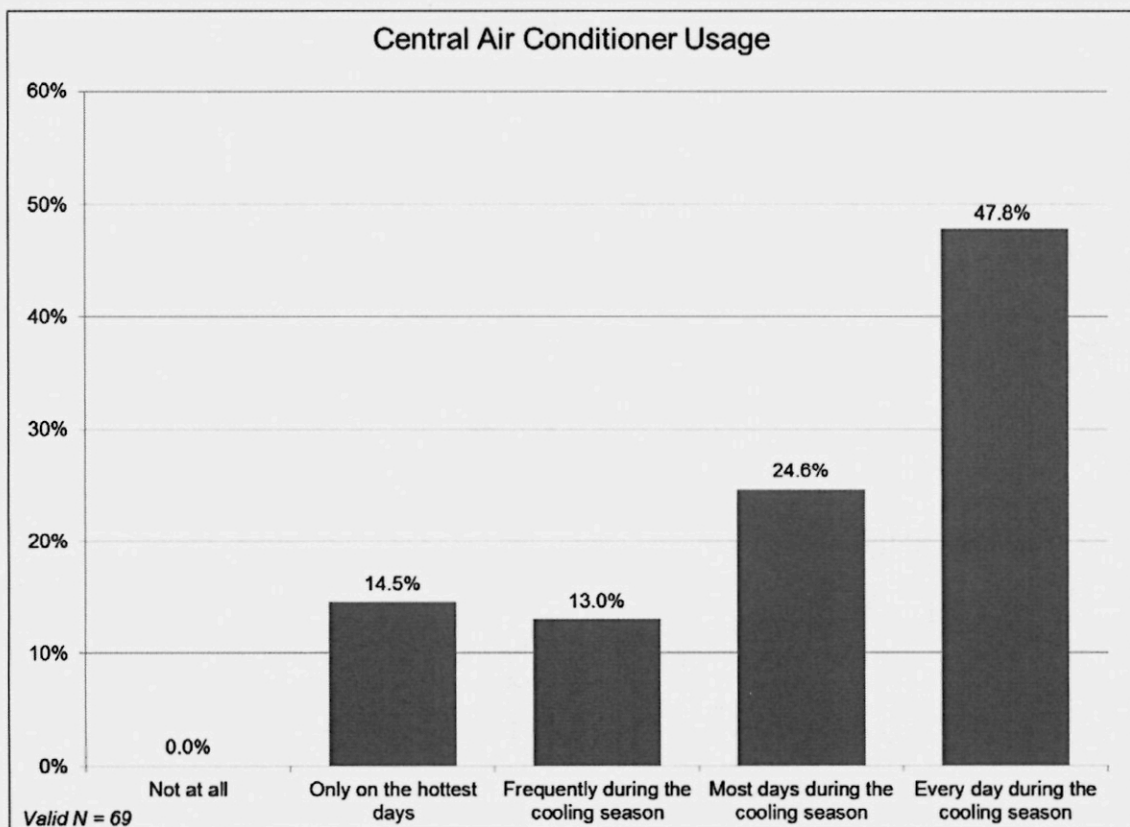
Two respondents gave unique responses to this question, which are listed below.

- *Choose Your Rate, but I don't suppose that's really to save energy.*

- *Duke's selecting an energy supplier mailing.*

## Air Conditioner Usage

The Power Manager program in Ohio is successfully enrolling participants that routinely use their air conditioners throughout the cooling season, and are therefore likely to be affected by Power Manager activation events. A plurality of Ohio participants surveyed (47.8% or 33 out of 69) have their AC on “every day” during the cooling season, and only 27.5% (19 out of 69) have their AC on “only on the hottest days” or merely “frequently” (as opposed to “most days” or “every day”). None of the participants surveyed in Ohio indicated that they “never” use their air conditioner.

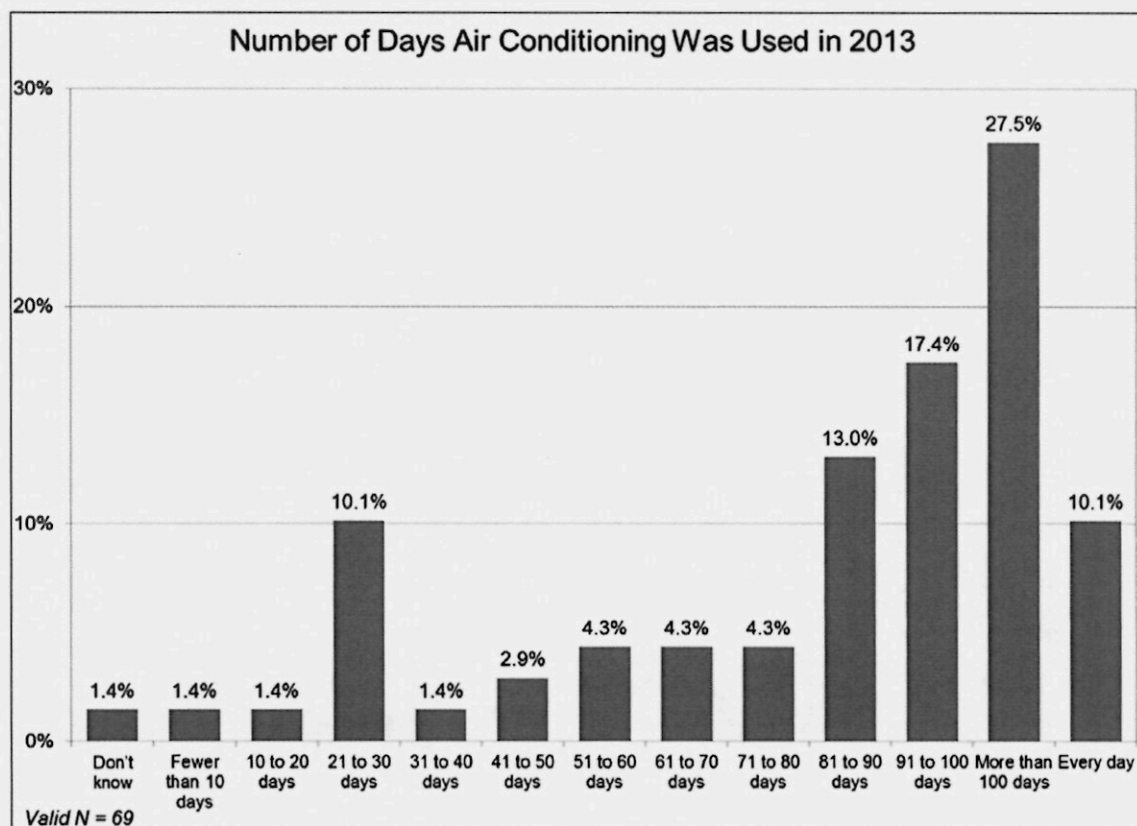


**Figure 11. Air Conditioner Use of Power Manager Participants**

Participants were also asked to estimate how many days they had used their central air conditioning during 2013<sup>11</sup>; these results are presented in Figure 12. More than a third of participants surveyed used their AC “more than 100 days” or “every day” (37.7% or 26 out of 69). Another 30.4% of participants (20 out of 69) said they used their AC from 81 up to 100 days per year, and 30.4% (20 out of 69) said they use their units on 80 or fewer days per year.

<sup>11</sup> These survey interviews were completed in October after the end of the cooling season.





**Figure 12. Estimated Number of Days Air Conditioning Was Used During 2013**

Most surveyed participants have had their air conditioner serviced since joining the Power Manager program (65.2% or 45 out of 69).

**Table 26. Air Conditioner Maintenance**

<i>Have you had your air conditioner tuned-up or serviced since you enrolled in the Power Manager program?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	45	65.2%
No	23	33.3%
Don't know	1	1.4%

The vast majority of participants who had their air conditioners serviced hired a professional AC contractor or electrician (86.7% or 39 out of 45); four participants did it themselves or had their spouse do it (8.9% of 45), and one participant (2.2% of 45) said that Duke Energy did the service work.

**Table 27. Air Conditioner Maintenance – Service Provider**

<i>Who serviced your air conditioner?</i>	<b>Count</b>	<b>Percent</b> (N=45 participants who had AC serviced)
HVAC contractor or electrician	39	86.7%
Friend or family member who is an HVAC contractor	1	2.2%
Did it myself / my spouse did it	4	8.9%
Duke Energy	1	2.2%
Don't know	0	0.0%

More than a third of the respondents who had their air conditioning systems serviced reported that the performance improved (37.8% or 17 out of 45), while more than a quarter (26.7% or 12 out of 45) said it did not improve, and another 35.6% (16 out of 45) “don’t know” if it improved or not.

**Table 28. Air Conditioner Maintenance – Performance Improvement**

<i>Did the performance of your air conditioner improve after you had it serviced?</i>	<b>Count</b>	<b>Percent</b> (N=45 participants who had AC serviced)
Yes	17	37.8%
No	12	26.7%
Don't know	16	35.6%

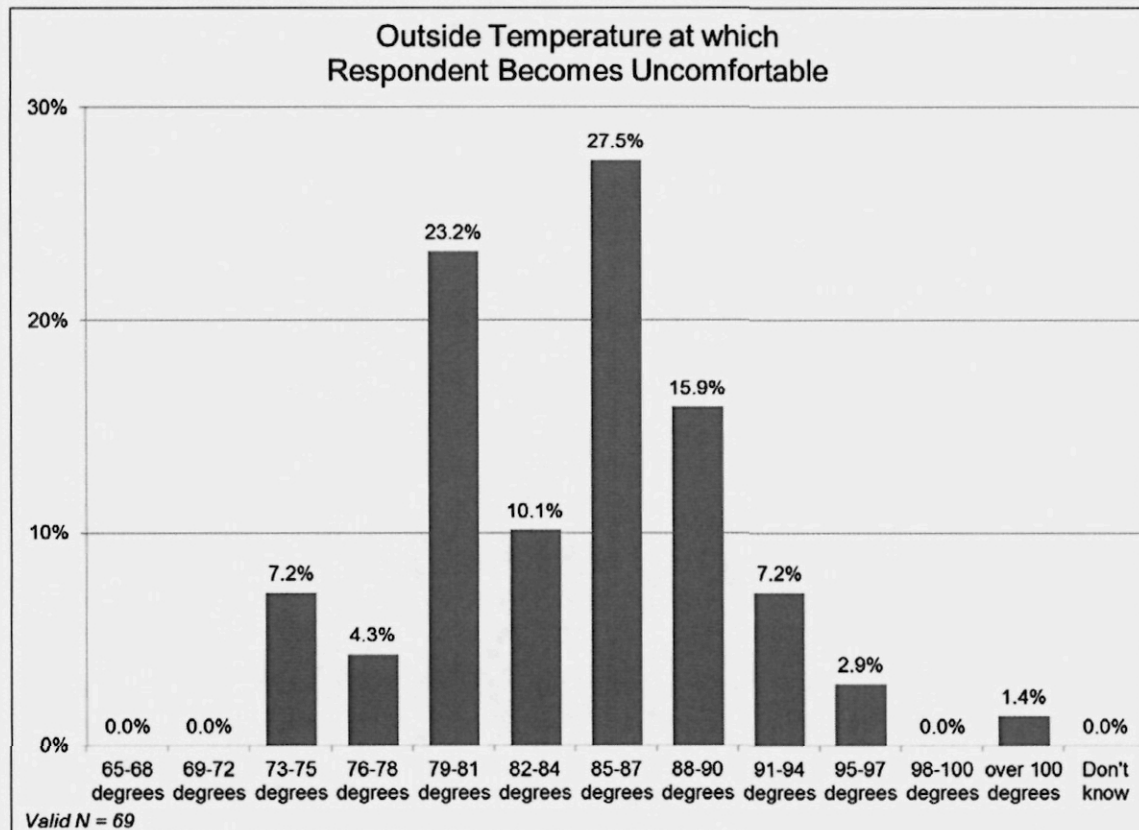
A majority of participants surveyed report that there is typically someone at home using the AC on summer weekday afternoons before 5 p.m. (65.2% or 45 out of 69), and virtually all participants report that someone is typically at home using the AC on summer weekdays after 5 p.m. (95.7% or 66 out of 69).

**Table 29. Typical Air Conditioner Usage on Summer Weekdays**

<i>Is the air conditioning typically used to keep someone at home comfortable during . . . ?</i>	<b>Count</b>	<b>Percent</b> (N=69)
Weekday summer afternoons before 5 p.m.	45	65.2%
Summer weekdays after 5 p.m.	66	95.7%

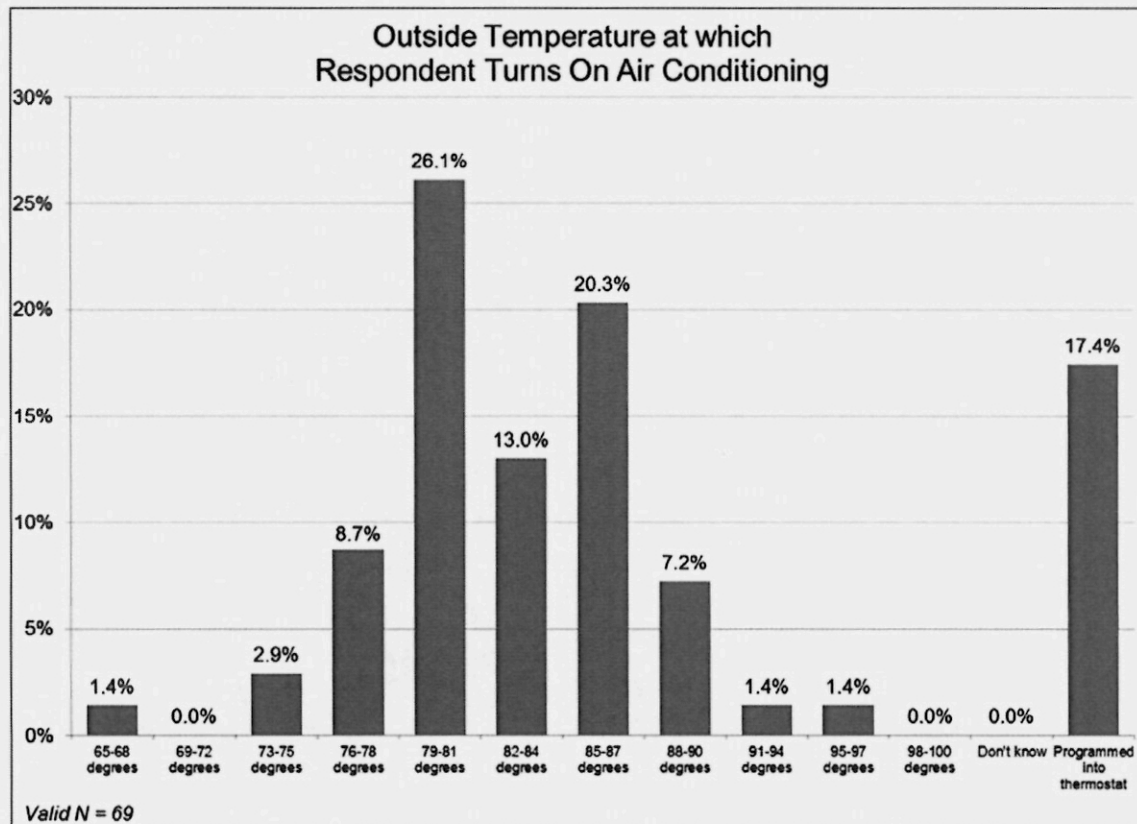
## Outside Temperatures and Thermostat Settings

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, and a vast majority of participants surveyed (76.8% or 53 out of 69) said they become uncomfortable when the temperature is between 79°F and 90°F. Another 11.6% (8 out of 69) become uncomfortable at temperatures between 73°F and 78°F, and 11.6% (8 out of 69) become uncomfortable only when the temperature reaches 91°F or above.



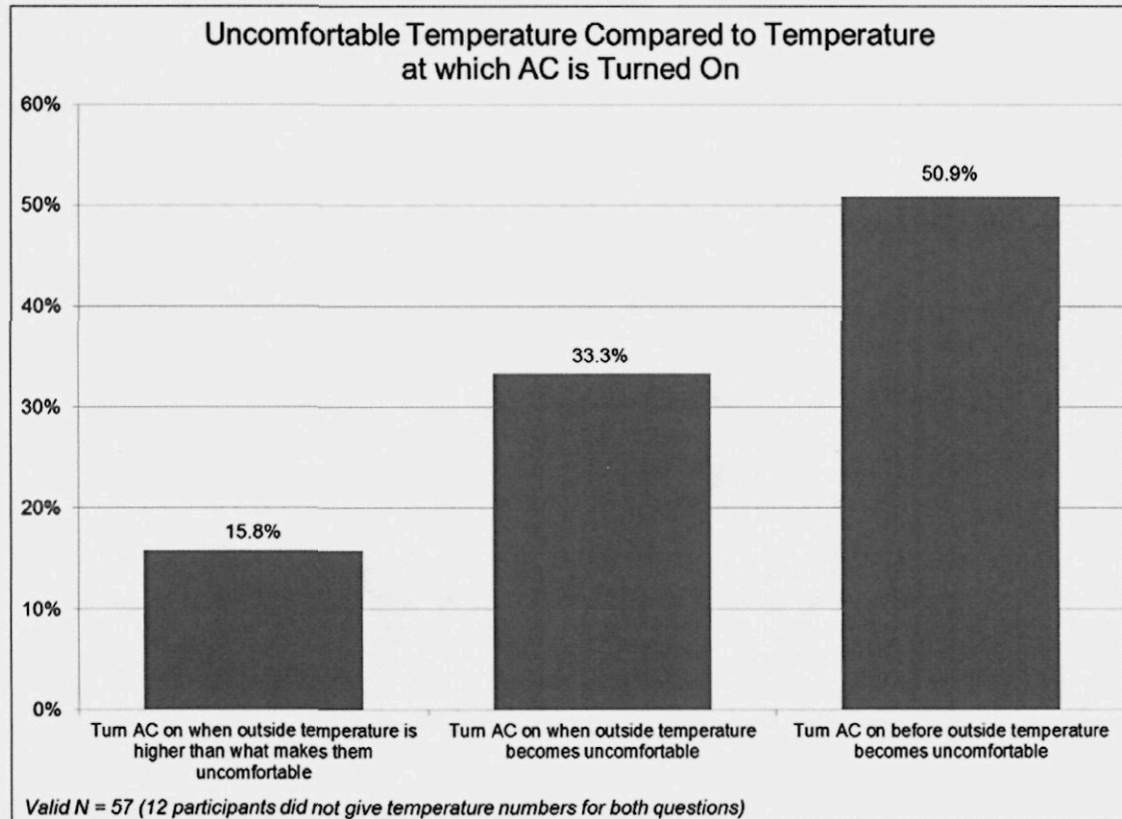
**Figure 13. Outside Temperatures at Which Participants Feel Uncomfortably Warm**

TecMarket Works next asked 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 82-84°F (one range lower than their discomfort level), with 59.4% of participants (41 out of 69) turning their AC on when the temperature is between 79°F and 87°F. Only 13.0% (9 out of 69) turn their AC units when the outdoor temperature is 78°F or lower, and only 10.1% (7 out of 69) wait until the temperature is 88°F or higher. Another 17.4% of participants (12 out of 69) did not give a number, instead saying “it is programmed into the thermostat”. The distribution of responses is presented in Figure 14.



**Figure 14. Outside Temperatures at which Participants Turn On Their Air Conditioners**

Comparing the two temperature points from Figure 13 (discomfort) and Figure 14 (when participants turn on their air conditioners) yields Figure 15, which indicates that about half of the surveyed participants in Ohio (50.9% or 29 out of 57) turn on their air conditioners *before* the temperature becomes uncomfortable. A third (33.3% or 19 out of 57) turn it on when the temperature becomes uncomfortable, and only about one participant in six (15.8% or 9 out of 57) waits until the temperature is higher than the level at which they begin to feel uncomfortable.



**Figure 15. Turning On Air Conditioners When Temperatures Reach an Uncomfortable Level**

Twelve participants (17.4% of 69) did not give a specific temperature at which they turn on their air conditioning because “it is programmed into the thermostat.” These respondents were asked a follow-up question about how they program their thermostats, the results of which are shown in Table 30.

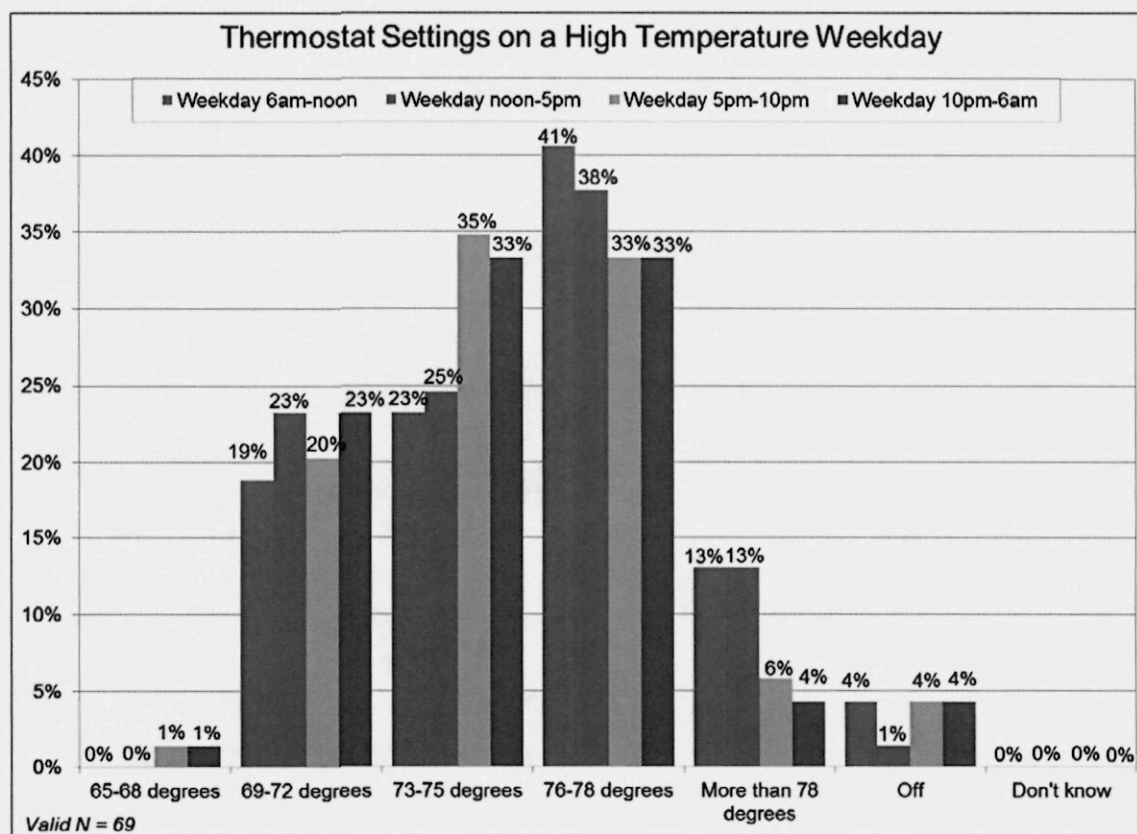
**Table 30. Programmable Thermostats**

<i>Do you set your thermostat seasonally or when the weather gets hot?</i>	<b>Count</b>	<b>Percent</b> (N=12 participants who program thermostats)
When the weather gets hot	7	58.3%
I program the thermostat seasonally	4	33.3%
Unique: “I never have to touch it: If it goes below 68 the heat comes on, and if it goes above 74 the cooling comes on.”	1	8.3%

## Thermostat Settings

Figure 16 shows participants’ thermostat settings on high temperature weekdays at four time periods throughout the day (6 a.m.-12 p.m., 12 p.m.-5 p.m., 5 p.m.-10 p.m., and 10 p.m.-6 a.m.).

