LARGE FILING SEPERATOR SHEET

CASE NUMBER: 08-1227- EL-UNC

FILE DATE: 11-17-08

SECTION: 3.074

NUMBER OF PAGES: 200

DESCRIPTION OF DOCUMENT: NEW Cash

WHERE		WHAT WAS REPLAC	CED	HOW MUCH ITS USED (Each Day)		
Example	Living Room	60W Floor Lamp		6 Hours Per Day (average)		
Bulb 1 _						
Bulb 2 _			<u></u>			
Bulb 3						
\ Bulb 4						
Bulb 5 _						
Bulb 6			<u> </u>			

Please write in WHERE the CFL went, WHAT it replaced, and HOW MUCH you use that light.

Any More? Please summarize briefly below.

Did you change the hours of use since installing the CFLs?	A	Yes		<u>e</u>	No	
If you answered yes, how did your usage change?	A	Increased	usage	A	Decrease	ed usag e
Have you removed any of the CFLs you installed?	A	Yes		A	No	
12+	1-2	3	4	5	6	7-11
If yes, how many did you remove?	.		.			
Why did you remove them?						
Did you have any CFLs in your house before you bought these No	e disc	counted CF	Ls?	A	Yes	A
12+	1-2	3	4	5	6	7-11

If yes, about how many?	- 、 、	▲ , , , , ▲ , , , , , , , , , , , , , , , , , , ,	<u>A</u> · · ·	د ک ر کرد در را	Å	
	Ver	y Satisfied	Som	ewhat Sa	atisfied	Not at
all Satisfied						
Overall, how satisfied are you with the CFLs?		A		A		
How long have you been using CFL light bulbs ?	A	Never purchased a	CFL un	til now	A	A year ago
years	A	2 to 3 years ago			A	4 or more
Section IV Energy Star Awareness	i kak		erie te an aller Al actor de rege	n a thugach		Mangara -
Did you give all of your coupons to someone else to No	use?		A	Yes		
			Often		Sometii	nes
Never						
Do you use the Duke Energy Website?						
Have you added any electrical appliances to your hom	me in	the past year?	A	Yes		
Are you aware of ENERGY STAR?			A	Yes		
Do you look for the ENERGY STAR label when pur	rchasi	ng an appliance?	<u>A</u> .	Yes		
			Notice			

Section V General Information About Your Home How would you best describe the type of home in which you live? Condominium Detached single-family Townhouse Δ ക B A Duplex/2-family Multi-Family (3 or more units) Apartment Manufactured home A Δ A In what year was your home built? Before 1959 1960 - 1979 1980 - 1989 a A 1990 - 1997 1998 - 2000 After 2001 A A What is the approximate square footage (heated area) of your home? Less than 1,200 1,201 - 1,6001,601 - 1,900 A 8 A 1,901 - 2,4002,401 - 3,000Greater than 3,000 A a. A Don't know a Last year of schooling? Some high school Completed high school Some college A A 6 Graduated college Some grad school Grad School degree a <u>.</u> A What range best describes your age group? 18 to 35 36 to 45 46 to 55 A A A 56 to 65 65 or over A a What range best describes your household income? Less than \$25,000 \$25,000 to \$50,000 A A \$50,000 to \$75,000 Over \$75,000 A a How many people live in your home? 2 A 1 A 3 4 Δ 5 6 7 A A Δ A more than 7 Do you own or rent your home? ▲ Own Rent ക Type of heating system? Central furnace Electric baseboard Heat pump Geo-thermal A a £ Other A

Type of cooling system?

<u>a</u>	Central air	æ	Window/Ro	юm		A Heat pu unit air condition	ner	<u>a</u>	Geo-thermal
Prin	pary heating fuel?	A	Electric	A	Gas	A	Other		
Prin	nary cooling fuel?	A	Electric	A	Gas	A	Other		

Thank you for your help with this study. Your 10.00 incentive check will be mailed within 6 – 8 weeks. Please verify your address on the front page of this survey.

A Yes, my address on the front page of this survey is correct

▲ No, please mail my check to:

THANK YOU FOR YOUR RESPONSES

Appendix 3 – Logged Bulb Characteristics Overview (Initial and Final Studies)

Bulb Characteristics Summary – Initial Lighting Logger Study

Bulb Type	Brand	Wattage	Location	Fixture	Table %
Candle	GE	60	Bathroom	Wall	0.60%
CFL	GE	13	Bedroom 1	Table lamp	0.60%
		26	Family Room	Table lamp	1.30%
			Living Room	Floor lamp	0.60%
	Greenlite	14	Family Room	Table lamp	0.60%
	Marathon	13	Bathroom	Wall	0.60%
			Bedroom 1	Ceiling	0.60%
			Hall	Ceiling	0.60%
		23	Family Room	Table lamp	0.60%
	Mini Spiral	13	Living Room	Table lamp	0.60%
	Miser	15	Office	Ceiling	0.60%
	Niagra	23	Bedroom 3	End Table	0.60%
			Living Room	Table lamp	0.60%
	Nvision	14	Kitchen	Ceiling	0.60%
			Living Room	Table lamp	0.60%
		23	Office	Ceiling	0.60%
	WestH	23	Office	Table lamp	0.60%
Flourescent	GE	40	Kitchen	Ceiling	1.30%
			Laundry Room	Ceiling	0.60%
	Unknown	Unknown	Bathroom	Ceiling	0.60%
		40	Basement	Ceiling	1.30%
			Laundry Room	Ceiling	0.60%
Incandescent	Comm Serv	60	Family Room	Ceiling Fan	0.60%
	Do It	60	Bathroom	Wall	0.60%
	DuraMax	60	Family Room	Ceiling Fan	0.60%
		75	Kitchen	Ceiling	0.60%
	GE	100	Basement	Table lamp	0.60%
	· · ·		Closet	Ceiling	0.60%
			Family Room	Table lamp	0.60%
			Front Porch	Ceiling	0.60%
			Kitchen	Ceiling Fan	0.60%
				Ceiling	0.60%
		30-70-100	Family Room	Table lamp	0.60%
		40	Basement	Ceiling Fan	0.60%
			Bathroom	Wali	1.90%
			Hall	Ceiling	0.60%
		50-100- 150	Bedroom 1	Table lamp	1.30%
			Family Room	Table lamp	0.60%
			Living Room	Table lamp	0.60%
		50-75-100	Living Room	Table lamp	0.60%

		60	Bathroom	Wall	1.90%
			Bedroom 1	Ceiling	1.30%
				Table lamp	1.90%
			Bedroom 2	Table lamp	0.60%
			Dining Room	Ceiling Can	0.60%
			Entryway	Ceiling	0.60%
			Family Room	Table lamp	0.60%
			Hall	Ceiling	1.90%
			Kitchen	Ceiling Fan	1.30%
······································				Ceiling	1.90%
			Living Room	Table lamp	3.10%
			Office	Ceiling	0.60%
		75	Bedroom 1	Floor lamp	0.60%
			1	Table lamp	0.60%
	······		Family Room	Ceiling	0.60%
			Hall	Ceiling	1.30%
			Kitchen	Ceiling	0.60%
· · · · · · · · · · · · · · · · · · ·	·		Living Room	Floor lamp	0.60%
	Phillips	40	Bathroom	Wall	0.60%
	•		Kitchen	Ceiling Fan	0.60%
		60	Bathroom	Wall	0.60%
			Bedroom 1	Ceiling Fan	0.60%
			Kitchen	Ceiling Fan	0.007
	1	65	Bathroom	Ceiling Can	0.007
	Polaroid	60	Bedroom 2	Ceiling Fan	0.007
	Sunbeam	80	Bedroom 1	Ceiling Fan	0.00%
	Supreme	60	Hall	Ceiling	0.007
	Sylvania	100	Bathroom	Wall	0.007
		100	Bedroom 1	Ceiling	0.007
			Bedroom 2	Ceiling Fan	0.007
		30-70-100	Bedroom 1	Table lamp	0.60%
		40	Bathroom	Wall	0.007
			Hall	Ceiling	0.60%
			Living Room	Floor Jamp	0.007
	- 	60	Bathroom	Wall	1 0.007
		00	Bedroom 1	Ceiling Fan	0.600
				Ceiling	0.007
			[Table lamo	0.007
			Dining Room	Chandelier	
		+	Hall	Ceiling	
			Living Room	Table Jamp	0.00%
	<u> </u>	75	Recoment	Ceiling	0.00%
	<u> </u>	10	Family Poom	Eloor Jamp	0.60%
			Kitchon	Ceiling	0.60%
				Table Iome	0.60%
	Linknown	l lake over	Dining Room	Ceiling	1.90%
			Living Room		0.60%
·		100			
	<u> </u>	25			0.60%
		<u> </u>	Deer Enter		1.30%
		-	rtear chury		<u>0.60%</u>

!		40	Bathroom	Wail	2.50%
		•	Bedroom 1	Ceiling Fan	0.60%
			Family Room	Floor lamp	0.60%
			Hall	Ceiling	0.60%
			Kitchen	Ceiling Fan	1.30%
			Living Room	Ceiling Fan	0.60%
		50-100- 150	Bedroom 3	Floor lamp	0.60%
			Family Room	Table lamp	0.60%
		50	Entryway	Track	0.60%
		60	Basement	Can	0.60%
			Bathroom	Wall	0.60%
			Bathroom/Baseme	ntWall	0.60%
			Bedroom 1	Table lamp	1.30%
			Bedroom 2	Ceiling Fan	0.60%
			Kitchen	Ceiling Fan	0.60%
				Ceiling	1.30%
· · · · · · · · · · · · · · · · · · ·	_		Laundry Room	Ceiling	0.60%
			Living Room	Table lamp	0.60%
			Office	Ceiling Fan	0.60%
			Porch	Outdoor Wall	0.60%
		75	Bathroom	Wall	0.60%
			Entryway	Ceiling	0.60%
			Hall	Ceiling	0.60%
			Kitchen	Ceiling	0.60%
			Master Bedroom Closet	Ceiling	0.60%
	WestH	100	Bedroom 2	Track	0.60%
			Family Room	Floor lamp	0.60%
		40	Living Room	Table lamp	0.60%
		60	Bedroom 2	Ceiling Fan	0.60%
			Kitchen	Ceiling Fan	0.60%
	-		Living Room	Table lamp	0.60%
Flood	GE	65	Basement	Track	0.60%
		75	Bathroom	Ceiling	0.60%
	Miser	65	Basement	Ceiling Can	0.60%
	Sylvania	120	Kitchen	Ceiling Can	0.60%
		65	Basement	Ceiling Can	0.60%
	Unknown	65	Bathroom	Ceiling Can	0.60%
		75	Hall	Ceiling Can	0.60%

Bulb Characteristics Summary – Final Lighting Logger Study

Bulb Type	Brand	Wattage	Location	Fixture	Table %
CFL	GE	10	Bathroom	Wall Light	.5%
		12-23-29	Family Room	Table Lamp	.5%
			Living Room	Table Lamp	.5%
		12-23-32	Living Room	Table Lamp	.5%
		13	Basement	Ceiling	.5%
			Bathroom	Ceiling	1.0%
				Wall Light	1.5%
			Bedroom 1	Ceiling Fan	1.0%
				Table Lamp	1.5%
			Bedroom 2	Ceiling Fan	.5%
			Closet	Ceiling	.5%
			Dining Room	Ceiling Fan	1.0%
				Ceiling	.5%
				Desk Lamp	.5%
			Family Room	Ceiling	.5%
				Floor	1.0%
······				Table Lamp	2.0%
·			Hall	Ceiling	.5%
· ····································			Kitchen	Ceiling Fan	1.5%
				Ceiling	2.5%
				Table Lamp	.5%
			Laundry Room	Ceiling	.5%
			Living Room	Floor	1.0%
				Table Lamp	2.0%
		15	Living Room	Can	.5%
		20	Basement	Ceiling	.5%
	· ·		Bathroom	Wall Light	.5%
			Family Room	Table Lamp	1.0%
		<u> </u>	Kitchen	Ceiling	.5%
				Under Cabinet	.5%
			Living Room	Table Lamp	.5%
		23	Bedroom 1	Floor	1.0%
				Table Lamp	.5%
	······································		Family Room	Table Lamp	1.5%
			Kitchen	Ceiling	1.0%
	-		Living Room	Floor	1.0%
				Table Lamp	.5%
		26	Bathroom	Wall Light	1.0%
			Bedroom 1	Ceiling Fan	.5%
			Family Room	Floor	.5%
	1		-	Wall Light	1.0%

.

Living RoomFloor1.5%Image: Living RoomTable Lamp.5%Image: Living RoomTable Lamp.5%Image: Lights of America25Family RoomTable LampImage: Lights of America23Family RoomTable LampImage: Lights of America14Living RoomTable LampImage: Lights of America23Family RoomTable LampImage: Lights of America14Living RoomTable Lamp
Image: systemImage: systemTable Lamp.5%Image: systemOffice/DenTable Lamp.5%Image: system30Bedroom 1Torchier.5%Image: system45Living RoomTable Lamp.5%Image: systemLights of America25Family RoomTable Lamp.5%Image: system14Living RoomTable Lamp.5%Image: system23Family RoomTable Lamp.5%Image: system23Family RoomTable Lamp.5%Image: systemLiving RoomTable Lamp.5%Image: systemLiving RoomTable Lamp.5%Image: systemImage: systemImage: system.5%Image: systemImage: systemImage: system.5%Image: systemImage: systemImage: system.5%Image: systemImage: systemImage: system.5%Image: systemImage: system.5%.5%Image: systemImage: system.5%.5%Image: systemImage: system.5%.5%Image: system.5%.5%.5%Image: system.5%.5%.5%Image: system.5%.5%.5%Image: system.5%.5%.5%Image: system.5%.5%.5%Image: system.5%.5%.5%Image: system.5%.5%Image: system.5%.5%Image: system.5%
Image: systemOffice/DenTable Lamp.5%30Bedroom 1Torchier.5%30Bedroom 1Torchier.5%45Living RoomTable Lamp.5%Lights of America25Family RoomTable Lamp.5%Nvison14Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Living RoomTable Lamp.5%Living RoomTable Lamp.5%S6S6.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%.5%S7.5%
30Bedroom 1Torchier.5%45Living RoomTable Lamp.5%Lights of America25Family RoomTable Lamp.5%Nvison14Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Living RoomTable Lamp.5%Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Play RoomCeiling.5%
45Living RoomTable Lamp.5%Lights of America25Family RoomTable Lamp.5%Nvison14Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Living RoomTable Lamp.5%Living RoomTable Lamp.5%9Living RoomTable Lamp.5%99Play RoomCeiling.5%
Lights of America25Family RoomTable Lamp.5%Nvison14Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Living RoomTable Lamp.5%Play RoomCeiling.5%
Nvison14Living RoomTable Lamp.5%23Family RoomTable Lamp.5%Living RoomLiving RoomTable Lamp.5%Play RoomCeiling.5%
23 Family Room Table Lamp .5% Living Room Table Lamp .5% Play Room Ceiling .5%
Living Room Table Lamp .5% Play Room Ceiling .5%
Play Room Ceiling .5%
Sylvania 13 Hall Table Lamp .5%
Kitchen Ceiling Fan .5%
23 Bedroom 1 Table Lamp .5%
Unknown 13 Dining Room Table Lamp .5%
Family Room Table Lamp .5%
Flood Feit 60 Kitchen Can .5%
GE 120 Kitchen Ceiling .5%
75 Kitchen Ceiling .5%
Sylvania 75 Family Room Ceiling 5%
Unknown 50 Office/Den Table Lamp .5%
Fluorescent GE 20 Kitchen Under Cabinet 5%
40 Bathroom Ceiling .5%
Lights of America 25 Kitchen Ceiling .5%
Phillips 15 Bathroom Wall Light .5%
20 Kitchen Under Cabinet 1.5%
40 Bathroom Ceiling 1.0%
Kitchen Ceiling .5%
Under Cabinet 1.0%
Laundry Room Ceiling .5%
Workout/Gym Ceiling .5%
Sylvania 30 Laundry Room Ceiling .5%
32 Kitchen Ceiling .5%
Unknown 15 Kitchen Table Lamp .5%
60 Laundry Room Ceiling .5%
Incandescent GE 100 Bathroom Wall Light .5%
Bedroom 1 Table Lamp
Dining Room Ceiling Fan 5%
Family Room Floor
Hall Ceiling 1.0%
Kitchen Ceiling Fan 5%
Ceiling 5%
Office/Den Table Lamp 5%
150 Living Room Table Lamp 1 0%
25 Bathroom Ceiling 5%

