

**Table 69. Measure Installation: Vinyl Weather Stripping for HVAC Window Units**

<i>Two participants received weather stripping for window units according to auditor records</i>	Customer count (N=2)	Measures installed count according to auditor records (N=2)	Confirmed measures installed count (N=1)
Auditor installed weather stripping for window units	0.0%	0.0%	0.0%
Auditor gave weather stripping for window units to customer, customer installed	0.0%	0.0%	0.0%
Auditor gave weather stripping for window units to customer, customer has NOT installed	0.0%	0.0%	0.0%
Did not receive weather stripping for window units	50.0%	50.0%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	50.0%	50.0%	100.0%

Since none of the weather stripping for window units measures were confirmed by surveyed participants (one said they did not receive the measure and one did not recall), none of the follow-up questions for this measure were asked; these customers would not be able to answer questions about a measure if they do not believe, or are not sure if, they have received it.

### **Caulking Windows Installations**

As seen in Table 70, the 27 surveyed participants who received this measure according to auditor records confirmed that 45 windows were caulked by the program, which is 91.8% of the 49 installations recorded by auditors.<sup>24</sup> A majority of customers who received this measure according to auditor records confirmed that it was installed by the auditor (63.0%), while one participant (3.7%) reported that the auditor left this measure but it has not been installed, four participants (14.8%) report that they did not receive this measure at all and five customers (18.5%) were not sure.

<sup>24</sup> Fifteen participants confirmed that auditors caulked 33 windows and two customers confirmed that auditors installed this measure but could not recall the number of windows caulked. Assuming that auditor records are correct for the two customers who did not know the number of windows caulked, these 17 customers had a combined 37 windows caulked. Nine of the fifteen customers (60.0%) who were able to report the number of windows caulked reported a different number of measures received than what was recorded by auditors: seven participants reported more measures than auditor records and two reported receiving fewer measures than auditor records. In addition, five customers did not know if they had any windows caulked, and according to program records these customers should have had eight of their windows caulked. Thus the total confirmed installed is 33 measures confirmed and corrected by customers plus twelve windows where auditor records are assumed correct equals 45 windows caulked.

**Table 70. Measure Installation: Caulking Windows**

<b>27 participants received door caulk according to auditor records</b>	<b>Customer count (N=27)</b>	<b>Measures installed count according to auditor records (N=49)</b>	<b>Confirmed measures installed count (N=45)</b>
Auditor caulked window(s)	63.0%	71.4%	82.2%
Auditor gave caulk to customer, customer caulked window(s)	0.0%	0.0%	0.0%
Auditor gave caulk to customer, customer has NOT caulked windows	3.7%	2.0%	0.0%
Did not receive window caulk	14.8%	10.2%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	18.5%	16.3%	17.8%

The customer who received window caulk from the auditor but has not installed it yet reports that they still intend to install this measure themselves.

One of the seventeen participants (5.9%) who confirmed the installation of this measure reported that it has been removed from both of the windows where it was installed (though auditor records only showed one measure installed for this customer). When asked who removed the measure and why, this Ohio customer responded: “*we had those windows replaced*”.

Seventeen participants who confirmed that they had windows caulked by the program rated their satisfaction with this measure on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for the program-provided window caulking is very high at 9.53, and only one participant (5.9%) gave a rating of “7” or lower for this measure.

The Ohio customer who rated their satisfaction a “6 out of 10” was asked the reason for their relatively low rating, and they explained: “*We still need to put plastic on that window to keep the draft out; basically, that window just needs to be replaced.*”

Table 71 shows that seven surveyed participants who confirmed this measure was installed (41.2%) report having a total of 47 windows caulked before the program (though this includes one participant who reports 20 windows caulked; the median number of previously caulked windows is four per household with windows caulked before the program). About a quarter (23.5%) of these participants report that they had been intending to purchase window caulk before the program and another 5.9% said they “maybe” would have bought window caulk in the absence of the program. One customer reported that they purchased and installed caulking for two more windows since participating in the program.

**Table 71. Window Caulking Installed Before the Program and Additional Window Caulk Purchased (N=17)**

<b>Base: 17 participants who confirmed program window caulking</b>	<b>Customers (N)</b>	<b>Customers (%)</b>
<b>Previously installed window caulk</b>		
Already had 1 to 3 windows caulked	2	11.8%
Already had 4 or more windows caulked	5	29.4%
Did not have any windows caulked	8	47.1%
Don't know / not specified	2	11.8%
<b>Were you planning on purchasing window caulk before participating in the program?</b>		
No	11	64.7%
No, already installed on all windows	0	0.0%
Maybe	1	5.9%
Yes	4	23.5%
Don't know / not specified	1	5.9%
<b>Additional window caulk purchased since program</b>		
Have not purchased additional windows caulk	16	94.1%
Purchased additional windows caulk	1	5.9%

**Clear Glass Patch Tape Installations**

As seen in Table 72, the five surveyed participants who received this measure according to auditor records confirmed that five windows were patched by the program, which is 71.4% of the seven installations recorded by auditors.<sup>25</sup> Two customers (40.0%) confirmed that auditors patched windows, two customers (40.0%) were not sure if their windows had been patched, and one (20.0%) reported that they did not receive this measure. None of the window patch tape was installed by the customers themselves.

**Table 72. Measure Installation: Clear Glass Patch Tape**

<b>Five participants received clear glass patch tape according to auditor records</b>	<b>Customer count (N=5)</b>	<b>Measures installed count according to auditor records (N=7)</b>	<b>Confirmed measures installed count (N=5)</b>
Auditor patched windows	40.0%	57.1%	60.0%
Auditor gave patch tape to customer, customer patched windows	0.0%	0.0%	0.0%
Auditor gave patch tape to customer, customer has NOT patched windows	0.0%	0.0%	0.0%
Did not receive patch tape	20.0%	14.3%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	40.0%	28.6%	40.0%

<sup>25</sup> The two participants who confirmed that the auditor installed glass patch tape should have had four windows patched according to auditor records, though they only confirmed that three windows were patched. In addition, two customers did not know if they had any windows patched, and according to program records these customers should have had two of their windows patched. Thus the total confirmed installed is three windows patched confirmed and corrected by customers plus two windows where auditor records are assumed correct equals five windows patched.

The two customers who confirmed that their windows were patched by the program were asked if any of the patch tape has been removed from where it was installed: One customer reported that the patch tape was still on their window and the other customer reported that the patch tape had been removed from the two windows where it was installed because “we replaced the window glass.”

Both of the participants who confirmed that they currently have windows patched by the program rated their satisfaction with this measure at “10 out of 10” on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for the program-provided door caulking is thus 10.0, and nobody surveyed gave ratings of “7” or lower for this measure.

As seen in Table 73, both customers who confirmed the installation of clear glass patch tape report that they did not have this measure installed before participating in the Residential Neighborhoods program, and neither of these customers have purchased any additional patch tape since the program. One customer reported that they “maybe” would have been intending to install this measure in the absence of the program, and the other had not been intending to patch their windows before the program.

**Table 73. Windows Patched with Clear Glass Tape before the Program and Additional Patch Tape Purchased (N=2)**

<i>Base: two participants who confirmed windows patched by program</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<b><i>Previously installed patch tape</i></b>		
Already had one or more windows patched	0	0.0%
Did not already have windows patched	2	100.0%
Don't know / not specified	0	0.0%
<b><i>Were you planning on purchasing patch tape before participating in the program?</i></b>		
No	1	50.0%
No, already installed on all windows	0	0.0%
Maybe	1	50.0%
Yes	0	0.0%
Don't know / not specified	0	0.0%
<b><i>Additional patch tape purchased since program</i></b>		
Have not purchased additional patch tape	2	100.0%
Purchased additional patch tape	0	0.0%

**Water Heater Pipe Wrap Installations**

As seen in Table 74, the 64 surveyed participants who received pipe wrapping confirmed that 621 linear feet of pipe were wrapped by the program, which is 68.8% of the 903 linear feet installed recorded by auditors.<sup>26</sup> About a fifth of participants report that they did not receive this

<sup>26</sup> The 39 participants who confirmed that the auditor wrapped pipes should have had 603 feet of wrapping installed according to auditor records, however only one participant reported the exact same number of linear feet that was recorded by the auditor, while one participant reported more linear feet than auditor records and fifteen participants reported fewer linear feet than auditors. Another 22 of these participants confirmed that their pipes were wrapped by auditors but did not know how many feet had been wrapped; for these participants, auditor records of linear footage

measure (18.8% or 12 out of 64 receiving the measure according to program records). None of the pipe wrap was installed by the customers themselves.

**Table 74. Measure Installation: Water Heater Pipe Wrap**

<b>64 participants received pipe wrap according to auditor records</b>	<b>Customer count (N=64)</b>	<b>Linear feet of measure installed according to auditor records (N=903)</b>	<b>Confirmed linear feet of measure installed (N=621)</b>
Auditor wrapped pipes	60.9%	66.8%	74.9%
Auditor gave wrap to customer, customer wrapped pipes	0.0%	0.0%	0.0%
Auditor gave wrap to customer, customer has NOT wrapped pipes	0.0%	0.0%	0.0%
Did not receive pipe wrapping	18.8%	15.9%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	20.3%	17.3%	25.1%

One participant (2.6%) reported that the auditor left additional pipe wrap behind which has not been installed, however the amount was only one-half of a linear foot.

Customers who confirmed that pipe wrap installed by the program were asked if there was previously any wrap on these hot water pipes: 92.3% said there was not, while only two surveyed participants (5.1%) previously had their pipes wrapped and the other 2.6% did not know.

Customers who confirmed that their pipes were wrapped by the program were asked if any of the pipe wrap has been removed from where it was installed. As indicated in Table 75, none of the surveyed participants report that wrap was removed from pipes.

**Table 75. Removing Program-Provided Hot Water Pipe Wrap**

	<b>Customers with confirmed installation percent (N=52)</b>	<b>Confirmed linear feet of measure installed percent (N=315)</b>
<b><i>Have any of the pipe wrap that was installed through the Residential Neighborhood Program since been removed?</i></b>		
No, all pipes wrapped are currently wrapped	75.0%	83.5% installed
Yes, some or all wrapping removed from pipe	0.0%	0.0% removed
Not sure if pipes were wrapped (did not answer questions about installation)	25.0%	16.5% assumed installed

Thirty-nine participants who confirmed that they currently have pipes wrapped by the program rated their satisfaction with this measure on a ten-point scale where "10" is the most satisfied. As

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are assumed to be correct. In addition, thirteen customers did not know if they had any pipes wrapped, and according to program records these customers should have had 156 feet of pipe wrap installed. Thus the total confirmed installed is 465 feet confirmed and corrected by customers plus 156 feet of wrap where auditor records are assumed correct equals 621 linear feet of pipe wrapped.

seen previously in Table 24, the mean satisfaction rating for the program-provided pipe wrap is very high at 9.56, and none of the customers rating this measure gave ratings of “7” or lower.

Only three surveyed participants (7.7%) already had hot water pipes wrapped before participating in the Residential Neighborhoods program, as seen in Table 76. Prior to the program, six respondents (15.4%) say they intended to purchase and install pipe wrap, while another two respondents (5.1%) said they “maybe” would have intended to wrap their pipes before participating in the program, while the remaining 79.5% did not intend to wrap any pipes. None of the surveyed program participants have wrapped any additional hot water pipes since receiving measures from the program audit.

**Table 76. Hot Water Pipes Wrapped Before the Program and Additional Wrap Purchased (N=39)**

<i>Base: 39 participants who confirmed program hot water pipe wrapping</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<b><i>Previously installed hot water pipe wrap</i></b>		
Already had pipes wrapped	3	7.7%
Did not already have pipes wrapped	34	87.2%
Don't know / not specified	2	5.1%
<b><i>Were you planning on purchasing pipe wrap before participating in the program?</i></b>		
No	31	79.5%
No, already installed on all available pipe	0	0.0%
Maybe	2	5.1%
Yes	6	15.4%
Don't know / not specified	0	0.0%
<b><i>Additional pipe wrap purchased since program</i></b>		
Have not purchased additional pipe wrap	39	100.0%
Purchased additional pipe wrap	0	0.0%

**Water Heater Tank Insulation Wrap Installations**

As seen in Table 77, the ten surveyed participants confirmed that nine water heaters were insulated by the program, which is 90.0% of the ten installations recorded by auditors.<sup>27</sup> One customer reported that they did not receive this measure, and one measure (11.1% of 9 confirmed installations) was installed by the participant. The sole survey participant who installed this measure themselves confirmed that this was easy to do.