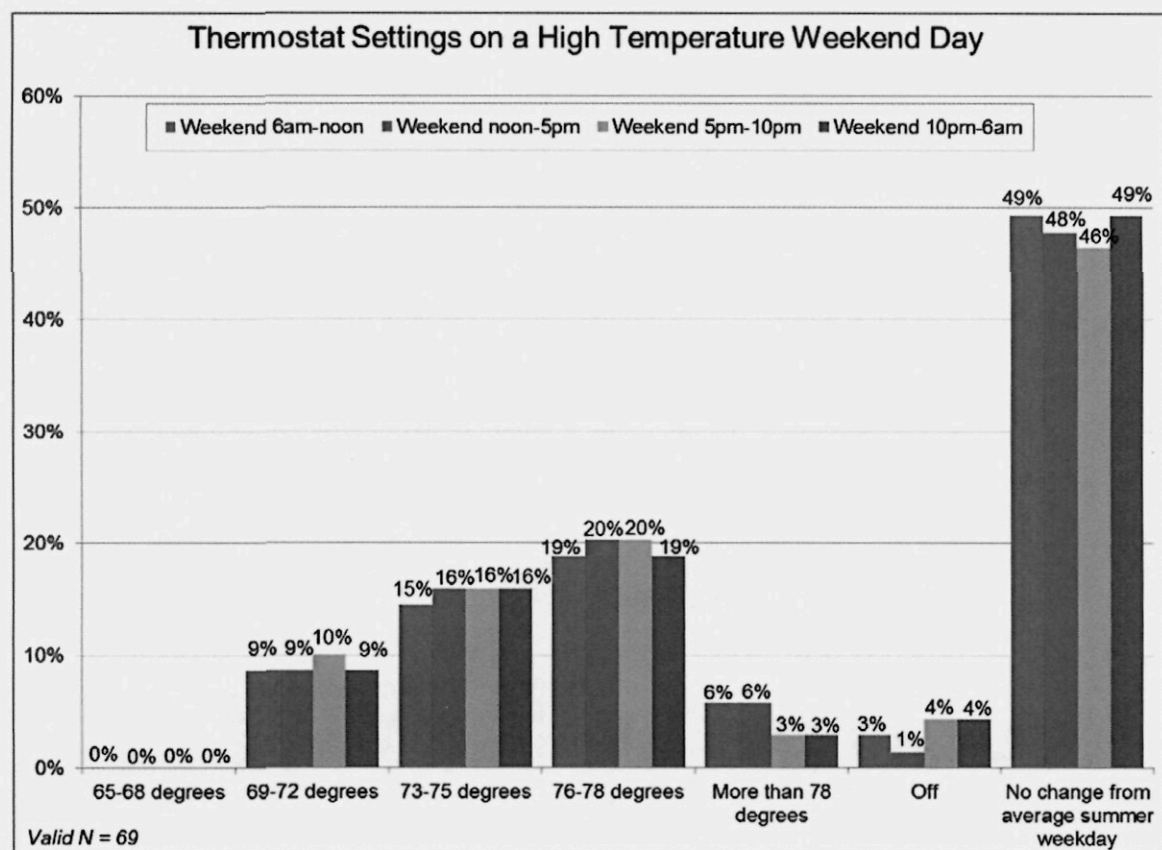
Between 6 a.m. and 5 p.m., a plurality of participants set their thermostats to 76-78°F (40.6% or 38 out of 69 during 6 a.m.-noon and 37.7% or 26 out of 69 during noon-5 p.m.), which is significantly higher than the percentage of participants who set their thermostats at 73-75°F during these hours ( $p < .05$  using student's t-test). Participants are also more likely to set their thermostats higher than 78 degrees during these hours than in the evening or overnight (13.0% or 9 out of 69 set their thermostats that high during 6 a.m.-noon and noon-5 p.m., compared to 5.8% or 4 out of 69 during the hours of 5 p.m.-10 p.m., and 4.3% or 3 out of 69 during the hours of 10 a.m.-6 a.m. (differences significant at  $p < .10$  or better using student's t-test). However in the evenings and overnight (5 p.m.-10 p.m. and 10 p.m.-6 a.m.), about equal percentages of 33% to 35% of participants set their thermostats at 76-78°F and 73-75°F (not statistically different between these two settings during these time periods).



**Figure 16. Thermostat Settings on a High Temperature Weekday**

Figure 17 shows participants' thermostat settings on a typical weekend day during the same four time periods. About half of participants surveyed (46% to 49% depending on time of day) set their thermostats the same on weekends as they do on weekdays. There are no statistically significant differences between weekend thermostat settings by time of day.





**Figure 17. Thermostat Settings on a High Temperature Weekend Day**

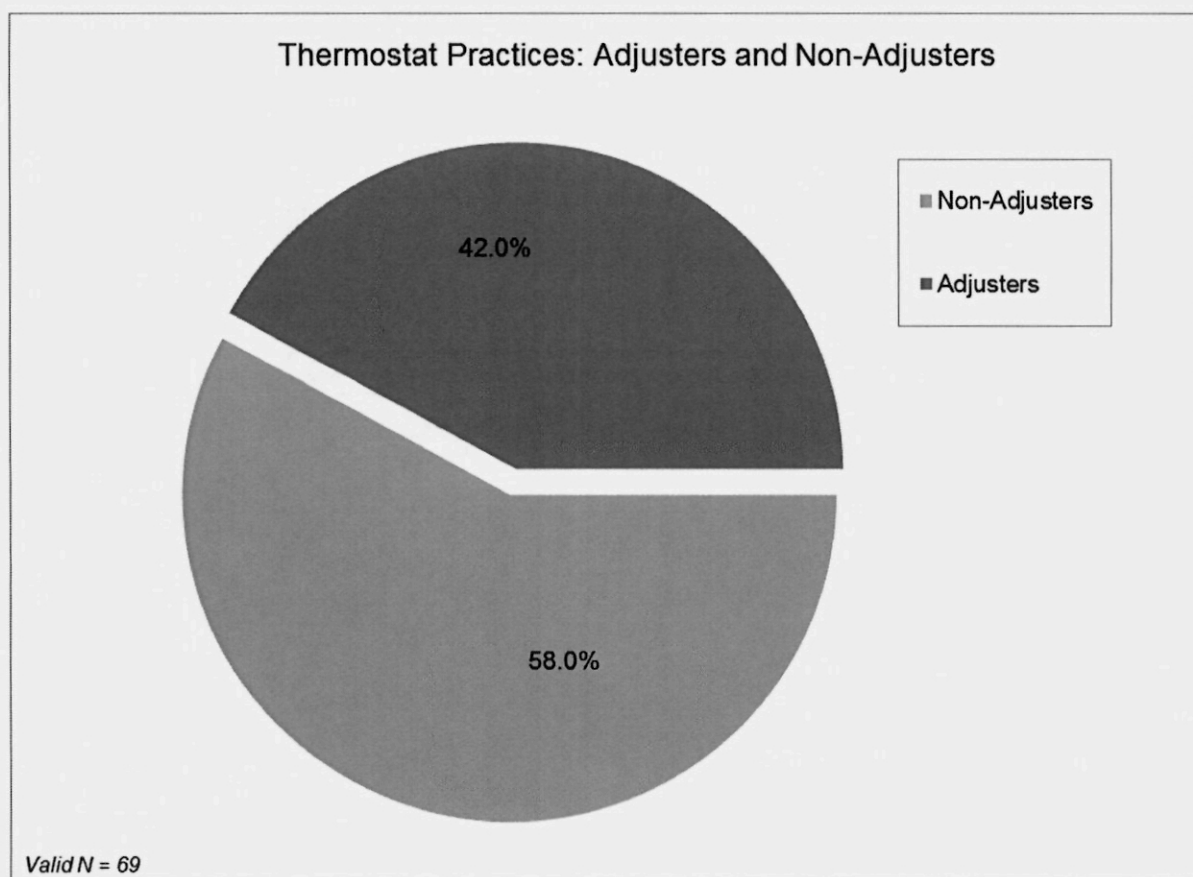
The vast majority of Power Manager participants surveyed (from 86% to 91% depending on the time of day) leave their settings the same throughout the week, from weekdays to weekends, as seen in Table 31. However, 11.6% of participants (8 out of 69) set their thermostats lower on weekends between 6 a.m. and noon and 8.7% (6 out of 69) set them lower on weekends between noon and 5 p.m., which is significantly higher than the 2.9% (2 out of 69) who set their thermostats lower on weekends between 5 p.m.-10 p.m. and 10 p.m.-6 a.m. ( $p < .10$  or better using student's t-test).

It is also true that surveyed participants are more likely to turn their ACs to lower temperatures on weekends between 6 a.m.-noon and noon-5 p.m. than they are to turn their ACs to higher temperatures during these times ( $p < .05$  using student's t-test), however during the 5 p.m.-10 p.m. and 10 p.m.-6 a.m. time periods, there is no statistically significant difference between the percentage of customers who set their ACs to higher temperatures versus those who set lower temperatures.

**Table 31. Changes in Thermostat Settings of Power Manager Participants by Days of Week**

Time period (N=69 for each)	Same on weekdays and weekends	Lower AC temperature on weekends	Higher AC temperature on weekends
6 a.m.-12 p.m.	85.5%	11.6%	2.9%
12 p.m.-5 p.m.	89.9%	8.7%	1.4%
5 p.m.-10 p.m.	91.3%	2.9%	5.8%
10 p.m.-6 a.m.	91.3%	2.9%	5.8%

TecMarket Works divided Power Manager participants into two groups: 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 their temperature settings (“Adjusters”). Figure 18 below shows that 42.0% (29 out of 69) Power Manager surveyed participants are Adjusters.

**Figure 18. Thermostat Practices of Power Manager Participants**

The outside temperature points at which Adjusters and Non-Adjusters say they become uncomfortable and turn on their air conditioners are shown in Table 32.



Both Adjusters and Non-Adjusters tend to become uncomfortable when the outside temperature reaches 85-87°F (as measured by the group medians). However, Adjusters tend to turn their air conditioners on when the outside temperature reaches 84-85°F while Non-Adjusters turn their units on sooner when the temperature is only 79-81°F. In addition, while Non-Adjusters leave their thermostats set at 73-75°F throughout the week, Adjusters usually have their thermostats set slightly higher (median 76-78°F) during weekdays from 6 a.m. to noon and from noon to 5 p.m., though they tend to turn the thermostats a little lower in the evening and at night (median 73-75°F during weekdays 5 p.m.-10 p.m. and 10 p.m.-6 a.m., the same as Non-Adjusters).

**Table 32. Temperature Points for Non-Adjusters and Adjusters**

<b>Non-Adjusters (N=40)</b>	
Median temperature range of discomfort	85-87°
Median temperature to turn AC on	79-81°
Median temperature thermostat setting (constant throughout day and week)	73-75°
<b>Adjusters (N=29)</b>	
Median temperature range of discomfort	85-87°
Median temperature to turn AC on	84-85° <sup>12</sup>
Median temperature thermostat setting weekdays 6 a.m.-noon	76-78°
Median temperature thermostat setting weekdays noon-5 p.m.	76-78°
Median temperature thermostat setting weekdays 5 p.m.-10 p.m.	73-75°
Median temperature thermostat setting weekdays 10 p.m.-6 a.m.	73-75°

Table 33 further illustrates that Adjusters are more likely to set their thermostats higher than Non-Adjusters (i.e., they use their air conditioning less): For every weekday time period, a higher percentage of Adjusters have set their thermostats to “78°F or higher” (the highest temperature category) or turned their AC units off. Between roughly a tenth (10.3% or 3 out of 29) and a third (31.0% or 9 out of 29) of Adjusters have their thermostats set high or AC units turned off at any given time during a weekday, compared to just 7.5% (3 out of 40) of Non-Adjusters (consistent throughout the day since by definition these participants do not change their thermostat settings). Differences between Adjusters and Non-Adjusters are significant at  $p < .05$  using student’s t-test for the 6 a.m.-noon and noon-5 p.m. time periods, but the differences between these groups are not statistically significant for 5 p.m.-10 p.m. or 10 p.m.-6 a.m. In other words, Adjusters are use significantly less cooling during weekdays 6 a.m.-5 p.m., which is the time of day participants are less likely to be at home.

<sup>12</sup> The median reported as “84-85” is in between the response categories “82-84” and “85-87”.

**Table 33. Incidence of High Weekday Thermostat Settings by Adjusters and Non-Adjusters**

<i>Percent of participants who set thermostat to 78+ or turn off AC during time period on a hot summer day</i>	<b>Adjusters (N=29)</b>	<b>Non-Adjusters (N=40)</b>
Weekday 6 a.m.-12 p.m.	31.0%	7.5%
Weekday 12 p.m.-5 p.m.	24.1%	7.5%
Weekday 5 p.m.-10 p.m.	13.8%	7.5%
Weekday 10 p.m.-6 a.m.	10.3%	7.5%

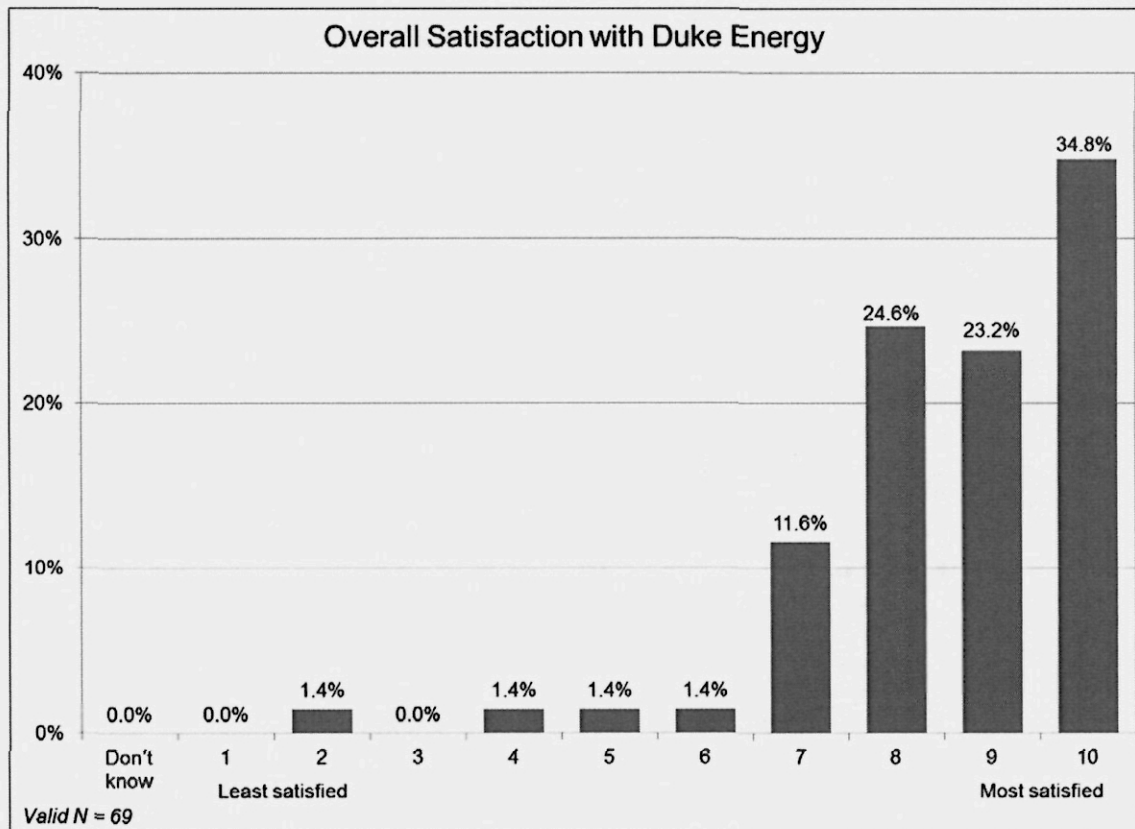
Table 34 further illustrates that Non-Adjusters use their air conditioners more than Adjusters: While half of Adjuster households (51.7% or 15 out of 29) report using the AC to keep someone comfortable in the home on weekdays before 5 p.m., fully three-quarters of Non-Adjusters (75.0% or 30 out of 40) report using the AC to keep comfortable on weekdays before 5 p.m. (this difference is statistically significant at  $p < .05$  using student's t-test). After 5 p.m. on weekdays, Non-Adjusters are also slightly more likely to use AC to keep comfortable in the home (97.5% or 39 out of 40, compared to 93.1% or 27 out of 29 Non-Adjusters), though this difference is not statistically significant.

**Table 34. AC Usage to Keep Someone Comfortable At Home on Weekdays for Adjusters and Non-Adjusters**

<i>Is the AC typically used to keep someone at home comfortable during...</i>	<b>Adjusters (N=29)</b>	<b>Non-Adjusters (N=40)</b>
Weekday summer afternoons before 5 p.m.	51.7%	75.0%
Summer weekdays after 5 p.m.	93.1%	97.5%

### Satisfaction with Duke Energy

Overall satisfaction with Duke Energy among these customers is quite high. Participants in Ohio report an overall average satisfaction score of 8.59 on a 10-point scale where "10" means very satisfied. The distribution of responses is presented in Figure 19; only twelve participants (17.4% of 69) rated their satisfaction with Duke Energy at a "7" or lower, while a plurality of 34.8% (24 out of 69) gave the highest possible "10 out of 10" ratings.



**Figure 19. Overall Satisfaction with Duke Energy**

Participants that gave a satisfaction score of “7” or lower were asked why they were less than satisfied with Duke Energy. Their responses are categorized and listed below.

**Rates and Billing (N=7):**

- *I think their costs are a little higher on their energy than they should be.*
- *Duke's energy rates are too high and they're planning yet another increase in January.*
- *The Duke Energy rates are too high.*
- *The overall cost of rates is ridiculous. I'm not satisfied with the requirement of paying a fee to pay my bill over the phone. Also, Duke is kind of vulture-like about shutting off your power. They did not even ring the doorbell to give notice that they were shutting the power off. The technician they send out to shut people's power off should have the courtesy to ring the doorbell and perhaps give the person a last chance or option to pay the overdue bill.*
- *Duke is a monopoly, but I'd like to be able to compare prices and policies with other power companies. Duke always has good services and I rarely lose power, but I would feel better about them as my power company if I had other choices.*

- *The customer service and power supply is fine, but Duke Energy is a monopoly. For almost all of our other services we can shop around, but there is only one provider of electricity in the area.*
- *I'm neutral, but I do pay them a fairly large amount of money every month. I don't think they're bad.*

**Other (N=5):**

- *The service that we had previously with another company was better at reacting to emergency situations. Duke Energy takes longer for repairs and is not as accessible.*
- *We experience infrequent power outages which tend to last six hours. Duke could repair them more quickly.*
- *Duke could improve customer service by following up and fixing problems that arise.*
- *I suggest no major changes, except using other resources besides coal. Here in West Cincinnati, there's prime opportunity for wind energy options where the wind comes over the river.*
- *I don't know.*

### Interest in Other Potential Energy Efficiency Programs

TecMarket Works asked Power Manager participants if they would be interested in a similar program for electric water heaters or other devices. As seen in Table 35, most participants (72.5% or 50 of 69) expressed interest in such a program. All of the eleven participants who were not interested said it was because their water heaters do not run on electricity (15.9% or 11 of 69), and none (0% of 69) mentioned the possibility of running out of hot water. Another eight participants (11.6% of 69) were not sure; when asked why they were unsure, most of these participants said they would need more specific information about the program before expressing an interest.

**Table 35. Interest in Programs to Cycle Water Heaters or Other Equipment**

<i>If Duke Energy were to offer a program that cycles other equipment at your home such as an electric water heater, would you be interested in participating?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	50	72.5%
No (our water heater does not run on electricity)	11	15.9%
No (don't want to run out of hot water)	0	0.0%
Don't know	8	11.6%

Participants were next asked if they had any suggestions for other programs or services Duke Energy could offer their customers. Twenty-eight participants (40.6% of 69) offered further suggestions.

**Table 36. Other Programs or Services Duke Energy Should Provide**

<i>Are there any programs or services that you think Duke Energy should provide to its residential customers that are currently not provided?</i>	<b>Count</b>	<b>Percent (N=69)</b>
Yes	28	40.6%
No	32	46.4%
Don't know	9	13.0%

The verbatim suggestions of the 28 respondents who suggested additional programs and services Duke Energy might offer are categorized and listed below.

**Power Manager-related (N=3):**

- *Duke should offer online services for the customer to be able to activate the Power Manager device on their own air conditioner. I think we should be able to control it, like if we are going to be out of town, or adjust according to our lifestyle.*
- *I would suggest they have some kind of incentive to sharing the benefits of the Power Manager program, like mention it to five friends and get \$10. Also, I seldom if ever see any defense against competitors' advertising. They should have literature that helps us understand that Duke Energy is competitive as well, that going with this or that company for services is not a significant savings and this is why.*
- *Cycle refrigerators and freezers.*

**Other programs (N=13):**

- *Promote programs like the Home Energy House Call and offer customers the ability to customize a variable rate plan based on their use versus desired convenience.*
- *Rebates for electric water heaters and rebates for using and installing solar power.*
- *Duke Energy should offer a rebate program for the customers who choose to install an energy efficient on-demand tankless hot water heating system. This program would encourage customers to choose an energy efficient hot water heating system.*
- *A rebate program for older HVAC systems and appliances.*
- *A program that would help with insulating one's home.*
- *Duke could offer light bulbs at a cheaper cost than Walmart.*
- *Provide kilowatt meters to customers to make them more aware of their energy usage.*
- *They should offer some of the discount programs for fuel. They should be able to offer fuel at a lower rate and yield more profit, as well. I don't know if they offer credits for replacing windows, but they should.*
- *A program where I could access my thermostat remotely through a cell phone or online so I could change the temperature while I'm away from home.*



- *About five years ago there was a pilot program in the Cincinnati area that had the internet running through electric lines instead of phone lines.*
- *I'd like Duke to verify whether or not the energy lines that bring electricity into the house are capable of 'piggy backing' as internet and/or phone lines.*
- *In the Greater Cincinnati Area, we mostly have above ground power lines. In 2008, hurricanes took out many power lines and we were without power for weeks. We lost two refrigerators and one freezer's worth of food. We've talked about how nice it would be if Duke Energy offered some kind of an emergency generator hooked up to the natural gas supply, so we could continue to get service when we're without electric. It would be nice to have something to keep your refrigerators going, to have hot water, and some lights.*
- *My home has a furnace that runs on gas but nothing else in the home uses gas. I have the gas shut off in May and then have Duke come out to turn the gas back on in October or November for about \$20. I have a heat pump for cooling my home so I can use it to heat my home until it gets too cold for the heat pump. Duke charges a flat rate for gas in my area of about \$35. Even with the turn on fee I end up saving about \$200 a year. It would be great if Duke set up a program for other people like this or at least let them know that it's a possibility.*

**Green energy (N=3):**

- *I have often wondered if Duke ever thought of offering programs for solar or wind.*
- *They could offer discounted solar or wind turbines.*
- *I'd love some kind of solar program.*

**Metering (N=3):**

- *I'd like it if I could give them a code to get into my house to read the meter. You used to have to give them a key, but I have a keypad for my garage door.*
- *Offer a 'Smart Reader' system instead of having a meter reader person physically read each customer's meter. The Smart Reader allows customers to read and report and submit their own meter via an online source. The Smart Reader option would save Duke's customers money.*
- *I'd like a smart meter in my house. My neighbors have one, but my meter's down in the basement.*

**Rates, fees and billing (N=4):**

- *Allow people to sign up for monthly, reoccurring payments using their credit card without a fee. I'm currently signed up for the payments through my bank account, but I want the cash back I get through use of my credit card.*
- *I want the ability to pay my bill over the phone without a having to pay a fee; it's ridiculous to have to pay a fee to pay a bill. This fee and lack of convenience has led*

*to me not paying my bill on time. I don't have computer access at home to pay my bill, and I'm sure not all of Duke's customers have computer access at home either.*

- *Establish a senior discount.*
- *Reduced rate programs. Why, if Duke is the largest energy provider around, can I purchase my energy cheaper from smaller companies?*

**Other questions/issues (N=2):**

- *I wish they'd put gas down our street. We're probably one of the few streets in Mason who don't have gas.*
- *I am confused about phone charging. I heard if you leave it plugged in, there's a drain; is that true?*

## Event Surveys Results

TecMarket Works surveyed 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 event surveys regarding each event during a 27-hour window beginning at 5 p.m. EDT on the day that a curtailment event occurred and ending at 8 p.m. EDT the day after the curtailment event. Calling hours were 10 a.m.- 8 p.m. EDT following events occurring on July 15, July 17, July 18, September 10 and September 11, 2013. TecMarket Works surveyed a total of 80 participants in Ohio. The Event survey protocol is located in *Appendix C: Event Survey Instrument*.