· · · · · ·				Wall Light	2.0%
			Dining Room	Ceiling Fan	.5%
			Hall	Ceiling	.5%
			Kitchen	Table Lamp	.5%
		40	Bathroom	Track	.5%
			1	Wall Light	5.0%
			Bedroom 1	Wall Light	.5%
			Dining Room	Ceiling Fan	.5%
			Kitchen	Wall Light	.5%
		50-100-150	Bedroom 2	Table Lamp	.5%
			Family Room	Table Lamp	1.5%
			Living Room	Floor	.5%
	-			Table Lamp	.5%
				Wall Light	.5%
			Office/Den	Table Lamp	.5%
				Wall Light	.5%
		50	Bathroom	Wall Light	.5%
		60	Bathroom	Ceiling	.5%
				Wall Light	3.0%
			Bedroom 1	Ceiling	.5%
				Table Lamp	.5%
			Dining Room	Ceiling Fan	1.0%
			Family Room	Table Lamp	.5%
			Hall	Ceiling	.5%
			Laundry Room	Ceiling	.5%
			Living Room	Floor	.5%
		·		Table Lamp	.5%
			Office/Den	Table Lamp	.5%
<i></i>		75	Bathroom	Wall Light	.5%
			Family Room	Table Lamp	.5%
		-	Kitchen	Ceiling Fan	.5%
		_	Living Room	Floor	.5%
		_		Table Lamp	1.0%
	-		Office/Den	Ceiling	.5%
	Halco	60	Bathroom	Wall Light	.5%
	Phillips	100	Kitchen	Ceiling	.5%
	-	40	Bathroom	Wall Light	.5%
	-		Hall	Ceiling	.5%
			Laundry Room	Ceiling	.5%
— ———————————————————————————————————		60	Dining Room	Ceiling	.5%
			Hall	Ceiling	.5%
			Laundry Room	Ceiling	.5%
			Living Room	Wall Light	.5%
	·	75	Bathroom	Ceiling	.5%
			Laundry Room	Ceiling	.5%

Satco	60	Bathroom	Wall Light	.5%
Sylvania	40	Bathroom	Wall Light	.5%
	60	Bathroom	Wall Light	.5%
		Family Room	Floor	.5%
			Table Lamp	.5%
		Kitchen	Ceiling	.5%
		Living Room	Floor	.5%
Unknown	40	Bathroom	Wall Light	.5%
	60	Office/Den	Ceiling Fan	.5%

Appendix 4 – OH and KY Hourly Lighting Logger Data

Lighting logger data from the OH study described in this report (the "final" lighting logger study) and a KY lighting logger study are compared in the graphs below. The graphs depict lighting logger data from 2/5/08 to 2/27/08 for Ohio, and from 4/6/08 to 5/1/08 for Kentucky. The average of the two data sets is also presented. Overall, for weekdays as well as weekends, the usage of Ohio and Kentucky customers has a similar load shape, with Kentucky customers having slightly more usage in the morning hours, and Ohio customers having more usage in the evening hours. Overall, customers have the least usage in the early morning hours, around 3:00am or 4:00am, and the most usage in the late evening hours, around 8:00pm or 9:00pm.



Weekday Only Hourly Load Profile



Weekend Only Hourly Load Profile

Appendix 5: Distributions of Initial and Final Populations

These findings are supported by a Kolmogorov-Smirnov Z test of the survey responses of the two logger study populations, which compared the responses of each population to similar questions on the surveys to determine whether the two populations are similar to one another, that is, come from similar distributions. Because participants self-select into the survey responses and logger studies, it is important to confirm that the samples are similar. The absolute, positive, and negative statistics display the largest differences between distributions in each sample. The "Asymp. Sig." values state whether this difference is significant. If the significance, or P values, are greater than .01, then we cannot reject the statement that the populations come from the same distribution.

Tables 7 and 8 show the first test, comparing the initial and final lighting logger study populations. The P values for this test are above .01, meaning that we cannot reject the statement that the populations come from the same distribution. P values for questions 8 through 11 are affected by the fact that the surveys were given before and after the implementation of the CFL program. Questions 8 through 11 also have the largest absolute difference values.

		1	2	3	4	5	6	7	8
		What is the approximate square footage (heated area) of your home?	How many people live in your home?	Type of heating system?	Type of cooling system?	Primary heating fuel?	Primary cooling fuel?	Do you own or rent your home?	Do you recall receiving CFL bulb coupons from Duke Energy, for use in Wal-Mart GE bulbs?
Most Extreme Differences	Absolute	.249	.238	.108	.124	.084	.082	.341	.475
	Positive	.249	.238	.013	.124	.000	.082	.341	.475
	Negative	125	148	108	033	084	.000	.000	.000
Kolmogorov- Z	-Smirnov	1.104	1.101	.498	.578	.387	.379	1.590	2.197
Asymp. Sig.	(2-tailed)	.175	.177	.965	.892	.998	.999	.013	.000

Table 7. K-S Z test for Initial and Final Lighting Logger Study Populations

Table 6.	R-521C	SUTOI TUILIA	ai anu rina.	i Lighting	гоуда эни	iy rupulation	is continu	cu		
	9	10	11	12	13	14	15	16	17	18
	How many CFL bulbs did you purcha se in total?	How many CFL bulbs would you have bought without the coupon?	How many CFLs are now installed?	Did you change the hours of use since installing the CFLs?	How many of the CFLs you installed have you removed?	How many CFL bulbs have you since purchased without coupons?	Overall, how satisfied are you with the CFLs?	How many CFLs did you have in your house before you bought these discounted CFLS?	In what year was your home built?	How would you best describe the type of home in which you live?
Absolute	.970	.306	.716	.070	.229	.203	.241	.248	.243	.110
Positive	.000	.000	.000	.070	.229	.000	.241	.031	.000	.110
Negative	970	306	716	.000	.000	203	.000	248	- 243	091
v-Smirnov Z	4.211	1.253	2.869	.266	.650	.802	.889	.884	1.086	.504
ig. (2-tailed)	.000	.086	.000	1.000	.793	.540	.408	.416	.189	.961
	Absolute Positive Negative v-Smirnov Z ig. (2-tailed)	Pable 6.R-9 Z te9How many CFL bulbs did you purcha se in total?Absolute.970Positive.000Negative970v-Smirnov Z4.211ig. (2-tailed).000	PattersR-S Z test for finite910How many CFLHow many CFLHow bulbs many CFLHow bulbs bulbs did you purcha se in total?Absolute.970Positive.000Negative970306v-Smirnov Z4.211.000.086	Pathe 3.R-9 Z test for initial and Final91011How many CFLHow many CFLHow bulbs bulbs did you purcha se in total?How would positiveAbsolute.970.306Positive.000.000Negative970306v-Smirnov Z4.2111.2532.4211.000.000	Pable 3.R-5 Z test for finitial and final Eighting9101112How many CFLHow many CFLDid you change the hours of bulbs bulbs did you purcha se in total?Did you change the hours of bought withoutAbsolute.970.306.716Positive.000.000.000Negative970306.716.2000.000.000.000v-Smirnov Z4.2111.2532.869.000.000.0001.000	P10111213910111213How many CFLCFLDid you change theHow many change theHow many change theHow many theDid you change theHow many CFLyou bulbs have did you purcha se in total?How coupon?Did you change theAbsolute.970.306.716.070.229Positive.000.000.000.000.000v-Smirnov Z4.2111.2532.869.266.650ig. (2-tailed).000.086.0001.000.793	9101112131491011121314How many CFL bulbs did you purcha se in total?How would purcha se in total?Did you change the many cFL sere now installed?Did you change the use the CFLs purcha the CFLs?How many cFL bulbs have you since you installed?Absolute.970.306.716.070.229.203Positive.000.000.000.000.229.000Negative ig. (2-tailed).000.086.0001.000.793.540	P1011121314159101112131415How many CFLHow many WouldDid you change the hours of purcha se in total?Did you would CFLsDid you change the hours of installed?How many of the CFLs installing cFLs?Overall, how many of since installed cFLs?Absolute.970.306.716.070.229.203.241Positive.000.000.000.000.000.241.200.203.241Negative970.306.716.000.000.000.229.000.241Negative970.306.716.000.000.000.241.203.241Negative970.306.716.000.000.000.241.203.241Negative970306716.000.000.000.243.000v-Smirnov Z4.2111.2532.869.266.650.802.889ig. (2-tailed).000.086.0001.000.793.540.408	910111213141516910111213141516How many CFL bulbs did you purcha se in total?How you purcha se in the total?Did you change the many CFL soil the the the now the?How the the the the the the the the?How many cFL soil you the CFLs you installed?How many cFL soil the CFLs you the CFLs you the CFLs?How many cFL bulbs you since purchased the coupon?How many the cFLs?Overall, now the coupons?How many cFLs?Absolute.970.306.716.070.229.203.241.248Positive.000.000.000.000.000.229.000.241.031Negative970306716.000.000.203.889.884ig (2-tailed).000.086.0001.000.793.540.408.416	9 10 11 12 13 14 15 16 17 How many CFL bulbs How many CFL bulbs How many CFL bulbs Did you bulbs Did you change the bulbs Did you bulbs How many cFL bulbs How many cFL bulbs How many cFL bulbs How bulbs How many cFL bulbs How bulbs How many cFL bulbs How many cFL bulbs How many bulbs How many cFL bulbs How many bulbs How many cFL bulbs How many before you many cFLs are installed? How many cFLs are installed? How many cFLs? Overall, how before you without coupons? Overall, how before you with the coupon? How many cFLs? In the now cFLs? Now many since purchased are you without coupons? Overall, how before you with the coupon? In these coupon In these coupon? In these coup

Table 8. K-S Z test for Initial and Final Lighting Logger Study Populations continued

Tables 9 and 10 show a K-S Z test comparing the entire survey population for each survey (not just the lighting logger participants). The results of this test show similar results to the first K-S Z test comparing the logger study participants only. Again, the P values are above .01, meaning we cannot reject the statement that the two populations are similar. The largest absolute differences between the populations are from questions 8 through 11.

Table 9.	K-S Z test for	Initial and Final	CFL Program	Survey Populations
----------	----------------	-------------------	--------------------	--------------------

		What is the approximate square footage (heated area) of your home?	How many people live in your home?	Type of heating system?	Type of cooling system?	Primary heating fuel?	Primary cooling fuel?	Do you own or rent your home?	Do you recall receiving CFL bulb coupons from Duke Energy, for use in Wal- Mart GE bulbs?
Most Extreme Differences	Absolute	.175	.207	.062	.108	.081	.106	.242	.470
	Positive	.175	.207	.062	.108	.029	.106	.242	.470
	Negative	063	094	018	029	081	.000	.000	.000
Kolmogorov	-Smirnov Z	1.016	1.262	.379	.667	.493	.655	1.498	2.872
Asymp. Sig.	(2-tailed)	.254	.083	.999	.765	.968	.784	.023	.000

		How many CFL bulbs did you purchas e in total?	How many CFL bulbs would you have bought without the coupon ?	How many CFLs are now installed ?	Did you change the hours of use since installin g the CFLs?	How many of the CFLs you installed have you removed ?	How many CFL bulbs have you since purchase d without coupons?	Overall, how satisfie d are you with the CFLs?	How many CFLs did you have in your house before you bought these discounte d CFLS?	In what year was your hom e built?	How would you best describ e the type of home in which you live?
iost xtreme ifferences	Absolute	.968	.324	.715	.073	.240	.261	.214	.169	.215	.145
	Positive	.000	.028	.000	.073	.240	.000	.214	.169	.000	.145
	Negative	968	324	715	.000	008	261	.000	144	215	023
Kolmogoro	ov-Smirnov Z	5.402	1.643	3.49 9	.334	.753	1.251	.937	.706	1.28 2	.895
Asymp. 3	Sig. (2-tailed)	.000	.009	.000	1.000	.622	.087	.343	.701	.075	.400

Table 10. K-S Z test for Initial and Final CFL Program Survey Populations continued

These findings are also supported by a K-S Z test of the lighting logger data for each population, which finds that we cannot reject the null hypothesis that the two populations come from the same distribution based on the p value greater than .05 (95% confidence).

		average hours per day
Most Extreme Differences	Absolute	.135
	Positive	.026
	Negative	135
Kolmogorov-Smirnov	Z	1.245
Asymp. Sig. (2-tailed)	.090

Table 11. K-S Z test for Initial and Final Lighting Logger Study Populations

Appendix 6: Wal-Mart CFL Coupon Mailer

Black boxes mark placement of address labels and barcodes.





Appendix 7: CFL Program Interactions with Retailers

This is a chart of the interactions between the various campaigns and stores that a CFL promotion has occurred in so far (including and in addition to Wal-Mart).

A letter represents a distributor, and a number represents a subset of that distributor (web, other, mail, etc.).

Interactions	Nuccencellarsternets
A1	275
B1	1683
B1 & A1	1
C1	326
C1 & A1	1
C1 & B1	9
D1 & B1	4573
D1 & A1	12
D1 & B1	47
D1 & C1	1
A2	101
A2 & B1	1
A2 & C1	2
A2 & D1	6
A3	36
A3 & B1	1
A3 & D1	1
A3 & A2 & D1	1
E1	6172
E1 & A1	27
E1 & B1	71
E1 & B1 & A1	2
E1 & C1	29
E1 & C1 & B1	3
E1 & D1	26
E1 & D1 & A1	2
E1 & D1 & B1	1
E1 & D1 & C1	2
D2	29528
D2 & A1	46
D2 & B1	162
D2 & B1 & A1	2
D2 & D1	120
D2 & A2	21
D2 & A3	10
D2 & E1	1870
D2 & E1 & A1	13

D2 & E1 & B1	28
D2 & E1 & B1 & A1	1
D2 & E1 & D1	27
D2 & E1 & D1 & B1	2
Total	45242

Appendix 8: Tables of Customer Characteristics Model Data

The following tables describe the customer characteristics that were appended to customer data for the Customer Characteristics model in Section 1. As previously stated, the model compared equal populations of CFL redeemers and other customers to determine the characteristics of customers more likely to participate in the promotion. The tables show the distribution of responses. In some cases, customer responses were grouped into ranges. Where applicable, the ranges are based on the characteristics of customers more likely to participate in the program (for example, "Age of head of household" is grouped into customers younger than 57 and customers 57 or older, with customers 57 or older more likely to participate). The tables included are for the 9 variables that were found to be significant in the model.