<sup>27</sup> The eight participants who confirmed that the auditor insulated their water heaters had 16 eight heaters insulated according to auditor records. In addition, one customer reported that the auditor left this measure and the customer installed it himself. Thus the total confirmed installed is nine units insulated confirmed by customers.

**Table 77. Measure Installation: Water Heater Tank Insulation Wrap**

<i>Ten participants received door caulk according to auditor records</i>	<b>Customer count (N=09)</b>	<b>Measures installed count according to auditor records (N=10)</b>	<b>Confirmed measures installed count (N=9)</b>
Auditor insulated water tank	80.0%	80.0%	88.9%
Auditor gave insulated water tank to customer, customer insulated water tank	10.0%	10.0%	0.0%
Auditor gave tank wrap to customer, customer has NOT insulated water tank	0.0%	0.0%	0.0%
Did not receive water tank wrap	10.0%	10.0%	11.1%
Don't know (assuming auditor record is correct and measure was installed)	0.0%	0.0%	0.0%

Customers who confirmed that water heaters were insulated by the program were asked if any of the insulation has been removed from where it was installed. As indicated in Table 78, none of the surveyed participants reported that insulation was removed.

**Table 78. Removing Program-Provided Water Heater Tank Insulation**

	<b>Customers with confirmed installation percent (N=9)</b>	<b>Confirmed measures installed percent (N=9)</b>
<i>Have the water heater tank insulation that was installed through the Residential Neighborhood Program since been removed?</i>		
No, insulation currently installed	100.0%	100.0% installed
Yes, insulation removed	0.0%	0.0% removed
Not sure if insulation was installed (did not answer questions about installation)	0.0%	0.0% assumed installed

Nine participants who confirmed that they currently have water heaters insulated by the program rated their satisfaction with this measure on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for the program-provided water heater tank insulation is very high at 9.44, and none gave this measure a rating of “7” or lower.

Only two of the surveyed participants who confirmed the installation of this measure (22.2%) already had insulation wrap on their water heater tanks before participating in the Residential Neighborhoods program, as seen in Table 79. Prior to the program, one respondent (11.1%) said they intended to purchase and install insulating wrap on their water heater, while another respondent (11.1%) said they “maybe” would have intended to insulate their water heater before participating in the program, while the remaining 77.8% did not intend to insulate their water heaters before the program.<sup>28</sup>

<sup>28</sup> Participants were not asked if they have purchased additional water heater tank insulation wrap after participating in the program, since this question is only asked of respondents who had the program-provided insulating wrap installed, and it is assumed that residences do not have more than one water heater.

**Table 79. Water Heater Tank Insulation Wrap Installed before the Program (N=9)**

<i>Base: Nine participants who confirmed program water heater tank insulation</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<b><i>Previously installed water heater tank insulation</i></b>		
Already had insulation on tank	2	22.2%
Did not already have insulation on tank	7	77.8%
Don't know / not specified	0	0.0%
<b><i>Were you planning on purchasing water heater tank insulation before participating in the program?</i></b>		
No	7	77.8%
No, already installed on water heater	0	0.0%
Maybe	1	11.1%
Yes	1	11.1%
Don't know / not specified	0	0.0%

**Water Heater Temperature Adjustments**

As seen in Table 80, the 71 surveyed participants whose water temperature was checked according to auditor records confirmed that their water temperature was checked in 70 cases (97.2%).<sup>29</sup> Only 2.8% of these participants report that they did not receive a check of their water heater temperature and none of the participants checked the temperature themselves.

**Table 80. Checking Water Heater Temperature**

<b><i>71 participants had their water temperature checked according to auditor records</i></b>	<b>Customer count (N=71)</b>	<b>Temps checked according to auditor records (N=72)</b>	<b>Confirmed temps checked (N=70)</b>
Auditor checked temperature	52.1%	52.8%	54.3%
Customer checked temperature	0.0%	0.0%	0.0%
Did not receive temperature check	2.8%	2.8%	0.0%
Don't know (assuming auditor record is correct and temperature was checked)	45.1%	44.4%	45.7%

The 37 participants who confirmed that the auditor checked the temperature of their water heater were asked if any adjustments were made to the temperature settings. As seen in Table 81, about half (48.6%) report that their temperature was adjusted, while 32.4% report that there was no adjustment and 18.9% are not sure.

<sup>29</sup> Thirty-seven participants confirmed that the auditor checked the temperature of a total of 38 water heaters (one participant had two measures performed according to auditor records), and 32 participants were not sure if this had been done or not. Thus the total confirmed temperature checks is 38 confirmed by customers plus 32 where auditor records are assumed correct equals 70 water heater temperatures checked.



**Table 81. Adjusting Water Heater Temperature**

<b>37 participants confirmed that the auditor checked their water heater temperature</b>	<b>Customer count (N=37)</b>
Auditor adjusted temperature	48.6%
Auditor did not make an adjustment	32.4%
Not sure if the temperature was adjusted or not	18.9%

The 37 participants who confirmed that the auditor checked the temperature of their water heater were also asked if they knew the temperature readings before and after any adjustments. Only one customer who confirmed that their temperature was adjusted was able to report the temperature reading from before the auditor’s adjustment: this customer says their water heater was set “*as high as it would go; 160 degrees, I think,*” and that the auditor set the temperature back to 120 degrees. Two more customers who confirmed their temperatures were adjusted were able to report the temperature after adjustment but not before: one customer reported that the auditor set their temperature to 120 degrees, and the other said “*I don’t know the number, but it is lower than before.*” Three customers who did not have their temperatures adjusted (25.0%) were able to give temperature readings: these are 105 degrees, 120 degrees and “*the water heater is on setting ‘B’.*”

Customers whose water heater temperature was checked were asked if any further adjustments have been made since the program audit. Table 82 shows that 86.5% of participants report no further adjustments, while one participant confirms that there was a further adjustment made and four participants are not sure.

**Table 82. Undoing Water Heater Temperature Adjustments (N=37)**

<b>37 participants confirmed that the auditor checked their water heater temperature</b>	<b>Customer count (N=37)</b>
<b><i>Has anyone made any further changes to the temperature setting since the home audit?</i></b>	
No, temperature has not been adjusted since audit	86.5%
Yes, temperature has been adjusted since audit	2.7%
Not sure if temperature has been adjusted since audit or not	10.8%

The customer whose water temperature was adjusted after the audit was asked who did this and what adjustment was made; they reported that “*the installer for my new water heater set the temperature*” but they did not know what temperature it was set at.

Thirty-four participants who confirmed that their water temperature was checked during the program audit rated their satisfaction with this measure on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for the temperature check is very high at 9.62, and only 2.9% gave a rating of “7” or lower.

One Ohio participant rated their satisfaction at “6 out of 10” and explained why by saying “*my water is not hot enough.*” However, this customer also reported that the auditor checked their temperature but did not make any adjustment, indicating that this customer was not happy with their water temperature before the program either.

Only 29.7% of program participants who confirmed that the auditor checked their water temperature report that they ever checked their water temperature before the program, and only 13.5% report checking their water temperature on a regular basis. Two-thirds of surveyed participants (67.6%) have never checked the temperature on their water heaters.

**Table 83. Checking Water Temperature before the Program (N=37)**

<i>Base: 37 participants who confirmed program water temperature check</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<i>How often did you check the temperature on your water heater before participating in the program?</i>		
Never checked	25	67.6%
Checked once or twice / a few times	6	16.2%
Checked regularly, but less than once a year	2	5.4%
Checked regularly, once per year or more often	3	8.1%
Don't know	1	2.7%

### Foam Insulation Spray Installations

As seen in Table 84, a minority of participants were able to positively confirm the installation of foam insulation spray measures. Only two out of five participants (40.4% or 19 out of 47) who received this measure according to program records verified that the auditor installed foam insulation spray, while nearly a third (29.8%) claim they did not receive the measure and another third (29.8%) are not sure. The 47 surveyed participants confirmed the installation of only 33 cans of insulation spray, which is 68.8% of the 48 installations<sup>30</sup> recorded by auditors; this includes 14 cans (42.4% of 33 confirmed installed) which are counted as installed according to auditor records because the customer did not know if they had received the measure or not. None of the surveyed participants reported installing this measure themselves, or receiving any spare measures to install later.

<sup>30</sup> Forty-six surveyed participants received one can of insulation spray according to auditor records, and one participant received two cans. However, when verifying this measure the customer who was supposed to have received two cans reported that only one can of insulation spray was installed. Only 5 out of 19 participants (26.3%) who confirmed that the auditor installed this measure were able to report the number of cans of spray installed: three of these customers reported one can installed, one customer reported "half a can" and the fifth reported "more than one can" (counted as 1.5 cans in the installation total). Since auditor records are assumed correct for customers who don't know how many cans of spray were installed, these 19 participants confirmed the installation of a total of 19 cans of insulation.

**Table 84. Measure Installation: Foam Insulation Spray**

<i>47 participants received foam insulation spray according to auditor records</i>	<b>Customer count (N=47)</b>	<b>Measures installed count according to auditor records (N=48 cans of spray)</b>	<b>Confirmed measures installed count (N=33 cans of spray)</b>
Auditor installed insulation spray	40.4%	41.7%	57.6%
Auditor gave foam insulation spray to customer, customer installed it	0.0%	0.0%	0.0%
Auditor gave foam insulation spray to customer, customer has NOT installed it	0.0%	0.0%	0.0%
Did not receive foam insulation spray	29.8%	29.2%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	29.8%	29.2%	42.4%

The 19 customers who confirmed that the auditor installed foam insulation spray were asked where this insulation was installed in their homes: Seven of these 19 responses (36.8%) identify somewhere in the basement as the place where this measure was installed, while six (31.6%) mention doors and four (21.1%) were installed under kitchen or bathroom sinks.

Customers who confirmed the installation of foam insulation spray were asked if any of this insulation has been removed from where it was installed; 94.7% confirmed that the measure is still installed, while one participant (5.3%) reported *“all of it was removed; I had a contractor remove the old door and replace it with a new one.”*

Sixteen participants who confirmed that they currently have program-provided foam insulation spray installed in their homes rated their satisfaction with the insulation spray on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for this measure is very high at 9.75, and none of these participants gave ratings of “7” or lower.

Only one surveyed participant who confirmed the installation of program-provided foam insulation spray (5.3%) already had foam insulation in their homes, as seen in Table 85. Prior to the program, only two respondents (10.5%) had intended to purchase foam insulation spray, while another two respondents (10.5%) said they “maybe” would have installed foam insulation spray before participating in the program, but a large majority of 73.7% did not intend to purchase foam insulation spray. Two of the surveyed program participants (10.5%) have purchased a combined total of three additional cans of foam insulation spray on their own since receiving this measure from the program audit.

**Table 85. Foam Insulation Spray Installed Before the Program and Additional Insulation Spray Purchased (N=19)**

<b>Base: 19 participants who confirmed program foam insulation spray</b>	<b>Customers (N)</b>	<b>Customers (%)</b>
<b>Previously installed showerheads</b>		
Already had foam insulation spray installed	1	5.3%
Did not already have foam insulation spray installed	18	94.7%
Don't know / not specified	0	0.0%
<b>Were you planning on purchasing any foam insulation spray before participating in the program?</b>		
No	14	73.7%
Maybe	1	5.3%
Yes	2	10.5%
Don't know / not specified	2	10.5%
<b>Additional foam insulation spray purchased since program</b>		
Have not purchased additional foam spray	17	92.3%
Purchased additional foam insulation spray	2	10.5%

### HVAC Filters and Filter Change Calendar Installations

As seen in Table 86, the 99 surveyed participants who received a year's supply of HVAC filters and/or the filter change calendar according to auditor records confirmed that 85 of them received filters from the program, which is 85.9% of the 99 measures recorded by auditors. Only 69.4% of customers confirming that they received filters also confirmed that they received the filter change calendar (customers who are not sure if they received the calendar can be assumed to not be using the calendar, whether or not they actually received it<sup>31</sup>). No surveyed customers report receiving the calendar but not the filters.