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 temperature was high enough to trigger a curtailment event, but on which no curtailment event actually occurred. On and following the high temperature dates of August 27, August 30 and September 9, 2013, TecMarket Works surveyed a total of 33 participants in Ohio. The high temperature Non-Event survey is located in *Appendix D: Non-Event Survey Instrument*.

## Home Occupancy During Power Manager Activation

TecMarket Works asked Event respondents whether they were home during the actual event timeframe (typically between the hours of 1:30-6:00 p.m. EDT) and asked Non-Event survey respondents if they were home at 3 p.m. EDT on the date of the high temperature. The results in Figure 20 and Figure 21 show more than half of Event (60.0% or 48 out of 80) and Non-Event survey respondents (51.5% or 17 out of 33) were home during these times.



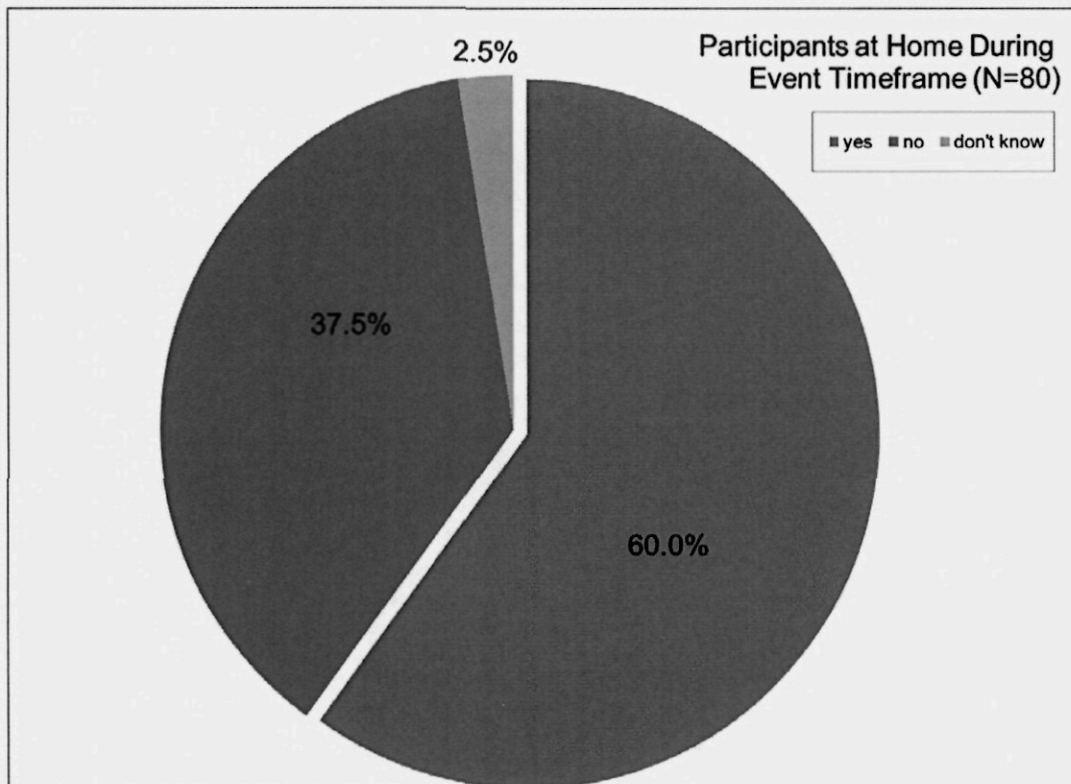


Figure 20. Event Participants at Home During Event Timeframe

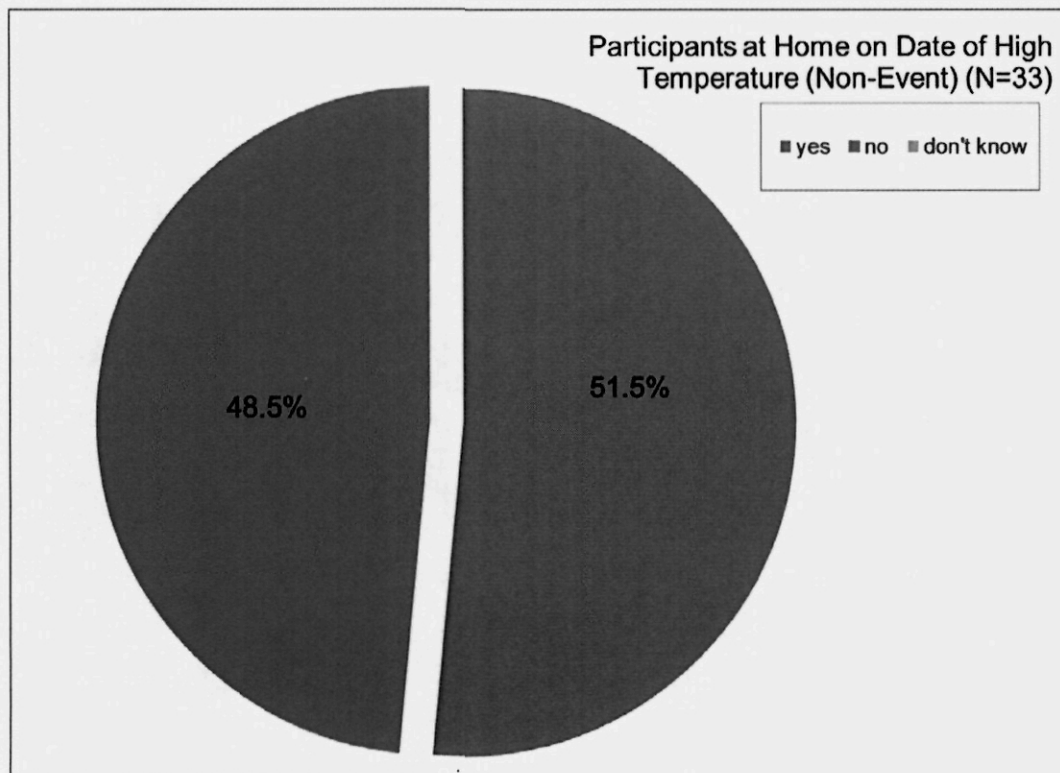
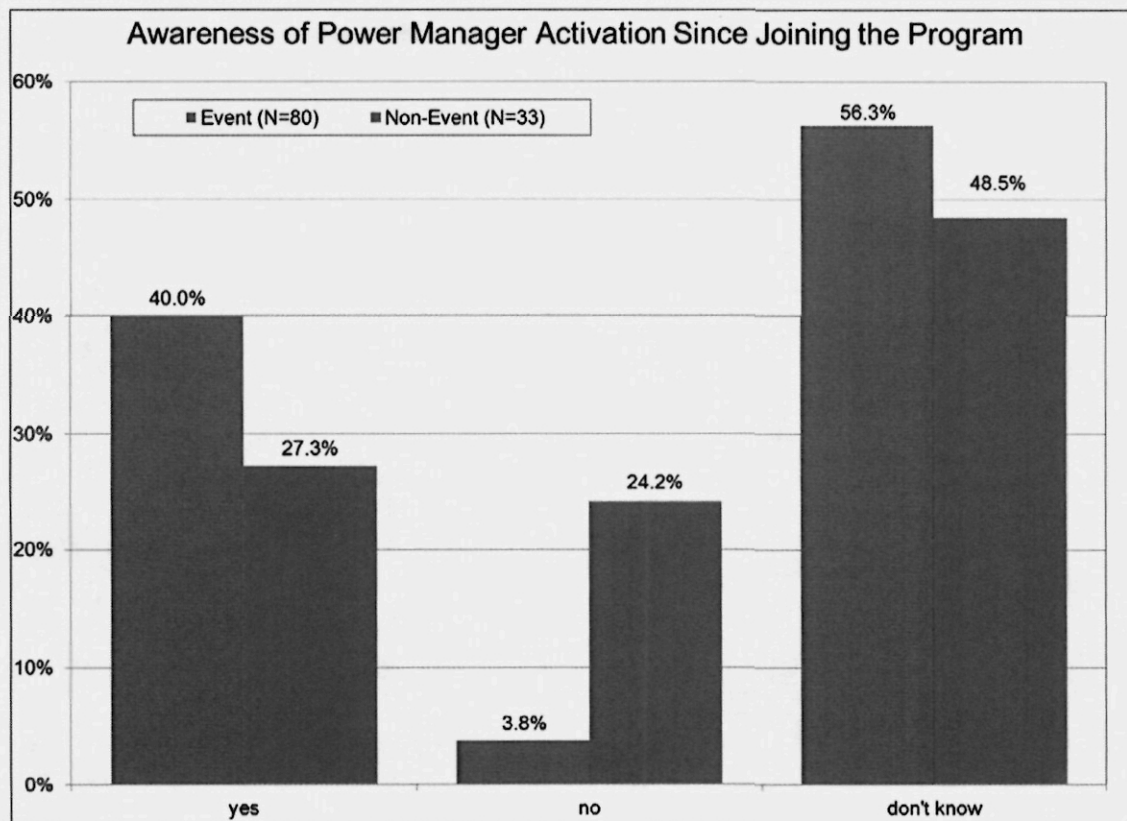


Figure 21. Non-Event Participants at Home on Date of High Temperature

## General Awareness of Device Activations

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 22 show minorities of 40.0% (32 out of 80) of Event participants and 27.3% (9 out of 33) of Non-Event participants are certain that their device has been activated since they joined the program. Larger percentages of participants (56.3% or 45 out of 80 Event participants and 48.5% or 16 out of 33 Non-Events) are not sure if the device has been activated or not (“don’t know”). These differences between Event and Non-Event participants are not statistically significant, although significantly more Non-Event participants are sure that their devices have not been activated (24.2% or 8 out of 33, versus 3.8% or 3 out of 80 Event participants; significant at  $p < .05$  using student’s t-test).



**Figure 22. 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. Nearly half of participants stated that they did not know how to tell if the Power Manager device had been activated, as seen in Table 37. For both Event and Non-Event participants, the most commonly mentioned indicators of Power Manager activation are “home temperature rises” and “air conditioning shuts down”. There are only two statistically significant differences between Event and Non-Event participants: Non-Event participants are more likely to mention “the light on the meter is on” and “lower bills” compared to Event participants, though both of these

responses were mentioned by fewer than 10% of participants (differences between groups significant at  $p < .10$  using student's t-test).

**Table 37. Reasons for Awareness of Activation**

	Event Participants (N=80)	Non-Event Participants (N=33)	Difference
Home temperature rises	17.5%	18.2%	-0.7%
AC shuts down	23.8%	15.2%	8.6%
The light on the meter is on	2.5%	9.1%	-6.6%
Bill credits	2.5%	6.1%	-3.6%
The light on the AC unit flashes	2.5%	0.0%	2.5%
Lower bills	1.3%	6.1%	-4.8%
Unique response (listed below)	10.0%	15.2%	-5.2%
Don't know	50.0%	39.4%	10.6%

*Note: Columns may total to more than 100% because respondents could give multiple responses.*

Thirteen participants offered unique responses to this question, which are listed below.

**Event participants (N=8)**

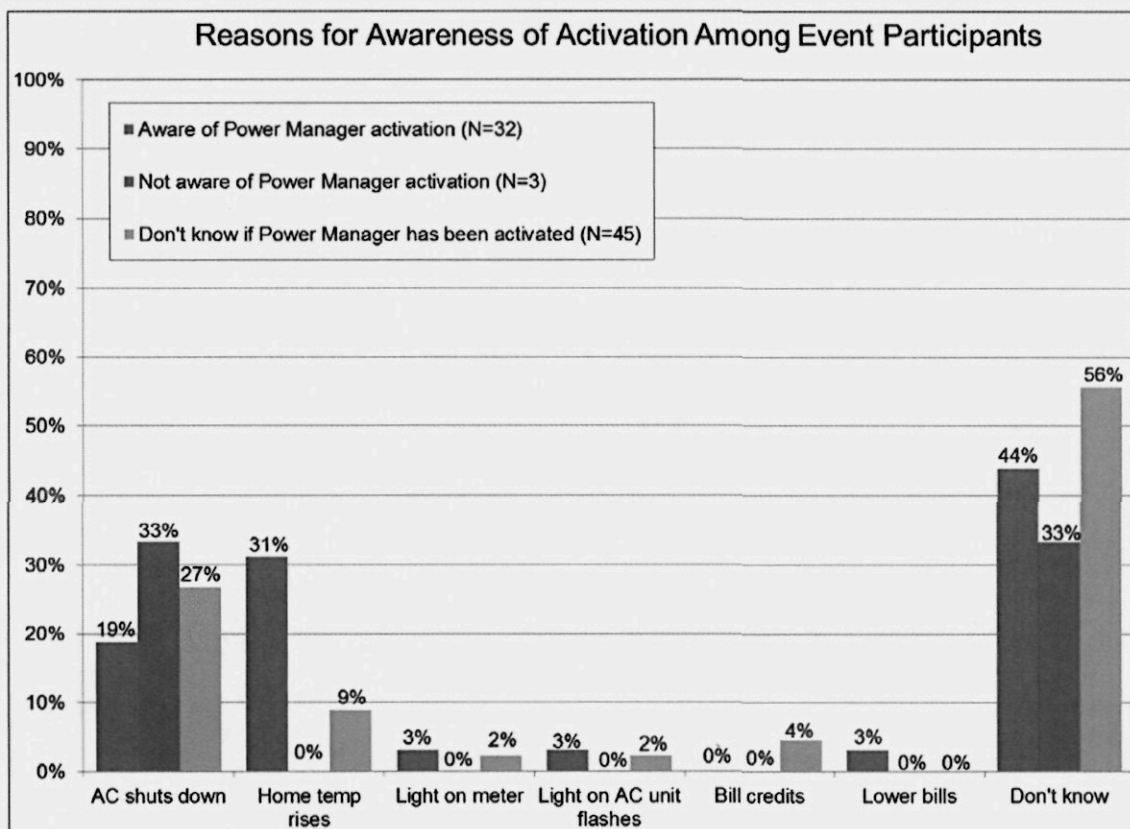
- *At 4:00 p.m. I noticed that the temperature was at 78 when the thermostat was set to 76.*
- *Duke Energy told me it was activated, and then it worked after installation.*
- *From the Duke website.*
- *A call from Duke.*
- *From the service man, when we had problems with our AC.*
- *We learned about Power Manager after doing a repair. The next day the system shut down again; I talked to the contractor and to my wife, went out to look and saw the activation light was on. That's how we knew it was in operation.*
- *I don't look for anything now, but I used to have a discount on my bill.*
- *I am not home most of the time.*

**Non-Event participants (N=5)**

- *I got a notice that it has been hooked up.*
- *That nothing goes wrong while it is off.*
- *I would look for something in writing from Duke.*
- *Is there a motor sound?*
- *I don't pay any attention to it.*

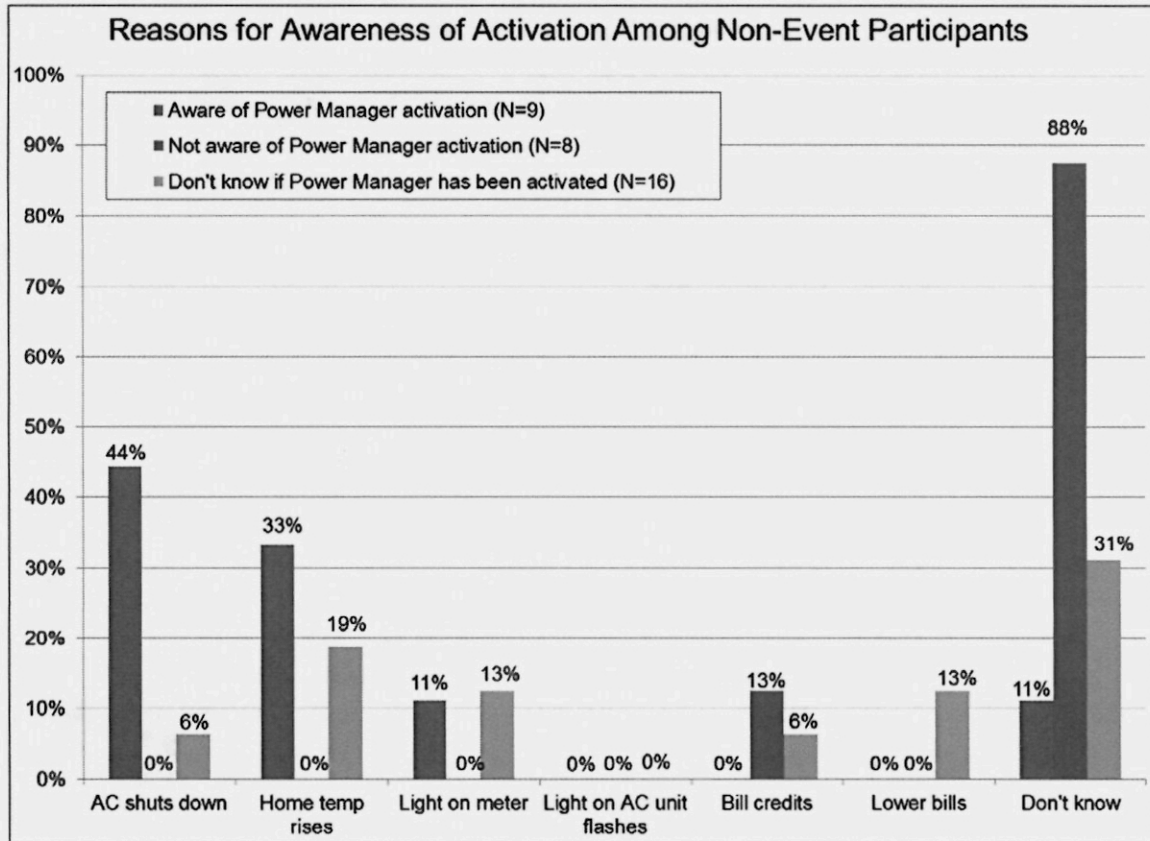
Event participants' reasons for awareness of Power Manager activations are broken out separately in Figure 23 for those who were aware that Power Manager had been activated since they joined the program, who were not aware, and who "don't know" if they were aware. Event participants who were not aware of Power Manager being activated but who could give a reason

for awareness of activation, were most likely to mention the air conditioner shutting off (26.7% or 12 out of 45). However only 8.9% (4 out of 45) mentioned rising home temperature as a reason for being aware of activations, which is significantly lower than the 31.3% (10 out of 32) of Event participants who are aware that their device has been activated mentioning rising temperatures (difference significant at  $p < .05$  using student's t-test). None of the other differences by awareness of activation are statistically significant for Event participants.



**Figure 23. Reasons for Awareness of Power Manager Activation Among Event Participants**  
*Note: Multiple responses were allowed per participant.*

Non-Event participants' reasons for awareness of Power Manager activation are broken out separately in Figure 24 for those who were aware that Power Manager had been activated since they joined the program, those who were not aware, and those who "don't know" if they were aware. Non-Event participants who are not aware that their device has ever been activated are significantly more likely to not be able to give a reason for being aware of activations ("don't know" 87.5% or 7 out of 8), and none mentioned "home temperature rises" as a reason for awareness (0% of 9; both of these differences from the other groups are significant at  $p < .05$  using student's t-test). Non-Event participants who are aware that their devices have been activated are the most likely to mention "AC shuts down" (44.4% or 4 out of 9, significantly higher than other groups at  $p < .05$  using student's t-test).



**Figure 24. Reasons for Awareness of Power Manager Activation Among Non-Event Participants**

*Note: Multiple responses were allowed per participant*

### Awareness of Activation and Monthly Billing

Table 38 shows differences in awareness of Power Manager activation according to whether participants receive their monthly energy bills by email notification to view online (referred to as “by email” in this report) or regular mail. There are no statistically significant differences between these groups in overall awareness of Power Manager activation since joining the program, nor in terms of their reasons for being aware of activation.



**Table 38. Awareness of Activation: Mail Versus email**

	Receive bills by mail (N=73)	Receive bills by email (N=40)
Aware of Power Manager activation since joining the program	35.6%	37.5%
<b>How can you tell when Power Manager is activated?</b>		
Home temperature rises	17.8%	17.5%
AC shuts down	17.8%	27.5%
The light on the meter is on	2.7%	7.5%
The light on the AC unit flashes	1.4%	2.5%
Bill credits	2.7%	5.0%
Lower bills	2.7%	2.5%
Don't know	47.9%	45.0%

*Note: Event and Non-Event participant results are combined in this table.*

Table 39 compares awareness of Power Manager activation among participants who review their Duke Energy bills regularly (more than half the time) versus those who do not (less than half the time, never and “don’t know”). Participants who review their bills more than half the time are significantly less likely to be aware that Power Manager has been activated since they joined the program (32.6% or 28 out of 86, versus 48.1% or 13 out of 27 among those who check their bills less than half of the time; this difference is statistically significant at  $p < .10$  using student’s t-test). However, there are no significant differences between these two groups in terms of their reasons for being aware of device activation.

**Table 39. Awareness of Activation: Reviewing Monthly Bills**

	Every month / more than half the time (N=86)	Less than half the time / never / don't know (N=27)
Aware of Power Manager activation since joining the program	32.6%	48.1%
<b>How can you tell when Power Manager is activated?</b>		
Home temperature rises	17.4%	18.5%
AC shuts down	23.3%	14.8%
The light on the meter is on	4.7%	3.7%
The light on the AC unit flashes	1.2%	3.7%
Bill credits	4.7%	0.0%
Lower bills	2.3%	3.7%
Don't know	46.5%	48.1%

*Note: Event and Non-Event participant results are combined in this table.*

Table 40 shows differences between customers who participate in the Power Manager program according to the method they use to pay their bills. Though the difference between groups is not significant for awareness of activation since joining the program, customers who pay their bills online are significantly more likely to be able to cite reasons for being aware of activations:

compared to customers who pay by mail, online bill payers are more likely to mention “AC shuts down”, “the light on the meter is on”, “bill credits” and “lower bills”, and are less likely to give “don’t know” responses (all significant at  $p < .10$  or better using student’s t-test). Online bill payers are also more likely to mention “bill credits” and “lower bills” compared to Autopay customers, while Autopay customers are significantly more likely to say they “don’t know” how to tell if their device is activated (differences significant at  $p < .10$  or better using student’s t-test).