										6001	
			751-	1501-	2251-	3001-	3751-	4501-	5251-	and	
	0	1-750	1500	2250	3000	3750	4500	5250	6000	greater	Totai
December	12	2581	2649	926	381	122	44	18	4	5	6742
Usage (Redeemers)	.2%	38.3%	39.3%	13.7%	5.7%	1.8%	.7%	.3%	.1%	.1%	100.0%

			751-	1501-	2251-	3001-	3751-	4501-	5251-	6001 and	
	0	1-750	1500	2250	3000	3750	4500	5250	6000	greater	Total
December	50	5439	5097	1773	707	259	95	38	15	11	13484
Usage (All)	.4%	40.3%	37.8%	13.1%	5.2%	1.9%	.7%	.3%	.1%	.1%	100.0%

	< 57	> = 57	Total
Age of head of household (Redeemers)	2762	3980	6742
	41.0%	59.0%	100.0%

	< 57	> = 57	Total
Age of head of household (All)	7443	6041	13484
	55.2%	44.8%	100.0%

	< 25,000	25,000 to 49,999	50,000 to 74,999	75,000 to 100,000	Over 100,000	Total
Family income	887	1944	1537	1035	1339	6742
(Redeemers)	13.2%	28.8%	22.8%	15. 4%	19.9%	100.0%

	< 25,000	25,000 to 49,999	50,000 to 74,999	75,000 to 100,000	Over 100,000	Total
Family income (All)	2052	3764	2884	1956	2828	13484
	15.2%	27.9%	21.4%	14.5%	21.0%	100.0%

	Most likely to rent	Likely to rent	Least likely to rent	Likely homeowner	Most likely homeowner	Self reported homeowner	Total
Owner or renter	76	470	94	198	333	5571	6742
(Redeemers)	1.1%	7.0%	1.4%	2.9%	4.9%	82.6%	100.0%

	Most likely to rent	Likely to rent	Least likely to rent	Likely homeowner	Most likely homeowner	Self reported homeowner	Total
Owner or renter	293	1548	238	385	548	10472	13484
probability (All)	2.2%	11.5%	1.8%	2.9%	4.1%	77.7%	100.0%

	< = 6 years	Between 7 and 21	> 21 years	Total
Length of residence (Redeemers)	1651	2444	2647	6742
	24.5%	36.3%	39.3%	100.0%

	< = 6 years	Between 7 and 21	> 21 years	Total
Length of residence (All)	4051	5204	4229	13484
	30.0%	38.6%	31.4%	1 00.0%
			1	

	0	1	2	2	3	4	5	6	7	Total
Number of adults in household	7	1225	1	2941	1495	687	271	89	26	6742
(Redeemer)	.1%	18.2%	.0%	43.6%	22.2%	10.2%	4.0%	1.3%	.4%	100.0%

	0	1	2	2	3	4	5	6	7	8	Total
Number of adults in household	16	3171	2	5930	2557	1174	453	144	34	3	13484
(All)	.1%	23.5%	.0%	44.0%	19.0%	8.7%	3.4%	1.1%	.3%	.0%	100.0%

	0	< ≠ 50,0 <u>0</u> 0	51,000 to 100,000	101,000 to 250,000	251,000 to 500,000	501,000 to 750,000	751,000 to 1 million	> 1 million	Total
Sales price of	2250	1063	1334	1789	273	30	1	2	6742
home (Redeemer)	33.4%	15.8%	19.8%	26.5%	4.0%	.4%	.0%	.0%	100.0%

	0	< = 50,000	51,000 to 100,000	101,000 to 250,000	251,000 to 500,000	501,000 to 750,000	751,000 to 1 million	> 1 million	Total
Sales price of home (All)	4645 34.4%	2012 14.9%	2570 19.1%	3576 26.5%	591 4.4%	71 .5%	10 .1%	9 .1%	13484 100.0%

	ļ	1 = Most ikely	2	3	4		5		1	6		7	8	9	10 = Least likely	Total
Internet		566	3 49	17 5	46 4	547	8	357		738		819	862	746	564	6742
score (Redeeme	r)	8.4%	7.4	8.1	% 8.	1%	12.	7%	10	.9%	1	2.1%	12.8%	11.1%	8.4%	100.0%
	1	=													10 =	
	Mo: like	st Iy	2	3	4		5		6		•	7	8	9	Least likely	Total
Internet Adoption	13	379	1195	1250	125	1	182	20	15	78	1	546	1440	1129	896	13484
score (All)	10.3	2%	8.9%	9.3%	9.3	%	13.5	%	11.	7%	11	.5%	1 0.7%	8.4%	6.6%	1 00.0%
		1 = Most likely	2	3	4		5	Į	5	6		7	8	9	10 = Least likely	Total
Probability	of	562	2 81	3 624	610		1	5	586	6	57	676	684	819	710	6742
monthly payments (Redeeme	rs)	8.3%	12.19	6 9.3%	9.0%		.0%	8.	7%	9.7	%	10.0%	10.1%	12.1%	10.5%	100.0%
							:	_								
	1 Me lik	= ost ely	2	3	4		5	5		6		7	8	9	10 = Least likely	Total
Probability of revolving	1	601	1858	1502	1380		3	12	19	129	93	1217	1160	1200	1051	13484
monthly payments (All)	11.	.9%	13.8%	11.1%	10.2%	•	0%	9.0	0%	9.6	%	9.0%	8.6%	8.9%	7.8%	1 00.0%

Appendix E: Section II

A Report on Duke Energy's Energy Star Programs Energy Efficiency Clothes Washer Pilot





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This study was conducted via a joint evaluation effort between Duke Energy and TecMarket Works. Duke Energy staff obtained the survey data and estimated the energy savings from the survey responses using the savings calculations developed by the TecMarket Works and Building Metrics analysis team.

TecMarket Works reviewed the survey data and the energy estimation approach to confirm the objectivity and accuracy of the savings estimates and adjusted the findings to account for self selection bias. This report provides the results of that evaluation collaboration.

Summary

The Energy Star energy efficiency washer program is a pilot program utilizing a rebate offer for \$75 off select energy efficient washers at HHGregg stores. These washers were of Whirlpool or Maytag brand. In addition, as a separate promotion, HHGregg offered an additional discount on the matching dryer.

There were 64 customers who redeemed the mail offer they received. A redeemer survey was sent to these 64 customers. In addition, a non-redeemer survey was mailed to 800 customers. These surveys asked questions regarding their decision to purchase or not to purchase an energy efficient washer, as well as questions about their clothes washing habits.

Three quarters of the non-redeemers stated they did not purchase a washer because they did not need one. Although all non-redeemers were mailed an offer from Duke, only 21.3% of non-redeemers recalled receiving the offer in the mail. This suggests that the offer may have been ignored, discarded, or overlooked by customers who were not in the market for or already considering purchasing a new washer.

Both sets of customers tended to visit HHGregg stores 1-2 times per year, while customers who did not purchase a washer were more likely to never shop at an HHGregg store. The most influential factor in customers' decision to purchase an energy efficient washer was the offer itself, as well as the Whirlpool/Maytag brand name, while for non-redeemers; the most influential factor was a better price at another store.

All customers tend to wash their clothes on weekdays, and at varying times during the week. The clothes washing habits of customers who purchased an energy efficient washer did change since purchasing the washer, with the most frequent changes being decreasing the number of loads washed, as well as using more warm/hot water. Because customers did not necessarily take additional energy saving measures after purchasing their energy efficient washer, and some took actions that may negate any energy savings realized from purchasing the efficient washer, the program should consider providing additional education to consumers who purchase the energy efficient washer through this program about energy efficient clothes washing practices.

Redeemers were slightly more aware of ENERGY STAR programs and the ENERGY STAR label than non-redeemers, and were more likely to have purchased an energy efficient appliance in the past year, if they purchased an appliance.

Savings were calculated using an algorithm developed by Building Metrics. Final net total program savings, accounting for freeridership and self-selection bias, are found in Table 1.

Savings	Final Net Total Program Savings (n=64)
kW	7.98
kWh	19146.67
Therm	442.83

This report describes the results of the redeemer surveys, followed by the energy savings calculations. Next the results of the non-redeemer surveys are described, as well as the home profile information that was collected.

The survey was developed and administered by Duke Energy. Duke Energy also collected and analyzed the data, using an algorithm developed by Building Metrics. TecMarket Works and Building Metrics reviewed and approved the final analysis and the evaluation written by Duke Energy.

Energy Star Clothes Washer Pilot Program with HHGregg

Redeemer Analysis

The redeemer survey was sent to 64 customers who redeemed the mail offer for \$75 off select energy efficient washers at HHGregg stores. Thirty-two customers returned the survey, for a 50.0% response rate.

HHGregg Rebate Program

Nearly all customers who responded, 96.8%, recalled receiving the offer of \$75 off select energy efficient washers at HHGregg, and only one customer did not recall purchasing a washer under this rebate program.

Yes	No	Missing	Total
30	1	1	32
96.8%	3.2%	3.2%	100.0%

Do you recall receiving an offer of \$75 off select energy efficient washers at HHGregg?

Did you purchase a select energy efficient washer under this rebate program?

Yes	No	Don't Know	Don't Recall	Fotal
31	0	0	1	32
04 00/	00/	007	2 10/	100.00/

Customers were asked to rate various aspects of the energy efficient washer offer from Duke Energy and HHGregg based on how influential the factors were in their decision to purchase a washer using the offer. The Whirlpool/Maytag brand name, along with the rebate offer from Duke Energy, were found to be most influential (63.3% and 61.3% "very influential", respectively), while displays and signs in HHGregg, as well as friends or family, were least influential (62.1% and 55.6%). Customers could also list other influences, and overall the reasons listed were listed as "not at all influential". These reasons included that the washer needed to be replaced, lower water/energy use, and the type of water hoses used.

	Very	Somewhat	Not at all	4.21174 QUILLA A A A A A A A A A A A A A A A A A A
• · · · · · · · · · · · · · · · · · · ·	Influential	Influential	Influential 🔤	Total
Rebate offer from Duke Energy	19	12	0	31
	61.3%	38.7%	.0%	100.0%
HHGregg Advertising	7	12	10	29
	24.1%	41.4%	34.5%	100.0%
Whirlpool/Maytag brand name	19	11	0	30
	63.3%	36.7%	.0%	100.0%
Matching dryer rebate offer	15	12	3	30
from Whirlpool/Maytag	50.0%	40.0%	10.0%	100.0%
Displays and signs in	3	8	18	29
HHGregg	10.3%	27.6%	62.1%	100.0%
Sales associates at HHGregg	7	13	10	30
	23.3%	43.3%	33.3%	100.0%
Special financing from	8	8	14	30
HHGregg	26.7%	26.7%	46.7%	100.0%
Friends or family	3	9	15	27
	11.1%	33.3%	55.6%	100.0%
Other	2	0	14	16
	12.5%	.0%	87.5%	100.0%

How influential were the following in your decision to purchase an energy efficient washer?

If other please describe:

Comment	Count
Needed to be replaced	1
To lower water and electric usage	1
Water hoses	1

Other Purchases Made at HHGregg

Most of the customers who purchased a washer using the Duke Energy offer visited HHGregg at least once a year, with most customers visiting 1-2 times per year (54.8%). These customers also tended to purchase additional items at the store while they were visiting to purchase the washer, including: matching dryer (87.0%), TV/video, other large appliances, personal electronics (8.7%), bedding and furniture (4.3%), and other (21.7%).

Over half of customers (58.1%) have not returned to an HHGregg store since purchasing their washer. The HHGregg offer ran from 2/14/2008 to 2/29/2008, and the survey was mailed out in May of 2008. Since most customers stated they only visit 1-2 times per

year, it is likely they would have not visited the store a second time since purchasing the washer and before receiving the survey questionnaire.

How often did you visit an HHGregg store before your recent visit to purchase a washing machine?

Never	1-2 Visits a year	3-4 Visits a year	5 or more visits a year	Total
4	17	7	3	31
12.9%	54.8%	22.6%	9.7%	100.0%

Did you purchase additional items during the visit in which you purchased the washing machine?

Yes	No	Total
23	8	31
74.2%	25.8%	100.0%

If yes, what types of products did you purchase? Mark all that apply.

	No	Yes	Total
Matching dryer	3	20	23
	13%	87.0%	100.0%
Bedding and furniture	22	1	23
	95.7%	4.3%	100.0%
TV and video	21	2	23
	91.3	8.7%	100.0%
Other large appliances	21	2	23
	91.3%	8.7%	100.0%
Camera and camcorders	23	0	23
	100.0%	.0%	100.0%
Personal electronics	21	2	23
	91.3%	8.7%	100.0%
Car audio	23	0	23
	100.0%	.0%	100.0%
Other small appliances	23	0	23
	100.0%	.0%	100.0%
Phone and accessories	23	0	23
	100.0%	.0%	100.0%
Computers and equipment	23	0	23
	100.0%	.0%	100.0%
Other	18	5	23
	78.3%	21.7%	100.0%

			3 or more	
Have not	I visit a month	2 visits a month	visits a month	Total
18	10	3	0	31
58.1%	32.3%	9.7%	.0%	100.0%

How often have you returned to HHGregg since purchasing your clothes washer?

Clothes Washer Use

One third of customers stated they wash 7 or more loads of laundry per week. Customers were least likely to wash clothes using hot water settings, with 33.3% of customers stating they wash 0 loads on that setting.

Customers stated they typically wash the majority of their clothes on weekdays (67.7%), at varying times from week to week (38.7%).

On average, how many loads of laundry do you do per week?

1	2	3	<u> </u>] : : 5 1118	6		Total
0	2	2	2	8	6	10	30
.0%	6.7%	6.7%	6.7%	26.7%	20.0%	33.3%	100.0%

			••						
	Û.	1	2	3	.4	5	6	7+	Total
Use	4	5	4	3	4	3	4	1	28
warm water settings	14.3%	17.9%	14.3%	10.7%	14.3%	10.7%	14.3%	3.6%	10 0.0%
Use hot	8	9	4	1	1	1	0	0	24
water settings	33.3%	37.5%	16.7%	4.2%	4.2%	4.2%	.0%	.0%	100.0%
Use	3	10	3	3	5	1	2	2	29
cold water settings	10.3%	34.5%	10.3%	10.3%	17.2%	3.4%	6.9%	6.9%	100.0%
Are	15	5	1	2	0	0	0	0	23
small sized loads	65.2%	21.7%	4.3%	8.7%	.0%	.0%	.0%	.0%	100.0%
Are	9	5	4	2	. 4	0	2	0	26
medium sized loads	34.6%	19.2%	15.4%	7.7%	15.4%	.0%	7.7%	.0%	100.0%
Are	1	5	2	3	0	5	5	7	28

Of these loads, how many...

large sized	3.6%	17.9%	7.1%	10.7%	.0%	17.9%	17.9%	25.0%	100.0%
loads									

On what days of the week do you typically wash the majority of your clothes?

Weekdays (Mon-Fri)	Weekends (Sat and Sun)	Total
21	10	31
67.7%	32.3%	100.0%

During what hours do you typically wash the majority of your clothes?

7:01am - 12 noon	12:01	5:01pm	8:01pm = 11pm -	-11:01pm - 7am	Varies from week to week	Don't Know	Tota
10	4	2	3	0	12	0	31
32.3%	12.9%	6.5%	9.7%	.0%	38.7%	.0%	100.0%

All 31 customers have changed their usage in some way since purchasing their energy efficient washer. The most frequent change was to decrease the number of loads that they washed, which was done by 51.6% of customers. A larger number of customers stated they have decreased their number of loads than stated they have increased their number of loads than stated they have increased their number of loads, however the decrease in number of loads may reflect increased washer capacity that customers have after purchasing their energy efficient washer. In addition most customers have not changed their load size since purchasing their washer, suggesting customers may not be taking advantage of any increased load capacity their washer might have. Interestingly, more customers stated they increased their warm water usage since purchasing the washer (67.7%). The least likely changes for customers to make were to use less hot/warm water (90.3% no change).

Only 5 out of 31 customers made only changes to their usage that would increase their energy savings (increase load size, decrease number of loads, use less warm/hot water). Because customers did not necessarily take additional energy saving actions after purchasing their washer (such as less hot water use, change time of day washing clothes, increase load size), accompanying the Duke Energy rebate offer with more education regarding additional energy efficiency measures that can be taken when washing clothes could help to increase the energy saving actions taken by customers who purchase the energy efficient washer using the rebate offer from Duke Energy.

Has your usage changed if at all since installing your energy efficient washer? Mark all that apply.

Usage change Usage has not changed Total

31	0	31
100.0%	0.0%	100.0%

Those who stated that their usage had changed listed the following usage pattern changes. Some customers made more than one change:

	No change	Wash clothes at different times	Total
Time of day	27	4	31
	87.1%	12.9%	100.0%
	No change	Increase number of loads	Total
Number of loads	27	4	31
	87.1%	12.9%	100.0%
	No change	Decrease number of loads	Total
Number of loads	16	15	31
	48.4%	51.6%	100.0%
	No change	Increase load size	Total
Load size	27	4	31
	87.1%	12.9%	100.0%
	No change	Decreased load size	Total
Load size	21	10	31
	67.7%	32.3%	100.0%
	No change	More warm/hot water use	Total
Water use	10	21	31
	32.3%	67.7%	100.0%
	No change	Less warm/hot water use	Total
Water use	28	3	31
	90.3%	9.7%	100.0%

Energy Efficiency Awareness

Customers who purchased the energy efficient washer were very aware of energy efficiency with respect to the ENERGY STAR program. Over 90.0% of customers were aware of the ENERGY STAR label, looked for the label when purchasing appliances, and typically purchased ENERGY STAR products when possible. In addition, of those customers who have purchased electrical appliances in the past year, 90.5% of those customers stated the appliances were energy efficient.