<sup>31</sup> Program participants are supposed to receive the filters and the calendar together, since they are intended to be used together. This survey asked them to confirm the receipt of both items separately, and customers often report that they did not receive both items. However, this is more likely due to incorrect recall by participants rather than auditors failing to deliver both measures; in particular they are less likely to recall the calendar (59.6%) than the filters (85.9%), indicating many may have forgotten about or "lost" the calendar. However, the energy savings for this set of measures are provided by the filters and not the calendar; the calendar is just a reminder to use the filters.

**Table 86. Measure Installation: HVAC Filters and Filter Change Calendar**

<i>99 participants received filters and/or calendar according to auditor records</i>	<b>Customer count (N=99)</b>	<b>Confirmed filters received count (N=85)</b>
Received filters and calendar	59.6%	69.4%
Received filters but not calendar	18.2%	21.2%
Received filters, not sure if received calendar	8.1%	9.4%
Received calendar but not filters	0.0%	0.0%
Did not receive filters or calendar	9.1%	0.0%
Not sure if received filters or calendar <sup>32</sup>	5.1%	0.0%

Customers who confirmed the receipt of either of these measures were asked if the auditor changed their filter during the audit. As indicated in Table 87, nine out of ten surveyed participants who reported receiving filters say that either the auditor changed filters during the audit (85.9%) or the participant changed the filter themselves during the audit (3.5%). The three customers who changed the filter themselves all confirmed that this was “easy” to do.

**Table 87. Changing Filters during the Home Audit (N=85)**

<i>Base: 85 participants who confirmed program filters received</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<i>Did you or the auditor change your A/C or heater filter during their visit to your home?</i>		
Yes, auditor changed filter	73	85.9%
Yes, I changed the filter	3	3.5%
No, filter was not changed	4	4.7%
Don't know	5	5.9%

As seen in Table 88, two-thirds of participants who confirmed that they received the filters and the calendar (67.8%) report that they are using the calendar and changing filters though only about half (45.8%) confirm that they are changing the filters at least as often as suggested, while 18.6% are changing them less frequently than the calendar suggests and two surveyed participants (3.4%) report using the calendar but are not sure if they are changing filters as often as suggested. Another 13.6% report that they are changing their filters regularly without using the calendar, and only 10.2% report that they are not changing their filters at all, and finally 8.5% are not sure if their filters are being changed or not (perhaps indicating that someone else in the household is responsible for changing filters). Combining responses, 81.4% of these customers report that they are changing their filters, even if not as often as recommended by the calendar.

Among the 26 participants who confirmed receiving the filters but not the calendar, about three-quarters (73.1%) confirm that they are regularly changing filters, which is not significantly different than the percentage of customers with calendars who confirm that they are changing filters regularly. Only 7.7% of participants with filters but not the calendar report that they are

<sup>32</sup> Measures that are installed by auditors are assumed installed when the participating customer can not recall if they received the measure. However, the filter change measure requires the participant to actively change their filters to have any effect on energy efficiency. Therefore, for this measure customers who can not recall the receipt of the program filters are assumed to not be using them, and these measures are reported as “not confirmed”.

not using the filters at all, though about one in five (19.2%) are not sure if the filters are being used (perhaps indicating that someone else in the household is responsible for changing filters).

**Table 88. Using the Filter Change Calendar (N=85)**

<i>Base: 85 participants who confirmed program filters received</i>	<b>Confirmed calendar and filters received (N=59)</b>	<b>Confirmed filters received but not calendar (N=26)</b>
<b><i>Have you been using the filter change calendar and changing your filters regularly since the Residential Neighborhood Program audit?</i></b>		
Yes, I am using the calendar and changing filters as the calendar suggests	44.1%	0.0%
Yes, I am using the calendar and changing filters more often than the calendar suggests	1.7%	0.0%
Yes, I am using the calendar and changing filters less often than the calendar suggests	18.6%	0.0%
Yes, I am using the calendar and changing filters, don't know if more or less often than suggested	3.4%	0.0%
Yes, I have been changing filters but not using the calendar	13.6%	73.1%
No, not using calendar or changing filters	10.2%	7.7%
Don't know	8.5%	19.2%

One surveyed Ohio participant reports changing filters more often than the calendar suggests: *“once every three weeks.”*

Eleven participants who report that they use the calendar but change their filters less often than suggested were asked how often they do change their filters: Five of these responses mention specific periods of time (the average length between filter changes for these participants is about 2.5 months), two participants mentioned that they do not change filters in summer because they do not have central air conditioning, and two report that they have not changed their filters as often due to not using their equipment as often. The remaining two participants merely report that they sometimes forget to change their filters as scheduled.

Eight customers who confirmed that they received the calendar but are changing filters without using it were asked why they are not using the calendar: six of these participants were already in the habit of changing filters on a regular schedule before the program, one merely said they lost their calendar, and one participant says *“I do not need to change it as often as the calendar suggests; it does not get that dirty for me.”*

Fifty-two participants who confirmed that they received the filter change calendar provided by the program rated their satisfaction with the calendar, and 79 participants who confirmed receiving the year's supply of HVAC filters rated their satisfaction with the filters, both using a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction ratings for the program-provided calendar and filters are quite high at 9.46 and 9.52

respectively, and only 9.6% of calendar raters and 8.9% of filter raters gave satisfaction ratings of “7” or lower for these measures.

Participants who rated these measures at “7” or lower were asked to explain their relatively low satisfaction ratings; among the five participants who gave low ratings for the calendar, two report that they were already changing filters regularly and do not need a reminder, two simply said they are not using the calendar at all, and one customer believes that the calendar suggests replacing filters too frequently. Among the seven participants who gave low ratings for the HVAC filters, four report that they find the filters to be of low quality, one prefers to use “allergy filters” instead, one finds it difficult to change the filter (“*it gets stuck*”) and the seventh customer feels that they have to change their filters too often.

More than half of surveyed participants who confirmed receiving the calendar or filters (55.3% or 47 out of 85) report that they were already planning to purchase HVAC filters before participating in the Residential Neighborhoods program, however 28.2% had not been intending to purchase any filters, as seen in Table 89. Only four participants (4.7%) have purchased additional filters since participating in the program; three of these four participants reported purchasing a combined total of 13 filters on their own, and the fourth customer could not recall exactly how many filters they purchased (“*I’m not sure, but it was the biggest pack you can get.*”)

**Table 89. Purchasing HVAC Filters Before and After Participating in the Program**

<i>Base: 85 participants who confirmed program filters received</i>	<b>Confirmed calendar and filters received (N=59)</b>	<b>Confirmed filters received but not calendar (N=26)</b>	<b>Total confirmed filters received (N=85)</b>
<b><i>Were you planning to purchase HVAC filters before receiving filters from the program</i></b>			
Yes	57.6%	50.0%	55.3%
Maybe	13.6%	7.7%	11.8%
No	25.4%	34.6%	28.2%
Don't know / not specified	3.4%	7.7%	4.7%
<b><i>Have you purchased any additional HVAC filters since participating in the program?</i></b>			
Yes	5.1%	3.8%	4.7%
No	94.9%	96.2%	95.3%

Table 90 shows that before participating in the program about a third (34.1%) of participants who confirmed the receipt of these measures were already changing their filters on a near-monthly basis, though 21.2% were changing them less often than every three months and 5.9% “never” or “almost never” changed their filters. Overall, the 74 participants<sup>33</sup> who were able to provide an estimate on the length of time between filter changes reported changing their filters every 90 days on average (though the median time between changes is only 60 days).

**Table 90. Changing HVAC Filters before Participating in the Program**

<i>Base: 85 participants who confirmed program filters received</i>	<b>Customers (N)</b>	<b>Customers (%)</b>
<i>How often were you changing your filters before you participated in this program?</i>		
More often than every other month	29	34.1%
Every other month up to every three months	20	23.5%
Less often than every three months	18	21.2%
Never / almost never	5	5.9%
Other response, listed below	9	10.6%
Don't know	4	4.7%

Nine surveyed participants gave “other” responses when asked how often they changed their filters before participating in the program; all but one of these responses are from customers who do not have central air conditioning and who therefore do not change their filters during the summer. The ninth respondent said “*I change them as needed, when they look dirty.*”

Among participants who used these measures and reported specific time periods for changing their filters both before and after the program, 36.8% report changing their filters more frequently after the program; these 21 customers went from changing their filters an average of once every 150 days before the program to an average of once every 37 days afterwards. Only one participant (1.8%) reported changing their filters less frequently after the program; this customer said they used to change their filters “*every six weeks, because there was a lot of dust in the neighborhood*” but since participating in the program they have changed their filters “*twice since January, or about once every three months.*”

**Switch Plate Wall Thermometer Installations**

As seen in Table 91, most participants confirmed the installation of switch plate wall thermometers (89.3% or 109 out of 122 who received this measure according to auditor records, including two participants who installed the thermometer themselves). According to auditor records, one customer who confirmed that they received this measure but has not installed it should have received two thermometers, while the rest of the surveyed participants should have

<sup>33</sup> Five participants who said they “never” or “almost never” changed their filters before the program are not included when calculating the average and median time between filter changes (because their time between filter changes is undefined). Four participants who do not know how often their filters were changed are not included for a similar reason. Participants who do not change filters in the summer because they do not have central air conditioning are included in the average based only on the frequency during winter months when they do change filters.



received one measure apiece. Overall, customers confirmed the installation of 92.7% of thermostats received according to auditor records.<sup>34</sup>

**Table 91. Measure Installation: Switch Plate Wall Thermometer**

<i>122 participants received wall thermometers according to auditor records</i>	<b>Customer count (N=122)</b>	<b>Measures installed count according to auditor records (N=123)</b>	<b>Confirmed measures installed count (N=114)</b>
Auditor installed thermometer	87.7%	87.0%	94.7%
Auditor gave thermometer to customer, customer installed it	1.6%	1.6%	1.8%
Auditor gave thermometer to customer, customer has NOT installed it	1.6%	2.4%	0.0%
Did not receive thermometer	5.7%	5.7%	0.0%
Don't know (assuming auditor record is correct and measure was installed)	3.3%	3.3%	3.5%

The installation rate reported by participants is slightly, but significantly, higher in Ohio than Kentucky: 13.0% of Kentucky households who should have received this measure reported that it has not been installed, compared to only 2.9% of Ohio participants reporting that this measure is not installed (this difference is significant at  $p < .05$  using Student's t-test). However there are no significant differences between participants in these two states when it comes to how they use the thermometers that were installed.

Two surveyed participants in Kentucky report installing this measure themselves (1.8% of 113 measures confirmed installed) and both confirmed that this was "easy" to do.

Another two participants from Kentucky received measures that have not been installed yet (1.6% of 122 who received measures according to auditor records). One of these customers does not intend to install the measure they received, stating "*it doesn't fit any of our switches*", while the other is not sure if they will install it, stating "*I will install it but I don't know when; I might install it at my parents' house when I move in.*"

Table 92 shows where in the home switch plate wall thermometers were installed: about a third are installed in hallways (29.4%), with kitchens (22.0%), bedrooms (18.3%) and living and family rooms (11.9%) being the next most-mentioned rooms where this measure was installed.

<sup>34</sup> One hundred and seven participants confirmed that the auditors installed a combined 108 thermometers (one participant confirmed the installation of two measures though auditor records only showed one measure), plus two participants confirmed that they installed this measure themselves. Four participants did not recall if they received a thermostat. Thus the total confirmed thermostats installed is 110 confirmed by customers plus four where auditor records are assumed correct equals 114 installed.

**Table 92. Switch Plate Wall Thermometer: Room Installed (N=109)**

<i>109 participants confirmed the installation of thermometers</i>	Count	Percent
Hallway / stairwell / landing	32	29.4%
Kitchen	24	22.0%
Bedroom	20	18.3%
Living room / family room	13	11.9%
Dining room	9	8.3%
Den / computer room / office	3	2.8%
Utility room / laundry room	3	2.8%
Bathroom	2	1.8%
Other, listed below	3	2.8%

Three participants reported other locations where their thermometers were installed; these are identified as a garage, “the middle room” and “close to the entry door.”

Fewer than a third of participants surveyed (28.4% of confirmed installations of thermometers) did not have any thermometers in their home before the program, as seen in Table 93. Most participants (71.6%) already had at least one thermometer before the program.