**Table 40. Awareness of Activation: Paying Monthly Bills**

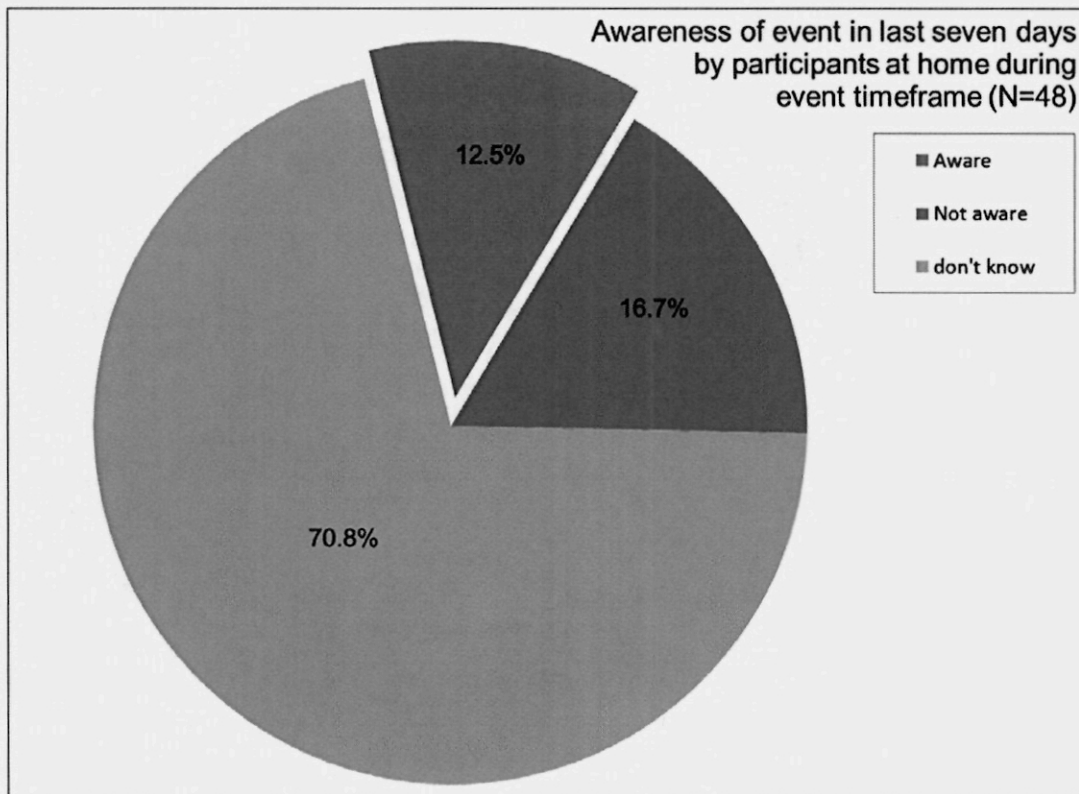
	Pay by mail with check (N=38)	Pay online through Duke Energy website (N=28)	Have Autopay set up for account (N=31)	Pay other ways (N=16)
Aware of Power Manager activation since joining the program	39.5%	25.0%	38.7%	43.8%
<b>How can you tell when Power Manager is activated?</b>				
Home temperature rises	21.1%	21.4%	16.1%	6.3%
AC shuts down	13.2%	28.6%	22.6%	25.0%
The light on the meter is on	0.0%	10.7%	3.2%	6.3%
The light on the AC unit flashes	0.0%	3.6%	0.0%	6.3%
Bill credits	0.0%	10.7%	0.0%	6.3%
Lower bills	0.0%	7.1%	0.0%	6.3%
Don't know	57.9%	28.6%	54.8%	37.5%

*Note: Event and Non-Event participant results are combined in this table. “Pay other ways” includes telephone and in-person payments as well as payments made through banks and credit unions.*

## Awareness of Power Manager Device Activation in the Past Seven Days

TecMarket Works then asked both Event and Non-Event participants who were home during the event (or high temperature non-event) whether they were aware of their Power Manager device being activated in the past seven days. However, in the case of the Non-Event participants, such activation had not occurred. These results are shown in Figure 25 and Figure 26.

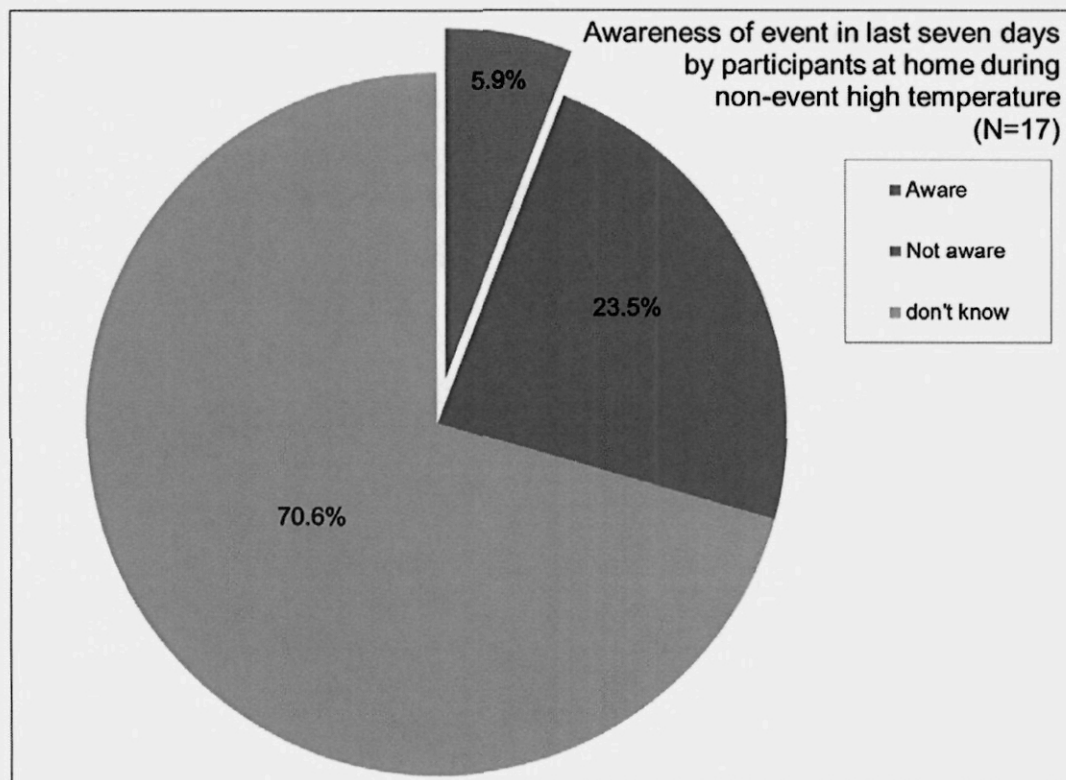
As seen in Figure 25, only 12.5% (6 out of 48) of Event participants who were at home were aware of a Power Manager activation, while 16.7% (8 out of 48) believed there had been no activation at all, and a large majority of 70.8% (34 out of 48) did not know whether an activation had occurred or not.



**Figure 25. Awareness of Activation in Past Seven Days by Event Participants at Home**

Figure 26 indicates that Non-Event participants' awareness of Power Manager device activations is not significantly different from Event participants, even though there really was no device activation for the Non-Event group. Only one Non-Event participant (5.9% of 17) incorrectly believed their device had been activated, while 23.5% (4 of 17) correctly stated that their device had not been activated, and a large majority of 70.6% (12 out of 17) did not know whether their device was activated or not (none of these percentages are significantly different from Event participants at the  $p < .10$  level using student's t-test).

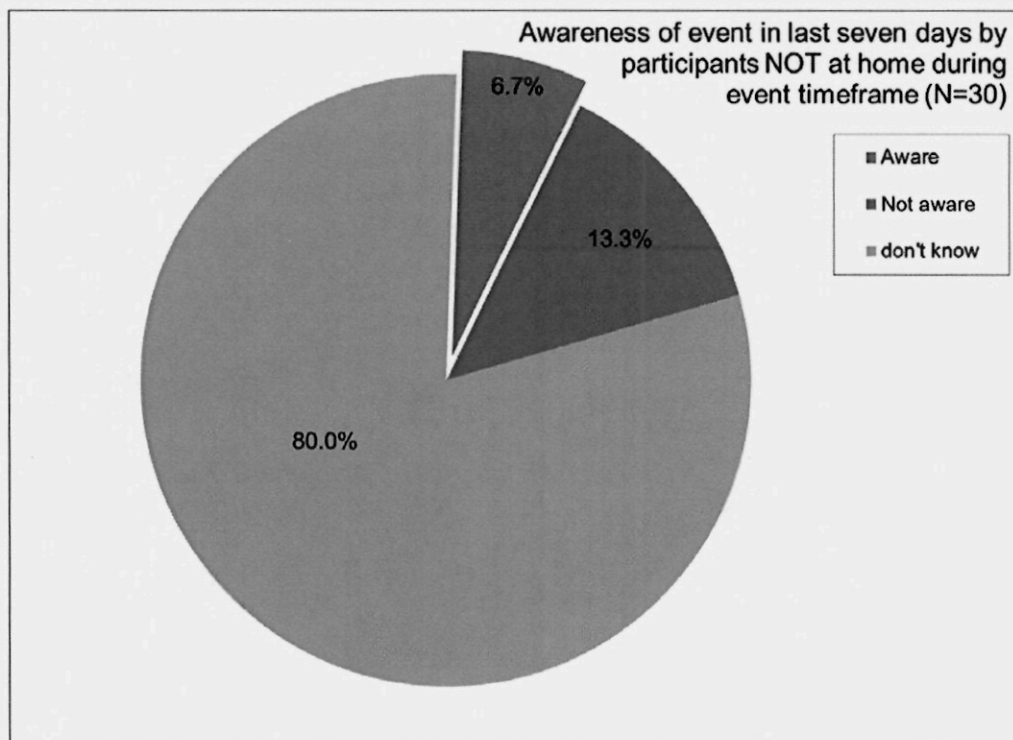




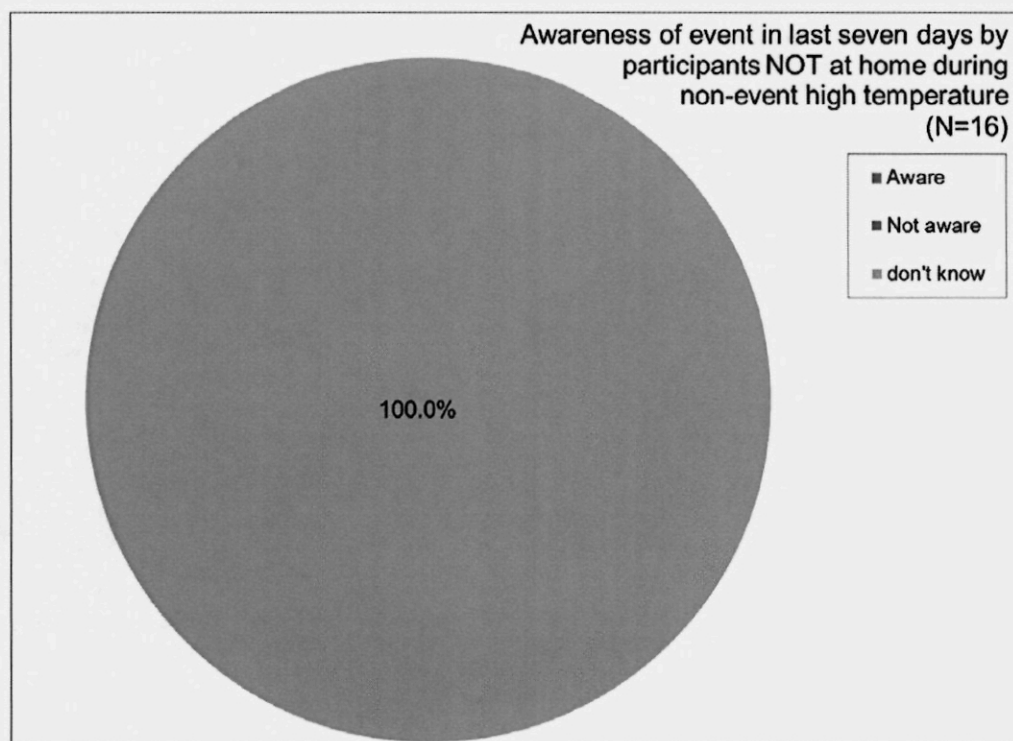
**Figure 26. Awareness of Event in Last Seven Days by Non-Event Participants at Home**

TecMarket Works also asked participants who were not at home during the event timeframe (or high temperature non-event day) whether they were aware of a Power Manager device activation. As shown in Figure 27, only 6.7% (2 out of 30) of Event participants not at home during an event correctly stated that a Power Manager activation had occurred, while twice as many (13.3% or 4 out of 30) incorrectly stated that there had been no activation and the majority of 80.0% (24 out of 30) could not tell. Figure 28 shows that all Non-Event participants who were not at home (16 out of 16) did not know whether a Power Manager activation had occurred or not.

Event participants who were home during a Power Manager event were not significantly more likely to believe there was an activation (12.5% or 6 out of 48) than Event participants who were not at home (6.7% or 2 out of 30).



**Figure 27. Awareness of Activation in Past Seven Days by Event Participants NOT at Home**



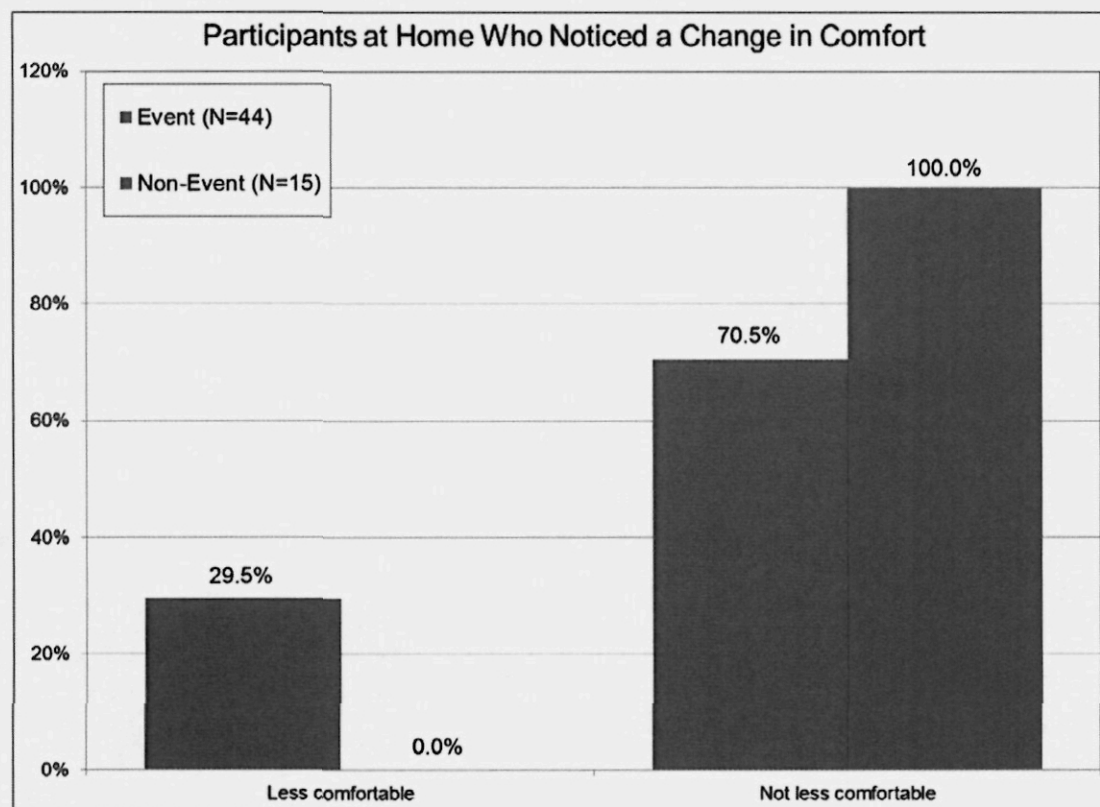
**Figure 28. Awareness of Event in Last Seven Days by Non-Event Participants NOT at Home**

## 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 asked two comfort-related questions to the 80 Event participants and 33 Non-Event participants who 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.

Figure 29 below shows that although the majority of both Event and Non-Event survey respondents indicated no change in their comfort level during the Power Manager activation or time of high temperature, those who were surveyed after an actual Power Manager event were significantly more likely to notice a decrease in comfort (29.5% or 13 out of 44 Event participants' comfort ratings declined, compared 0.0% or none of 15 Non-Event participants; this difference is significant at  $p < .05$  using student's t-test).



**Figure 29. Comfort Change Perception by Participants at Home**

*Note: Only respondents who answered both comfort rating questions are included in this table.*

Table 41 shows the mean ratings for before and during the event or high temperature as well as the high, low and mean differences for Event and Non-Event participants. Event and Non-Event customers give similar ratings for comfort before the activation event or non-event high temperature day (mean ratings 8.27 for Events and 8.47 for Non-Events; not significantly different). During the event or non-event high temperature day, Event participants report a lower mean level of comfort (7.61 for Events) while none of the Non-Event participants reported a decline in comfort and two actually reported an increase in comfort, thus the average comfort rating for Non-Event participants actually went up during the afternoon on high-temperature non-event days. The decline in mean comfort ratings for Event participants from 8.27 to 7.61 is statistically significant ( $p < .05$  using student's t-test), while the increase in mean ratings among Non-Event participants is not significant. Mean comfort ratings for Event participants during events (7.61) are also significantly lower than for Non-Event participants' mean comfort ratings during the afternoon on non-event high temperature days (8.73; difference significant at  $p < .05$  using ANOVA).

**Table 41. Comfort Rating Differences for Events and Non-Events by Customers at Home**

	Event (N=44)	Non-Event (N=15)
Mean comfort rating before event or high temperature day	8.27	8.47
Mean comfort rating during event or high temperature day	7.61	8.73
Mean difference of ratings	-0.66	0.27
Highest difference (among those who became less comfortable)	8	NA
Lowest difference (among those who became less comfortable)	1	NA

*Note: Only respondents who answered both comfort rating questions are included in this table.*

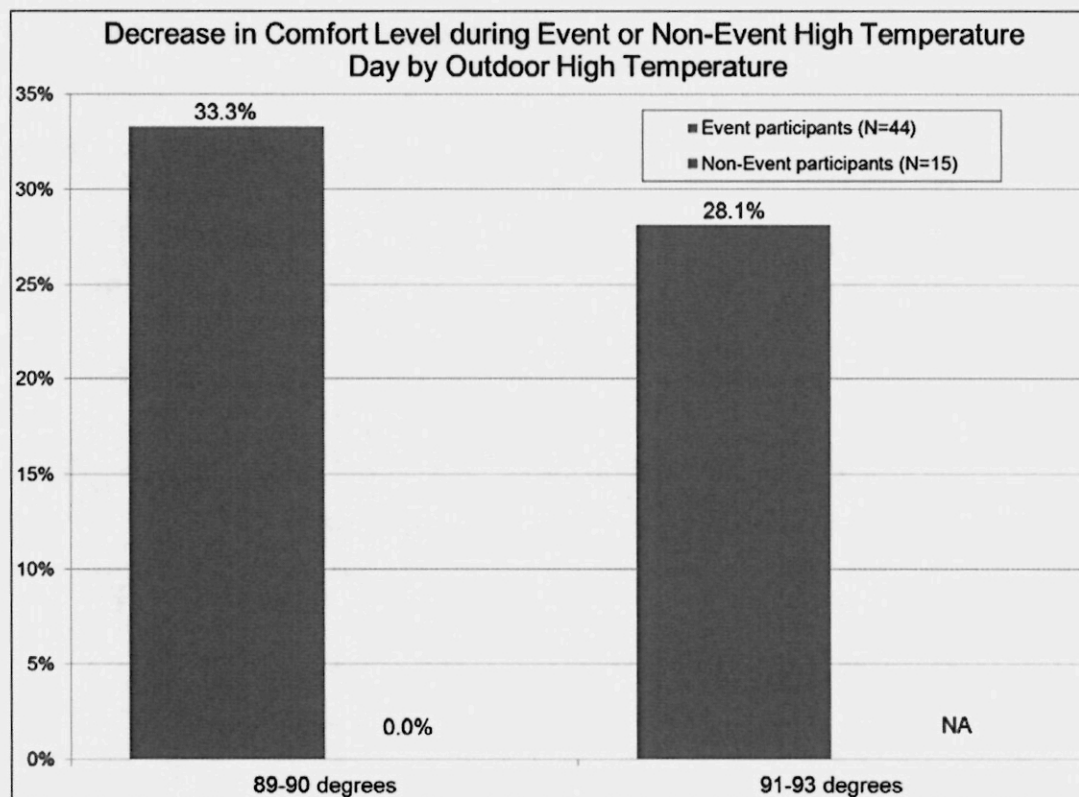
Table 42 shows the range of comfort decline among those respondents who reported a decline in comfort. The average decline in comfort ratings among Event participants who reported a decline in comfort is about 2.5 points on a 10-point scale, from 8.15 before the event to 5.62 after the event. There were no Non-Event participants surveyed in Ohio who reported a decline in comfort on a non-event high temperature day.

**Table 42. Comfort Rating Differences for Events and Non-Events Among Those Who Reported Their Comfort Level Declined During Event or High Temperature Day**

	Event (N=13)	Non-Event (N=0)
Mean of pre-event comfort rating	8.15	NA
Mean of rating during event or high temperature	5.62	NA
Mean difference of ratings	-2.54	NA
Comfort rating declined by 1 point	38.5%	NA
Comfort rating declined by 2 points	23.1%	NA
Comfort rating declined by 3 points	23.1%	NA
Comfort rating declined by 5 points	7.7%	NA
Comfort rating declined by 8 points	7.7%	NA
Comfort rating declined by 6 points		NA
Comfort rating declined by 7 points		NA

*Note: Only respondents whose comfort ratings declined during the event/high temperature day are included in this table.*

Figure 30 shows the percentage of participants who reported a decline in comfort by the outdoor high temperature on the day of the event or non-event. In Ohio during the 2013 cooling season, Power Manager activation events occurred on days when the temperature ranged from 89 to 93 degrees and the only non-event high temperature days surveyed had high temperatures of 89 or 90 degrees. By design, activation events occur on days when electricity demand for cooling is at its highest, which tend to be the hottest days of the season; in 2013, there were only three sufficiently high temperature days in Ohio where there were not Power Manager activation events. At the 89 to 90 degree temperature level, more Event participants (33.3% or 4 out of 12) than Non-Event participants (0 out of 15) reported a decline in comfort (significant at  $p < .05$  using student's t-test). Event participants surveyed after activation events which occurred on days when the outdoor high temperature was 91 to 93 degrees are not more likely to report a decline in comfort (28.1% or 9 out of 32) compared to Event participants on days when the temperature was 89 to 90 degrees.