Just over half of customers stated they have never visited the Duke Energy website.

Yes No Total

Are you aware that the ENERGY STAR label appears on	29	1	30
appliances that are energy efficient?	96.7%	3.3%	100.0%
	Yes	No	Total
Do you look for the ENERGY STAR label when purchasing	28	2	30
an appliance?		6.7%	100.0%
	Yes	No	Total
Do you typically buy ENERGY STAR products when	29	1	30
possible?		3.3%	100.0%
	Yes	No	Total
Besides your washer, have you added any other electrical	21	10	31
appliances to your home in the past year?		32.3%	100.0%
	Yes	No	Total
If yes, were any of the appliances you purchased energy	19	2	21
efficient?	90.5%	9.5%	100.0%

In the past 6 months, how many times have you visited the Duke Energy website?

Never	Less than once a month	1 - 2 times per month	3 - 4 times per month	5-6 times per month	More than 6 times per month	Total
17	6	7	1	0	0	31
54.8%	19.4%	22.6%	3.2%	.0%	.0%	100.0%

Savings Calculations

To estimate savings for the customers who redeemed the offer for \$75 off select energy offers from Duke Energy, an algorithm was developed by Building Metrics. The algorithm can be found in Appendix C. The algorithm takes into account customer clothes washing habits as well as characteristics of the particular clothes washer purchased, including information from the Energy Star tag such as energy use per year and washer size.

Table 2 shows initial savings calculations for customers who returned a completed survey.

Measure	Initial Total Sa	wings Per Participant S	avings
kW	6.03	0.21	
kWh	14459.73	498.61	

Table 2. Initial Savings Calculations for Survey Population (n=29).

Therm	334.43	11.53	

Net Savings Calculations

Net savings calculations take into account freeridership as well as self selection biases.

Freeridership and Self-Selection Bias

None of the customers responding to the survey indicated that the Duke rebate was non influential in their decision to purchase an energy efficient washer. In addition, 38.7% said the Duke Energy rebate was somewhat influential, while 61.2% stated the Duke Energy rebate was very influential. These results suggest a low level of freeridership. However, 96.7% of customers stated that they choose to purchase Energy Star appliances when possible, which suggests that many customers were already considering purchasing an energy efficient washer without the Duke Energy offer, or before receiving the Duke Energy offer. Based on these two numbers, the estimate of net to gross could be as high as 70%, that is, freeridership could be as low as 30%.

The response rate of the survey was 50.0%, so there is likely to be some self selection bias present in this survey. That is, customers who returned the survey may be more interested in the subject matter, and therefore more likely to take energy efficient actions related to the program. Based on the response rate, 70% is a high value for overall net to gross, and it could be as low as 40%. For the purposes of this study, net to gross is estimated at 60%, that is, freeridership and self-selection bias are estimated to be 40%. All impacts will be discounted by 40% to account for freeridership and self-selection bias. It should be noted that this value is an estimate, and other evaluation measures, such as on-site verification, would need to be conducted in order to more exactly calculate this discount factor.

Savings calculations accounting for freeridership and self-selection bias are found in Table 3.

()				
Savings	Initial Total Savings	Discounting	Final Total	Final Savings Per Participant
kW	6.03	40%	3.62	0.12
kWh	14459.73	40%	8675.84	299.17
Therm	334.43	40%	200.66	6.92

 Table 3. Net Savings Calculations with Freeridership and Self-Selection Bias for Survey Population.

 (n=29)

Final Total Program Savings

The final total program savings for all 64 customers who purchased a washer using the Duke Energy coupon are found in Table 4. Total savings for the program are 7.98 kW, 19,146.67 kWh, and 442.83 Therm.
Savings	Final Savings Per Participant	Final Net Total Program Savings (n=64)
kW	0.12	7.98
kWh	299.17	19146.67
Therm	6.92	442.83

Table 4. Final Net Total Program Savings including freeridership and self-selection bias estimates.

Energy Star Clothes Washer Pilot Program with HHGregg

Non-Redeemer Analysis

The non-redeemer survey was sent to 800 customers who received the coupon mailing and did not redeem the coupon. 169 surveys were returned, for a 21.1% response rate.

HHGregg Rebate Program

Customers were asked questions regarding their participation in the HHGregg rebate program. Although all customers who were mailed the non-redeemer survey received the mail offer, only 21.3% of customers recalled receiving the offer. This is not surprising, considering that almost 75% of customers stated they did not purchase a washer using the offer because they did not need a new washer. This suggests that the offer may have been ignored or discarded by many customers who were not in the market for a new clothes washer.

Do you recall receiving an offer of \$75 off select energy efficient washers at HHGregg?

Yes	No	Total
35	129	164
21.3%	78.7%	100.0%

Did you purchase a select energy efficient washer under this rebate program?

No and	Ys	Don't Know	Don't Recall	Total
156	2	6	1	165
94.5%	1.2%	3.6%	.6%	100.0%

Why did you decide NOT to take advantage of this rebate offer?

Too much to hassle	Did not need a new washer	Do not shop at HHGregg	Did not understand program	Thought there was a catch	Other	Total
0	103	6	0	0	32	141
.0%	73.0%	4.3%	.0%	.0%	22.7%	100.0%

Customers were also given the opportunity to state other reasons for not purchasing a clothes washer using the rebate offer. Over half of customers (64.3%) stated they did not purchase a washer because they did not recall receiving the rebate offer. Other responses included inability to afford one, and not needing a new washer. Combining these responses with the responses to the question above, not needing a new washer was the main reason customers did not purchase a washer using the Duke Energy offer.

If other, please explain:

Comment	Count	Total
Can't afford one	4	14.3%
Didn't need one/Washer is currently new	6	21.4%
Didn't receive offer/Unaware of offer	18	64.3%
Total	28	100.0%

Nearly all respondents (95.0%) also stated that they were not motivated by the rebate offer to purchase an energy efficient washer from a different store. This may reflect that a majority of customers were not interested in purchasing a new clothes washer, as previously stated.

Of the 7 customers who did purchase an energy efficient washer at a different store after receiving the rebate offer, the most customers found a better price at a store other than HHGregg to be very influential in their decision to purchase a clothes washer elsewhere (80%). Customers were equally divided regarding the influence of the Whirlpool/Maytag brand name in their decision to purchase a washer elsewhere. The least influential factors in purchasing an energy efficient washer at another store were: 1) displays and signs in the other store, 2) the sales associate in the other store, and 3) special financing from the other store.

Did the energy efficient washer rebate offer motivate you to purchase an energy efficient washer somewhere else, without receiving the rebate?

Yes	No	Total
7	133	140
5.0%	95.0%	100.0%

If yes, how influential were the following in your decision to purchase an energy efficient washer somewhere else, without receiving the rebate?

	Very Influential	Somewhat Influential	Not at all Influential	Total
Better price at other store	4	1	0	5
	80.0%	20.0%	.0%	100.0%
Other store's advertising	0	3	2	5
	.0%	60.0%	40.0%	100.0%
Whirlpool/Maytag brand name	3	1	3	7
	42.9%	14.3%	42.9%	100.0%
Matching dryer rebate offer	1	2	3	6
from Whirlpool/Maytag	16.7%	33.3%	50.0%	100.0%

Displays and signs in other	1	1	3	5
store	20.0%	20.0%	60.0%	100.0%
Sales Associate at other store	0	2	3	5
	.0%	40.0%	60.0%	100.0%
Special financing from other	1	1	3	5
store	20.0%	20.0%	60.0%	100.0%
Friends or Family	2	1	2	5
	40.0%	20.0%	40.0%	100.0%
Other	2	1	1	4
	50.0%	25.0%	25.0%	100.0%

Customers also listed other reasons that affected their decision to purchase an energy efficient washer elsewhere. These reasons were both influential and not influential, and included:

If c	other.	please	describe.
		predoe	deberroe.

Comment	Count	Total
Already had	1	16.7%
Didn't purchase one	1	16.7%
Not received offer	1	16.7%
Internet	1	16.7%
Previously Owned Brand	1	16.7%
Best price at particular store	1	16.7%
Total	б	100.0%

Other Purchases Made at HHGregg

Customers were asked to respond to questions regarding their experience with the HHGregg store. Just over half of customers (51.3%) stated that they visit an HHGregg store 1-2 times per year. Most customers did not visit HHGregg as a part of their decision to not purchase an energy efficient washer through the rebate program. Only 4 customers did visit the store. Two of those customers purchased a different washer at HHGregg that did not qualify for the rebate, and 2 customers purchased additional items while at HHGregg. These items included personal electronics (2 customers), other small appliances (1 customer), and phone/accessories. Finally, one customer states they have visited an HHGregg store 3 or more times per month since the visit to browse the energy efficient washers, while one customer states they visit one time per month. A third customer states they have not visited the store since browsing the clothes washers.

How often do you shop at HHGregg?

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59	80	12	5	156
37.8%	51.3%	7.7%	3.2%	100.0%

Did you visit the HHGregg store to browse the select energy efficient washers before deciding not to purchase a washer through the rebate program?

Yes	No	Total
4	88	92
4.3%	95.7%	100.0%

If yes:

Did you purchase a different washer that did not qualify for the rebate during your visit to HHGregg?

Yes	No	Total
2	1	3
66.7%	33.3%	100.0%

Did you purchase additional items during the visit in which you browsed the select energy efficient washers?

Yes	No	Total
2	1	3
66.7%	33.3%	100.0%

If yes, what types of products did you purchase? (Mark all that apply).

Appliance	Count
Matching dryer	0
	.0%
Bedding and furniture	0
	.0%
TV and video	0
	.0%
Other large appliances	0
	.0%
Camera and	0
camcorders	.0%
Personal electronics	2
	50.0%
Car audio	0
	.0%

Other small	1
appliances	25.0%
Phone and accessories	1
	25.0%
Computers and	0
equipment	.0%
Other	0
	.0%

How often have you returned to HHGregg since your visit to browse the energy efficient washers or purchase other items?

Have not returned	1 visit a month	2 visits a month	3 or more visits a month	Total
. 1	1	0	1	3
33.3%	33.3%	.0%	33.3%	100.0%

Clothes Washer Use

Customers were asked about their clothes washing habits. Customers' amount of laundry varied, with customers washing from 1 to greater than 7 loads per week. 29.6% of customers stated they wash more than 7 loads of laundry per week, while only 3.9% of customers stated they wash 1 load of laundry per week.

1	2	1000 3 10-55	4	5	6	7+	Total
6	15	28	23	23	12	45	152
3.9%	9.9%	18.4%	15.1%	15.1%	7.9%	29.6%	100.0%

On average, how many loads of laundry do you do per week?

Customers described the settings they typically use with their washing machine. Overall, the most loads of laundry were done using warm or cold water settings, and with a large sized load. 46.4% of customers washed 0 loads using hot water settings, and 50% of customers washed 0 small sized loads.

Of these loads, how many...

	0 1 2	3 4	5 6 7 4 Total
--	-------	-----	---------------------------------

....

Use warm	27	27	28	21	11	10	3	8	135
water settings	20.0%	20.0%	20.7%	15.6%	8.1%	7.4%	2.2%	5.9%	100.0%
Use hot	52	34	13	7	4	0	1	1	112
water settings	46.4%	30.4%	11.6%	6.3%	3.6%	.0%	.9%	.9%	100.0%
Use cold	17	28	26	19	9	10	5	18	132
water settings	12.9%	21.2%	19.7%	14.4%	6.8%	7.6%	3.8%	13.6%	100.0%
Are small	47	26	10	8	2	1	0	0	94
sized loads	50.0%	27.7%	10.6%	8.5%	2.1%	1.1%	.0%	.0%	100.0%
Are medium	34	23	22	18	9	7	2	6	121
sized loads	28.1%	19.0%	18.2%	14.9%	7.4%	5.8%	1.7%	5.0%	100.0%
Are large	11	14	20	16	20	16	9	25	131
sized loads	8.4%	10.7%	15.3%	12.2%	15.3%	12.2%	6.9%	19.1%	100.0%

Customers may have been confused by this question and the previous question. The total number of loads described by each customer in either the water settings or load size portion of the question many times exceeded or fell short of the total number of loads the customer described washing per week in the previous question.

Customers stated that they most frequently wash their clothes during the week (66.9%). 33.4% of customers stated that they wash their clothes between 7:01 am and 12 noon, but additionally 28.4% of customers stated that the time of day varies from week to week.

On	what	davs	of the	week do	vou	typically	v wash	the	maiority	of your	clothes?
~	**11040	uuj o	01 010	Week do	<u> </u>	vy prount	7700311	uiv	majority	or Jom	with most

Weekdays (Mon-Fri)	Weekends (Sat and Sun)	Total
101	50	151
66.9%	33.1%	100.0%

During what hours do you typically wash the majority of your clothes?

7:01am to 12noon	12:01pm to 5pm	5:01pm to 8pm	8:01pm to 11pm	11:01pm to 7am	Varies from week to week	Don't Know	Total
53	29	16	12	0	44	1	155
34.2%	18.7%	10.3%	7.7%	.0%	28.4%	.6%	100.0%

Energy Efficiency Awareness

Customers were asked questions regarding their energy efficiency awareness, with respect to the energy efficiency washer program as well as the ENERGY STAR label. When asked if the energy efficiency washer rebate increased their awareness of energy efficiency options, most customers (70.5%) stated they were already aware that energy efficient appliances would help them save energy in their home.

Most customers are also already aware of the ENERGY STAR program and its benefits. 84.4% of customers stated that they are aware of the ENERGY STAR label, and a similar number of customers state they look for the label when purchasing an appliance (80.4%) and typically buy an ENERGY STAR product when possible (83.4%). Consistent with these numbers, of those people who have purchased a new appliance in the past year, 76.5% stated the appliance was energy efficient.

Finally, almost three quarters of customers (72%) stated that they have not visited the Duke Energy website in the past 6 months.

Did the energy efficient washer rebate offer increase your awareness of how you could	d
save energy by using energy efficient appliances?	

Yes	No-I was alread aware	ly Somewhat -	Helped me understand benefits better	their Total
17	98		24	139
12.2%	70.5%		17.3%	100.0%

	Yes	No	Total
Are you aware that the ENERGY STAR label appears on	124	22	146
appliances that are energy efficient?	84.4%	15.1%	100.0%
	Yes	No	Total
Do you look for the ENERGY STAR label when purchasing an appliance?	115	28	143
	80.4%	19.6%	100.0%
	Yes	No	Total
Do you typically buy ENERGY STAR products when	121	24	145
possible?	83.4%	16.6%	100.0%
	Yes	No	Total
Besides an energy efficient washer, if nurchased have you	50	06	146
Storato un thirty for the storate washers, in partitabed, have you	50	90	140
added any other electrical appliances to your home in the past year?	34.2%	90 65.8%	100.0%

If yes, were any of the appliances you purchased energy	39	12	51
efficient?	76.5	23.5	100.0%

				<i>.</i>	More than	아프 아파 문
	Less than	1-2 times	3-4 times	5-6 times	6 times	
Never	once a month	per month	per month	per month	per month	Total
113	18	24	0	2	0	157
72.0%	11.5%	15.3%	.0%	1.3%	.0%	100.0%

In the past 6 months, how many times have you visited the Duke Energy website?

Water Heater Temperature Setting

Customers were asked to describe their water heater temperature settings in two ways. First, they were asked to look at their water heater and determine the temperature it was set to. They were then asked to use a water temperature card included with the survey to measure the temperature of the hot water coming out of their faucet. The water temperature card reads the temperature of the water in a range from less than 120 degrees to more than 150 degrees. A colored square on the card changes to indicate the specific temperature of the water after the card has been held in hot water that has run out of the faucet for 3 to 5 minutes.

The water heater settings that customers described on the survey were very similar for both redeemers and non-redeemers. 55.6% of redeemers indicated a setting of 111-120 degrees, while 53.9% of non-redeemers indicated this setting. Similarly, 27.6% of redeemers and 24.0% of non-redeemers indicated a setting of 121-130 degrees. The least likely temperature settings for both groups were at the high and low ends of the range, \leq 100 and \geq 151 degrees.