**Table 93. Number of Thermometers in the Home after the Program (N=109)**

<i>109 participants confirmed the installation of thermometers</i>	Count	Percent
One thermometer (none before the program)	31	28.4%
Two thermometers (one before the program)	69	63.3%
Three thermometers (two before the program)	6	5.5%
Four or more thermometers (at least three before program)	2	1.8%
Four or more thermometers (at least two before program)	1	0.9%

One participant who received a thermometer has moved it to a different room in their home, but none of the thermometers have been removed completely, as seen in Table 94. The participant who relocated their thermometer moved it from the kitchen to the dining room, and explained: “it was a better placement.”

**Table 94. Removing Program-Provided Switch Plate Wall Thermometer**

	Customers with confirmed installation percent (N=113)	Confirmed measures installed percent (N=114)
<i>Has the thermometer that was installed through the program since been removed?</i>		
No, installation is still in place	95.6%	95.6% installed
Yes, moved to somewhere else in the home	0.9%	0.9% installed
Yes, thermometer is no longer installed	0.0%	0.0% removed
Not sure if thermometer was installed (did not answer questions about installation)	3.5%	3.5% assumed installed

Customers who confirmed receiving wall thermometers from the program were asked how often they use them. Table 95 indicates that a majority of 58.7% checks their thermometers at least once a week, and the frequency of use by customers who did not previously have thermometers

in their homes is similar to the frequency among customers who did previously have thermometers in their homes.

**Table 95. Frequency of Checking the Program-Provided Thermometer (N=109)**

<i>Base: 109 participants with program thermometers currently installed</i>	<b>Customers with no thermometer before audit (N=31)</b>	<b>Customers with thermometers before audit (N=78)</b>	<b>Total confirming thermometer installed (N=109)</b>
<b><i>How often do you check the thermometer that was installed through this program?</i></b>			
More than once a day	12.9%	7.7%	9.2%
About once a day	22.6%	23.1%	22.9%
Once every few days	12.9%	16.7%	15.6%
About once a week	19.4%	7.7%	11.0%
Less often than once a week	16.1%	25.6%	22.9%
Never	16.1%	19.2%	18.3%

Participants who confirmed the installation of the wall thermometer were asked if they have made any adjustments to their heating or cooling settings since the program. Table 96 indicates that only 4.6% turned their heat down in the winter, while twice as many turned their cooling temperature up in the summer (9.2%).

Customers who did not previously have a thermometer in their home are somewhat less likely to report adjusting their cooling temperature up in summer (3.2%) compared to those who already had thermostats (11.5%; this difference is significant at  $p < .10$  using Student's t-test). However the biggest difference between these groups is that customers who had thermometers before the program are less likely to know if their wintertime temperatures have been adjusted at all (20.5% "don't know", compared to 6.5% for those who did not have thermometers before the program; this difference is significant at  $p < .05$  using Student's t-test).<sup>35</sup>

<sup>35</sup> The lower recall for wintertime temperature adjustments may be due in part to the timing of the survey: Participants in the Midwest were surveyed in August and September, at the end of the cooling season. Also, some participants received this measure after the most recent winter, so would not have had an opportunity to make heating adjustments yet.

**Table 96. Heating and Cooling Adjustments since Installation of the Thermometer (N=109)**

<i>Base: 109 participants with program thermometers currently installed</i>	<b>Customers with no thermometer before audit (N=31)</b>	<b>Customers with thermometers before audit (N=78)</b>	<b>Total confirming thermometer installed (N=109)</b>
<b><i>Have you made any adjustments to your heating settings in the <u>winter</u> since the thermometer was installed?</i></b>			
No changes	83.9%	71.8%	75.2%
Yes, turned temperature up	0.0%	1.3%	0.9%
Yes, turned temperature down	6.5%	3.8%	4.6%
Yes, with no effect or unexplained	3.2%	2.6%	2.8%
Don't know	6.5%	20.5%	16.5%
<b><i>Have you made any adjustments to your heating settings in the <u>summer</u> since the thermometer was installed?</i></b>			
No changes	83.9%	75.6%	78.0%
Yes, turned temperature up	3.2%	11.5%	9.2%
Yes, turned temperature down	3.2%	5.1%	4.6%
Yes, with no effect or unexplained	3.2%	3.8%	3.7%
Don't know	6.5%	2.6%	3.7%
Not applicable (no air conditioning)	0.0%	1.3%	0.9%

The nine customers who reported adjusting their heating temperatures in the winter (8.3% of 109 with thermometers installed) were asked what changes were made: On average, these customers turned their heating down by 3.9 degrees Fahrenheit.

The 19 customers who reported adjusting their cooling temperatures in the summer (17.4%) were also asked what changes were made: The average adjustment made by these customers is to set the cooling back (raise the temperature) by 1.0 degrees Fahrenheit.

One hundred participants who confirmed that they currently have wall thermometers supplied by the program installed in their homes rated their satisfaction with this measure on a ten-point scale where “10” is the most satisfied. As seen previously in Table 24, the mean satisfaction rating for the program-provided wall thermometers is quite high at 9.16, and only 11.0% gave a rating of “7” or lower. These eleven participants who gave lower ratings were asked the reasons for their relatively low ratings: four of these customers report that they have trouble reading the display (due to small digits and/or poor eyesight), four say they never check it, two question the accuracy of their readings and one customer said *“I wish they would have provided more information about how to use the thermometer and what its benefits are.”*

### **Additional Actions to Save Energy in the Home**

Nearly half of surveyed participants in the Midwest (44.5%) report that they have taken additional steps to save energy since participating in the Residential Neighborhoods Program. These actions are categorized in Table 97; the only actions mentioned by at least 10% of

surveyed participants are turning off lights when not in use (15.6%), turning off and/or unplugging electronic devices (11.7%) and sealing windows and doors (10.2%).

**Table 97. Additional Actions to Save Energy since Participating in the Program (N=128)**

	Ohio % participants (N=70)	Kentucky % participants (N=58)	Total Midwest % participants (N=128)
<b>Have not taken any additional actions</b>	57.1%	53.4%	55.5%
<b>Have taken additional actions</b>	42.9%	46.6%	44.5%
<b>Actions taken:</b>			
Turn off lights when not in use	14.3%	17.2%	15.6%
Turn electronics off / unplug	11.4%	12.1%	11.7%
Caulk / tape / seal doors & windows	8.6%	12.1%	10.2%
Use less cooling / turn down or turn off AC	10.0%	8.6%	9.4%
Use less heat / turn down thermostat	4.3%	5.2%	4.7%
Use curtains / shades to control heat & light	2.9%	3.4%	3.1%
Conserving water (other than clothes washing)	5.7%	0.0%	3.1%
Upgrade windows / doors	1.4%	3.4%	2.3%
Regular HVAC maintenance	2.9%	1.7%	2.3%
Add insulation to walls, floors, ceilings, attics	2.9%	1.7%	2.3%
Upgrade HVAC system	0.0%	3.4%	1.6%
Use fans to circulate air better	2.9%	0.0%	1.6%
Unique actions, listed below	12.9%	1.7%	7.8%

*Percentages total to more than 100% because respondents could take multiple actions.*

Ten respondents reported taking unique actions to save energy, including running appliances during off-peak hours, consolidating laundry loads, cooking outdoors, turning down the hot water temperature, using fewer space heaters and closing vents and doors.

## What Participants Learned from Residential Neighborhoods

TecMarket Works asked participants “*what would you say are the most important things you learned from the Residential Neighborhood Program?*” and recorded up to three responses per respondent. These responses are categorized in Table 98; the lessons learned cover a broad range of topics, with the most-mentioned being about CFLs and the benefits of efficient lighting (29.7%), “saving energy” in general (19.5%), the need to weatherize and plug leaks (18.8%) and that measures and steps to save energy also save money on utility bills in the long run (14.1%). Only about one in eight customers could not name anything that they learned by participating in this program (11.7%).

There are two statistically significant differences between Ohio and Kentucky participants in terms of what they learned from the program: Kentucky participants are more likely to mention saving money on utility bills (20.7%, versus 8.6% in Ohio) while Ohio participants are more likely to mention insulating water heaters and pipes (8.6%, versus 1.7% in Kentucky; both of these differences are significant at  $p < .05$  using Student’s t-test).

**Table 98. What Participants Learned by Participating in the Residential Neighborhoods Program (N=128)**

<i>What are the most important things you learned from this program?</i>	<b>Ohio % participants (N=70)</b>	<b>Kentucky % participants (N=58)</b>	<b>Total Midwest % participants (N=128)</b>
About CFLs / efficient lighting	27.1%	32.8%	29.7%
About saving energy (general measures)	21.4%	17.2%	19.5%
Need to plug drafts / weatherize	17.1%	20.7%	18.8%
Measures save money on bills / cost effective over time	8.6%	20.7%	14.1%
Change HVAC filters regularly	12.9%	10.3%	11.7%
Duke Energy has programs to help customers / Duke cares	11.4%	5.2%	8.6%
Use less heating and cooling / how to use a thermostat	5.7%	8.6%	7.0%
Save energy by hot water adjustment	4.3%	8.6%	6.3%
Turn off / unplug unused electronics	4.3%	6.9%	5.5%
About insulating water heater and pipes	8.6%	1.7%	5.5%
Turn off lights when not in use	4.3%	5.2%	4.7%
About saving water (aerators & showerheads)	2.9%	5.2%	3.9%
Unique responses, listed below	11.4%	6.9%	9.4%
Don't know / nothing	10.0%	13.8%	11.7%

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

Twelve participants gave unique responses when asked what were the most important things they learned from the program. Most of these responses involve measures received from the program (how to install the window HVAC kit) and miscellaneous tips provided by auditors (do not block freezer vents, keep doors shut, keep furnace maintained, use fans to circulate air); two participants gave general responses (“*change your way of thinking*”) and one participant reported that they learned that “*we thought we were being more efficient than we were.*”

## What Participants Liked Most about Residential Neighborhoods

TecMarket Works asked participants what was their favorite thing about participating in this program; their responses are shown in Table 99. Overall, positive comments about the program and/or measures being free (no cost to customer) are the most frequently mentioned (by 31.3%), followed by positive comments about specific measures (28.9%), saving energy (26.6%) and saving money on utility bills (25.7%).

There are two statistically significant differences by state in Table 99: Kentucky participants are more likely to mention specific measures as their favorite thing about the program (36.2%, compared to 22.9% for Ohio), while Ohio participants are more likely to mention saving energy and conservation (32.9%, compared to 19.0% for Kentucky; these differences are significant at  $p < .05$  using Student’s t-test).

**Table 99. What Participants Liked Most About the Residential Neighborhoods Program (N=128)**

<i>What was your favorite thing about participating in this program?</i>	<b>Ohio % participants (N=70)</b>	<b>Kentucky % participants (N=58)</b>	<b>Total Midwest % participants (N=128)</b>
Free program / free measures	28.6%	34.5%	31.3%
Like measures received, listed below	22.9%	36.2%	28.9%
Saving energy / conservation	32.9%	19.0%	26.6%
Saving money on energy bills	28.6%	22.4%	25.8%
Home audit / advice and assistance from auditor	17.1%	22.4%	19.5%
Education and information gained	22.9%	13.8%	18.8%
Improvements to the home	8.6%	6.9%	7.8%
Duke Energy wants to help customers	4.3%	1.7%	3.1%
Attending the community meeting	4.3%	0.0%	2.3%
Participation was easy / convenient	1.4%	1.7%	1.6%
Enjoyed interactions with auditors / Duke Energy representatives	1.4%	1.7%	1.6%
Don't know / nothing	5.7%	3.4%	4.7%

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

Thirty-seven participants mentioned specific measures received as being their favorite aspect of the program; these are listed below (the list totals to more than 37 responses because participants could name more than one measure). Two-thirds of participants mentioning specific measures as their favorite thing about the program mentioned the CFLs (64.9%), while a quarter (24.3%) mentioned the HVAC filters.