**Figure 30. Decrease in Comfort by Outdoor High Temperature**

*Note: There were no non-event high temperature days in Ohio where the outdoor temperature was 91 degrees or higher.*

The complete distribution of high temperatures for event and non-event days in Ohio can be found in *Table 1. Schedule of Events and Non-Event High Temperature Days in Ohio* on page 14. For further discussion, see *Comfort Ratings by High Temperature* on page 98.

## Participant Perceptions Relative to Comfort Change

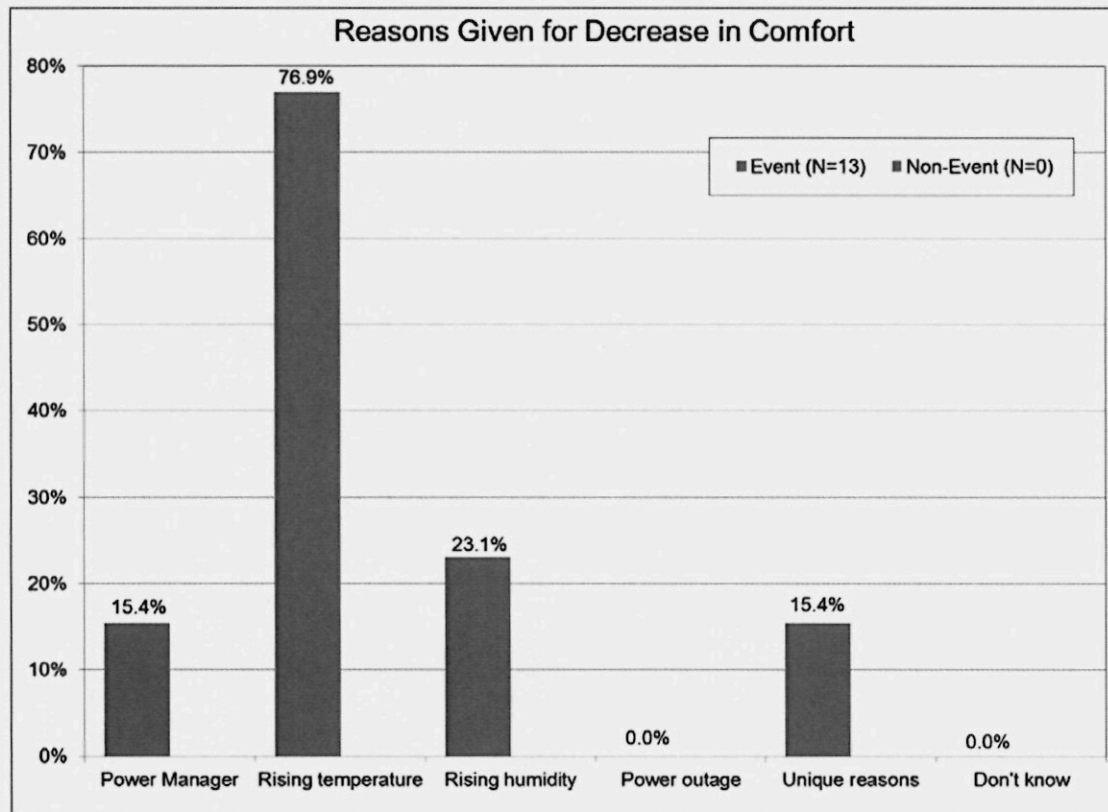
TecMarket Works asked participants who noted a change in comfort during the event or non-event timeline an open-ended question as to what they believe caused the change in comfort. The responses are shown below in Figure 31. The vast majority of Event participants who reported a decrease in their comfort level during an event attribute their change in comfort to rising outdoor temperatures (76.9% or 10 out of 13). There were no Non-Event participants who reported a decrease in comfort, thus none were asked the reason for their decrease in comfort.

Very few Event participants (15.4% or 2 out of 13) cited Power Manager as contributing to their decline in comfort. Power outage was not mentioned as a factor contributing to comfort change by any Event respondents (0 of 13).

This data – along with the data from Figure 25 showing that only 12.5% of Event participants who were at home were aware of a Power Manager device activation 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, many participants may be unaware that the Power Manager device is causing the changes they feel in comfort.



**Figure 31. Reasons for Comfort Change**

*Note: Only respondents whose comfort ratings declined during the event/high temperature day are included in this table.*

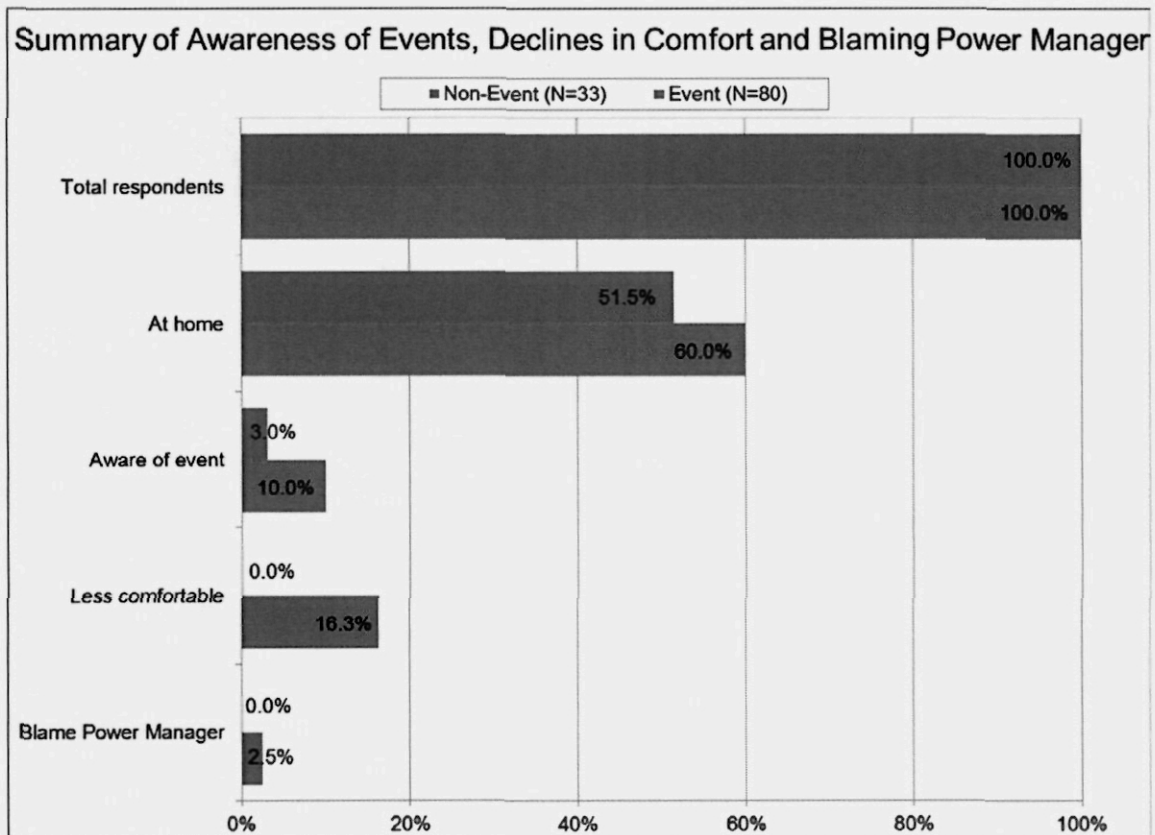
Two surveyed Event participants blamed other factors for their decrease in comfort ratings; these are listed below.

- *I noticed that I keep the thermostat set to 77 but it read 79 during the event. My wife was also cooking at the time.*
- *Unrelated to the Power Manager, I had the thermostat setting higher before 3:00 p.m. yesterday.*

### Summary of Event Awareness, Declines in Comfort and Blaming Power Manager

Figure 32 shows the overall percentages of surveyed Event and Non-Event participants who were at home during the event or non-event high temperature day, who were aware of an event (or believed there was an event on a non-event high temperature day), those whose comfort ratings showed a decline in comfort during the event or non-event high temperature day, and finally the percentage who blame Power Manager for their decline in comfort.

There is only one statistically significant difference between Event and Non-Event participants shown in this table: Event participants are more likely to report a decrease in comfort after device activation (16.3% or 13 out of 80, compared to 0% of 33 for Non-Event participants on high-temperature days; this difference is significant at  $p < .05$  using student's t-test). Event participants are not significantly more likely to be aware of device activations than Non-Event participants are on high-temperature days where there was no activation, and Event participants are not more likely to blame Power Manager for decreases in comfort (although in Ohio during 2013 there were no Non-Event participants surveyed who reported a decrease in comfort, so no Non-Event customers were asked to give reasons for their decrease in comfort).



**Figure 32. Summary of Event Awareness, Declines in Comfort and Blaming Power Manager**

### Decreases in Comfort and Age of Air Conditioning Units

Only two Event participants in Ohio blamed Power Manager for their decrease in comfort; both own air conditioning units that are less than 6 years old. Among all thirteen surveyed Event respondents who reported a decline in comfort during an event, only a third (30.8% or 4 out of 13) have air conditioners that are less than 6 years old. Table 43 shows the distribution of air conditioner ages among Event participants who were home during an event and provided comfort ratings; overall, there are no statistically significant differences between participants who reported a decline in comfort and those who did not.



**Table 43. Age of Air Conditioners among Event Participants**

Age of air conditioner	Event, Comfort Rating Decreased (N=13)	Event, Comfort Rating Did Not Decrease (N=31)
0 to 6 years old	30.8%	41.9%
7 to 12 years old	30.8%	32.3%
13 to 20 years old	15.4%	12.9%
More than 20 years old	15.4%	9.7%
Don't know / not specified	7.7%	3.2%

*Note: Only respondents who were at home and gave both comfort ratings are included in this table.*

## 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.

Two Event participants (4.2% of 48 at home during the event) stated that they adjusted their thermostats: one turned their thermostat down by two degrees, and one turned their thermostat down by three degrees. The average change for these two Event respondents was down 2.5 degrees.

Four Non-Event participants (23.5% of 17 at home during the high-temperature day) stated that they adjusted their thermostats: one turned their thermostat from "off" to 77 degrees, and the other three all adjusted their thermostats upwards, by an average of 3.3 degrees apiece.

### 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. This was the most common response to high temperatures reported by respondents; the results are shown in Table 44. There is no significant difference between surveyed Event and Non-Event participants.

**Table 44. Did You or Your Family Turn on a Fan During Event or High Temperature?**

<i>Base: at home during event or high temperature day</i>	Event (N=48)	Non-Event (N=17)
Yes	39.6%	35.3%
No	60.4%	64.7%
Don't Know	0.0%	0.0%

Participants were also 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. A majority of both Event (75.0% or 36 out of 48) and Non-Event participants (58.8% or 10 out of 17) stated that they did nothing else (or nothing at all) in response to the device activation or high temperature. The remaining responses are included in Table 45; the only statistically significant difference between Events and Non-Events is that Non-Events are more likely to not be able to recall what they did (11.8% or 2 out of 17 “don’t know”, compared to 2.1% or 1 out of 48 Events; difference significant at  $p < .10$  using student’s t-test).

None of the surveyed participants (0% of 48 Event respondents at home during an event) indicated that they had used room or window air conditioners to keep cool or to compensate for the Power Manager device activation.

**Table 45. Other Activities Participants Took to Cool Down**

<i>Base: at home during event or high temperature day</i>	<b>Event (N=48)</b>	<b>Non-Event (N=17)</b>
Continued normal activities / nothing different	75.0%	58.8%
Stayed indoors	8.3%	5.9%
Closed blinds / shades	4.2%	11.8%
Drank water / cool drinks	4.2%	5.9%
Cooled off with water (shower, sprinkler, hose, pool)	6.3%	0.0%
Kept doors / windows shut	6.3%	5.9%
Moved to a cooler part of the house	4.2%	0.0%
Left the house and went somewhere cool	2.1%	0.0%
Wore less clothing	4.2%	0.0%
Opened windows	0.0%	0.0%
Turn on room / window AC	0.0%	0.0%
Unique actions (listed below)	2.1%	5.9%
Don't know / refused	2.1%	11.8%

*Note: Multiple responses were allowed per participant*

Two respondents mentioned unique actions they took to cool down; these are listed below.

**Event participants (N=1)**

- *I closed off certain rooms of the house to keep the cool air localized.*

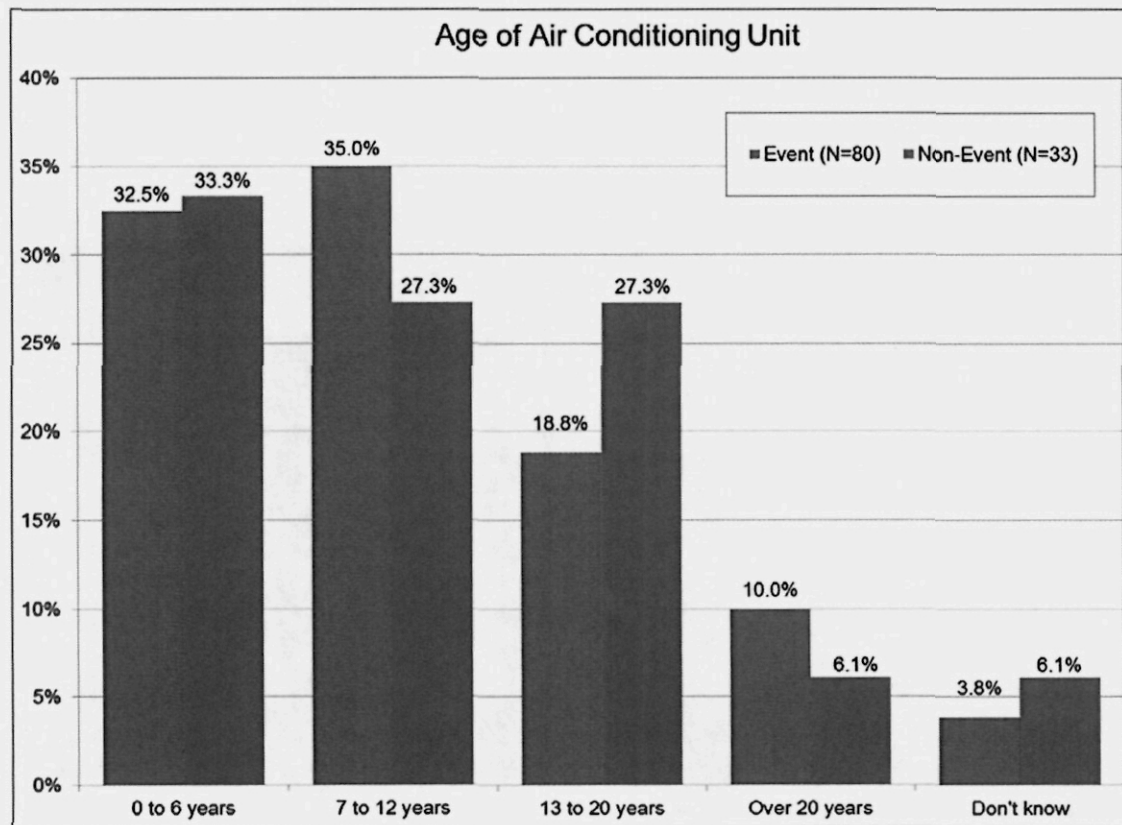
**Non-Event participants (N=1)**

- *I increased the fan speed.*

**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 33; about two-thirds of units belonging to surveyed participants in Ohio are 12 years old or newer (67.5% or 54 out of 80 for Events, 60.6% or 20 out of 33 for Non-

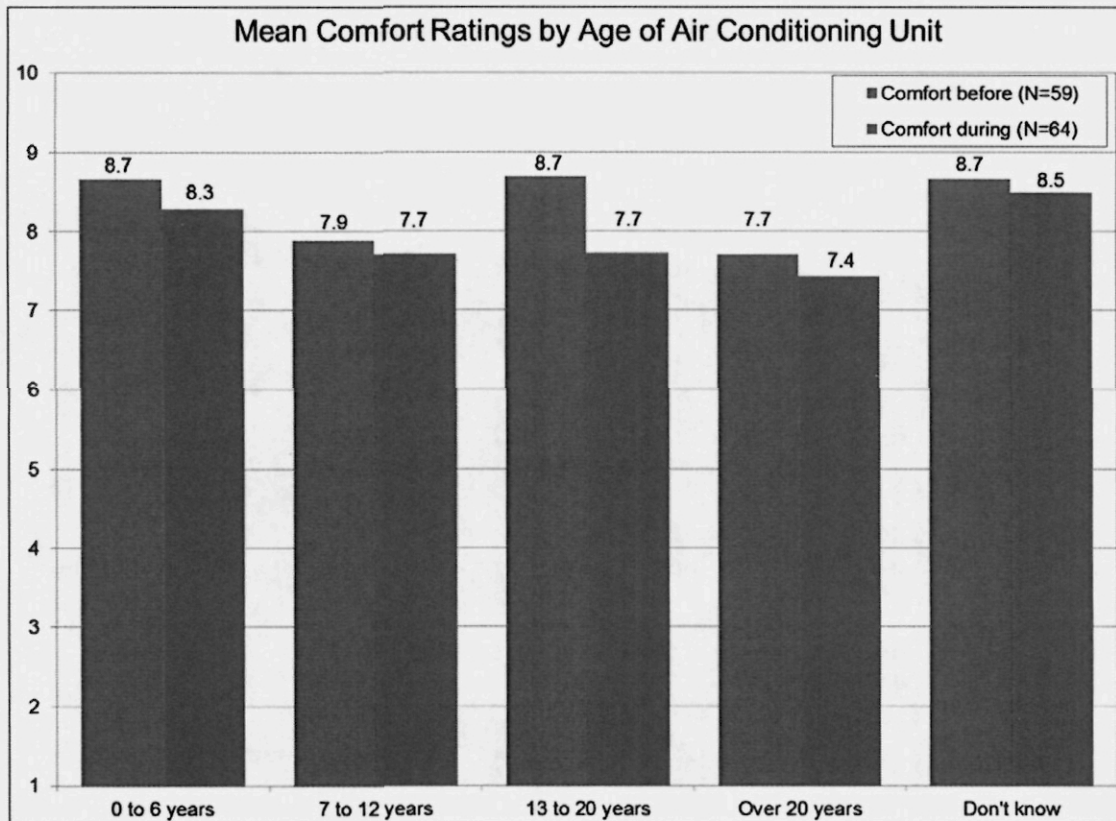
Events). There are no statistically significant differences between Event and Non-Event participants in terms of the age distribution of air conditioning units.



**Figure 33. Air Conditioner Age**

Figure 34 shows mean comfort ratings by age of air conditioner. Participants with AC units less than six years old gave mean comfort ratings during events or high temperature days that are slightly higher than participants with older AC units, although there is no statistically significant relationship between age of air conditioner and comfort levels before or during an event or high-temperature day.<sup>13</sup>

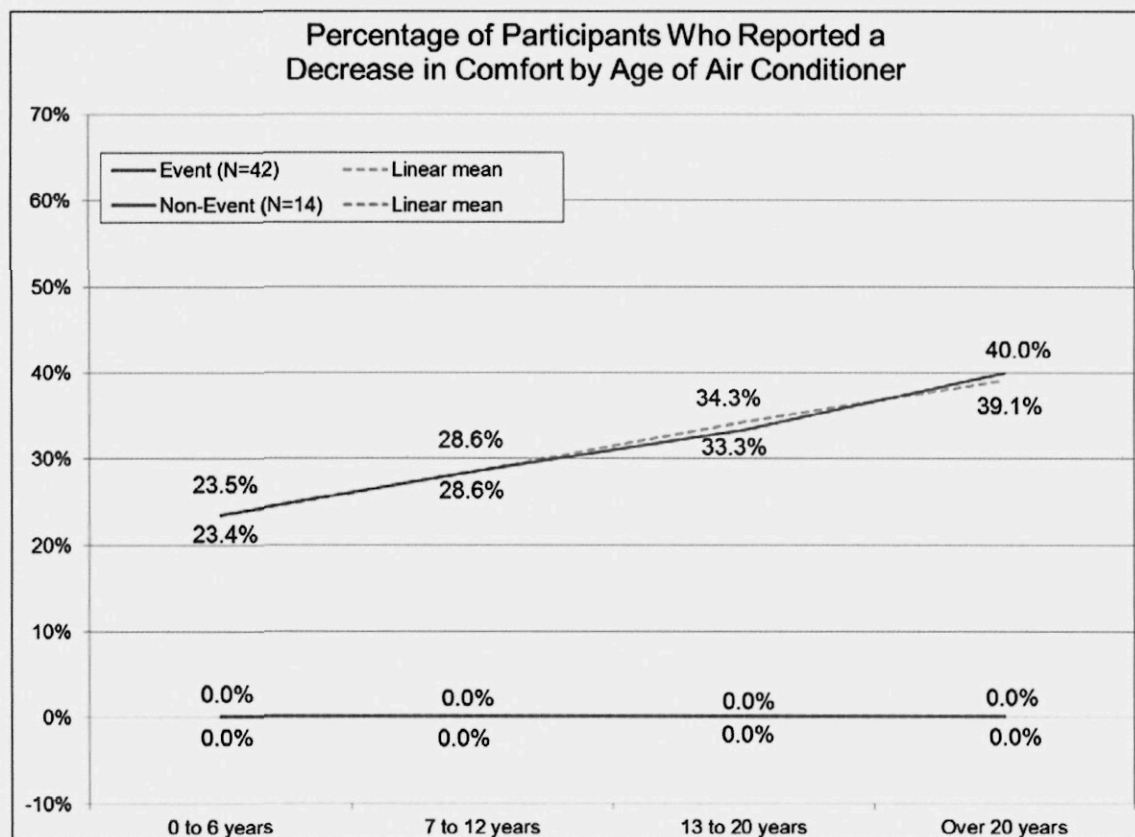
<sup>13</sup> The lack of significance is partly due to sample size: there were only seven participants surveyed in Ohio who were at home during the event or high temperature day, who provided comfort ratings, and had A/C units over 20 years old.



**Figure 34. Mean Comfort Ratings by Air Conditioner Age**

*Note: Only respondents who were at home during an event or high temperature day gave comfort ratings. Event and Non-Event participants are combined in this table.*

The distribution of air conditioner ages is similar between Event and Non-Event participants, with about two-third of air conditioners in both groups being less than 12 years old (as seen in Figure 33). Cross-tabulating air conditioner age with comfort, and using age of air conditioner to predict a decrease in comfort (using a simple linear regression), yields the following line chart (Figure 35).



**Figure 35. Comfort Decline vs. Air Conditioner Age**

In Figure 35 the linear means (regression lines<sup>14</sup>) for the two survey subgroups indicates that age of air conditioner has different effects on discomfort during Power Manager activation events than on non-event high temperature days: the older the AC unit, the more likely a participant will notice a decline in comfort during a Power Manager activation event (the dotted blue line slopes upwards), though on high temperature days when there is no event, participants are not any more likely to report a decline in comfort if their AC unit is old (the dotted red line is “flat” with a slope of zero). However the effect of air conditioner age on comfort levels is not statistically significant: for Event participants, the age of the AC unit explains only 1.4% of variance (R-squared) in change in comfort, and for Non-Event participants age of AC unit does not explain any variance in change in comfort (since none of the Non-Event participants reported a decline in comfort, the dependent variable is zero at every level of AC unit age and has no variance).