Temperature	Count	Percent
≤ 100	0	0.0%
101-110	1	5.6%
111-120	10	55.6%
121-130	5	27.6%
131-140	1	5.6%
141-150	1	5.6%
<u>> 151</u>	0	0.0%
Total	18	100.0%

What is the current temperature setting on your water heater? Redeemers

What is the current temperature setting on your water heater? Non-redeemer

Temperature	Count	Percent
≤ 100	3	2.9%
101-110	8	7.7%
111-120	56	53.9%
121-130	25	24.0%
131-140	5	4.8%
141-150	6	5.8%
≥151	1	0.9%
Total	104	100.0%

Temperature	Count	Percent
≤100	1	4.2%
101-110	2	8.3%
111-120	12	50.0%
121-130	5	20.8%
131-140	0	0.0%
141-150	4	16.7%
≥ 151	0	0.0%
Total	24	100.0%

What is the temperature reading on the card? Redeemers

What is the temperature reading on the card? Non-redeemer

Temperature	Count	Percent
<u>≤</u> 100	1	0.8%
101-110	4	3.4%
111-120	61	51.7%
121-130	18	15.3%
131-140	3	2.6%
141-150	30	25.4%
≥ 151	1	0.8%
Total	118	100.0%

A simple linear regression analysis comparing stated water temperature to actual water temperature was run using the responses of customers who responded to both questions (the water temperature setting and water temperature indicated on the card). 101 cases are used for the regression.

The final results of the regression indicate that customer actual water heater temperature for both redeemers and non-redeemers can be estimated by 31.98+0.75*Stated Temperature. Because the sample size is small, collecting additional data of water heater settings and water temperature card readings would further refine the estimate.

Group	Intercept	Coefficient	Equation
Non-redeemers	34.97	0.73	Actual Temp = 34.97 + 0.73*Stated Temp
Redeemers	12.63	0.88	Actual Temp = $12.63 + 0.88$ *Stated Temp
All	31,98	0.75	Actual Temp = 31.98 + 0.75*Stated Temp

Home Profile Questions - Redeemers

		/				
Detached single- family	Mobile Manufactured home	Condo	Duplex/2- family	Multi- family	Townhouse	Total
29	0	0	0	1	1	31
93.5%	.0%	.0%	.0%	3.2%	3.2%	100.0%

How would you best describe the type of home in which you live?

In what year was your home built?

Before 1959	1960 - 1979	1980 - 1989	1990 - 1997	1998 - 2000	After 2001	Total
10	8	2	2	4	5	31
32.3%	25.8%	6.5%	6.5%	12.9%	16.1%	100.0%

What is the approximate square footage (heated area) of your home?

Less than 500 -	500 - 999	1000 - 1499	1500 - 1999	2000 - 2499	2500 - 2999	3000 - 3499	3500 - 3999	4000 or more	Don't Know	Total
0	2	5	9	5	0	3	4	3	0	31
.0%	6.5%	16.1%	29.0%	16.1%	.0%	9.7%	12.9%	9.7%	.0%	100.0%

Approximately how many rooms are in your home (EXCLUDING bathrooms, INCLUDING finished basements?

	5 	5	6		8	9	More than 9	Total
0	0	1	4	8	4	7	6	30
.0%	.0%	3.3%	13.3%	26.7%	13.3%	23.3%	20.0%	100.0%

How many people live in your home?

	2	3	4	5	6	au	More than 7	Total
1	10	7	4	6	1	1	1	31
3.2%	32.3%	22.6%	12.9%	19.4%	3.2%	3.2%	3.2%	100.0%

Last year of schooling?

Some high	Completed	Some	Graduated	Some	Grad school or other adv	
school	high school	college	college	school	degree	Total
3	5	9	9	1	4	31
9.7%	16.1%	29.0%	29.0%	3.2%	12.9%	100.0%

What range best describes your age group?

18-35	36-45	46-55	56-65	Over 65	Total
6	6	7	8	3	30
20.0%	20.0%	23.3%	26.7%	10.0%	100.0%

What range best describes your household income?

Less than 25000	25000- 49999	50000- 74999	75000- 100000	Over 100000	Prefer not to answer	Total
1	4	9	4	4	9	31
3.2%	12.9%	29.0%	12.9%	12.9%	29.0%	100.0%

Do you own or rent your home?

Own	Rent	Total
30	1	31
96.8%	3.2%	100.0%

Type of heating system?

Central furnace	Electric baseboard	Heat pump	Geo- thermal	Hot water/stcam boiler	Other	No heating system	Total
24	0	6	0	0.	1	0	31
77.4%	.0%	19.4%	.0%	.0%	3.2%	.0%	100.0%

Age of heating system?

35.5%	32.3%	19.4%	6.5%	.0%	6.5%	100.0%
11	υ • 7 10	LU 7.14:20	ງ ເມື່ອ ອະນຸລະ 2000 ວ	0		21
	5 0			More than	Don't	

Type of cooling system?

Central air	Window/Ro om unit	Heat Pump	Geo- thermal	Other	No cooling system	Total
25	1	5	0	0	0	31
80.6%	3.2%	16.1%	.0%	.0%	.0%	100.0%

Age of cooling system?

ии н. 0-4 ни	5-9	10-14	15-19	More than 19	Don't Know	Total
11	11	6	1	0	2	31
35.5%	35.5%	19.4%	3.2%	.0%	6.5%	100.0%

Do you have a swimming pool pump or spa?

Yes	No	Total
7	23	30
23.3%	76.7%	100.0%

What is the fuel used by the following?

	Electricity	Natural Gas	Oil	Propane	Other	Do not have this appliance	Total
Primary	8	21	1	0	0	0	30
heating	26.7%	70.0%	3.3%	.0%	.0%	.0%	100.0%
Primary	30	1	0	0	0	0	31
cooling	96.8%	3.2%	.0%	.0%	.0%	.0%	100.0%
Water	14	16	0	0	0	0	30
heater	46.7%	53.3%	.0%	.0%	.0%	.0%	100.0%
Range	27	4	0	0	0	0	31
(cooking)	87.1%	12.9%	.0%	.0%	.0%	.0%	100.0%
Oven	29	2	0	0	0	0	31
(cooking)	93.5%	6.5%	.0%	.0%	.0%	.0%	100.0%
Clothes	29	2	0	0	0	0	31
dryer	93.5%	6.5%	.0%	.0%	.0%	.0%	100.0%

Heating and Cooling Your Home

What do you currently use as your typical SUMMER AFTERNOON there
--

	<65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekday	0	1	9	8	0	4	_ 4	0	1	27
	.0%	3.7%	33.3%	29.6%	.0%	14.8%	14.8%	.0%	3.7%	100.0%
	<65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekend	0	1	10	7	3	5	1	0	0	27
·	.0%	3.7%	37.0%	25.9%	11.1%	18.5%	3.7%	.0%	.0%	100.0%

Stated do not have thermostat:

Has thermostat	Does not have thermostate	Total
27	4	32
84.4%	15.6%	100.0%

What do you currently use as your typical WINTER AFTERNOON thermostat setting?

	≤65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekday	4	6	6	4	1	0	0	0	0	21
	19.0%	28.6%	28.6%	19.0%	4.8%	.0%	.0%	.0%	.0%	100.0%
	<65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekend	1	9	6	4	1	0	0	0	0	21
	4.8%	42.9%	28.6%	19.0%	4.8%	.0%	.0%	.0%	.0%	100.0%

Stated do not have thermostat:

Has thermostat	Does not have thermostat	Total
21	10	32
65.6%	34.4%	100.0%

Home Profile Questions – Non-redeemers

11011 110440	you best accounce the typ	V VI HOM	v m wmon y	ou		
Detached						
single-	Mobile/Manufactured		Duplex/2-	Multi-	u upan katalapa (k	
family	home	Condo	tamily	tamily	lownhouse	Total
128	3	6	2	8	2	149
85.9%	2.0%	4.0%	1.3%	5.4%	1.3%	100.0%

How would you best describe the type of home in which you live?

In what year was your home built?

Before 1959	1960 - 1979	1980 - 1989 -	1990 - 1997	1998 - 2000	After 2001	Total
30	45	21	21	7	21	145
20.7%	31.0%	14.5%	14.5%	4.8%	14.5%	100.0%

What is the approximate square footage (heated area) of your home?

Less than 500	500 - 999	1000 - 1499	1500 - 1999	2000 - 2499	2500 - 2999	3000 - 3499	3500 - 3999	4000 or more	Don't Know	Total
2	9	35	37	16	13	5	4	4	19	144
1.4%	6.3%	24.3%	25.7%	11.1%	9.0%	3.5%	2.8%	2.8%	13.2%	100.0%

Approximately how many rooms are in your home (EXCLUDING bathrooms, INCLUDING finished basements?)

1-3	4	5	6	7	анд айрын 8	9999 2	More than 9	Total
5	7	22	30	27	23	18	12	144
3.5%	4.9%	15.3%	20.8%	18.8%	16.0%	12.5%	8.3%	100.0%

How many people live in your home?

	2	3	4		6	2 2 2 2 2 2 2 2 2	More than 7	Total
23	58	19	29	9	8	2	1	149
15.4%	38.9%	12.8%	19.5%	6.0%	5.4%	1.3%	.7%	100.0%

Last year of schooling?

Some				Some	Grad school or	
high school	Completed high school	Some	Graduated college	grad school	advance degree	Total
4	21	38	46	5	35	149
2.7%	14.1%	25.5%	30.9%	3.4%	23.5%	100.0%

What range best describes your age group?

18 - 35	36 - 45	46 - 55	56 - 65	Over 65	Total
33	32	32	27	25	149
22.1%	21.3%	21.3%	18.0%	16.8%	100.0%

What range best describes your household income?

Less than	25000 -	50000 -	75000 -	Over	Prefer not to	
25000	49999	74999	100000	100000	answer	Total
18	26	34	22	20	29	149
12.1%	17.4%	22.8%	14.8%	13.4%	19.5%	100.0%

Do you own or rent your home?

Own	Rent	Total
132	17	150
88.6%	11.4%	100.0%

Type of heating system?

Central	Electric	Heat	Geo-	Hot water/steam		No heating	
furnace	baseboard	Pump	thermal	boiler	Other	system	Total
112	5	16	0	1	8	0	142
78.9%	3.5%	11.3%	.0%	.7%	5.6%	.0%	100.0%

Age of heating system?

0-4	69	10-14	15-19	More than 19yrs	Don't Know	Total
35	45	30	15	16	14	155
22.6%	29.0%	19.4%	9.7%	10.3%	9.0%	100.0%

Type of cooling system?

Central	Window/	Heat	Geo-	Other	Total
air	room unit	pump	thermal		
135	9	9	0	1	154
87.7%	5.8%	5.8%	.0%	.6%	100.0%

Age of cooling system?

0-4	5-9	10-14	15-19	More than 19yrs	Don't = Know	Total
37	52	29	13	6	17	154
24.0%	33.8%	18.8%	8.4%	3.9%	11.0%	100.0%

Do you have a swimming pool pump or spa?

Yes	No	Total
21	132	153
13.7%	86.3%	100.0%

What is the fuel used by the following?

		Natural				Do not have this	
	Electricity	gas	Oil	Propane	Other	appliance	Total
Primary	41	94	9	8	1	0	153
heating	26.8%	61.4%	5.9%	5.2%	.7%	.0%	100.0%
Primary	140	9	0	0	0	2	151
cooling	92.7%	6.0%	.0%	.0%	.0%	1.3%	100.0%
Water	79	70	0	0	0	1	150
heater	52.7%	46.7%	.0%	.0%	.0%	.7%	100.0%
Range	135	16	0	4	0	1	156
(cooking)	86.5%	10.3%	.0%	2.6%	.0%	.6%	100.0%
Oven	135	14	0	4	0	0	153
(cooking)	88.2%	9.2%	.0%	2.6%	.0%	.0%	100.0%
Clothes	127	21	0	0	0	4	152
dryer	83.6%	13.8%	.0%	.0%	.0%	2.6%	100.0%

Heating and Cooling Your Home

What do you cu	urrently use as	your typical si	Immer afternoon	thermostat setting?
	MALEAS HIN + HIN	Jow Cyprowiou		

	<65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekday	3	12	42	46	17	19	8	0	4	151
	2.0%	7.9%	27.8%	30.5%	11.3%	12.6%	5.3%	.0%	2.6%	100.0%
	<65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekend	3	16	45	43	16	17	3	0	5	148
	2.0%	10.8%	30.4%	29.1%	10.8%	11.5%	2.0%	.0%	3.4%	100.0%

Stated do not have a thermostat:

Has thermostat	Does not have thermostat	Total
158	2	160
98.8%	0.2%	100.0%

What do you currently use as your typical winter afternoon thermostat setting?

	≤65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Total
Weekday	19	68	50	9	6	2	0	0	1	155
	12.3%	43.9%	32.3%	5.8%	3.9%	1.3%	.0%	.0%	.6%	100.0%
	≪65	65-69	70-72	73-75	76-77	78-79	80-85	>85	OFF	Jotal
Weekend	10	68	53	13	7	1	1	0	0	153
	6.5%	44.4%	34.6%	8.5%	4.6%	.7%	.7%	.0%	.0%	100.0%

Stated do not have a thermostat:

Has thermostat	Does not have thermostat	Total
158	2	160
98.8%	0.2%	100.0%

Appendix A – Redeemer Survey

Dear Customer,

Duke Energy is continuously trying to deliver improved services to you, our customers. We would like your input on the company's recent HH Gregg clothes washer rebate promotion. If you have any questions, please contact Stephanie Simpson at 513-287-3077.

You will receive a \$10 VISA gift card if you return your completed survey by June 4th.



DUKE ENERGY WOULD LIKE YOUR OPINION ABOUT OUR REBATE OFFER FOR ENERGY EFFICIENT CLOTHES WASHERS. FILL IN THE CIRCLES COMPLETELY USING BLUE OR BLACK INK.

THII Greecitcism Program

Do you recall receiving an offer of \$75 off select energy efficient washers at HH Gregg? A Yes No

Did you purchase a select energy efficient washer under this rebate program?

- A Yes Continue this survey
 A No Thank you. Please return
 survey.
 A Don't know Thank you. Please return survey
 A Don't recall Thank you. Please
 - L Don't know Thank you. Please return survey 🕰 Don't recall Thank you. Pleas réturn survey.

How influential were the following in your decision to purchase an energy efficient washer?