- CFLs (Ohio n=8, Kentucky n=16)
- HVAC filters (Ohio n=3, Kentucky n=6)
- Air sealing and insulation: doors, windows and/or foam spray (Ohio n=4, Kentucky n=2)
- Switchplate thermometer (Ohio n=1, Kentucky n=3)
- Showerheads (Ohio n=1, Kentucky n=1)
- Aerators (Ohio n=1)
- Winter HVAC kit (Ohio n=1)
- Hot water insulation: heater and/or pipes (Ohio n=1)

### **What Participants Liked Least about Residential Neighborhoods**

TecMarket Works also asked the surveyed participants what they liked least about the program. Their responses are shown in Table 100. More than three-quarters of participants (80.5%) could not name a least favorite aspect of the program. The only other response categories mentioned by as many as 5% of participants are that they disliked measures they received (7.0%) or didn't receive a measure they wanted or expected (4.7%). There are no statistically significant differences between Ohio and Kentucky participants.

**Table 100. What Participants Liked Least About Residential Neighborhoods (N=128)**

<i>What was your least favorite thing about this program?</i>	<b>Ohio % participants (N=70)</b>	<b>Kentucky % participants (N=58)</b>	<b>Total Midwest % participants (N=128)</b>
Did not like measures, listed below	8.6%	5.2%	7.0%
Did not receive measures, listed below	2.9%	6.9%	4.7%
Not comfortable letting auditor into my home / negative interactions with auditors and Duke Energy staff	1.4%	3.4%	2.3%
Difficulty scheduling audit / inconvenient	0.0%	1.7%	0.8%
Wanted more free items	2.9%	0.0%	1.6%
Unique responses, listed below	2.9%	3.4%	3.1%
No complaints / nothing / don't know	81.4%	79.3%	80.5%

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

Nine participants said their least favorite thing about this program was a measure or measures they received: five of these comments involve complaints about low water pressure from program aerators and/or showerheads, two involve CFLs (one customer says their program bulbs burned out too quickly and another customer prefers LEDs), and there was one complaint apiece about the thermometer, weatherstripping and water heater temperature change (this list totals to more than nine responses because one respondent mentioned two measures).

Six participants said their least favorite thing about this program is that they did not receive measures that they were promised or expected; four of these complaints involve not receiving a thorough inspection of doors and windows and/or not receiving the installation of door and window sealing measures, while one customer complained about not receiving HVAC filters, and one customer was unhappy that this program does not fix ductwork and vents.

Four respondents made unique comments regarding their least favorite part of participating in the program: One participant could not take follow-up actions because they require landlord approval, one participant thought the program did not receive enough promotion, one participant felt they did not get enough help reducing their water bill and another participant was confused about how water measures are supposed to reduce their electric bill.

## **Program Improvements and Additional Services**

TecMarket Works asked surveyed participants *“are there things that this program could have provided that you think would have made more people want to participate?”* These suggestions are shown in Table 101 below. The most common recommendations are to provide more measures and services through the program (17.2%). No other category of response was mentioned by more than 10% of participants, and a majority of surveyed customers (60.2%) did not have any suggestions.

Kentucky participants are somewhat more likely to suggest additional measures and services (22.4%) compared to Ohio participants (12.9%; this difference is significant at  $p < .10$  using Student's t-test). Ohio participants are somewhat more likely not to have any suggestions for improvement (65.7%, versus 53.4% for Kentucky participants; this difference is significant at  $p < .10$  using Student's t-test).



**Table 101. Participants' Suggestions for Increasing Program Participation (N=128)**

	Ohio % participants (N=70)	Kentucky % participants (N=58)	Total Midwest % participants (N=128)
Include additional measures / services, listed below	12.9%	22.4%	17.2%
More advertising	7.1%	3.4%	5.5%
Provide bill credits or gift cards as part of program	2.9%	6.9%	4.7%
Provide more information about the program ahead of time	4.3%	5.2%	3.9%
Partner with community organizations for more exposure	2.9%	3.4%	3.1%
Need security assurance (strangers in the home)	1.4%	3.4%	2.3%
Highlight utility bill savings	1.4%	1.7%	1.6%
Better coordination with landlords about audits for renters	0.0%	3.4%	1.6%
Auditor should provide more information / explanation during audit	2.9%	0.0%	1.6%
More mailings and flyers	1.4%	0.0%	0.8%
Highlight no cost to customer (free)	1.4%	0.0%	0.8%
More recruiting and auditing on evenings and weekends to get working people	1.4%	0.0%	0.8%
Teach classes about energy efficiency	0.0%	1.7%	0.8%
Don't know / nothing / fine as is	65.7%	53.4%	60.2%

*Percentages total to more than 100% because respondents could give multiple suggestions.*

Twenty-two respondents suggested additional measures and services: Fourteen of these responses (63.6%) involve insulation and sealing leaky doors and windows, while two participants requested "smart" technology for controlling their thermostats (NEST system and cellphone app) and two participants requested more of measures already offered by the program (CFLs and HVAC window kits). Five miscellaneous requests are listed below (these responses total to more than 22 because participants could mention more than one measure or service).

- *Provide a before and after energy savings and cost savings estimate. (Ohio)*
- *If they could provide the option to have your heating and air conditioner serviced to assure they are running at top performance, I think more people would be interested in the program. (Kentucky)*
- *Install duct work and vents for homes that don't have them. (Ohio)*
- *I would like to be able to divide my house into separate zones for heating and cooling. I would also like a program that offers installation of solar panels. (Kentucky)*
- *They could send somebody out once a month to change my filter in the storm cellar. (Ohio)*

Participants were also asked, "Are there any additional services that you would like the Residential Neighborhood Program to provide that it does not currently provide?" Twelve surveyed participants (9.4%) offered suggestions for new services, which are listed below.

- *I really think the program should include exterior examinations of the home for energy efficiency. (Ohio)*

- *They could check for heat loss with a thermal gun around windows and doors. (Kentucky)*
- *I would like the program to repair and/or replace leaky doors. Also, repair cracks and leaks in the basement foundation. (Kentucky)*
- *Installation of duct work and vents and window replacement. (Ohio)*
- *It would be great if the program would supply storm windows or storm window repairs. (Kentucky)*
- *If they offered to put plastic on the windows in winter, that would be a plus. (Kentucky)*
- *Have attic and wall insulation; that would be a big thing and save a lot of energy. (Ohio)*
- *The program could spray foam insulation or install gaskets in and around wall outlets. (Kentucky)*
- *Come and inspect our electrical outlets to see why my outlets aren't working. (Kentucky)*
- *I'd like to see a tune-up on my furnace; I can't afford it out-of-pocket. (Kentucky)*
- *Offer cutting-edge things tied to Smart Homes, such as tablet- or smart phone-based technologies. (Kentucky)*
- *They could offer fluorescent tubes. (Kentucky)*

## Non-Participant Survey Results

### Non-Participant Program Awareness

TecMarket Works contacted 199 non-participating customers in the Midwest (145 from Ohio and 54 from Kentucky), and overall a little less than half (42.7%) said they recalled hearing something about the Residential Neighborhood program in their community. However, awareness of the program differs greatly by state, as shown in Table 102: a majority of 59.3% of Kentucky non-participants are aware of the program compared to only 36.6% of non-participants in Ohio (this difference is significant at  $p < .05$  using Student's t-test).

**Table 102. Awareness of the Residential Neighborhood Program (N=199)**

<i>Base: all contacted non-participants</i>	<b>Ohio (N=145)</b>	<b>Kentucky (N=54)</b>	<b>Total Midwest (N=199)</b>
Aware of program	36.6%	59.3%	42.7%
Not aware of program	63.4%	40.7%	57.3%

Customers who had not heard anything about this program before the survey call were disqualified based on their lack of awareness (customers who were called for the non-participant surveys were also disqualified if someone else in their household participated in the program).

Non-participant customers who qualified for the survey were asked how they first learned about the Residential Neighborhood program; these responses are shown in Table 103. Overall, the three most frequently-mentioned sources of program awareness for non-participants are letters and postcards from Duke Energy (37.8%), home visits from Duke Energy representatives (17.1%) and word-of-mouth from friends, family and neighbors (13.4%). Door hangers from Duke Energy are recalled much more frequently by Kentucky non-participants (22.6%) than Ohio non-participants (3.9%; this difference is significant at  $p < .05$  using Student's t-test).

There are some significant differences between Ohio program participants and non-participants in terms of how they first learned about the program (see *Awareness and Understanding of the Program* on page 35). Nearly 40% of non-participants in Ohio and Kentucky mentioned mailings, as did a similar percentage of Kentucky participants, however only 15.7% of Ohio participants learned about the program through mailings. Conversely, very few Ohio non-participants recall door hangers (3.9%) compared to Ohio participants (18.6%) Both of these differences are significant at  $p < .05$  using Student's t-test; differences between participants and non-participants in Kentucky do not reach this level of significance.

**Table 103. Source of Awareness of the Residential Neighborhood Program (N=82)**

<i>Base: non-participants who are aware of the program</i>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
Received a letter or postcard in the mail from Duke Energy	37.3%	38.7%	37.8%
Received a letter or postcard in the mail from someone else	0.0%	0.0%	0.0%
Received a letter or postcard in the mail but not sure who it was from	3.9%	0.0%	2.4%
Received a door-hanger from Duke Energy	3.9%	22.6%	11.0%
Received a door-hanger from someone else ( <i>Community Action Center</i> )	0.0%	3.2%	1.2%
Received a door-hanger but not sure who it was from	0.0%	3.2%	1.2%
Someone from Duke Energy (or contracted by Duke Energy) visited my home to tell me about it	15.7%	19.4%	17.1%
Someone from another company visited my home to tell me about it ( <i>Just Energy</i> )	2.0%	0.0%	1.2%
Someone visited my home to tell me about it, not sure what organization	11.8%	0.0%	7.3%
Saw Duke Energy personnel and/or van in the neighborhood and they told me about the program	3.9%	3.2%	3.7%
Someone from Duke Energy called to tell me about the program	2.0%	3.2%	2.4%
Can't recall who called to tell me about the program	2.0%	0.0%	1.2%
I called Duke Energy (or someone else) for information or help	0.0%	3.2%	1.2%
Heard about a community event promoting the program but did NOT attend	0.0%	0.0%	0.0%
Attended a community event promoting the program	0.0%	0.0%	0.0%
Through another agency or organization ( <i>People Working Cooperatively</i> )	2.0%	0.0%	1.2%
Friends / Family / Neighbors (word of mouth)	11.8%	16.1%	13.4%
Media ( <i>"a flyer in the Tribune"</i> )	2.0%	0.0%	1.2%
E-mail from Duke Energy	2.0%	0.0%	1.2%
Online (Duke Energy or other websites)	0.0%	0.0%	0.0%
Some other way (listed below)	3.9%	3.2%	3.7%
Don't know / not specified	2.0%	0.0%	1.2%

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

Three non-participants mentioned becoming aware of the program "some other way": one participant claims they saw yard signs about the program, one says there was information on their utility bill and one customer is a landlord informed by their tenant.

None of the surveyed non-participants in the Ohio or Kentucky said that they had heard about or attended the community meeting to promote the program. Therefore none of these customers were asked to rate their satisfaction the community meeting, nor were they asked to give suggestions for improving the meetings.

**Non-Participants' Understanding of the Program**

Surveyed non-participants were asked to describe in their own words what they thought the Residential Neighborhood program was about and what it would do for them: "*Please describe*

*what you understood was required of participants in this program, and what you could have received in return had you participated in Duke Energy's Residential Neighborhood Program. (What is this program about / what would they do?)*" These responses are categorized below in Table 104.

The aspects of the program that are most likely to be recalled by non-participants are "receiving free energy-saving measures" (mentioned by 35.4%) and "visiting the home for a free energy audit" (23.2%); both of these are "correct" responses that accurately describe the program. Four more categories of response were mentioned by at least 10% of surveyed non-respondents: "receiving home weatherization" (19.5%) and "saving money on energy bills" (12.2%) and are also both accurate responses, while "visiting the home to inspect systems and measure energy usage" (11.0%) is only partially correct (these responses describe the home audit but not its actual purpose). Another common response, "participation requires landlord's permission / program is for homeowners only" (11.0%), is an accurate description of a potential barrier to participation (many of the customers mentioning this aspect did not participate because their landlord did not give permission). Only 12.2% of surveyed non-participants could not answer this question ("don't know / not specified").

Several of the differences by state shown in Table 104 are statistically significant: Customers in Kentucky are more likely than those in Ohio to mention "free measures" (54.8% versus 23.5%) and "visit home for free energy audit" (32.3% versus 17.6%), while the only survey respondents to mention the community meetings are Ohio customers (9.8% versus zero mentions by Kentucky customers; these differences are all significant at  $p < .10$  or better using Student's t-test).