However, recall from Figure 29 that activation of Power Manager on event days causes discomfort for significantly more Event participants overall (this is also indicated in Figure 35 because the dotted blue line is always higher than the dotted red line). It should also be noted that comfort ratings are fundamentally subjective measures (respondents with the same AC units may give different scores on the same temperature days; while respondents with different AC units on

<sup>14</sup> Two regressions were run separately and plotted together, one for Event participants and one for Non-Event participants (dotted lines). Both regression models predict the percent of participants noticing a decline in comfort using only the age of air conditioner. Actual percentages noticing a decline in comfort by age of AC unit are also plotted for Event and Non-Event participants (solid lines).

different temperature days may give identical ratings. These models do not account for any individual characteristics of respondents, which remain “unexplained variance.”)

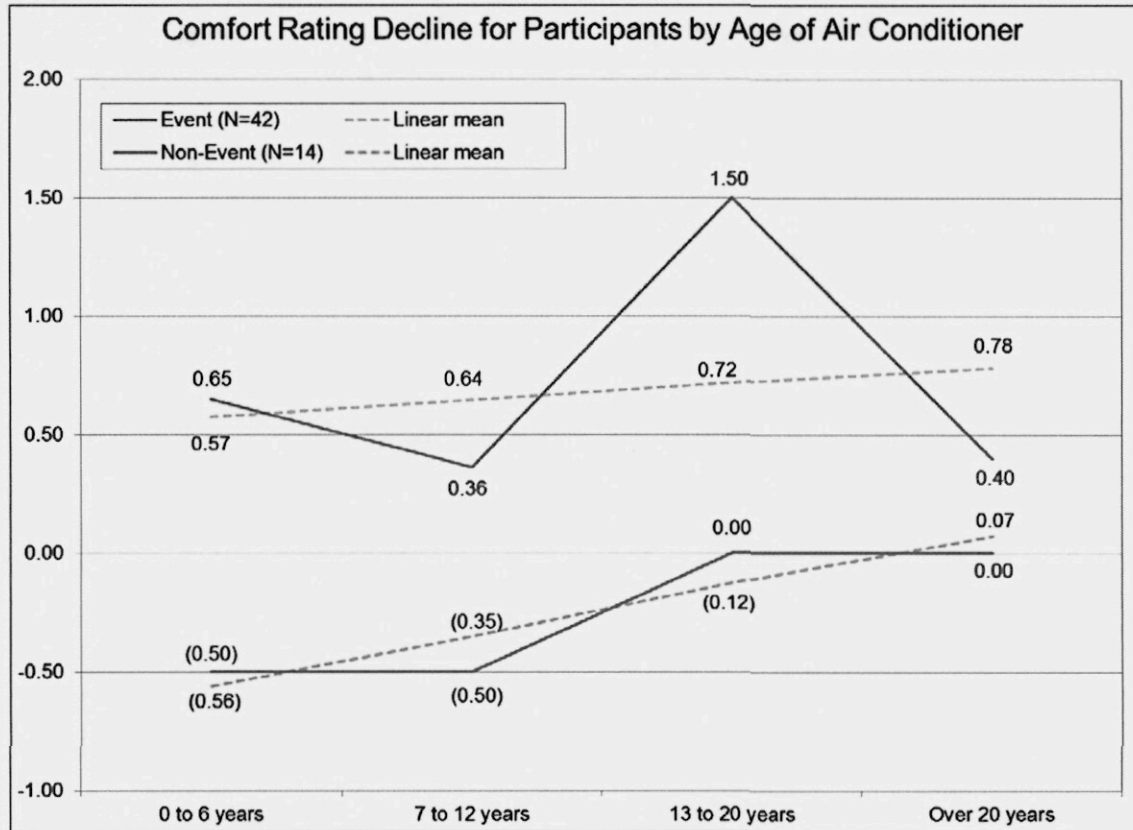
Figure 36 shows a similar analysis using the same model but predicting the amount of decline in comfort ratings (rather than whether or not there was a decline in comfort ratings<sup>15</sup>). The result for Non-Event participants is consistent with other findings: There is no decline in comfort ratings on high temperature non-event days, in fact the negative changes in comfort ratings for most Non-Event participants indicates that some of them actually became more comfortable on the afternoons of high-temperature days. However, Event participants reported a decline in mean comfort ratings for every age of air conditioner (the blue lines have positive values, indicating a decline in comfort; and blue lines are always higher than the red lines indicating more effect for Events than Non-Events).

This model shows that Event participants comfort is predicted to decline by from 0.57 to 0.78 points depending on the age of their air conditioner, versus a predicted decline of only 0.07 points for Non-Event participants with AC units that are more than 20 years old, and predicted increases in comfort (negative declines) for Non-Event participants with AC units that are newer than 20 years old. However, neither of the regression lines in Figure 36 are statistically significant at  $p < .10$  or better; the regression for Event participants explains 0.2% of variance, while the regression for Non-Event participants explains 9.9% of the variance in comfort ratings point decline (or increase).

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<sup>15</sup> Two regressions were run separately and plotted together, one for Event participants and one for Non-Event participants (dotted lines). Both regression models predict the change in comfort ratings on a 10-point scale using only the age of air conditioner. Actual mean decline in comfort rating points (on a 10-point scale) by age of AC unit are also plotted for Event and Non-Event participants (solid lines).

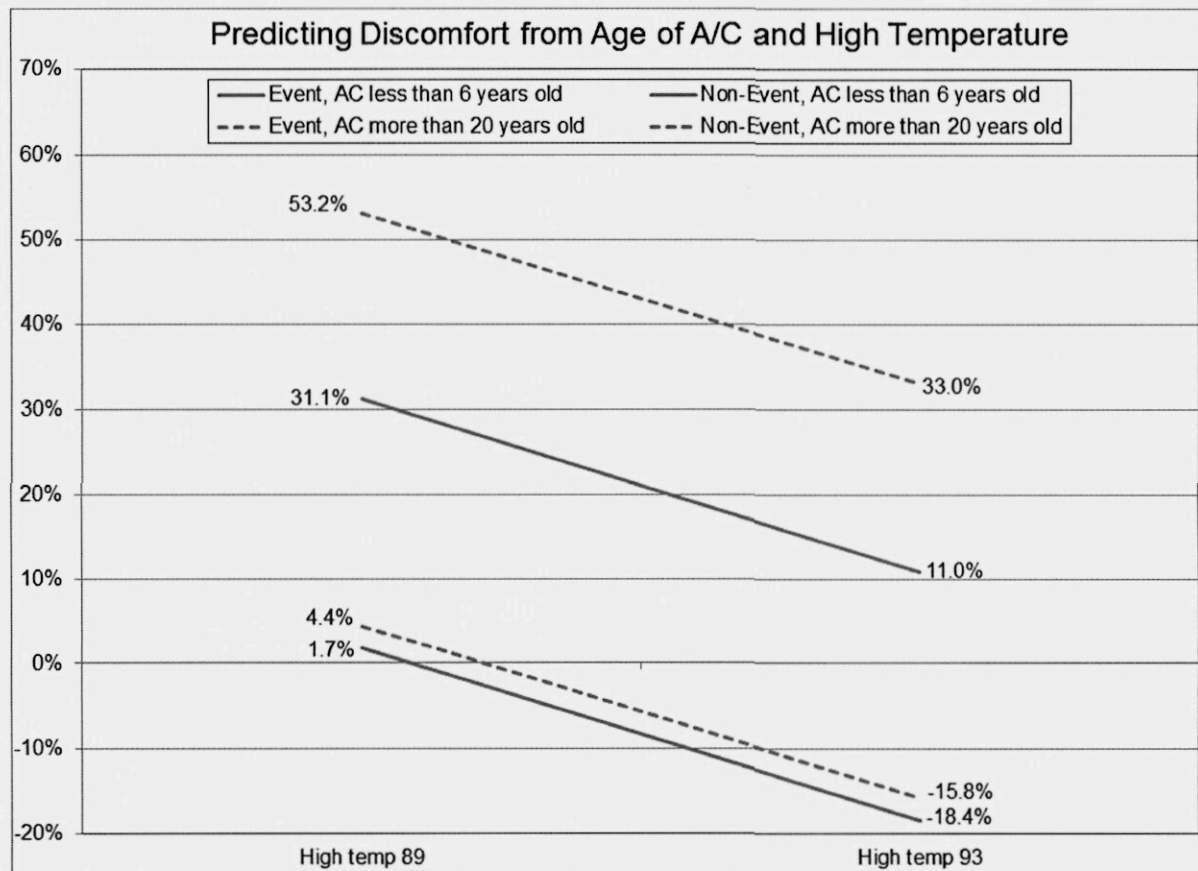




**Figure 36. Comfort Ratings Point Decline vs. Air Conditioner Age**

## Age of Air-Conditioner and Change in Comfort Levels During Event: Controlling for Outdoor High Temperatures

TecMarket Works also used regression analysis to predict changes in comfort level taking both age of air conditioner and the high temperature on the event day (or non-event high temperature day) into account<sup>16</sup>. This analysis allows us to separate the effects of the outdoor temperature and the age of the air conditioner unit; the results are shown in Figure 37.



**Figure 37. Comfort Change vs. Air Conditioner Age and High Temperature**

Figure 37 indicates that the age of the air conditioner unit is related to increasing discomfort for Event participants, but has less effect on comfort changes for Non-Event participants – even when controlling for differences in outdoor temperature. Among households with an air conditioner 6 years old or less (solid lines), Event participants are far more likely to report a decline in comfort (predicted 31.1% of Events and 1.7% of Non-Events at 89 degrees, and 11.0% of Events and negative<sup>17</sup> 18.4% of Non-Events at 93 degrees). For those with AC units more than 20 years old, the differences are even greater (predicted 53.2% for Events and 4.4% for Non-Events at 89 degrees, 33.0% for Events and negative 15.8% for Non-Events at 93 degrees),

<sup>16</sup> One regression was run, predicting the percent of participants noticing a decline in comfort using the following predictors: outdoor high temperature, age of AC unit, Event vs. Non-Event, and an interaction term for Event-by-age-of-air-conditioner. The interaction term allows the effect of age of air conditioner to vary for Event and Non-Event participants. The chart only plots the predicted regression lines (not the actual distributions).



although the sample of participants with A/C units more than 20 years old who were at home and answered both comfort ratings questions is only seven.

The differences between predicted levels of discomfort at 89 degrees and 93 degrees (about 20%) are less generally more than the differences predicted by newer vs. older AC units (from 3% to 22%), and both have less impact than Event vs. Non-Event (from 29% to 49% differences). This indicates that the effect of outdoor temperature and age of the AC unit are lesser factors in predicting participant comfort compared to whether or not Power Manager was activated. The standardized coefficients<sup>18</sup> from the regression model also indicate that temperature and age of AC are less important than the occurrence of Power Manager events: Temperature has the second-largest effect ( $\beta = -0.176$ ) of any predictors in the model, while the presence of a Power Manager event had the most ( $\beta = 0.279$ ), and age of air conditioner had the least effect ( $\beta = 0.022$ ).

The regression model in Figure 37 explains 12.7% of the variance (R-squared) in comfort decline, though does not achieve statistical significance at  $p < .10$  or better ANOVA, and none of the individual predictors by themselves are significant at  $p < .10$  or better either.

### **Curtailment kW Option and Change in Comfort Levels During Event**

In Ohio, Power Manager participants have the option to sign up for either of two levels of curtailment: 1.0 kW or 1.5 kW. 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 1.0 kW and 1.5 kW option participants:

- Thirteen Event respondents were signed up for the 1.5 kW option, and seven of these respondents reported being home during an event and answered all of the questions about comfort level before and during the event. Of those seven respondents, two (28.6%) reported a decline in comfort.
- Sixty-seven Event respondents were signed up for the 1.0 kW option, and 37 of these reported being at home during an event and answered all of the questions about comfort level before and during the event. The percentage reporting a decline in comfort was 29.7% (11 out of 37).
  - The effect of the program option on reporting a decline in comfort is not statistically significant for Event participants.

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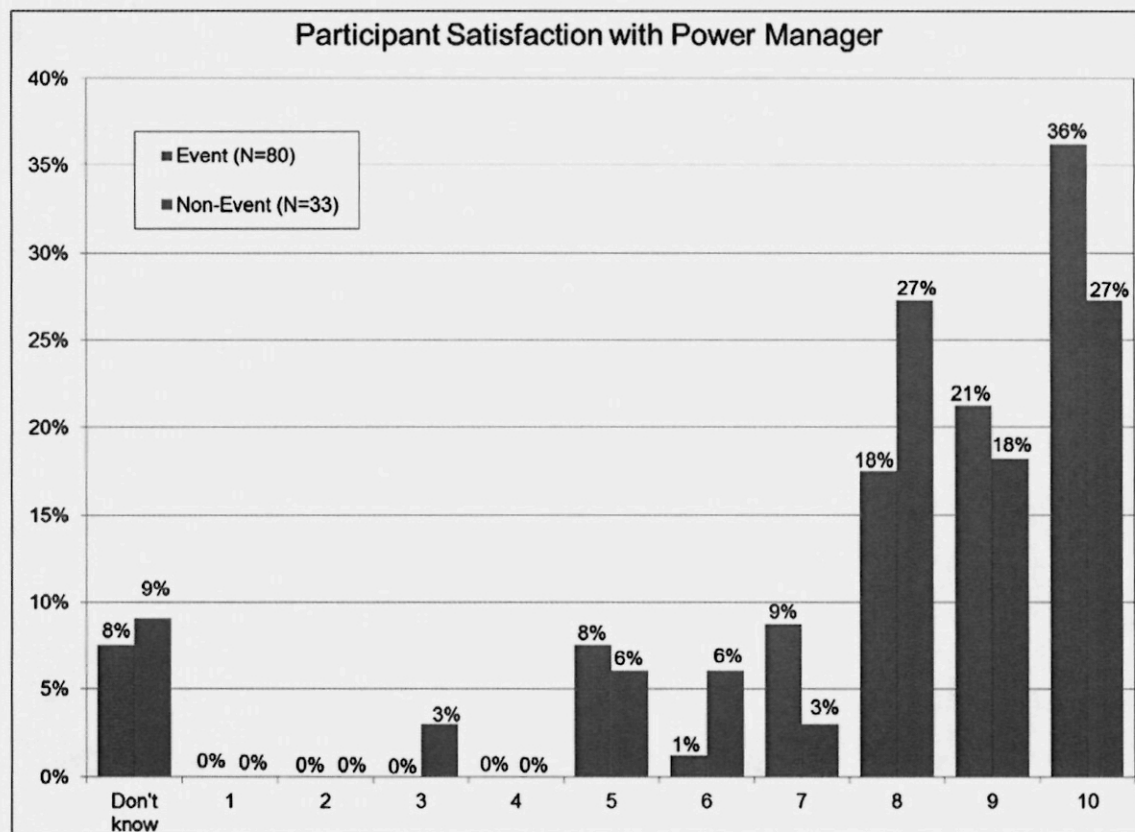
<sup>17</sup> All Non-Event participant surveys were conducted on days when the outdoor high temperature was 89 or 90 degrees (the range of observed temperatures is very limited for this group), and only two Non-Event participants with an AC unit more than 20 years old was at home and answered comfort questions (the dotted red line in Figure 18 is based on a minute sample size). Since this is a linear regression, the model can predict negative percentages for values at the extreme of the distribution. Though logically, the number of participants who say their comfort level declined cannot be less than 0%.

<sup>18</sup> The standardized coefficient (also known as  $\beta$ ) is rescaled so that variance equals 1.0. This allows the effect of variables scaled in different units (such as years and degrees) to be compared with each other.

- Seven Non-Event respondents were signed up for the 1.5 kW option, and two of these respondents reported being home at the time of high temperature and answered all of the questions about comfort level. Of these two respondents, none (0.0%) reported a decrease in comfort.
- Twenty-six Non-Event respondents were signed up for the 1.0 kW option, and 13 of these respondents reported being home at the time of high temperature and answered all of the questions about comfort level. Of these two respondents, none (0.0%) reported a decrease in comfort.
  - The effect of the program option on reporting a decline in comfort is not statistically significant for Non-Event participants (because no Non-Event participants reported a decline in comfort).

### Respondent Satisfaction and Willingness to Recommend the Program

Participants' satisfaction with the Power Manager program is high with an overall mean of 8.54 on a 10-point scale with "1" being not at all satisfied and "10" being very satisfied, and a plurality of 33.6% (38 out of 113) of participants rated their satisfaction with Power Manager a "10 out of 10". Event respondents' mean satisfaction with Power Manager is 8.65 while the mean for Non-Event respondents is 8.27 (the difference between these groups is not statistically significant). The distribution of ratings is shown in Figure 38 below.



**Figure 38. Distribution of Power Manager Satisfaction Ratings**

Twenty respondents gave satisfaction ratings of “7” or lower on a 10-point scale; these customers were asked for the reason for their relatively low ratings, which are listed below.

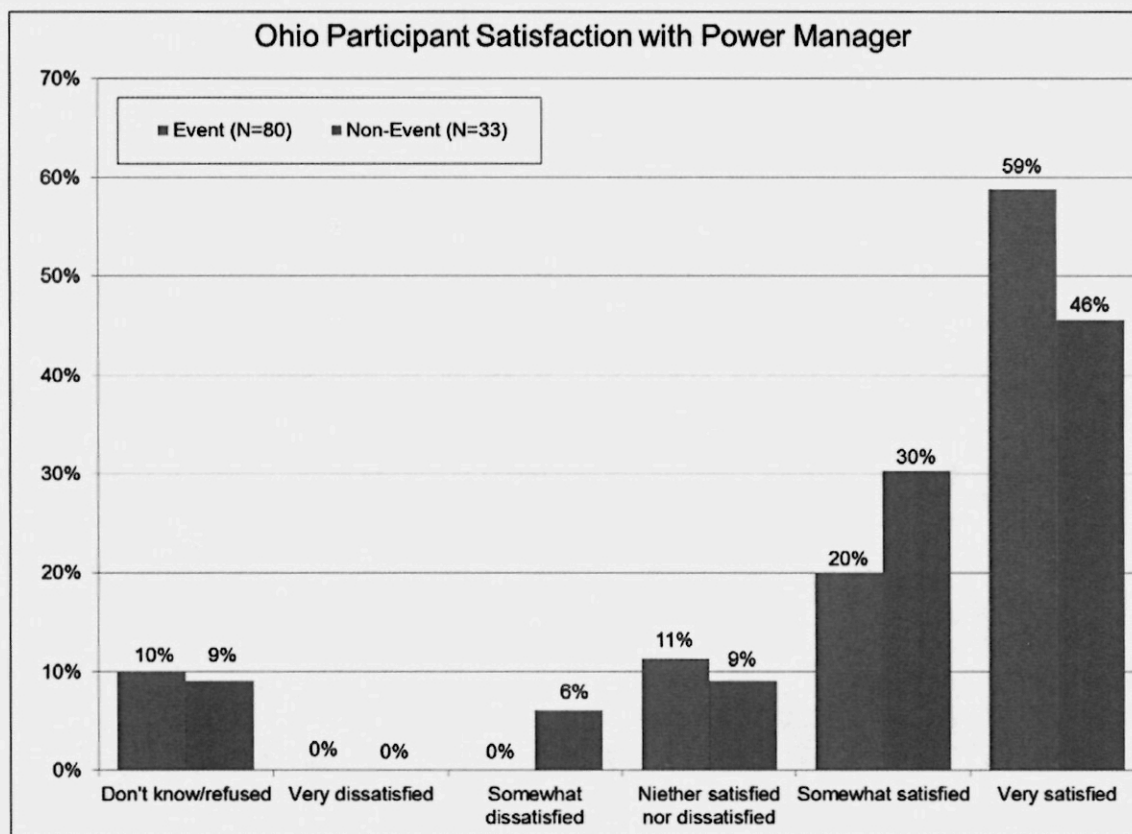
**Event participants (N=14)**

- *I was uncomfortable when the device was activated. (N=3)*
- *The bill credits are not large enough.*
- *I don't feel like the program saves me any money.*
- *I had thought the device was on all the time instead of sporadically.*
- *I suspect it hurt my AC until last year.*
- *Well, I'm neutral. I don't really notice anything, but I also haven't noticed these bill credits you speak of.*
- *I don't have anything to compare it to.*
- *I am neither happy nor unhappy; I don't have enough experience with it yet.*
- *I am not unsatisfied.*
- *I don't know. (N=3)*

**Non-Event participants (N=6)**

- *I was uncomfortable when the device was activated.*
- *I haven't noticed a huge decrease in my energy bills.*
- *I don't know that much about it. We had lights flickering and had a crew out twice to check our system.*
- *I don't even notice any effect.*
- *I don't pay any attention to it.*
- *I don't know.*

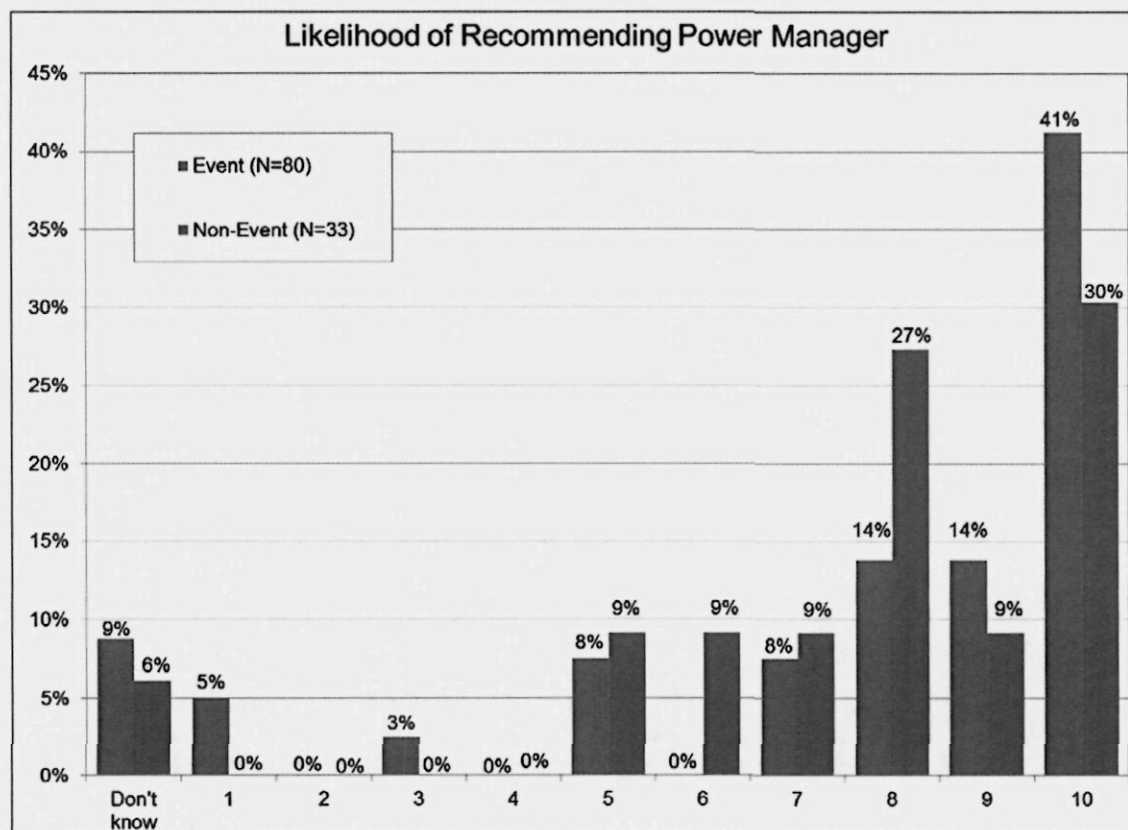
Power Manager program participants in Ohio were also asked to rate their satisfaction with the program using a five-point Likert scale. As seen in Figure 39, a majority of Event participants (58.8% or 47 out of 80) and a plurality of Non-Event participants (45.5% or 15 out of 33) gave the highest possible rating of “very satisfied.” Only two Non-Event participants (6.1% or 33) said they were “somewhat dissatisfied” and none of them said they were “very dissatisfied” (0% of 33). Among Event participants, none of those surveyed gave “somewhat dissatisfied” or “very dissatisfied” ratings (both 0% of 80). Compared to Non-Event participants, Events are more likely to give “very satisfied” ratings (58.8% versus 45.5%) and are less likely to give “somewhat dissatisfied” ratings (0% versus 6.1%; both of these differences are significant at  $p < .10$  or better using student's t-test).