	Very Influential	Somewhat Influential
Not at all Influential	•	
Rebate offer from Duke Energy HH Gregg Advertising	▲	
Whirtpool/Maytag brand name Matching dryer rebate offer from		

A	<u>A</u>	<u> </u>	
Displays and signs in HH Gregg			
Sales Associate at HH Gregg		▲ · · · · · · · · · · · · · · · · · · ·	
Special financing from HH Greg			
Friends or Family		٩	
Other States and States			The second s
If other, please describe:			
IT OUT TRADES HERE T		in South Carls and Carls	n t din h
	~		
How often did you visit an HH	Gregg store before your recent vi	sit to purchase a washing m	achine?
How often did you visit an HH	Gregg store before your recent vi	sit to purchase a washing m 3-4 visits a year	achine?
How often did you visit an HH Never A or more visits a year	Gregg store before your recent vi	isit to purchase a washing m 3-4 visits a year	achine?
How often did you visit an HH A Never or more visits a year Did you purchase additional item Yes A No	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purc	sit to purchase a washing m 3-4 visits a year chased the washing machine?	achine?
How often did you visit an HH Never Never rmore visits a year Did you purchase additional items Yes No If yes, what types of products definition of the second	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that a	sit to purchase a washing m 3-4 visits a year chased the washing machine? pply.	achine?
How often did you visit an HH A Never or more visits a year Did you purchase additional item Yes A No If yes, what types of products d A Matching dryer	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purch lid you purchase? Mark all that an Bedding and Furniture	sit to purchase a washing m 3-4 visits a year chased the washing machine? pply. A TV and video	achine?
How often did you visit an HH Never Never or more visits a year Did you purchase additional items Yes No If yes, what types of products d Matching dryer Other large appliances 	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that ap Bedding and Furniture	isit to purchase a washing m 3-4 visits a year chased the washing machine? pply.	achine?
How often did you visit an HH A Never or more visits a year Did you purchase additional item Yes Mo If yes, what types of products d Matching dryer Other large appliances Camera and Camcorders	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that and Bedding and Furniture Personal electronics	 isit to purchase a washing m 3-4 visits a year chased the washing machine? pply. TV and video Car Audio 	achine?
How often did you visit an HH A Never Or more visits a year Did you purchase additional item Yes A No If yes, what types of products d A Matching dryer Other large appliances A Camera and Camcorders A Other small appliances	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that and Bedding and Furniture Personal electronics	 a year a year based the washing machine? pply. TV and video Car Audio 	achine?
How often did you visit an HH A Never Or more visits a year Did you purchase additional item Yes No If yes, what types of products d Matching dryer Other large appliances Camera and Camcorders Other small appliances Phone and Accessories	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that and Bedding and Furniture Personal electronics Computers and Equipment	 asit to purchase a washing m 3-4 visits a year chased the washing machine? pply. TV and video Car Audio Other 	achine?
How often did you visit an HH A Never A or more visits a year Did you purchase additional item Yes A No If yes, what types of products d A Matching dryer Other large appliances A Camera and Camcorders A Other small appliances A Phone and Accessories How often have you returned to	Gregg store before your recent vi 1-2 visits a year as during the visit in which you purchase? Mark all that and Bedding and Furniture Personal electronics Computers and Equipment o HH Gregg since purchasing you	 a year a year based the washing machine? pply. TV and video Car Audio Other 	achine?

more visits a month

	In this sec	tion we w	ould fi	ke to lear	in about fl	ie.us	of your c	lothes w	asher:		(le constant dan 1999)
							5	1 6	2 7+	3	4
On	average, ho	ow many l	loads o	f laundry	y do you d	o <u>per</u>	week?	A	A	<u>a</u>	<u>a</u>
	≏	4	А								
0	f these load 6	ls, how ma 7+	any			0	1	2	3	4	5
24	use we	irm water A	setting	đ	nan nan selen side se Nan nan selen selen se						n ana 1 1892 4
	use <u>ho</u>	t water sel	ttings?			<u>A</u>	<u>A</u>	A	<u>A</u>	<u>a</u>	<u>a</u>
sa Nageri Segnis y la John ya β γ John ya β γ	use <u>co</u> م	ld water s	sttings?	400				i a i i			
	are <u>sm</u>	all sized l	oads?			A	A	A	A	A	4
승생	are <u>bir</u>	dium size	<u>d</u> load	û tê ki							
	are <u>lar</u> ≏	r <u>ge sized</u> le ≏	oads?			A	A	A	A	<u>a</u>	А
Qn	what days	of the wee	ek do y	ou typics	ally wash t	he m	ajority of	your clo	thes?		
A	Weekdays	(Mon-Fri)	۱ ۵	Weekends ((Sat a	nd Sun)				
Dui	ing what h	ours do y	ou typi	cally wa	sh the maj	ority	of your cl	lothes?			
<u>م</u> ا ا p	7:01am to m	12 noon	Δ	12:01 p	m to 5pm		A	5:01pr	n to 8pm	A	8:01pm to
A	11:01pm t	o 7am	A	Varies f	from week	to we	ek 🕰	Don't	Know		
Hov all t	w have you that apply.)	r usage pa	atterns	changed	, if at al l , s	ince i	installing	your ene	ergy effici	ient wasi	her? (<i>Mark</i>
Δ	My usage	has not ch	anged			a	Wash clo	thes at d	ifferent tù	nes of th	e day
Δ	Increased	number of	f loads			A	Decrease	ed numbe	r of loads		
Δ	Increased	size of loa	ıds			<u>~</u>	Decrease	d size of	loads		
<u>a</u>	More war	m or hot w	ater us	e		A	Less war	m or hot	water use	•	

<u>B</u>	Every Efficience	ware	ness			No.					
In t	he past 6 months, how	v ma	ny times	have you visited	the Duke E	nergy	website	?			
<u>A</u>	Never		A	Less than once a	month		A	1-2 times per month			
▲	3-4 times per month		▲	5-6 times per mo	nth	A	More th	an 6 times per month			
Are you aware that the ENERGY STAR label appears on appliances that are energy efficient?											
Dog	you look for the ENE	RGY	' STAR la	abel when purch: No	asing an apj	plianc	e?				
Do	you typically buy EN A Yes	ERG	Y STAR	products when pr	ossible?	(Maa					
Bes	ides your washer, hav	ve yo	u added :	any other electric	al applianc	es to y	our hor	ne in the past year?			
A	Yes	A	No								
If y	es, were any of the ap	pliar	ices you j	purchased energ	y efficient?						
A	Yes	Δ	No								
V Hov	General Information w would you best desc	Allo	if You a	nt Com Home of home in whicl	you live?						
4	Detached single-fam	ily	A	Mobile/Manufac	tured home		A	Condominium			
A	Duplex/2-family		A	Multi-Family (3	or more unit	ts)	A	Townhouse			
In v	vhat year was your h	ome	built?								
A	Before 1959		A	1960 - 1979		A	1980 - 1	989			
A	1990 - 1997	A	1998 – 2	1000	Al م	fter 20	01				
Wh	What is the approximate square footage (heated area) of your home?										
<u>a</u>	Less than 500	<u>a</u>	500-999	<u> </u>	1,000-1,499	9	A	1,500 – 1,999			
	▲ 2,000 – 2,49	99		▲ 2,500-2,999	£ 3,	000-3,4	499	a 3,500-3,999			
	▲ 4,000 or mo	ore	A	Don't know							

-

App base	roxi mate ly ho ments)?	w n	nany	rooms	are i	n your hon	ne (EX(CLUDIN	NG bath	rooms	INCLU	J DING	finished
A	1-3 🛆	. 4	4	<u>a</u>	5	A	6	Δ	7	A	8	<u>a</u>	9
Δ	more than 9												
How	/ many people	live	e i n y o	our ho	me?								
а А	1 A more than 7	2		Ð	3	<u>a</u> 4	1	<u>a</u> 5		A (i	a 7	
Last	Last year of schooling?												
A	Some high scl	hool	l		A	Completed	l high so	hool	<u>A</u>	Some	college		
▲ adva	Graduated col nced degree	llege	e		A	Some grad	school		A	Grad	School a	or other	
Wha	What range best describes your age group?												
а Д	18 to 35 over 65		1	⊾ 36	to 45	5	<u>a</u> .	46 to 55		A	56 to	65	
Wha	at range best d	lesc	ribes	your h	ouse	hold incom	ie?						
A	Less than \$25	,000)		A	\$25,000 to	\$49,99	9	<u>a</u>	\$50,0	00 to \$7	4,999	
A	\$75,000-\$100	,00(D		<u>.</u>	Over \$100	,000		A	Prefe	r not to a	inswer	
Do y	/ou own or rei	nt ye	our h	ome?									
A	Own		<u>م</u>]	Rent									
Тур	e of heating sy	ster	m?										
▲ Geo	Central furnad	ce			A	Electric ba	iseboard	l	<u>a</u>	Heat	pump		<u>A</u>
A	Hot water/ste	am t	boiler		A	Other			A	No he	ating sy	stem	
Age	Age of heating system?												
▲	0-4 years		£	5-9) year	s		a	10-14 y	ears			

A	15-19 years	A	More than 19 ye	ars	<u> </u>	Don't k	inow		
Тур	e of cooling sys	tem?							
<u>_</u>	Central air	A	Window/room u	nit air co	onditioner	A	Heat pum	р	
4	Geo-thermal		▲ Other				۲ <u>م</u>	lo coolir	ng system
Age	e of cooling syste	em?							
4	0-4 years	<u>A</u>	5-9 years		<u>.</u>	10-14 y	ears		
A	15-19 years	£	More than 19 ye	ars	Δ	Don't k	inow		
Do	you have a swin	nming pool	pump or spa?	A	Yes	۵	No		
Wh	at is the fuel use	ed by the fo	ollowing:						
	Do not have	Electric: e this applia	ity Natural ; ince	gas	Oil		Propane		Other
Pri	mary beating				A				
Pri	mary cooling	A	A		Д		A		A
Wa	ter heater						.		
Rai	nge (cooking) A	Δ	A		A		A		<u>a</u>
Ovi	en (cooking)	.							
Сю	thes Dryer	<u>A</u>	A		A		æ		<u>A</u>
Wh	at is the curren	t temperati	ure setting on yo	our wate	r heater?		deg	jrees.	
Nov	w please follow (the instruct	tions on the wate	er tempe	rature ca	rd that	came with t	his surv	ey.
Wh maj	at is the temper y or may not be	ature read the same a	ing on the card? s the temperatu	re readi	ng on you	ir water	(Note: tl heater.)	nis temp	erature
Wh	at do you curre	ntly use as	your typical SU	MMER	AFTERN	100N tl	hermostat s	etting?	
	Setting		< 65	65–69	70-72	73-75	76-77 73	8-79 8	0-85 >
	85		OFF						

WEEKDAY	<u>A</u>	A	<u>.</u>	ß	A	<u>.</u>	A	<u>a</u>	
<u>A</u>									
WEEKEND	A	<u>A</u>	6	<u>a</u>	<u>A</u>	A	Δ	A	
<u>A</u>									
Do not have a thermostat.									

What do you currently use as your typical WINTER AFTERNOON thermostat setting?

Setting	< 65	65–69	70-72	73-75	76-77	78-79	80-85	>
85	OFF							
WEEKDAY	A	<u>A</u>	A	A	<u>a</u>	A	A	A
<u>A</u>								
WEEKEND	A	<u>a</u>	A	А	4	A	A	A
<u>A</u>								

▲ Do not have a thermostat.

Thank you for your help with this study. Your \$10.00 incentive will be mailed within 6-8 weeks. Please verify your address on the front page of this survey.

A Yes, my address on the front page of this survey is correct

▲ No, please mail my check to:

THANK YOU FOR YOUR RESPONSES

Appendix B – Non-Redeemer Survey

Dear Customer,

Duke Energy is continuously trying to deliver improved services to you, our customers. We would like your input on the company's recent HHGregg clothes washer rebate promotion. If you have any questions, please contact Stephanie Simpson at 513-287-3077.

You will receive a \$10 VISA gift card if you return your completed survey by <u>June 4th.</u>



DUKE ENERGY WOULD LIKE YOUR OPINION ABOUT OUR REBATE OFFER FOR ENERGY EFFICIENT CLOTHES WASHERS. FILL IN THE CIRCLES COMPLETELY USING BLUE OR BLACK INK.

1 HH-Greeg Rebails Program

Do you recall receiving an offer of \$75 off select energy efficient washers at HHGregg? A Yes A No

Did you purchase a select energy efficient washer under this rebate program?

- No Continue this survey.
- 🔺 Yes Thank you. Please return

survey.

△ Don't know - Thank you. Please return survey. △ Don't recall - Thank you. Please

return survey.

Why did you decide NOT to take advantage of this rebate offer?	
--	--

at H	Too much hassle HGregg	A	Did not need a new washer	Δ	Do not shop
▲	Did not understand program	A	Thought there was a catch	A	Other
lf ot	her, please explain:				

Did the energy efficient washer rebate offer <u>increase your awareness</u> of how you could save energy by using energy efficient appliances?

- A Yes A No I was aware of the energy savings already
- Somewhat- I was already aware, but it did help me understand their benefits better

Did the energy efficient washer rebate offer motivate you to purchase an energy efficient washer somewhere else, without receiving the rebate?

🕰 Yes 🗳 No

<u>If yes</u>, how influential were the following in your decision to purchase an energy efficient washer somewhere else, without receiving the rebate?

	Very Influential	Somewhat Influential
Not at all Influential	·	
Better price at other store Other store's Advertising	A	
Whirlpool/Maytag brand name Matching dryer rebate offer from Whirlpool/Maytag	▲	
Displays and signs in other store Sales Associate at other store	A A A	
Special financing from other store Friends or Family		A.
Other Andrew Control of Control o		

If other, please describe:

-

If Other Purchases Made at HHGregg

How often do you shop at HHGregg?

A Never – skip to section III A 1-2 visits a year A 3-4 visits a year A 5

or more visits a year

Did you visit the HHGregg store to browse the select energy efficient washers before deciding not to purchase a washer through the rebate program?

A Yes A No-skip to section III

If yes:

Did you purchase a different washer that did not qualify for the rebate during your visit to HHGregg?

Did you purchase additional items during the visit in which you browsed the select energy efficient washers?

🕰 Yes 💁 No

If yes, what types of products did you purchase? (Mark all that apply.)

Δ	Matching dryer	Δ	Bedding and Furniture	A	TV and video	A
Othe	er large appliances					
A A	Camera and Camcorders Other small appliances	A	Personal electronics	A	Car Audio	
<u>.</u>	Phone and Accessories	A	Computers and Equipment	A	Other	

How often have you returned to HHGregg since your visit to browse the energy efficient washers or purchase other items?

A	Have not returned	A	l visit a month	<u> </u>	2 visits a month	<u>A</u>	3 or
---	-------------------	---	-----------------	----------	------------------	----------	------

more visits a month

118211-4	thesecti	on we w	ould like	to learn a	bout the	nseo	Your s	lothed like				
5	6	7+						1	2	3	4	
On ave	erage, how	w many	loads of	aundry d	o you do	<u>per w</u>	<u>eek</u> ?	A	A	A	A	
	A	A	A									
Of th	ese loads 6	, how n 7+	nany			0	1	2	3	4	5	
S Contraction Markalanti	use war	m wate	r settings?		••• •	A	<u>a</u>					
	use <u>hot</u>	water se	ettings?			<u>a</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>a</u>	A	

use <u>cold</u> water settings?	a .	A . (.			
are <u>small sized</u> loads?	<u> </u>	<u>a</u>	٩	A	a	<u>a</u>
are <u>medium sized</u> loads?	A	<u>a</u> . ^(−) .		- (J a ng	844 A (()	
are <u>large sized</u> loads?	Ð	٩	A	A	ß	A

On what days of the week do you typically wash the majority of your clothes?

▲ Weekdays (Mon-Fri) ▲ Weekends (Sat and Sun)

Du	During what hours do you typically wash the majority of your clothes?										
& 11p	7:01am to 12 noon m	<u>a</u>	12:01 pm to 5pm	•	5:01pm to 8pm	A	8:01pm to				
<u>a</u>	11:01pm to 7am	A	Varies from week to week	A	Don't Know						

NTEL Det Der Efficienter Awareness

In the past 6 months, how many times have you visited the Duke Energy website?

A	Never	<u>a</u>	Less than once a month		1-2 times per month
A	3-4 times per month	A	5-6 times per month	P	More than 6 times per month

Are you aware that the ENERGY STAR label appears on appliances that are energy efficient?

Do you look for the ENERGY STAR label when purchasing an appliance?

Do you typically buy ENERGY STAR products when possible?

Besides an energy efficient washer, if purchased, have you added any other electrical appliances to your home in the past year?