Though the percentages of customers mentioning "weatherization" are not significantly different between states, in relative terms weatherization measures are mentioned about as often as the top response "free measures" in Ohio (23.5% measures and 21.6% weatherization), however for Kentucky customers "weatherization" is a distant third most-mentioned and is cited by fewer than a third as many Kentucky customers as the proportion mentioning "free measures" (54.8% measures and 16.1% weatherization).

**Table 104. Non-Participants' Understanding of the Residential Neighborhood Program (N=82)**

<b>Base: non-participants who are aware of the program</b>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
Receive free energy-saving measures (bulbs, aerators, sweeps, etc.)	23.5%	54.8%	35.4%
Visit home for free energy audit and energy-saving information	17.6%	32.3%	23.2%
Receive home weatherization / seal leaks (doors, windows, insulation, etc.)	21.6%	16.1%	19.5%
Saving money on energy bills	11.8%	12.9%	12.2%
Visit home to inspect systems / measure energy usage	11.8%	9.7%	11.0%
Participation would require my landlord's permission / for homeowners only	13.7%	6.5%	11.0%
Attending community meeting to discuss energy issues & learn about energy efficiency	9.8%	0.0%	6.1%
Learning how to save energy (other than through audit or meeting)	5.9%	6.5%	6.1%
We are already efficient / don't need what this program offers / not interested	0.0%	0.0%	0.0%
Other responses (listed below)	27.5%	19.4%	24.4%
Don't know / not specified	13.7%	9.7%	12.2%

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

Twenty non-participants surveyed in the Midwest system gave “other” responses when asked to describe the program. Most of these responses are either vague (“*make the neighborhood better*”, “*they wanted to come into my house and do something*”) or inaccurate (“*the program offers prize giveaways like free trips and casino credits*”, “*you have to be a home owner to participate.*”) Seven of these customers made comments relating to income requirements (believing that their income had to be under a limit to qualify) and assistance programs (including confusing LIHEAP programs with the Residential Neighborhoods program).

The top responses for non-participants' understanding of the program mirror the top responses for program participants (reported in Table 21 on page 37), though a significantly larger percentage of participants are able to name these benefits of the program. For example, the top response for both groups is “installing measures”, mentioned by 58.6% of participants but only 35.4% of non-participants, a difference which is significant at  $p < .05$  using Student's t-test. However, non-participants are more likely to mention landlords and rental issues (11.0% of non-participants and 1.6% of participants, also significant at  $p < .05$  using Student's t-test).

As indicated by Table 105, almost three-quarters of non-participants who were aware of the program believe that they would have been eligible to participate (73.2%). Only 7.3% believe that they would not have been eligible, while another 19.5% are not sure if they were eligible or not. There are no significant differences between states.

**Table 105. Non-Participants' Understanding of Their Eligibility to Participate in the Residential Neighborhood Program (N=82)**

<b>Base: non-participants who are aware of the program</b>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
Think I would have been eligible	74.5%	71.0%	73.2%
Do not think I would have been eligible	5.9%	9.7%	7.3%
Don't know if I would have been eligible	19.6%	19.4%	19.5%

The 60 surveyed non-participants who believe that they would have been eligible to participate in the Residential Neighborhoods program were asked why they did not participate in the program. A plurality of these customers (33.3%) did not participate due to issues with availability and scheduling, while ten customers (16.7%) referred to issues with applications and paperwork and miscommunications about enrollment, nine customers (15.0%) said they lacked enough information to make a decision, eight (13.3%) could not participate due to issues involving landlord permission, seven (11.7%) felt they were already efficient and did not need this program and three (5.0%) did not want to let strangers into their home.

The 16 surveyed non-participants who did not know if they would have been eligible to participate in the Residential Neighborhoods program were asked why they did not apply or seek more information about the program. The most frequent category of response again has to do with scheduling and availability (37.5%), while three participants (18.8%) felt they could not participate due to issues involving landlord permission, three more (18.8%) felt they were already efficient and did not need this program, two (12.5%) did not want to let strangers into their home and two (12.5%) lacked enough information to make a decision.

All non-participants were next asked if there were "any other reasons" why they did not participate in the program. Twenty-nine non-participants (35.4%) made additional comments about why they did not participate, most of which are restatements of their primary reasons for not participating and expressions of future interest ("*I still want to participate.*") However, two of these participants indicate that they are not concerned about utility bills because they do not pay them directly ("*government assistance pays my electric bill*", "*heat is included with the rent*") and one participant said "*this program seems geared towards people who don't have a lot of money and I am very comfortable financially.*"

### **Non-Participants Recommending the Program to Others**

Non-participants who believe they would have qualified for the Residential Neighborhood program are more likely to report that they recommended this program to others (38.3%) compared to non-participants who did not believe (or were not sure) that they qualified for the program (21.1%; this difference is significant at  $p < .10$  using Student's t-test). However, among non-participants who recommended the program to others there are no significant differences between the numbers of recommendations given by customers who believe they would have qualified and those who believe they do not qualify or who are not sure.

**Table 106. Non-Participants Recommending the Program to Other People (N=66)<sup>36</sup>**

<i>Base: non-participants who are aware of the program</i>	<b>Believe they qualify (N=47)</b>	<b>Believe they do not qualify or not sure (N=19)</b>	<b>Total (N=66)</b>
<b>Recommended program to friends, neighbors or relatives (total)</b>	<b>38.3%</b>	<b>21.1%</b>	<b>33.3%</b>
Recommended to 1-4 other people	31.9%	15.8%	27.3%
Recommended to 5 or more other people	6.4%	5.3%	6.1%
Recommended, don't know how many other people	0.0%	0.0%	0.0%
<b>Did not recommend program</b>	<b>61.7%</b>	<b>78.9%</b>	<b>66.7%</b>
<b>Don't know / not specified</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>
Mean number of recommendations (among customers who made recommendations)	2.6	2.5	2.6
Median number of recommendations (among customers who made recommendations)	2	1.5	2
Maximum number of recommendations	10	6	10

### Non-Participant Recommendations for Increasing Participation

Non-participant customers were asked “*Are there things that this program could have provided that you think would have caused more people such as yourself to want to participate?*” Their responses are categorized below in Table 107; only about a quarter of survey respondents had no suggestions (28.8%). Overall, the two most frequently-mentioned categories of response have to do with communications (19.5%) and information about the program (18.3%).

There is only one difference between states that is statistically significant at the  $p < .05$  level using Student's t-test: Kentucky customers are more concerned about security issues (12.9%) than Ohio customers (2.0%).

**Table 107. Non-Participants' Suggestions for Improving Program Participation (N=82)**

<i>Base: non-participants who are aware of the program</i>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
Suggestions for improving communications about program (listed below)	21.6%	16.1%	19.5%
Give customers more / better information about this program	17.6%	19.4%	18.3%
Landlord would not allow me to participate / renter issues	9.8%	12.9%	11.0%
Security concerns about letting people into the home	2.0%	12.9%	6.1%
Focus on weatherization / winterization	5.9%	6.5%	6.1%
Make more weekend and evening hours available for audits	2.0%	9.7%	4.9%
Give out more light bulbs / measures / emphasize free measures	3.9%	3.2%	3.7%
Give more advance notice ahead of the program being available	5.9%	0.0%	3.7%
Lower the rates / payment issues (not program related)	5.9%	0.0%	3.7%
Comments about participation requirements	2.0%	3.2%	2.4%
Make it easier to sign-up / enroll	3.9%	0.0%	2.4%
Make program available again / more than once per year	0.0%	0.0%	0.0%
Other program-related suggestions or comments (listed below)	17.6%	3.2%	12.2%

<sup>36</sup> Due to a survey programming error, the first sixteen non-participant customers interviewed in the Midwest were not asked about recommending the program to other people. Results are reported based only on the responses of the 66 customers who were asked these questions.



No suggestions / don't know	23.5%	35.5%	28.0%
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*Percentages total to more than 100% because respondents could give multiple responses.*

Sixteen non-participants in the Midwest made suggestions about improving communications about the program to improve participation; these responses are categorized below (there are more responses listed than respondents since customers could make multiple suggestions).

- More or better advertising in traditional media (Ohio n=4)
- Improve door hangers so they are more noticeable (Ohio n=2, Kentucky n=1)
- Door-to-door solicitation so customers can ask questions in person (Ohio n=3)
- Advertise the program by email (Ohio n=2)
- Mail out example measures and/or examples of typical savings that can be expected with measures (Ohio n=2)
- Make multiple attempts to reach customers (one attempt is not enough) (Kentucky n=2)
- Target elderly and disabled customers (Kentucky n=1)
- Community meeting “requirement” sounds like a sales pitch<sup>37</sup> (Kentucky n=1)

Two non-participants had comments about participation requirements; both of these customers expressed a concern that renters may not know they are eligible to participate in this program.

Ten non-participant customers in the Midwest gave miscellaneous suggestions or comments that did not fit into the categories listed in Table 107; these responses are categorized below.

- Offer assistance purchasing major upgrades: HVAC systems, water heaters, refrigerators, carpeting, roofs, windows, doors (Ohio n=3)
- Lower rates as an incentive / provide direct financial assistance (Ohio n=1, Kentucky n=1)
- Offer to arrange transportation to and from the community meeting (Ohio n=2)
- Offer HVAC tune-ups and duct inspections (Ohio n=1)
- Offer a guarantee that the program will save money on my utility bill (Ohio n=1)
- Make it clearer that Duke Energy is offering the program (thought this program was from People Working Cooperatively) (Ohio n=1)

### **Non-Participant Actions to Save Energy in the Home**

Non-participants were asked if they have taken any steps to save energy in their homes in the past year. Overall, 67.1% said that they have taken actions to save energy, and the actions they took are categorized in Table 108. The most frequently mentioned actions are using efficient light bulbs (23.2%) and sealing door and window leaks (23.2%). There are no differences between states which reach the  $p < .05$  level of statistical significance using Student's t-test.

<sup>37</sup> Attending the community meeting is not a requirement for participation in the program, however some customers seem to believe that attendance is required in order to participate.

**Table 108. Non-Participants' Steps Taken to Save Energy in the Past Year (N=82)**

<i>Base: non-participants who are aware of the program</i>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
<b>Did not take steps to save energy</b>	<b>27.5%</b>	<b>38.7%</b>	<b>31.7%</b>
<b>Took steps to save energy (total)</b>	<b>70.6%</b>	<b>61.3%</b>	<b>67.1%</b>
Use more efficient light bulbs / CFL, LED	25.5%	19.4%	23.2%
Seal leaks / caulk, tape, plastic on windows, doors	21.6%	25.8%	23.2%
Turn off lights when not in use / use less light	15.7%	12.9%	14.6%
Use less heating (turn down thermostat, dress warmly)	7.8%	19.4%	12.2%
Upgrade windows, doors	13.7%	6.5%	11.0%
Turn items off when not in use / unplug, use power strips	11.8%	3.2%	8.5%
Upgrade HVAC system	9.8%	6.5%	8.5%
Keep doors / windows shut	2.0%	6.5%	3.7%
Added insulation to walls, ceilings, attic, floor	3.9%	0.0%	2.4%
Do not adjust thermostat (maintain steady temperature)	3.9%	0.0%	2.4%
Regular HVAC maintenance	3.9%	0.0%	2.4%
Upgrade water heater	3.9%	0.0%	2.4%
Unique actions (listed below)	9.8%	9.7%	9.8%
<b>Don't know / not specified</b>	<b>2.0%</b>	<b>0.0%</b>	<b>1.2%</b>