**Figure 39. Distribution of Power Manager Satisfaction Ratings (Five-Point Likert Scale)**

All surveyed Ohio participants were asked to give reasons for the satisfaction ratings they gave for the Power Manager program. These are listed in *Appendix G: Participants' Reasons for Satisfaction Ratings*.

Participants in the event survey were also asked to rate the likelihood that they would recommend Power Manager to a friend or colleague on a 10-point scale where "1" means "very unlikely" and "10" means "very likely". A plurality of participants surveyed (overall 38.1% or 43 out of 113) rated their likelihood of recommending the program at "10 out of 10", and the mean rating for likelihood of recommending the program was 8.19 overall. By subgroups, the mean recommendation rating was 8.21 among Event participants and 8.16 among Non-Event participants (the difference between these groups is not statistically significant). Responses to this question are shown in Figure 40.



**Figure 40. Distribution of Likelihood Ratings for Recommending Power Manager**

Twenty-seven respondents gave recommendation ratings of “7” or lower on a 10-point scale; these customers were asked for the reason for their relatively low ratings, which are listed below.

**Event participants (N=18)**

- *I am not dissatisfied. It is part of being a good citizen; you can make your contribution to balance power demand and help the grid. It's also something that's environmentally-friendly, I would guess.*
- *I would recommend it, to save energy and money while keeping comfort level.*
- *I am unclear as to the benefits of participating in the program.*
- *I don't know enough about the program, specifically regarding how much money it's saving me.*
- *I don't see the personal benefits of participating in the program.*
- *I don't know much about it and I thought that when we signed up for the program it would only be for that summer.*
- *I can't imagine the subject ever coming up. Also, I don't really know much about the program.*
- *I don't know enough about the program to give it a full recommendation.*
- *I don't know enough about the program to recommend it.*
- *I haven't noticed the activation of the device enough to form an opinion about it.*
- *I'm not the type of person to recommend things.*

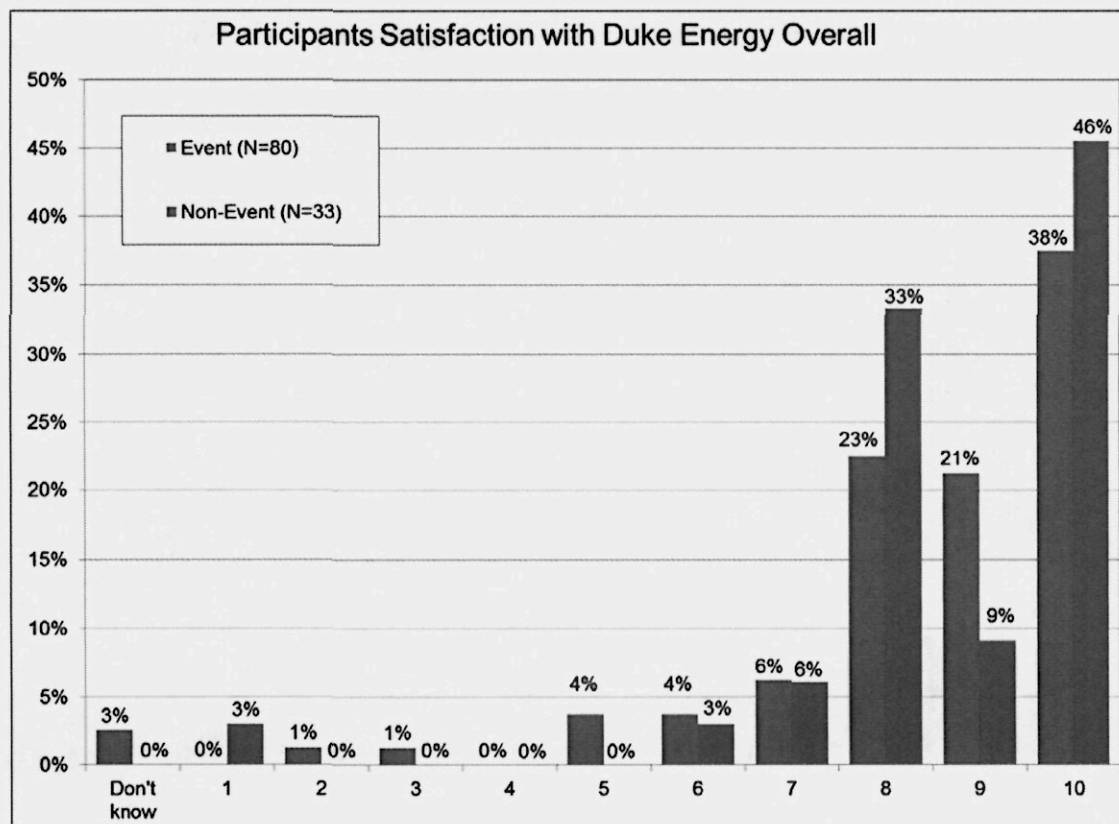


- *The program is something that I would never talk about.*
- *I would not recommend it because what other people want to do is not a concern of mine.*
- *I don't like the house becoming so warm. It heats up very quickly to 80 degrees.*
- *We have some occasional discomfort. Some parts of the house don't cool down, but that's probably more a function of the AC system itself.*
- *This is not something comes up in conversation. Also, my HVAC contractor recommended against the system; he said the gizmo they use isn't sufficient for what they're trying to do.*
- *I would not recommend this or any other program, because I feel those decisions are best left up to the individual. I also know of someone whose AC unit was severely damaged by the Power Manager device and had to be replaced.*
- *I would tell anyone that is interested in the program that I suspect the device might have harmed my AC unit.*

#### **Non-Event participants (N=9)**

- *I would if the subject came up, but I don't really spend time talking about ways to save money on your electric bill.*
- *I would probably recommend it. I haven't really noticed it.*
- *I would 'almost' recommend it, but wouldn't want to extend myself without being conversant about the program.*
- *If I really noticed a difference, I might.*
- *I don't pay attention to it. It's just there.*
- *They're trying, but I'm not sure about it. I don't know that much about it.*
- *I would highly recommend it, but only for those who are gone for long hours during peak periods.*
- *I'm not home during day. I can't recommend it to folks who are home at those times.*
- *We have more tolerance of heat than others. We're one of the only houses in our neighborhood with the windows open in the summer.*

Participants' overall satisfaction with Duke Energy is also high with an overall mean of 8.61 on a 10-point scale with "1" being not at all satisfied and "10" being very satisfied. A plurality of participants surveyed (overall 39.8% or 45 out of 113) rating their satisfaction with Duke Energy a "10 out of 10". Event respondents' mean satisfaction with Duke Energy is 8.59 while the mean for Non-Event respondents is 8.67 (the difference between these groups is not statistically significant). The distribution of ratings is shown in Figure 41 below.



**Figure 41. Distribution of Duke Energy Overall Satisfaction Ratings**

Seventeen respondents gave satisfaction ratings of “7” or lower on a 10-point scale for their satisfaction with Duke Energy; these customers were asked for the reason for their relatively low ratings, which are listed below.

**Event participants (N=13)**

- *Duke should reduce the number of power outages and quit calling us about the natural gas aggregation policy.*
- *I can't get any answers about what is happening in our area with the power companies. We keep getting people coming to the house to tell us that we can't have Duke Energy here anymore and that we have to switch over to another company but then when I call Duke about it they don't give me any answers.*
- *Every time we have storms we lose power. Our subdivision fares poorly in storms.*
- *I have experienced numerous power outages. I am also curious why our Duke bill hasn't gone down, since now there are other energy providers competing for our business.*
- *We've had a lot of problems with power outages, from storms or just for no reason, perhaps one per month. We've contacted customer service and some were storm-related and they were aware, but two-thirds of the time they had no idea why it went out.*
- *When it comes to their disaster relief, I would rate them pretty low. It's not so much Duke's response, but it's where we live: we're at the end of the street and we're one of the last to be restored. It took a week after Ivan to get back up, even when our neighbor had*

*power. After another event we were out for 3-4 days. But I understand Duke has to fix the greatest service lines first.*

- I dislike the \$25 monthly 'delivery charge' that has been added to our energy bill.*
- I don't use them that much; I have other services for electric and gas. Their pricing is too high.*
- Duke's energy rates are higher than their competitors.*
- Their services are good but there was an increase in my bill again. It seems like the rates keep going up.*
- The rates are high and then you tell us that there are going to be more rate increases.*
- The rates seem high, and they raise rates frequently, but I rarely have any other problems with Duke's services. So I'm neutral.*
- I'm neutral. It is something I don't think about.*

#### **Non-Event participants (N=4)**

- One: improve dividends. Two: I would like a way to participate in money-saving energy efficiency programs without getting bogged down on details and paperwork.*
- I manage the neighborhood and I have had to call Duke several times, from issues of power outages (I was told it could be birds on the lines; never heard that before) to rodents chewing into things. I wish Duke would be more proactive about giving better reliability and better communication when things happen.*
- They are more expensive than their competitors.*
- They are too expensive.*

### **Satisfaction with Power Manager and Comfort Ratings by Activation Event End Time**

As shown previously in Table 1, Power Manager activation events occurred on weekday afternoons during the summer. Activation events in Ohio during the summer of 2013 all began at either 1:30 p.m. or 2:30 p.m. and all concluded at either 5:00 p.m. or 6:00 p.m. However, all surveyed activation events ended at 5:00 p.m. (the only event which lasted until 6:00 p.m. was on July 16, and this event was not surveyed). Thus it is not possible to analyze differences in discomfort or satisfaction based on the end times of events since all surveyed events in Ohio during 2013 had the same end time.

### **Exploring Factors that Affect Comfort Ratings**

#### **High Temperature Correlations with Comfort Levels**

The outdoor high temperature<sup>19</sup> during an activation event or non-event high temperature day has low correlations with ratings of comfort before (Pearson correlation 0.038) and during (Pearson correlation -0.090) the device activation or high temperature non-event (neither correlation reaches the  $p < .10$  level of statistical significance). The negative correlation with comfort “during” events or high-temperature weekday afternoons indicates that participants tend to be

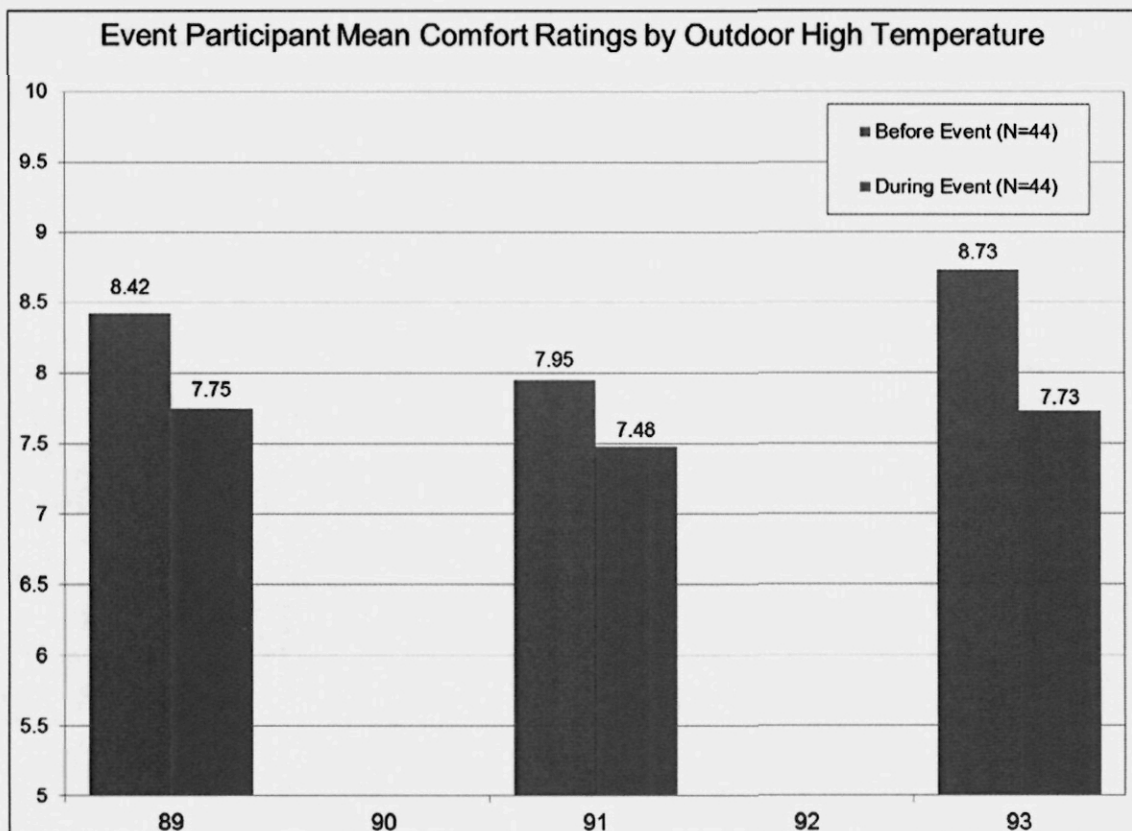
<sup>19</sup> Heat Index is very highly correlated with High Temperature (Pearson Correlation = 0.614 which is significant at  $p < .01$ ), and correlates with measures of respondent comfort at about the same levels that High Temperature does. Therefore only High Temperature correlations are reported in this section.



less comfortable, in general, on days when the outdoor temperature is hotter (though the relationship is not statistically significant). Correlations between outdoor high temperature and noticing a decline in comfort (Pearson correlation -0.031) and absolute change in comfort ratings (Pearson correlation 0.170) are not significant either.

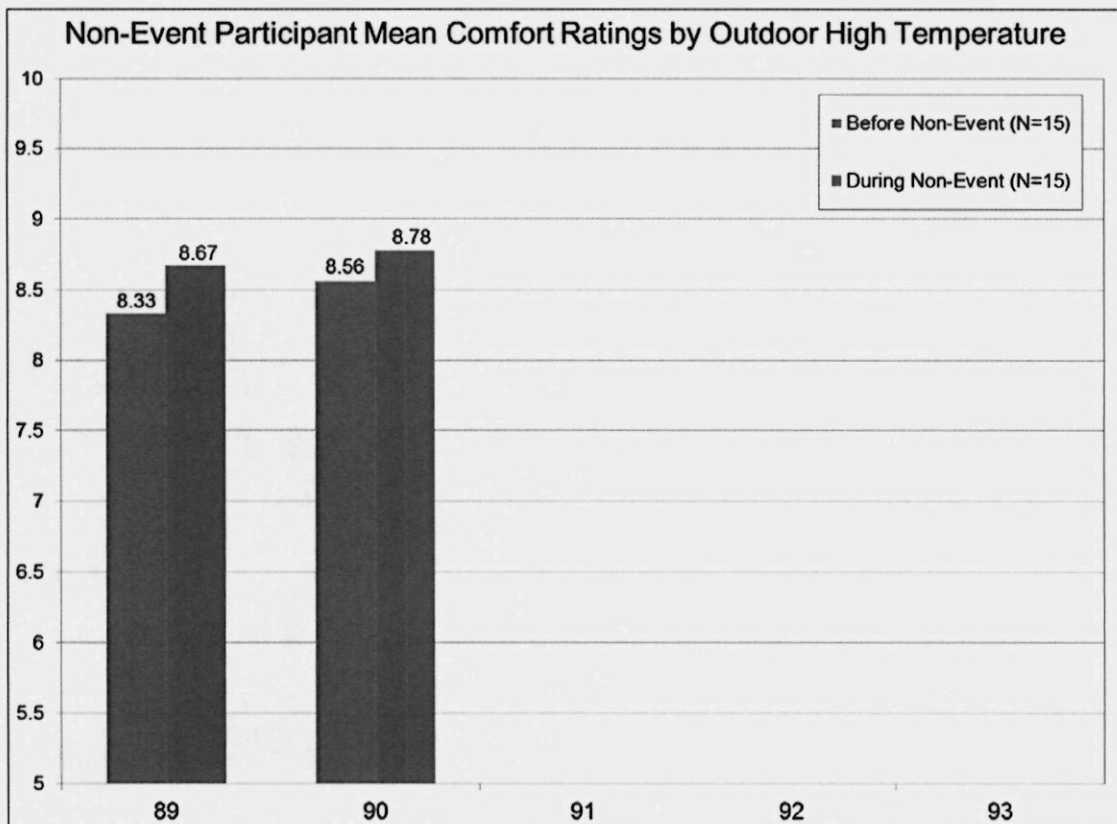
### Comfort Ratings by High Temperature

Figure 42 and Figure 43 show mean comfort ratings before and during Power Manager events and non-event high temperature days by the outdoor high temperature on that day (the schedule of events and non-events and corresponding high temperatures and heat index readings can be found in Table 1). As seen previously (such as in Figure 29), non-event high temperature days do not have a negative effect on participants' comfort levels (red "during" bars are actually higher than blue "before" bars indicating a net *increase* in comfort), while Power Manager activation events do cause a significant decrease in comfort ratings (red "during" bars are lower than blue "before" bars indicating a net *decline* in comfort). However, the only comparison shown in these two charts which is statistically significant is for Event participants on days when the outdoor temperature reached 91 degrees (comfort ratings declined from 7.95 to 7.48, significant at  $p < .05$  using student's t-test; this result is partly due to sample size, in that there are 21 respondents in this group and all other scores shown are based on between six and twelve respondents).



**Figure 42. Comfort Ratings Before and During Events by Outdoor High Temperature**

*Note: Only respondents who were at home during the event and who provided both comfort ratings are included in this chart.*

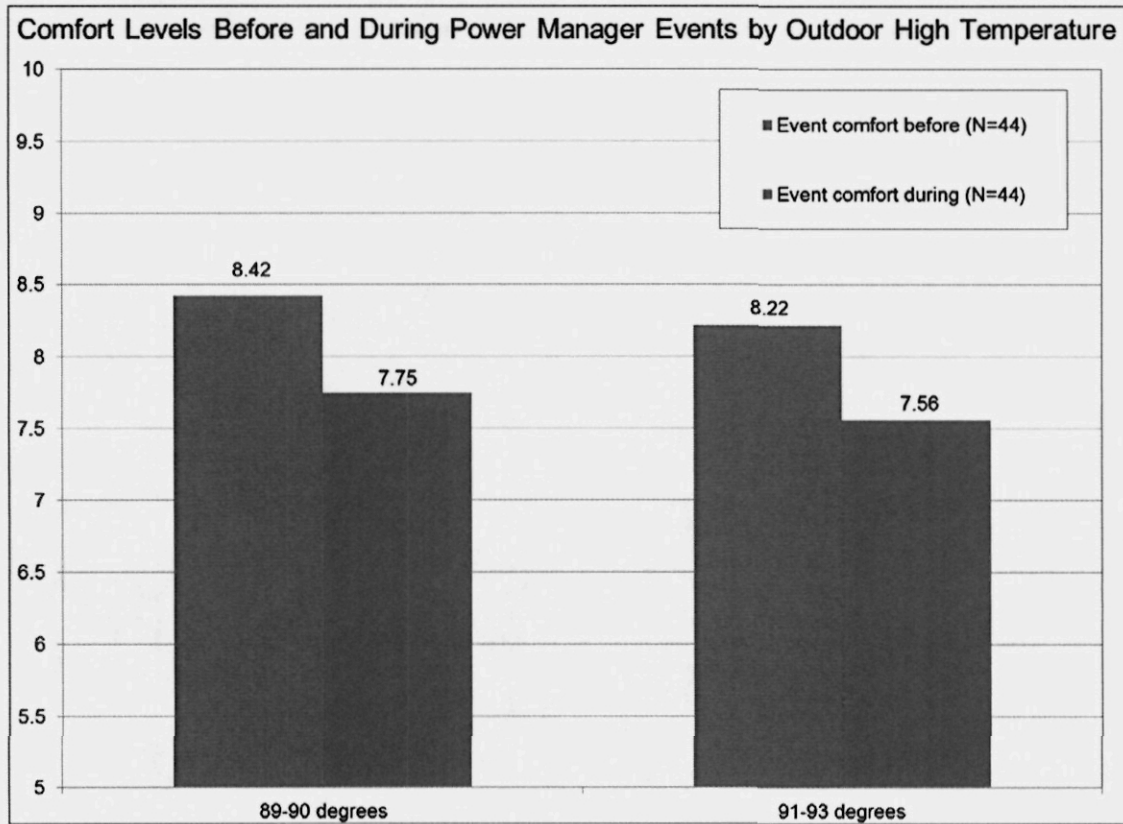


**Figure 43. Comfort Ratings Before and During Non-Events by Outdoor High Temperature**

*Note: Only respondents who were at home during the event and who provided both comfort ratings are included in this chart.*

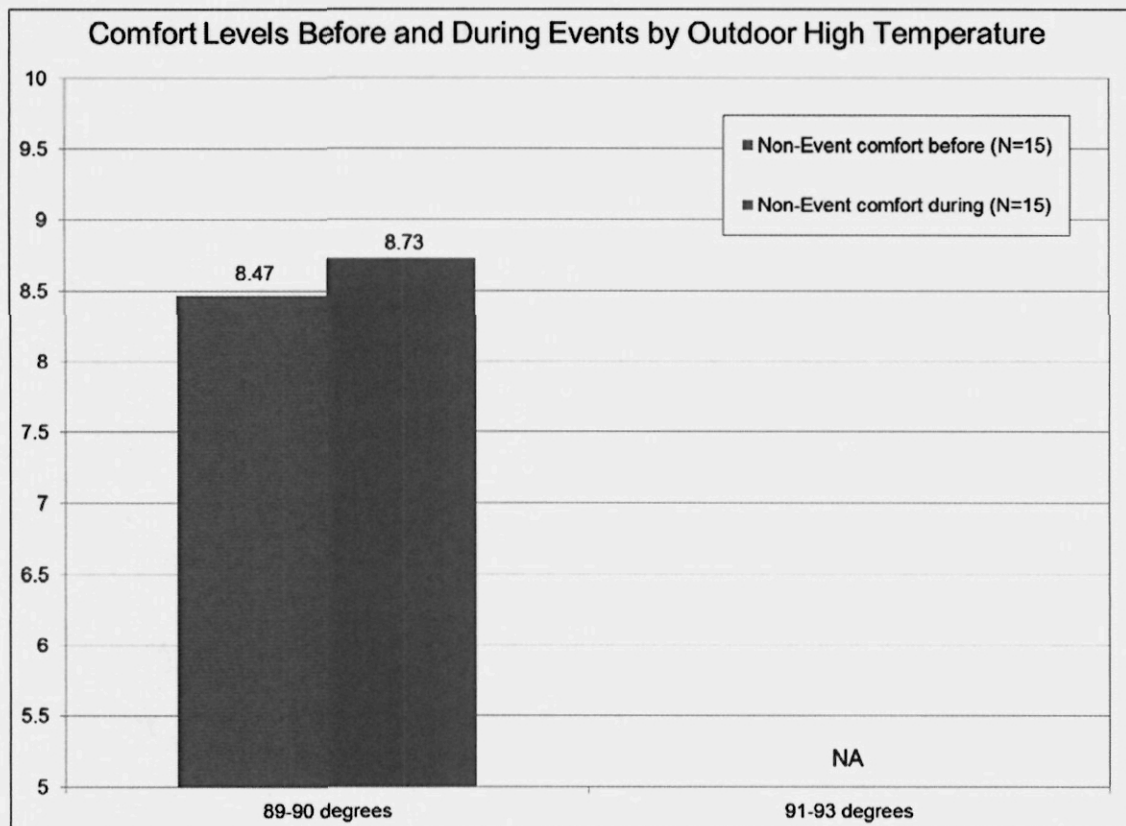
Figure 44 and Figure 45 show the same mean comfort ratings by two outdoor high temperature ranges. Power Manager Events decrease comfort in both temperature categories, and comfort ratings are somewhat lower (before and during events) when the outdoor temperature is higher. For Event participants, the difference between “before” and “during” comfort levels is statistically significant at the  $p < .05$  level using student’s t-test when the outdoor temperature is 91 to 93 degrees (but is not significant when the temperature is 89 to 90 degrees).