A Yes A No

If yes,	were any of the a	ppliances y	ou purchased	energy efficient?	A	Yes	A	N	0
---------	-------------------	-------------	--------------	-------------------	---	-----	---	---	---

	Seneral Information A	out Yon and Your Home	糶									
Hov	How would you best describe the type of home in which you live?											
A	▲ Detached single-family ▲ Mobile/Manufactured home ▲ Condominium											
A	Duplex/2-family	A Multi-Family (3 or more units) A Townhouse										
In w	In what year was your home built?											
<u> </u>	Before 1959	🛥 1960 - 1979 🔿 1980 - 1989										
4	ه 1990 - 1997	1998 – 2000 🕰 After 2001										
Wha	What is the approximate square footage (heated area) of your home?											
a	Less than 500	500-999 a 1,000-1,499 a 1,500 – 1,999										
	▲ 2,000 – 2,499	a 2,500-2,999 a 3,000-3,499 a 3,500-3,999)									
	▲ 4,000 or more	▲ Don't know										
App base	Approximately how many rooms are in your home (EXCLUDING bathrooms, INCLUDING finished basements)?											
A	1-3 🙇 4	<u>م 5 م 6 م 7 م 8 م 9</u>										
A	more than 9											
Hov	v many people live in ye	ur home?										
<u>æ</u>	1 <u>a</u> 2 more than 7	<u>a</u> 3 <u>a</u> 4 <u>a</u> 5 <u>a</u> 6 <u>a</u> 7										
Las	t year of schooling?											
A	Some high school	Completed high school Some college										
.▲ adva	Graduated college anced degree	Some grad school Grad School or other										
Wha	What range best describes your age group?											
A	18 to 35	. 36 to 45 🙇 46 to 55 🙇 56 to 65										

Wh	at range best describe	s yo	ur house	ehold inc	ome?					
4	Less than \$25,000		A	\$25,000) to \$49,99	9	A	\$50,000 to	o \$74,999	
Δ	\$75,000-\$100,000		Δ	Over \$1	00,000		₽	Prefer not	to answer	
Dog	you own or rent your :	hom	e?	<u>A</u>	Own	A	Rent			
Тур	e of heating system?									
≞ Geo	Central furnace -thermal		<u>A</u>	Electric	baseboard	J	A	Heat pum	p	<u>a</u>
A	Hot water/steam boile	эr	A	Other			Ð	No heatin	g system	
Age	of heating system?									
A	0-4 years	<u>a</u>	5-9 yea	rs		A	10-14 y	/ears		
A	15-19 years	A	More th	ian 19 ye:	ars	A	Don't l	now		
Тур	e of cooling system?									
A	Central air	A	Window	w/room u	nit air con	ditioner	<u>_</u>	Heat purr	р	
A	Geo-thermal		A	Other				<u>a</u>	No cooling	g system
Age	of cooling system?									
A	0-4 years	A	5-9 year	rs		A	10-14 y	ears/ears		
A	15-19 years	A	More th	an 19 ye	ars	A	Don't l	cnow		
Dog	you have a swimming	роо	l pump o	or spa?	A	Yes	A	No		
Wb	at is the fuel used by t	he f	ollowing	:		0.1				0.1
	Ele Do not have this a	ctric pplia	ance	Naturai g	gas	Oil		Propane	1	Other
Pri	nary heating									• 4 •
Pri	nary cooling	A		A		A		<u>a</u>		<u>a</u>
Wa	ter heater									A

Range (cooking)	A	A	A	<u>A</u>	•
Oven (cooking)					
Clothes Dryer	A	A	A	<u>a</u>	₽

What is the current temperature setting on your water heater? ______ degrees.

Now please follow the instructions on the water temperature card that came with this survey.

What is the temperature reading on the card? ______ (Note: this temperature may or may not be the same as the temperature reading on your water heater.)

Whether the provide states of the states and states and states and states and states and consider an in-states in the

What do you currently use as your typical SUMMER AFTERNOON thermostat setting?

Setting	< 65	65–69	70-72	73-75	76-77	78-79	80-85	>
85	OFF							
WEEKDAY	A	<u>a</u>	<u></u>	<u>.</u>	<u></u>	<u>.</u>	<u>.</u>	<u>e</u>
<u>A</u>								
WEEKEND	<u>A</u>	А	A	A	A	A	A	A
<u>A</u>								

▲ Do not have a thermostat.

What do you currently use as your typical WINTER AFTERNOON thermostat setting?

Setting	< 65	6569	70-72	73-75	76-77	78-79	80-85	>
85	OFF							
WEEKDAY	A	А	A	A	A	A	A	A
<u>a</u>								
WEEKEND	A	А	A	A	A	A	<u>A</u>	<u>0</u>
<u>A</u>								

▲ Do not have a thermostat.

Thank you for your help with this study. Your \$10.00 incentive check will be mailed within 6 - 8 weeks. Please verify your address on the front page of this survey.

- A Yes, my address on the front page of this survey is correct
- ▲ No, please mail my check to:



THANK YOU FOR YOUR RESPONSES

Appendix C – Impacts Estimation Algorithm

Clothes Washer Savings Algorithm

From Energy Star Tag:

- 1. kWh/yr (kWhee)
- 2. Cost with gas water heater (\$) (gas cost)
- 3. Cost with electric water heater (\$) (electric cost)
- 4. Washer size (cu ft; use 2.96 as default) (CF)

From customer survey:

Water heater type (gas or electric) Number of loads per week (loads/wk)

If water heater type = electric:

kWh savings = loads/week $/ 8 \times (679 \times CF/2.96 - kWhee)$

kW savings = kWh savings x 0.000417

If water heater type = gas:

Base therm = $27 \times \text{loads/week} / 8 \times \text{CF} / 2.96$

Base kWh = 611 x loads/week / 8 x CF / 2.96

Measure therm = (gas cost - .1 x kWhee x 0.0803)/.688 x loads/week / 8 x CF / 2.96

Measure kWh = kWhee * 0.9

kWh savings = (Base kWh = Measure kWh)

kW savings = kWh savings $\times 0.000417$

Therm savings = (Base therm – measure therm)

Appendix F

Energy Efficiency Website Program Impact Evaluation



Submitted by Johna: Roth and Nick Hall TecMarket Works


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15 15W and 20W Mini CFL Light Bulbs
Weather Stripping
$W_{1} = U_{1} \in \Omega^{-1} \setminus U^{-1}$
Window Shrink Fil
Insulating Gaskets
Website Tips – Installation and Repairs
Install New Furnace
Install New Heat Pump
Install New Central Air Conditioner
Insulate Sidewalls
Insulate Attic
Insulate Ducts
Repair or Fix Holes in Ducts
Unange Furnace Filler
Website Time Actions Takon
Vectorie 11ps - Activity 1 arcti
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This study was conducted via a joint evaluation effort between Duke Energy and TecMarket Works. Duke Energy staff obtained the survey data and estimated the energy savings from the survey responses using the savings calculations developed by the TecMarket Works and Building Metrics analysis team.

TecMarket Works reviewed the survey data and the energy estimation approach to confirm the objectivity and accuracy of the savings estimates and adjusted the findings to account for self selection bias. This report provides the results of that evaluation collaboration.

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Overall, customers are satisfied or very satisfied with the energy efficiency website (52.7% satisfied), energy efficiency kit (56.8% very satisfied), and the overall energy efficiency program (46.6% satisfied). Customers' reasons for visiting the site were most likely to learn how to reduce their energy costs or to obtain the energy efficiency kit. Suggestions for improving the energy efficiency website and overall program include having a website that is more adaptable to a particular customer's home characteristics, lifestyle and energy usage; making the website content more visible and transparent from the homepage; and add additional links to sections of the website to limit the need to move back through several webpages in order to click the next link in a list. Finally, customers would like to see additional tips and suggestions, and would also be interested in a do-it-yourself section for those customers who are more "handy" and could undertake more labor intensive energy saving measures on their own.

Customers were most likely to have installed the CFLs before receiving the energy efficiency kit, and were most likely to install the CFLs, along with the aerators, after receiving the energy efficiency kit. Customers were least likely to install the window shrink fit.

Of the actions and tips, customers were most likely to follow the "change your furnace filter" tip, although this item did not generate any savings. Customers were also more likely to manage their drapes in summer and winter, and lower their thermostat in winter for energy savings. The tips and actions customers were least likely to follow included installing a heat pump, installing dual heating, and installing doors on the fireplace.

Total savings for the energy efficiency kit installation and website tips and actions are presented in the table below, along with final savings. Total final savings accounting for freeridership and website usefulness are 138.71 kW; 1,253,297 kWh; and 38,152.1 Therm.

		Revenue -	ale and a second se
Kit Savings	11.88	137,469	5479.2
Actions/Tips Savings	126.83	1,115,828	32,672.9
	13871	1 253 297	38.1523

Table 1. Final Total Energy Efficiency Savings

Recommendations

1. If cost considerations arise, consider offer kits to site visitors that fit into specific market segments that are more likely to install the kit's measures as the web site becomes more popular. Key demographics can be pinpointed using the information collected for this report.

2. Participation can be increased through advertising of the website. This can be done through bill inserts, targeted emails, or external advertising (radio, TV, newspapers).

Introduction

This document evaluates Duke Energy's Energy Efficiency website program, as administered in Ohio. The program provides energy savings tips through a website and allows the customer to request an energy efficiency starter kit. The program manager is responsible for looking at weekly activity on the website, and submits all requests for the energy efficiency kits to the vendor, and also verifies that the requests are from customers that are eligible to receive a kit.

The evaluation stems from a web-based survey emailed to customers who visited the Duke Energy Efficiency website and requested an energy efficiency kit. The report is divided into four sections: the overall website program, energy efficiency kit measures, installations and repairs made from website tips, and actions taken as a result of website tips.

One aspect of visiting the Energy Efficiency website is using the Home Energy Calculator. The Home Energy Calculator allows customers to input specific information about their home and read an output describing their energy usage. Customers can change their selections on the calculator to determine how lifestyle or technology changes could affect their energy usage. After using the Home Energy Calculator, customers see a link to request an energy efficiency kit to be sent to their home. Customers that used the Home Energy Calculator and then requested the energy efficiency kit were solicited for the online survey.

In the survey, customers were asked to describe their use of the measures from the energy efficiency kit and indicate which measures they installed. Customers were also asked questions regarding appliances they may have purchased, installations/repairs they may have made, or actions they may have taken after reading tips on the website. Customers were also asked questions to determine their overall satisfaction with the Energy Efficiency website and the Energy Efficiency website program.

The survey was developed by Duke Energy, using a sample survey provided by TecMarket Works, as well as a previous Duke Energy Energy Efficiency website survey used in Kentucky. The survey was administered by Duke Energy using an online survey host. Duke Energy also collected and analyzed the data, with assistance from Integral Analytics. TecMarket Works reviewed and approved the final evaluation written by Duke Energy.

Methodology

Survey

The online customer surveys were developed from a sample survey developed by TecMarket Works, as well as a previous Energy Efficiency website survey developed by Duke Energy for use in Kentucky. The survey asked customers a series of questions about each of the items the customer received in the energy efficiency kit to determine how the customer has used the item as well as to determine energy savings as a result of using of the item. The survey also asks customers about any new appliances or installations they may have added to their home as a result of visiting the website and reading the energy efficiency tips. Customers were asked not only if they have installed the item, but also how influential the website was in their decision to install the item. Customers were asked similar questions about any actions they may have taken as a result of reading the energy efficiency tips on the website (such as managing their drapes or lowering their thermostat). Finally, the survey asked questions regarding the website content (including the Home Energy Calculator) as well as overall satisfaction with the Energy Efficiency website. The survey questions are found in a separate document, entitled "Appendix A. Energy Efficiency Website Survey".

Once the survey content was finalized, the survey and skip patterns were coded into Sawtooth software¹. The survey was then uploaded to be emailed using silverPOP². A random sample of 1000 customers who visited the website and requested the energy efficiency kit was obtained. The customers in the sample were emailed a link and a passcode which would allow them to access the online survey. The survey was "live" online and able to accept customer input for 14 consecutive days.

Survey Response

The survey access information was successfully emailed to 932 customers out of 2,613 that received the energy efficiency kits from September 2007 through end of June 2008, after bounce-backs, duplicates, etc. were removed. 154 surveys were returned, for a 16.5% response rate.

Data Analysis

The survey data was obtained from the software and cleaned and coded into SPSS³ and Microsoft Excel.

Impact Estimation

Impacts were estimated using survey responses using engineering algorithms developed by TecMarket Works and BuildingMetrics for the Kentucky Personalized Energy Report (PER) impact evaluation. The Kentucky PER offers an identical energy efficiency kit as a part of the program, and the energy efficiency tips offered on the website are similar to those offered by the PER, so the Energy Efficiency kit impacts as well as the impacts of utilizing the tips and taking the actions recommended on the website are calculated directly using the algorithms developed by the TecMarket Works/BuildingMetrics Team and customer characteristics and responses from the Energy Efficiency website survey.

¹ Sawtooth Software SSI Web version 6.

² silverPOP Marketer, version 7.

³ Statistical Package for the Social Sciences, version 15.0.

The engineering algorithms developed by the TecMarket Works/BuildingMetrics Team are described in Appendix B, which is a separate document entitled "Appendix B. Impact Estimation Algorithms". The algorithms use DOE-II residential software modeling algorithms and location-based weather data⁴.

⁴ The weather data found in the Appendix references the city of Covington, KY for local weather data. This location is used for all local area weather data for Ohio and Kentucky and is an accurate source for weather data in the Ohio and Kentucky service territories.

Overall Website Program Satisfaction

Customers were asked to assess their overall experiences with the content of the Energy Efficiency website by answering questions both at the beginning and end of the survey. Overall, only 3.9% of customers did not recall visiting the Energy Efficiency website to request the energy efficiency kit. Reasons for not recalling receipt of the energy efficiency kit may be that the customer who received the survey was not the same person who installed the energy efficiency kit in their home, or that the customer did not request the energy efficiency kit. Customers who responded that they do not recall their visit to the website were directed by a skip pattern to answer only the Home Profile Questions at the end of the survey.

Do recall visiting the Duke Energy website to request an energy efficiency kit?

Total	No	Yes
154	6	148
100.0%	3.9%	96.1%

Overall Motivations

Motivations for visiting the website included wanting to reduce energy costs or to receive the energy efficiency kit offered (56.8% and 50.7%, respectively). The least motivating factor for consumers was recommendations from other utility programs (0.7%), followed closely by advertisement in newspaper and past experience with another Duke Energy program (2%). Other motivating factors that customers listed included other forms of advertisement (television, booth at an event/fair, another website) and wanting to "be green". Although the percentages for these other responses are also small compared to the most highly motivating factors, Duke Energy may want to consider addressing other forms of advertisement, as well as the other environmentally-related advantages of participating in the program to the consumer, besides reducing energy costs.

The receipt modified you to that this sho and request the energy emetericy have							
	Motivating	Non-Motivating					
Motivation	factor	factor - the management	Total				
The energy efficiency kit offered	75	73	148				
	50.7%	49.3%	100.0%				
Wanted to reduce energy costs	84	64	148				
	56.8%	43.2%	100.0%				
The information provided by the website	32	116	148				
	21.6%	78.4%	100.0%				
Because of past experience with another Duke Energy program	3	145	148				
	2.0%	98.0%	100.0%				

What factors motivated you to visit this site and request the energy efficiency kit?

Recommendation from other utility	1	147	148
programs	-		
	.7%	99.3%	100.0%
Recommendation of family/friend/neighbor	43	105	148
	29.1%	70.9%	100.0%
Advertisement in newspaper	3	145	148
	2.0%	98.0%	100.0%
Radio advertisement	2	146	148
	1.4%	98.6%	100.0%
Information from my bill	26	122	148
· · · · · · · · · · · · · · · · · · ·	17.6%	82.4%	100.0%
Don't know	4	144	148
	2.7%	97.3%	100.0%
Other motivating factors for visiting the such	site and remiesti	ng the energy effici	ency
Motivation	Count	Col %	
None	145	94.2%	
Another website	2	1.2%	
Wanted to give as a gift	1	.6%	
Interested in alternative energy/	-	1.8%	
sustainability/"being green"	د		
School project	1	.6%	
Speaking of Women's Health booth info	1	.6%	
Television program	1	.6%	
Total	154	100.0%	

Usefulness of Website Components

Customers overwhelmingly rated the usefulness of the Energy Efficiency website's information about energy use in their home at a 3 or above on a 5-point scale, with 68.3% of customers rating the Energy Efficiency website at a 4 or above in this category. The component of the website customers were least likely to visit was the "For Kids" section, while customers were most likely to visit the Home Energy Calculator, which was expected given that customers had to use the Home Energy Calculator in order to request the energy efficiency kit. Interestingly, however, only 86.5% of customers recall visiting the Home Energy Calculator, suggesting that customers may not associate the name "Home Energy Calculator" with the web tool they used to request their energy efficiency kit. The next most visited portion of the website was the Appliance Calculator, with 77.0% of customers visiting that component of the website.

The component of the website customers found the most useful were the Home Energy Calculator and the Appliance calculator (both 23.0% "very useful"). Most of the time, customers rated a component of the website they visited at least "somewhat useful" but not as high as "very useful".

Overall, how useful was the website in providing you with information about energy use in your home?

Not at all Useful 1	2	Somewhat Useful 3	4	Very Useful 5	Total
0	4	43	60	41	148
.0%	2.7%	29.1%	40.5%	27.7%	100.0%

Which components in the website did you review and how useful were they?