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

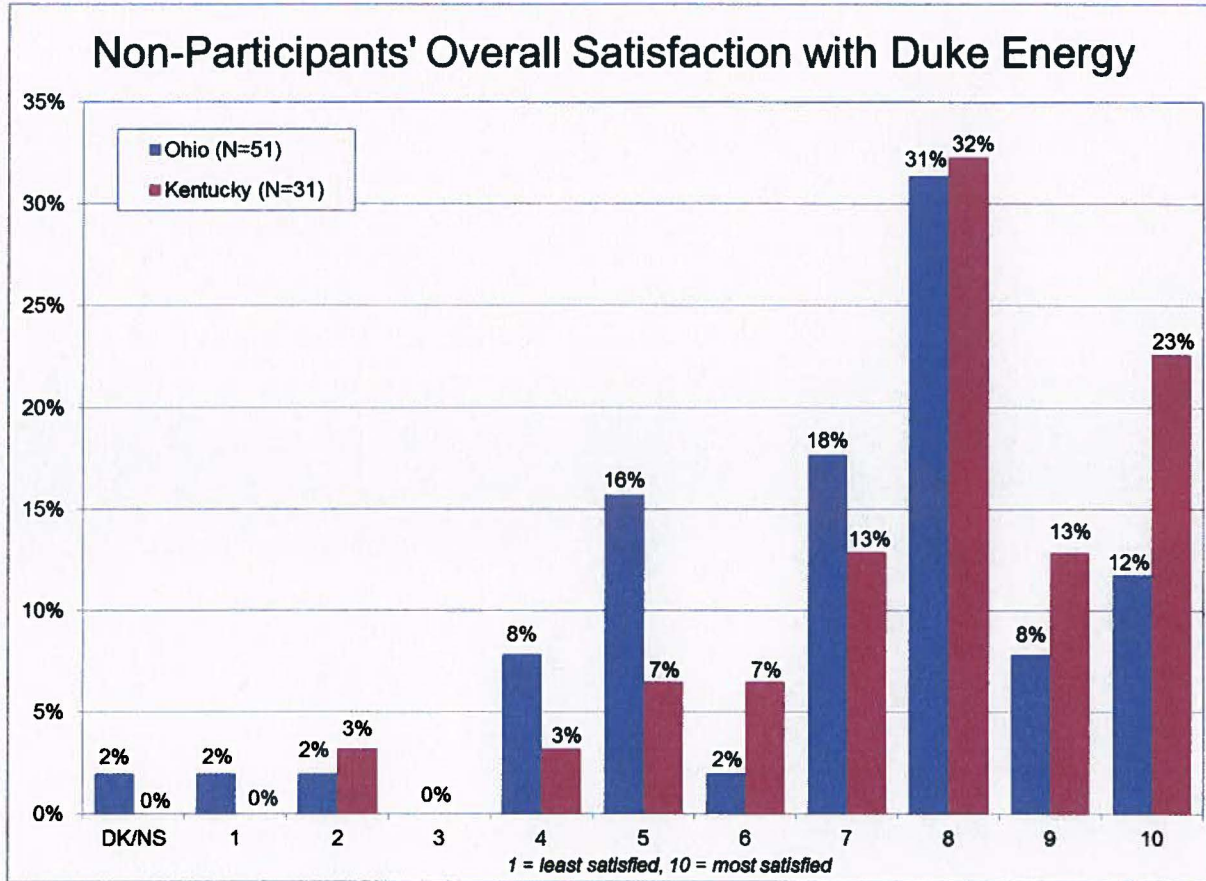
Eight non-participants in the Midwest mentioned unique actions they have taken to save energy: these include replacing a roof, replacing kitchen appliances, installing a new thermostat, using a space heater, using night lights<sup>38</sup>, closing drapes, closing off rooms in winter and adding mulch around the home foundation.

### **Non-Participant Satisfaction with Duke Energy**

Surveyed non-participants are generally satisfied with Duke Energy; Figure 9 shows the distribution of satisfaction ratings scores. The mean satisfaction rating among all surveyed non-participants in the Midwest is 7.33 on a 10-point scale where "10" is the most satisfied, and the median and mode for both states is "8 out of 10".<sup>39</sup> Kentucky residents give Duke Energy slightly higher satisfaction ratings (mean 7.81 versus 7.04 for Ohio), though the difference in mean ratings scores between states does not reach the  $p < .10$  level of significance using ANOVA.

<sup>38</sup> LED night lights were provided to attendees at some of the community meeting "kick off" events.

<sup>39</sup> Among 80 surveyed program participants in the Midwest, the mean satisfaction rating for Duke Energy is 8.79 (as seen in *Satisfaction with Duke Energy* on page 25); the mean satisfaction rating of 7.33 among non-participants is significantly lower ( $p < .05$  using Student's t-test). Satisfaction with Duke Energy is significantly correlated with satisfaction with the program (see *Predicting Overall Program Satisfaction* on page 31), and may also be a driver of participation (i.e., customers who are more satisfied with Duke Energy are more likely to participate in Duke Energy programs, and customers who are less satisfied with Duke Energy are less likely to participate in programs).



**Figure 9. Non-Participant Satisfaction with Duke Energy Overall (N=82)**

Thirty-four non-participants (41.5%) rated their satisfaction with Duke Energy at “7” or less, and these customers were asked how their satisfaction could be improved. Their responses are listed by state below; most of these comments have to do with rates and billing, particularly in Ohio (there are more responses listed than respondents because customers could mention multiple issues).

**Ohio (N=24)**

- Lower my bills / rates are too high (n=10)
- Be more understanding of customers who fall behind on their bills (n=4)
- Do a better job communicating with customers (n=4)
- Increase / improve energy efficiency programs (n=2)
- Reduce billing errors / better explain billing fluctuations (n=2)
- Compel landlords to participate in this program (n=1)
- Don't know (N=4)

**Kentucky (N=10)**

- Lower my bills / rates are too high (n=4)
- Be more understanding of customers who fall behind on their bills (n=4)
- Issues with meter reading / meter readers (n=3)
- Duke Energy should call customers before visiting their homes (n=1)
- Don't know (N=1)

Table 109 indicates about half of surveyed Kentucky non-participants (51.6%) felt more positive about Duke Energy based on what they know about the Residential Neighborhood program, while only about a third of Ohio non-participants (29.4%) said the program made them feel more positive toward Duke Energy (this difference is significant at  $p < .05$  using Student's t-test). However, about one non-participant in five in both states reported feeling "much more positive" toward Duke Energy (17.6% in Ohio, 19.4% in Kentucky and 18.3% in the Midwest overall). Only one non-participant in Ohio (1.2% of 82 surveyed in the Midwest) said that the program made them feel more negative towards Duke Energy, while overall a majority of Midwest non-participants (56.1%) said they felt about the same toward Duke Energy based on what they know about this program.

**Table 109. Changes in Non-Participants' Attitude toward Duke Energy Based on Knowledge of the Residential Neighborhoods Program (N=82)**

<b>Base: non-participants who are aware of the program</b>	<b>Ohio (N=51)</b>	<b>Kentucky (N=31)</b>	<b>Total Midwest (N=82)</b>
Much more positive toward Duke Energy	17.6%	19.4%	18.3%
Somewhat more positive	11.8%	32.3%	19.5%
About the same	62.7%	45.2%	56.1%
Somewhat more negative	0.0%	0.0%	0.0%
Much more negative	2.0%	0.0%	1.2%
Don't know / not specified	5.9%	3.2%	4.9%

Non-participants who said they felt more positive or more negative towards Duke Energy based on what they know about the Residential Neighborhoods program were asked why they felt more positive or more negative. Only one customer's attitude became more negative; this customer explained: "I made an honest effort to sign up for the program but did not receive a call back nor an explanation." There are 31 customers whose attitude toward Duke Energy improved based on what they know about this program; their explanations are categorized below (there are more responses than respondents because customers could give multiple reasons). Most customers who became more positive cite the idea that Duke Energy is "giving back to the community" and that the utility "cares about helping" its customers, with customers saving money and receiving free items being the second-most mentioned reason for a more positive view of Duke Energy.

**Much more positive towards Duke Energy (N=15)**

- This program shows that Duke Energy cares about and wants to help their customers / gives back to the community (Ohio n=5, Kentucky n=4)
- Duke Energy is helping customers save money / giving free measures (Ohio n=1, Kentucky n=4)

- This program teaches people about energy efficiency / education (Ohio n=2, Kentucky n=1)
- Duke Energy is saving energy (and water) / conservation (Ohio n=2, Kentucky n=1)

**Somewhat more positive towards Duke Energy (N=16)**

- Duke Energy is helping customers save money / giving free measures (Ohio n=4, Kentucky n=5)
- This program shows that Duke Energy cares about and wants to help their customers / gives back to the community (Ohio n=4, Kentucky n=3)
- This program teaches people about energy efficiency / education (Ohio n=2, Kentucky n=2)
- Duke Energy is saving energy (and water) / conservation (Ohio n=1, Kentucky n=1)
- General positive comments (“nice”, “great program”) (Kentucky n=2)

## Appendix A: Counts of Participants for Billing Analysis

<b>Participant Since YYYYMM</b>	<b>Number of New Participants in Each Month</b>
201304	34
201305	43
201306	32
201307	57
201308	74
201309	64
201310	105
201311	121
201312	228
201401	139
201402	169
201403	258
201404	207
201405	179
201406	177
201407	193
201408	17

## Appendix B: Estimated Model

This appendix presents the complete model estimated for the billing analysis. The model includes indicators for each month (the YYYYMM variable), temperature, and the participation variables.

### Variables:

- Interaction of monthly binary indicator and temperature:
  - 201102 – 201408: Binary indicator variables for that YYYYMM
  - CDD\*MonthlyID: product of monthly CDD and binary monthly variables
  - HDD\* MonthlyID: product of monthly CDD and binary monthly variables
- Indicator variables for participation in other Duke Energy programs:
  - Free\_cfl: Residential Smart \$aver Energy Efficiency: CFL
  - CFL\_promo: Residential Smart \$aver Energy Efficiency: Discounted CFL
  - CFL\_special: Residential Energy Efficiency: Specialty Bulbs
  - K12: Energy Education for Schools
  - HEHC: Home Energy House Call
  - lowinc\_weath: Low Income Weatherization
  - PER-OHEC: Personalized Energy Report
  - appl\_recycle: Appliance Recycling Program
  - insul\_seal\_date: Residential Smart \$aver: Insulation and Seal
  - refrige\_replace: Refrigerator replacement program (included in the analysis whereas no participation)
  - furnace\_replace: Furnace replacement program (included in the analysis whereas no participation)
  - smsvr\_HVAC: Residential Smart \$aver HVAC
  - HVAC\_tuneup\_date: Residential Smart \$aver HVAC tune up (included in the analysis whereas no participation)
  - Property\_mgr: Residential Smart \$aver: Property Manager CFLs
  - MyHER: My Home Energy Report

Number of Observations Read 68077  
Number of Observations Used 68077

Dependent Variable: kwhd

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2191	25857239.16	11801.57	56.16	<.0001
Error	65885	13846243.86	210.16		
Corrected Total	68076	39703483.02			

R-Square 0.651259    Coeff Var 49.77696    Root MSE 14.49682    kwhd Mean 29.12355

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Account_Id	2096	22175121.78	10579.73	50.34	<.0001
cdd*monthID	36	1915035.89	53195.44	253.12	<.0001
hdd*monthID	46	1755261.21	38157.85	181.57	<.0001
k12_date	1	428.49	428.49	2.04	0.1533
Insul_Seal_date	0	0.00	.	.	.
HVAC_tuneup_date	0	0.00	.	.	.
Free_CFL	1	858.23	858.23	4.08	0.0433
cfl_promo	1	271.96	271.96	1.29	0.2553
cfl_special	1	15.65	15.65	0.07	0.7849
HEHC	1	66.69	66.69	0.32	0.5732
lowinc_weath	1	1725.79	1725.79	8.21	0.0042
PER_OHEC	1	73.69	73.69	0.35	0.5538
SmSvr_HVAC	1	20.60	20.60	0.10	0.7542
Appl_Recycle	1	81.00	81.00	0.39	0.5347
Refrige_Replace	1	1286.80	1286.80	6.12	0.0133
furnace_replace	1	874.75	874.75	4.16	0.0413
Property_Mgr	0	0.00	.	.	.
MyHER	1	1942.24	1942.24	9.24	0.0024
part	1	4174.39	4174.39	19.86	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
cdd*monthID	36	1405101.758	39030.604	185.72	<.0001
hdd*monthID	46	1753381.054	38116.979	181.37	<.0001
k12_date	1	368.242	368.242	1.75	0.1856
Insul_Seal_date	0	0.000	.	.	.
HVAC_tuneup_date	0	0.000	.	.	.
Free_CFL	1	526.278	526.278	2.50	0.1135
cfl_promo	1	238.674	238.674	1.14	0.2866