The difference between “before” and “during” comfort ratings for Non-Event participants is not statistically significant. The differences between comfort ratings given by Event and Non-Event participants on days where the outside temperature was 89 to 90 degrees are also not statistically significant (there were no Non-Event surveys conducted on days when the temperature was higher than 90 degrees).



**Figure 44. Comfort Ratings Before and During Events by Outdoor High Temperature**

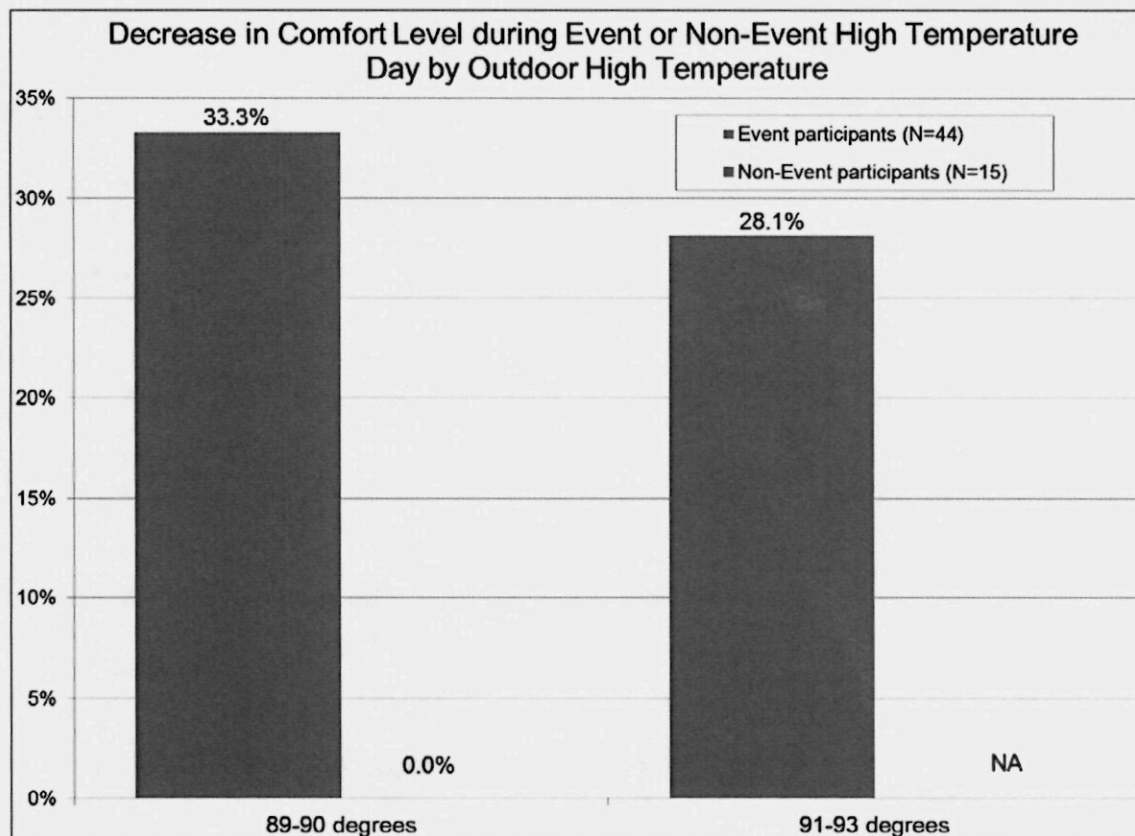
*Note: Only respondents who were at home during the event and who provided both comfort ratings are included in this chart.*



**Figure 45. Comfort Ratings Before and During Non-Events by Outdoor High Temperature**

*Note: There were no non-event high temperature days in Ohio where the outdoor temperature was 91 degrees or higher. Only respondents who were at home on the non-event high temperature day and who provided both comfort ratings are included in this chart.*

Figure 46 shows the percentage of participants who reported a decline in comfort ratings during an event or non-event high temperature day. The percentage of participants who reported a decline in comfort during Power Manager events is consistently higher across outdoor temperature levels (28.1% to 33.3%), and is significantly greater ( $p < .05$  using student's t-test) than the percentage of Non-Event participants reporting a decline in comfort on non-event high temperature days with comparable temperatures (all Non-Events were surveyed on days where the high temperature reached 89 or 90 degrees, and none of these participants reported a decline in comfort).



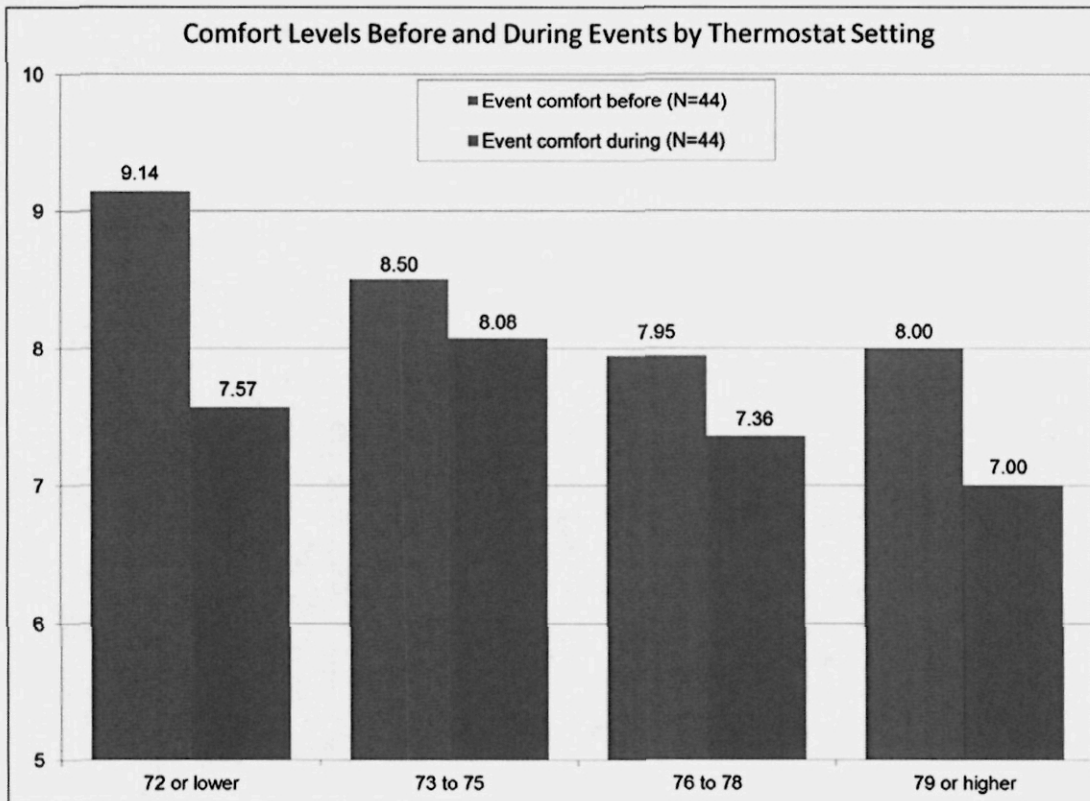
**Figure 46. Decrease in Comfort by Outdoor High Temperature**

*Note: There were not any non-event high temperature days in Ohio where the outdoor temperature was 91 degrees or higher.*

### Comfort Ratings by Thermostat Settings

Event participants were more likely to report a decline in comfort during Power Manager events than Non-Event participants were to report a change on a high temperature non-event day. However, the magnitude of the change for Event participants in Ohio is only statistically significant when thermostats were set to between 76 and 78 degrees during the event ( $p < .10$  or better using student's t-test). Comfort ratings before and after events are shown by thermostat settings in Figure 47.

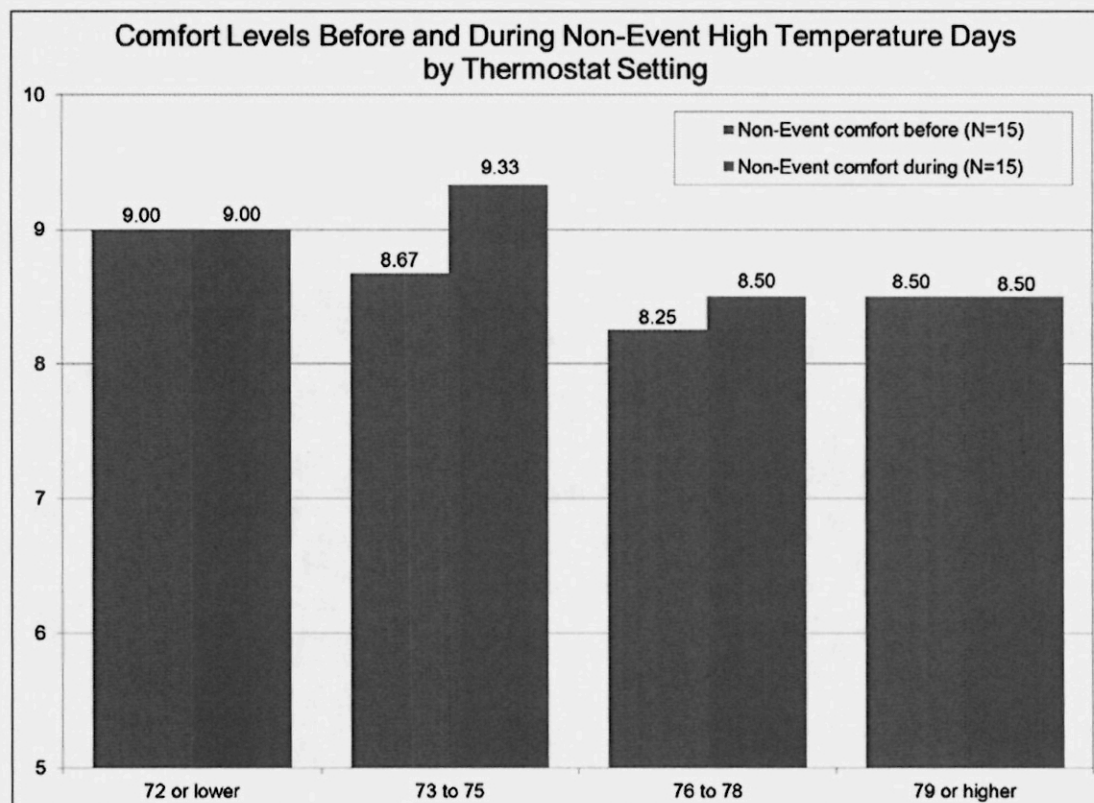
Seven Event participants had their thermostats set at 72 degrees or lower and their mean comfort ratings declined from an initial 9.14 before the event to 7.57 during the event (not significant due to small sample size). Twelve Event participants had their thermostats set at 73 to 75 degrees and their mean comfort ratings declined from 8.50 to 8.08 (also not significant). Twenty-two Event participants had their thermostats set at 76 to 78 degrees and reported that their mean comfort ratings fell significantly from 7.95 before the event to 7.36 after the event ( $p < .10$  using student's t-test). Only one Event participant had their thermostat set at 79 or higher and their reported comfort ratings fell from "8" to "7" during the event.



**Figure 47. Changes in Comfort by Thermostat Settings – During Power Manager Events**

Changes in comfort ratings by thermostat setting for Non-Event participants on high temperature days are shown in Figure 48. For these participants, there were no significant changes in comfort ratings from “before” to “during” at any thermostat level (and the only changes in comfort ratings for this group are increases rather than decreases).

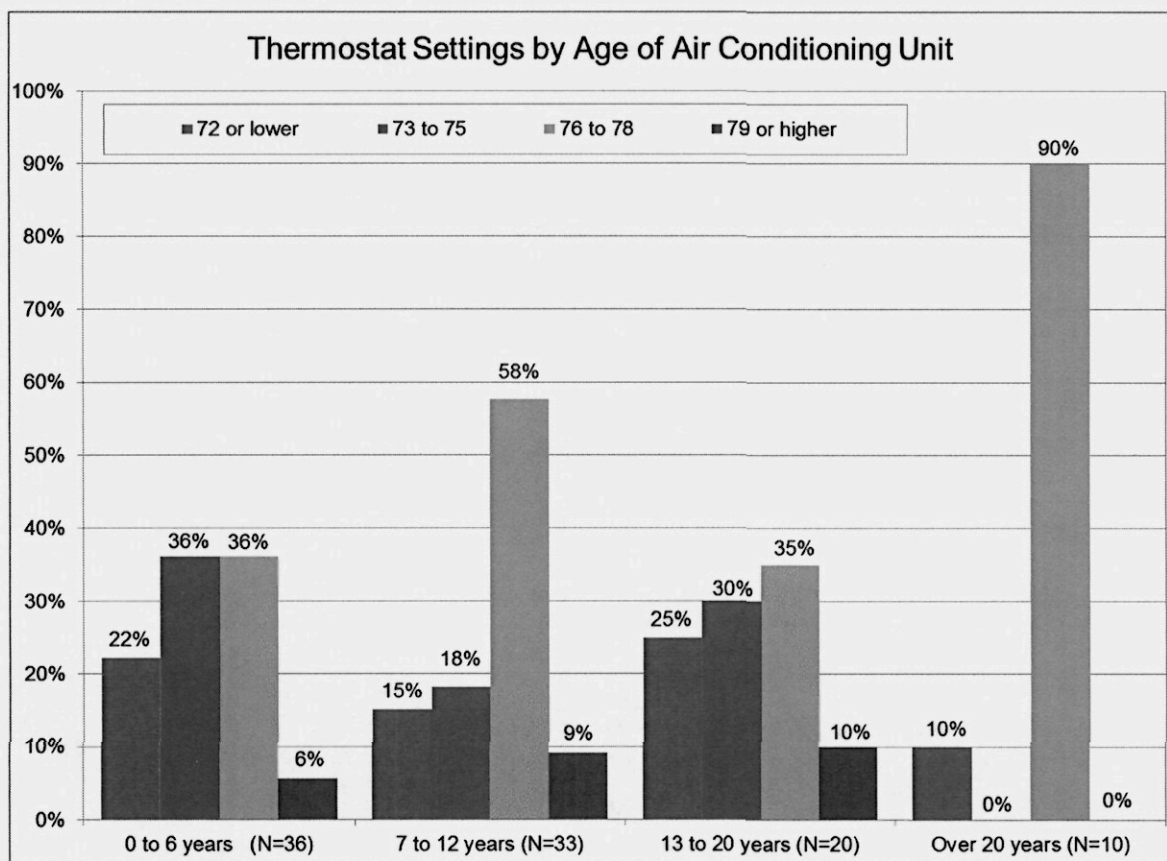




**Figure 48. Changes in Comfort by Thermostat Settings – During High Temperature Non-Events**

### Thermostat Settings by Age of Air Conditioner

There are some statistically significant differences in terms of the temperature participants had their thermometers set to during an event or non-event high temperature day by the age of their air conditioning unit, as seen in Figure 49. Customers with AV units that are 7 to 12 years old are more likely to set their units at 76 to 78 degrees (57.6% or 19 out of 33) and less likely to set them at 73 to 75 degrees (18.2% or 6 out of 33) compared to customers with units that are 6 years old or newer (differences significant at  $p < .05$  using student's t-test). Customers with 7 to 12 year old units are also more likely than those with 13 to 20 year old units to set their thermostats to 76 to 78 degrees (significant at  $p < .10$  using student's t-test). Finally, customers with units that are more than 20 years old are more likely than any of the other groups to set their thermostats to 76 to 78 degrees (90.0% or 9 out of 10; differences significant at  $p < .05$  using student's t-test).



**Figure 49. Thermostat Settings by Age of Air Conditioning Unit (Event and Non-Event Participants Combined)**

*Note: Only respondents who were able to specify thermostat settings and ages of air conditioning units are included in this chart (total N=99).*



## Appendix A: 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 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.**

### Background

1. Please describe your role and scope of responsibility in detail. When did you take on this role?
2. Can you please give me some history of the Power Manager program in \_\_\_\_\_, and tell me about the energy market in \_\_\_\_\_.
3. Are there any major differences between Power Manager in \_\_\_\_\_ and the other states in Duke Energy's service territory?

### Program Implementation and Customers

Please explain how the Power Manager program works: Walk us through the participatory steps starting with a customer who knows nothing about the program.

### Targeting and marketing

4. How does Duke determine the best target markets or customer segments to focus on? Do you use any type of strategic targeting of customers in order to market to those that have the size of home and AC unit that is capable of providing load reductions?
5. Do you use other Duke Energy EE programs to generate leads for PM?
6. Are there any market information, research or market assessments that you are using to identify market barriers, or to target customers?

**Enrollment**

7. What are the options for enrolling?
8. What is the enrollment process?

**Event calls**

9. Under what conditions would you call an event? Who is involved in the call?
10. How do you coordinate event calls between your residential and non-residential DR programs?
11. Please explain the customer's options for opting out of events

**Demand Response Capacity**

12. What is the current enrollment in Power Manager?
13. What is the current dropout rate for Power Manager? What are some of the typical reasons for dropping out?
14. What is the current demand response capacity you have with Power Manager, assuming you have 100% switch operability?
15. Is Duke Energy planning to increase this capacity in the next few years? Why or why not?
16. If yes, 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?

**Program Objectives**

17. In your own words, please briefly describe the Power Manager Program's objectives as a program?
18. What are Power Manager's objectives as a part of Duke Energy's demand response portfolio?
19. In your opinion, how well are the energy impact objectives being met? How do you know if the objectives are met or not?
20. Have these objectives changed in the last year or so, and if so how? Why?
21. I understand that Duke Energy's Retail Energy Desk has responsibility for conducting the two main studies. Can you share with me what has found with the AC duty cycle study and the switch operability study?

22. Are there other studies that Duke Energy has been carrying out to better understand the response of the market?
23. Are there any new internal or external influences on the program since the objectives were developed, that might be affecting program operations? How is Duke Energy responding to those objectives?

### **Analysis and Technology**

24. How do you verify load shed? What is the quality control, tracking and accounting process for determining how well control strategies work?
25. (for post-season interview) Please tell me about the events that were called in 2013. How many events were called? Why were they called (what type of call event)?
26. Where there any surprises or problems with the process? Are there changes that you would recommend to the event call process?
27. (for post-season interview) Did you achieve the load shift you needed for these events? How do you know this?
28. (for post-season interview) How well did the payment accounting and application process operate this last year? Did the program staff come across any issues or problems with payment? How were they resolved?
29. (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 2013? What is being done to deal with this issue? Do you have any suggestions for improving this in addition to the approaches being taken?
30. How are the event calls transmitted to the participants? Is there anything that you would like to change about this process?
31. We understand there is an IT project that allows better administration of the customers' participation or opt out status. Could you please explain this to me in detail?

### **Program Planning and Design**

32. Do you use any vendors to help implement the program? Please tell me their roles and responsibilities for Power Manager
33. Do you currently use any smart grid technologies in your DR programs? Do you have any plans to do so in the future? What do you hope that smart grid technology would provide?

**Program Successes and Challenges**

34. 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 various approaches or methods. How often do you use these resources? What do you use them for?
35. In what ways do you think the Power Manager Program's operations could be improved?
36. If you could change any part of the program what would you change first?
37. What would you say are the program's biggest successes?
38. 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?
39. Do you have any questions for me, about this interview or this process evaluation?

## Appendix B: Participant Survey Instrument

*Use four attempts at different times of the day and different days before dropping from contact list. Call times are from 10:00 a.m. to 8:00 p.m. EPT, Monday through Saturday. No calls on Sunday. Note: Only read words in bold type, italics are instructions.*

Survey ID \_\_\_\_\_  
Surveyor Name \_\_\_\_\_

### State

- ☐ Kentucky
- ☐ Ohio
- ☐ South Carolina
- ☐ North Carolina

*for answering machine 1st through penultimate attempts:*

**Hello, my name is \_\_\_\_\_ and I am calling with a survey about Duke Energy's Power Manager Program. I'm sorry I missed you. I'll try again another time.**

*for answering machine - Final Attempt:*

**Hello, my name is \_\_\_\_\_ and I am calling with a survey about Duke Energy's Power Manager Program. This is my last attempt at reaching you, my apologies for any inconvenience.**

*if person answers:*

**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. We are conducting this survey to obtain your opinion about the program. If you qualify, we will send you a check for \$20 for completing the survey. This survey will take 25 minutes or less 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/NS

*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.*

**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
- ☐ It was already installed when I moved in
- ☐ DK/NS

*if No, DK/NS or Already Installed, skip to question 7*

**3. Do you recall how you first heard about the program?**

- ☐ Yes
- ☐ No
- ☐ DK/NS

*If yes,*

**3a. How did you hear about the Power Manager Program?**

- ☐ Utility bill insert
- ☐ Direct mail offer from Duke Energy
- ☐ Utility website
- ☐ Word-of-mouth (friend/neighbor/landlord)
- ☐ Newspapers
- ☐ Social network \_\_\_\_\_
- ☐ DK/NS
- ☐ Other \_\_\_\_\_

**4. To the best of your ability, could you please tell me what the promoted benefits of the program were?**

- ☐ *benefits* \_\_\_\_\_
- ☐ DK/NS

**5. What was the main reason why you chose to participate in the program?**

- ☐ For the bill credits
- ☐ Helping Duke avoid power shortages/outages
- ☐ To save energy
- ☐ To save money (through lower utility bills)
- ☐ To help the environment
- ☐ *Please explain: (to reduce carbon or GHG, etc.)* \_\_\_\_\_
- ☐ I don't use the air conditioner much
- ☐ I'm usually not home when the events are supposed to occur
- ☐ DK/NS
- ☐ Other \_\_\_\_\_

**5a. Do you recall reading about this benefit in the program brochure or materials sent to you?**

- ☐ Yes
- ☐ No
- ☐ DK/NS