Source	DF	Type III SS	Mean Square	F Value	Pr > F
cfl_special	1	14.250	14.250	0.07	0.7946
HEHC	1	11.668	11.668	0.06	0.8137
lowinc_weath	1	456.762	456.762	2.17	0.1404
PER_OHEC	1	61.470	61.470	0.29	0.5886
SmSvr_HVAC	1	17.439	17.439	0.08	0.7733
Appl_Recycle	1	68.633	68.633	0.33	0.5677
Refrige_Replace	1	1131.617	1131.617	5.38	0.0203
furnace_replace	1	923.710	923.710	4.40	0.0360
Property_Mgr	0	0.000	.	.	.
MyHER	1	1815.201	1815.201	8.64	0.0033
part	1	4174.385	4174.385	19.86	<.0001

Parameter	Estimate	Standard Error	t Value	Pr >  t
cdd*monthID 201102	16.31593451 B	3.84178802	4.25	<.0001
cdd*monthID 201103	0.56487294 B	0.38682527	1.46	0.1442
cdd*monthID 201104	-0.00023371 B	0.07370069	-0.00	0.9975
cdd*monthID 201105	0.08879681 B	0.01388294	6.40	<.0001
cdd*monthID 201106	0.10305176 B	0.00427153	24.13	<.0001
cdd*monthID 201107	0.08726072 B	0.00153201	56.96	<.0001
cdd*monthID 201108	0.10502988 B	0.00226066	46.46	<.0001
cdd*monthID 201109	0.09109737 B	0.01005015	9.06	<.0001
cdd*monthID 201110	0.19121528 B	0.13374181	1.43	0.1528
cdd*monthID 201111	3.10323033 B	1.02167621	3.04	0.0024
cdd*monthID 201112	4.91591292 B	2.68264806	1.83	0.0669
cdd*monthID 201202	0.84805356 B	0.26604153	3.19	0.0014
cdd*monthID 201203	0.23697578 B	0.05227811	4.53	<.0001
cdd*monthID 201204	0.10918188 B	0.02802446	3.90	<.0001
cdd*monthID 201205	0.10968888 B	0.00672818	16.30	<.0001
cdd*monthID 201206	0.08665850 B	0.00310523	27.91	<.0001
cdd*monthID 201207	0.08597382 B	0.00137233	62.65	<.0001
cdd*monthID 201208	0.10863070 B	0.00225769	48.12	<.0001
cdd*monthID 201209	0.10307882 B	0.00983347	10.48	<.0001
cdd*monthID 201210	0.12374077 B	0.09045448	1.37	0.1713
cdd*monthID 201211	1.50139465 B	0.38984466	3.85	0.0001
cdd*monthID 201303	0.76380057 B	0.09527184	8.02	<.0001

cdd*monthID	201304	0.11131182 B	0.05476938	2.03	0.0421
cdd*monthID	201305	0.09395890 B	0.01325277	7.09	<.0001
cdd*monthID	201306	0.09275846 B	0.00434221	21.36	<.0001
cdd*monthID	201307	0.09619596 B	0.00303899	31.65	<.0001
cdd*monthID	201308	0.09831215 B	0.00524616	18.74	<.0001
cdd*monthID	201309	0.06733126 B	0.00976723	6.89	<.0001
cdd*monthID	201310	0.12696281 B	0.05313212	2.39	0.0169
cdd*monthID	201311	-1.53929230 B	1.44488846	-1.07	0.2867
cdd*monthID	201403	2.15422347 B	0.25040685	8.60	<.0001
cdd*monthID	201404	-0.04236676 B	0.05600247	-0.76	0.4493
cdd*monthID	201405	0.03794048 B	0.01276363	2.97	0.0030
cdd*monthID	201406	0.11255592 B	0.00379416	29.67	<.0001
cdd*monthID	201407	0.06799687 B	0.00580560	11.71	<.0001
cdd*monthID	201408	0.42072307 B	0.12139788	3.47	0.0005
hdd*monthID	201011	-0.01068967	0.01470134	-0.73	0.4672
hdd*monthID	201012	0.02524519	0.00071604	35.26	<.0001
hdd*monthID	201101	0.02728734	0.00050106	54.46	<.0001
hdd*monthID	201102	0.02887120	0.00072586	39.77	<.0001
hdd*monthID	201103	0.03404571	0.00125925	27.04	<.0001
hdd*monthID	201104	0.05513229	0.00357658	15.41	<.0001
hdd*monthID	201105	0.07526567	0.01294464	5.81	<.0001
hdd*monthID	201106	0.14154616	0.06537701	2.17	0.0304
hdd*monthID	201107	2.12748142	0.87952378	2.42	0.0156
hdd*monthID	201108	-0.02672598	0.06958675	-0.38	0.7009
hdd*monthID	201109	0.11289693	0.00982505	11.49	<.0001
hdd*monthID	201110	0.05288446	0.00309062	17.11	<.0001
hdd*monthID	201111	0.03551236	0.00148435	23.92	<.0001
hdd*monthID	201112	0.03267737	0.00080853	40.42	<.0001
hdd*monthID	201201	0.03514290	0.00059815	58.75	<.0001
hdd*monthID	201202	0.03019729	0.00071520	42.22	<.0001
hdd*monthID	201203	0.04093493	0.00200927	20.37	<.0001
hdd*monthID	201204	0.04955407	0.00241541	20.52	<.0001
hdd*monthID	201205	0.10310396	0.00690464	14.93	<.0001
hdd*monthID	201206	0.45945208	0.05028235	9.14	<.0001
hdd*monthID	201207	4.66043131	0.80519105	5.79	<.0001
hdd*monthID	201208	0.26935198	0.11943180	2.26	0.0241
hdd*monthID	201209	0.08888696	0.00873398	10.18	<.0001
hdd*monthID	201210	0.04358854	0.00206118	21.15	<.0001
hdd*monthID	201211	0.03175520	0.00082884	38.31	<.0001
hdd*monthID	201212	0.03226989	0.00058732	54.94	<.0001
hdd*monthID	201301	0.02951810	0.00049576	59.54	<.0001

Parameter		Estimate	Standard Error	t Value	Pr >  t
hdd*monthID	201302	0.02930533	0.00055075	53.21	<.0001
hdd*monthID	201303	0.02889188	0.00063047	45.83	<.0001
hdd*monthID	201304	0.04260264	0.00269476	15.81	<.0001
hdd*monthID	201305	0.09137563	0.00989515	9.23	<.0001
hdd*monthID	201306	0.34213966	0.04420508	7.74	<.0001
hdd*monthID	201307	1.66388558	0.21863739	7.61	<.0001
hdd*monthID	201308	0.56185382	0.09824125	5.72	<.0001
hdd*monthID	201309	0.21494607	0.02127200	10.10	<.0001
hdd*monthID	201310	0.04405562	0.00354139	12.44	<.0001
hdd*monthID	201311	0.03230366	0.00070349	45.92	<.0001
hdd*monthID	201312	0.03071537	0.00049521	62.02	<.0001
hdd*monthID	201401	0.03043854	0.00041147	73.97	<.0001
hdd*monthID	201402	0.02969267	0.00045848	64.76	<.0001
hdd*monthID	201403	0.03155282	0.00067965	46.42	<.0001
hdd*monthID	201404	0.04996026	0.00204377	24.45	<.0001
hdd*monthID	201405	0.11930271	0.00855147	13.95	<.0001
hdd*monthID	201406	0.07305878	0.03236117	2.26	0.0240
hdd*monthID	201407	1.69801539	0.15225526	11.15	<.0001
hdd*monthID	201408	-9.60880558	2.83117862	-3.39	0.0007
k12_date		-1.06743418	0.80639329	-1.32	0.1856
Insul_Seal_date		0.00000000 B	.	.	.
HVAC_tuneup_date		0.00000000 B	.	.	.
Free_CFL		-0.34790665	0.21985060	-1.58	0.1135
cfl_promo		-1.56855896	1.47187599	-1.07	0.2866
cfl_special		-0.59764678	2.29511977	-0.26	0.7946
HEHC		-0.25321322	1.07464163	-0.24	0.8137
lowinc_weath		-0.91541876	0.62093733	-1.47	0.1404
PER_OHEC		-0.70204867	1.29809570	-0.54	0.5886
SmSvr_HVAC		0.65211185	2.26379766	0.29	0.7733
App1_Recycle		-0.98440054	1.72257946	-0.57	0.5677
Refrige_Replace		-2.94705110	1.27002024	-2.32	0.0203
furnace_replace		-4.53121048	2.16132061	-2.10	0.0360
Property_Mgr		0.00000000 B	.	.	.
MyHER		-0.64953936	0.22101200	-2.94	0.0033
part		-1.16382134	0.26113361	-4.46	<.0001

Parameter	Estimate	Standard Error	t Value	Pr >  t
hdd*monthID 201302	0.04616824	0.0004003	115.34	<.0001
hdd*monthID 201303	0.04854534	0.0005156	94.15	<.0001
hdd*monthID 201304	0.06273890	0.0020151	31.13	<.0001
hdd*monthID 201305	0.14097334	0.0060986	23.12	<.0001
hdd*monthID 201306	0.27111413	0.0344485	7.87	<.0001
hdd*monthID 201307	0.75227106	0.5459625	1.38	0.1682
hdd*monthID 201308	0.64648682	0.0836063	7.73	<.0001
hdd*monthID 201309	0.23497863	0.0125078	18.79	<.0001
hdd*monthID 201310	0.07431079	0.0020218	36.75	<.0001
hdd*monthID 201311	0.05209481	0.0006242	83.46	<.0001
hdd*monthID 201312	0.04551292	0.0005830	78.07	<.0001
hdd*monthID 201401	0.04740798	0.0003332	142.29	<.0001
hdd*monthID 201402	0.04654439	0.0003836	121.35	<.0001
hdd*monthID 201403	0.04988105	0.0005253	94.95	<.0001
hdd*monthID 201404	0.06945916	0.0018043	38.50	<.0001
hdd*monthID 201405	0.15354932	0.0064585	23.77	<.0001
hdd*monthID 201406	0.39260212	0.0408723	9.61	<.0001
hdd*monthID 201407	18.42271508	6.4661767	2.85	0.0044
hdd*monthID 201408	-36.33626290	215.5990767	-0.17	0.8662
k12_date	-0.06574948	0.2929747	-0.22	0.8224
Insul_Seal_date	-1.68582223	6.2833457	-0.27	0.7885
Free_CFL	0.27569834	0.0981067	2.81	0.0050
cfl_promo	1.56743195	5.1477852	0.30	0.7608
cfl_special	-0.19005964	1.3100903	-0.15	0.8847
HEHC	0.85054143	0.5368744	1.58	0.1131
lowinc_weath	2.41266070	1.4140526	1.71	0.0880
PER_OHEC	-0.73461637	0.5426533	-1.35	0.1758
SmSvr_HVAC	0.37324155	1.3090581	0.29	0.7756
Appl_Recycle	-0.14340946	0.8868349	-0.16	0.8715
Property_Mgr	-0.62212566	0.1640377	-3.79	0.0001
MyHER	-0.35044884	0.1004404	-3.49	0.0005
part	-1.07687179	0.1173765	-9.17	<.0001

## Appendix C: Engineering Algorithms

### CFLs

#### General Algorithm

##### Gross Summer Coincident Demand Savings

$$\Delta kW = \text{ISR} \times \text{units} \times \left[ \frac{\text{Watts}_{\text{base}} - \text{Watts}_{\text{ee}}}{1000} \right] \times \text{CF} \times \text{WHF}_d$$

##### Gross Annual Energy Savings

$$\Delta kWh = \text{ISR} \times \text{units} \times \left[ \frac{(\text{Watts} \times \text{HOURS})_{\text{base}} - (\text{Watts} \times \text{HOURS})_{\text{ee}}}{1000} \right] \times 365 \times \text{WHF}_e$$

where:

$\Delta kW$	= gross coincident demand savings
$\Delta kWh$	= gross annual energy savings
units	= number of units installed under the program
$\text{Watts}_{\text{ee}}$	= connected load of energy-efficient lamp = 15.76
$\text{Watts}_{\text{base}}$	= connected load of baseline lamp
HOURS	= Average daily hours of use
CF	= coincidence factor = 0.11 (taken from Draft Ohio TRM)
$\text{WHF}_e$	= Waste heat factor for annual electricity consumption = 0.9942
$\text{WHF}_d$	= Waste heat factor for demand = 1.167

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