Component	Not at all Useful 1		Somewhat Useful 3	4	Very Useful 5	Did Not Visit	Total Visits to Component	Total
Home energy	2	4	43	45	34	20	128	148
calculator	1.4%	2.7%	29.1%	30.4%	23.0%	13.5%	86.5%	100.0%
Appliance calculator	2	5	42		34	34	114	148
	1.4%	3.4%	28.4%	20.9%	23.0%	23.0%	77.0%	100.0%
calculator	2	3	32	41	33	37	111	148
1 APR - 100 200 AL	1.4%	2.0%	21.6%	27.7%	22.3%	25.0%	75.0%	100.0%
	3	13	31	29	15	57	91	148
	2.0%	8.8%	20.9%	19.6%	10.1%	38.5%	61.5%	100.0%
Energy library: Home energy system	4	9	24	36	10	65	83	148
	2.7%	6.1%	16.2%	24.3%	6.8%	43.9%	56.1%	100.0%
Energy library: Fundamentals of electricity		6	27	31	9	69	79	148
For kide	4. 1%	4.1%	17	20.9%	6.1% 3	46.6%	53.9% 54	100.0%
	11.5%	4.1%	11.5%	7.4%	2.0%	63.5%	36.5%	100.0%

Home Energy Calculator Usefulness and Satisfaction

In order to receive the energy efficiency kit as a part of the website program, customers had to visit and use the Home Energy Calculator on the website. Customers were asked in more detail about their visit to the Home Energy Calculator. Most customers stated that they looked at the Home Energy Calculator report details and felt that the details reasonably reflected their usage. Similarly to the component as a whole, a majority of customers rated the Home Energy Calculator report at least somewhat useful, but not as high as "very useful".

Did you look at the Home Energy calculator report details?	Yes	No	Total
	114	14	128
	89.1%	10.9%	100.0%
Did you feel that the estimate from the home energy calculator reasonably reflected your usage?	Yes	No	Total
	95	19	114
	83.3%	16.7%	100.0%

Was the [Home Energy Calculator] report very useful?

Not at all Useful 1	2	Somewhat Useful 3	4	Very Useful 5	Total
4	5	44	37	24	114
3.5%	4.4%	38.6%	32.5%	21.1%	100.0%

Overall Website Usefulness and Satisfaction

Overall, customers found the Energy Efficiency website easy to navigate to get the information they wanted. Even so, a few customers had recommendations to make the energy efficiency website better. In general, the suggestions included content more generalized to the user, and some website navigation changes. These changes should be taken into consideration as future website upgrades and content updates are made.

Was the site easy to navigate to get to the information you wanted?

Yes	No	Total
142	6	148
95.9%	4.1%	100.0%

What changes would you recommend to make the site better? (Responses are summarized)

Changes	Count	%
None	150	87.00%
Relate site content directly to	1	0.60%
customers' energy consumption; inform		
how much energy each appliance/light		
is using each month.		
Links to programs across submenus;	1	0.60%
remove need to return to main menu		
and enter another submenu to find a		

different program		
More information with specific tips and	1	0.60%
actions to be taken.		
Would prefer highly visible navigator	1	0.60%
at Home Page.		
Total	154	100.00%

Overall, the website does a "satisfactory" job of causing consumers to take energy conservation actions that had not occurred to them in the past (41.2% rated the website as between "somewhat" and "very effective"), and over half of customers give the website a 4 or above (on a 5-point scale) in this category. Additionally, over half of customers stated that the website was "very effective" in confirming actions they had already taken were the correct thing to do. This suggests that the current Energy Efficiency website contains a good mix of tips and suggestions that customers have heard of through other sources of information and can confirm on Duke Energy's website, as well as tips that customers are interested in implementing but may not have heard of in the past.

Overall, how much did the website alone cause you to take energy conserving actions that you had not thought of prior to visiting the site?

Not at All	2	Somewhat 3	4	Very Much S	Total
10	12	50	61	15	148
6.8%	8.1%	33.8%	41.2%	10.1%	100.0%

If you had energy conserving actions that you did before visiting the website, how effective was the website in confirming that these actions were the correct thing to do?

	Not at all				Very	
NI/A	Effective	່. ງ	Somewhat		Effective	Total table
3	<u>4</u>	2	19	46	74	148
2.0%	2.7%	1.4%	12.8%	31.1%	50.0%	100.0%

Did the website inspire you to take these actions sooner?

Yes	No	No, but plan to	N/A ***	Total
106	33	5	1	145
73.1%	22.8%	3.4%	.7%	100.0%

Customers found the kit to be similar in usefulness to the website, stating that the kit was between "somewhat" and "very much" an influence in customers taking actions they had not thought of in the past. Looking at the installation rates of the kit items in more detail in the next section will determine which items consumers have most frequently not installed in the past, but did implement after receiving the kit.

How much did the addition of the kit cause you to take energy conserving actions that you had not thought of prior to visiting the site?

Not at All 1	2	Somewhat	4. <u>.</u>	Very Much 5	Total
6	8	33	60	41	148
4.1%	5.4%	22.3%	40.5%	27.7%	100.0%

Overall Satisfaction with Energy Efficiency website and kit

Overall, half of customers strongly agreed that the items from the energy efficiency kit were of satisfactory quality, while over 80% of consumers rated the kit items at a 4 or above.

The items I installed from the energy efficient website were of satisfactory quality?

Strongly Disagree 1	2	Somewhat 3	4	Strongly Agree 5	Total
4	3	15	52	74	148
2.7%	2.0%	10.1%	35.1%	50.0%	100.0%

Overall, a majority of the customers were satisfied with both components of the Energy Efficiency website program, as well as the overall energy efficiency program itself. The energy efficiency kit received the most "very satisfied" ratings, at 56.8%. The most frequent rating for the Energy Efficiency website was a 4 (52.7%), while the most frequent rating for the overall program was also a 4 (46.6%).

	Not Satisfied 1	2	Somewhat⊒ 3	4	Very Satisfied	Total
Energy efficiency	3	3	26	78 52 79/	38	148
Fnerov efficiency kit	2.0%	2.0%	17.0%	52.1% 43	25.7%	100.0%
	2.7%	2.0%	9.5%	<u>29.1%</u>	56.8%	100.0%
Overall energy	3	1	21	69	54	148
efficiency program	2.0%	.7%	14.2%	46.6%	36.5%	100.0%

Overall, how satisfied are you with the following?

If a customer answered three or below for the website, kit, or program, they were asked to state why they were not satisfied and to identify additional factors that may make the website more useful or helpful to customers. They were also asked to state, overall, any additional comments they had. Many customers had multiple comments/suggestions.

T lease explain why you well not satisfied.	
Comment	Count
Already knew website tips/website	3
recommendations are common sense	
Actions described on website I have already	1
taken or do not apply to me	
Availability of products described on site	1
not in store	
Kit items were broken/ kit was of	7
unsatisfactory quality	
Kit never received	3
Didn't like kit items	3
Website too general with actions/tips	2
Website layout is awkward or confusing	2
N/A	2

Please explain why you were not satisfied:

Please let us know if you have any additional comments:

Comments
Update the website with an advanced DIY
section for those who are handy or have
technical skills
Great program
I am interested in other programs Duke
offers
Provide a list of companies who offer home
energy audits
No comments

Energy Efficiency Kit Measures

The energy efficiency kit the customer received contained the following items to install:

- energy efficient showerhead,
- kitchen faucet aerator,
- bathroom faucet aerator,
- 15W mini compact fluorescent bulb,
- 20W mini compact fluorescent bulb,
- weather stripping,
- window shrink fit kit, and
- insulating gaskets for outlet boxes or wall switches.

Customers were asked if they had installed any of the measures included in the kit before visiting the website and receiving their kit. The most common items that customers had previously installed were the 15W and 20W bulbs (62.8% and 60.8%), while half of customers requesting the kit had installed weather stripping in the past. The higher incidence of CFL bulbs being installed previously compared to other items suggests more frequent exposure to CFLs as an energy saving item, whether through Duke Energy's EnergyStar programs or other information resources.

	Yes	No	Total
Energy efficient (low	58	90	148
flow) showerhead	39.2%	60.8%	100.0%
Kitchen faucet	65	83	148
aerator	43.9%	56.1%	100.0%
Bathroom faucet	47	101	148
aerator	31.8%	68.2%	100.0%
15 Watt mini	93	55	148
compact fluorescent lights	62.8%	37.2%	100.0%
20 Watt mini	90	58	148
compact fluorescent lights	60.8%	39.2%	100.0%
Weather stripping	74	74	148
	50.0%	50.0%	100.0%
Window shrink fit	25	123	148
	16.9%	83.1%	100.0%
Insulating gaskets on	56	92	148
outlet boxes or wall switches	37.8%	62.2%	100.0%

Table 2. Frequency of kit item pre-installation.

Installation of Kit Items

The following sections describe the installation and related savings for each kit item. As mentioned previously, savings are calculated using the engineering algorithms developed for the KY Energy Efficiency website and KY Personalized Energy Report programs. The table below summarizes the kit installations made by customers who visited the website. The most frequently installed item was the 15W bulb, followed by the 20W bulb, and the kitchen faucet aerator. The least installed item was the window shrink fit, with almost half of customers not installing. Most customers who planned to install items later planned to install the weather stripping or the insulating gaskets.

Table 3. Frequency of kit item installation.

			No, but		
	Yes	No	plan to	<u>N/A</u>	Total
Energy efficient (low	78	35	31	4	148
flow) showerhead	52.7%	23.6%	20.9%	2.7%	100.0%
Kitchen faucet	89	27	25	7	148
aerator	60.1%	18.2%	16.9%	4.7%	100.0%
Bathroom faucet	74	35	30	9	148
aerator	50.0%	23.6%	20.3%	6.1%	100.0%
15 Watt mini	121	7	15	5	148
compact fluorescent lights	81.8%	4.7%	10.1%	3.4%	100.0%
20 Watt mini	118	8	17	5	148
compact fluorescent	79.7%	5.4%	11.5%	3.4%	100.0%
Weather stripping	58	38	40	12	148
	39.2%	25.7%	27.0%	8.1%	100.0%
Window shrink fit	30	71	32	15	148
	20.3%	48.0%	21.6%	10.1%	100.0%
Insulating gaskets on	73	24	40	11	148
outlet boxes or wall switches	49.3%	16.2%	27.0%	7.4%	100.0%

Kit Item Savings

Savings for kit items were calculated using the impact algorithms mentioned previously in the report. Savings were calculated for each install of the kit items that qualified for savings for that measure, taking into account HVAC characteristics and characteristics of the kit item installed. The estimated total savings for each of the kit items are described below.⁵ Final savings are described in the summary table later in the report.

Low-Flow Showerhead

52.7% of customers installed the low-flow showerhead. For a majority of customers, 5 to 15 showers are taken per week using the low-flow showerhead, with most customers stating they take between 5 and 10 showers per week. Customers who stated they take zero showers per week were not included in the savings calculations. A majority of customers state that the length of their showers is about the same as before installing the low-flow unit. Nearly 75% of customers who installed the showerhead state that they were not planning on installing a low flow showerhead before receiving the kit, suggesting the showerhead is a useful kit item that generates new energy savings for the customer.

⁵ Savings for the four customers who installed the dual heating system were not calculated due to lack of detail.

Installed Showerhead		
Yes	78	52.7%
No	35	23.6%
No, but plan to	31	20.9%
N/A	4	2.7%
Total	148	100.0%
Number of Showers		
0-4	10	12.8%
5-10	29	37.2%
11-15	26	33.3%
16-20	6	7.7%
21+	7	9.0%
Total	78	100.00%
Length of Showers		
Longer	4	5.1%
Shorter	8	10.3%
About the same	66	84.6%
Total	78	100.0%
Were you already planning on installing an energy		
efficient (low flow) showerhead before you visited		
the website to get your tree kit?		
Yes	16	20.5%
No	58	/4.4%
No, already have them installed in all showers	4	5.1%
Total	78	100.0%

Energy savings are presented below. Overall, installation of the showerhead created a total savings of over 15000 kWh and over 1300 therm. A savings of 1.72 kW was also realized. On average, the installations of this item produced first-year savings of 207.04 kWh and 17.46 Therm per install.

Table 4	1. L	ow F	low	Shower	head	Savi	ngs

Low-Flow showerhead	Number	Total KW Savings	Total kWh Savings	Total Therm Savings
	of			
	Installs			
	76	1.72	15734.87	1327.27
Mean (per install)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.02	207.04	17.46
			a	

Most customers (88.5%) have not purchased any additional energy efficient showerheads since receiving the kit from the website. Of those that have, two thirds have purchased 2 showerheads, while one third of customers have purchased 1 showerhead. The frequency

Have you purchased any additional energy c receiving the kit from the website?	fficient (low f	low) showerheads since
Yes	9	11.5%
No	69	88.5%
Don't know	0	0.0%
Total	78	100.0%
How Many?		
1	6	66.7%
2	3	33.3%
Total	9	100.0%

of additional showerhead purchases is likely to be dependent on the number of showers in the customer's home.

Kitchen and Bathroom Faucet Aerators

Of the customers who installed the kitchen faucet aerator, just over half of customers stated they had to remove an aerator to install the new one (50.6%), while just under half of customers installing the bathroom aerator had to remove an old one (47.3%). Most of these customers that installed both the kitchen and bathroom faucet aerators stated the aerators were working well when they removed them. About half of customers stated the amount of water coming out of either new aerator was less than the old unit (53.3%) kitchen, 57.1% bathroom).

Was there an aerator on your 1	aucet you had to remove?		
Kitchen Aerator	Yes	45	50.6%
	No	44	49.4%
	Total	89	100.0%
Bathroom Aerator	Yes	35	47.3%
	No	39	52.7%
	Total	74	100.0%
Was the old aerator working w	vell when you removed it?		u (di li contra di la contra di l La contra di la contra
Kitchen Aerator	Yes	33	73.3%
	No	12	26.7%
	Total	45	100.0%
Bathroom Aerator	Yes	26	74.3%
	No	9	25.7%
	Total	35	100.0%
Would you estimate that the a	mount of water coming through the r	new aerat	or is:
Kitchen Aerator	Less than the old unit	24	53.3%
	About the same	17	37.8%

	More than the old unit		8.9%
	Total	45	100.0%
Bathroom Aerator	Less than the old unit	20	57.1%
	About the same	15	42.9%
	More than the old unit	0	0.0%
	Total	35	100.0%

A high majority of customers were not planning on installing a faucet aerator before receiving the kit, suggesting that customers were either satisfied with the aerator they already had, or had not considered an aerator as an energy efficiency item.

Were you already p website?	lanning on installing a new faucet acrator before you vis	ited 1	he d of the
Kitchen Aerator	Yes	14	15.7%
	No	73	82.0%
	No, already have them installed in all available faucets	2	2.2%
	Total	89	100.0%
Bathroom Aerator	Yes	6	8.1%
	No	67	90.5%
	No, already have them installed in all available faucets	1	1.4%
	Total	74	100.0%

For both the kitchen and bathroom aerators, installations for which the customer had to remove an old aerator to install the new aerator are not counted in the energy savings estimates, unless the customer stated that the old aerator was not working well. Customers who had installed an aerator previously are included in the calculation, as long as they did not have to remove an aerator to install the new one. Overall, total first-year energy savings for the aerators are over 1600 kWh and about 90 Therm.

Table 5. Aerator Savings

	Number	Total kW Savings	Total kWh Savings	Total Therm Savings-
	of			2
	Installs			
Kitchen Aerator	53	0.01	946.92	43.19
Bathroom Aerator	47	0.009	757.54	46.52
Mean (per install)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
Kitchen Aerator		0.0002	17.87	0.81
Bathroom Aerator		0.0002	16.12	0.99

Nearly all customers have not purchased additional kitchen faucet aerators since visiting the website. This may reflect that many kitchens only have one faucet. In addition, less

Have you purchased any additional <u>kitchen fa</u> the web site?	ucet aerators since rece	iving the kit from
Yes	2	2.3%
No	84	96.6%
Don't Know	1	1.1%
Total	87	100.0%
How many kitchen faucet aerators?		
1	1	50.0%
3	1	50.0%
Total	2	100.0%
Have you purchased any additional <u>bathroom</u> the website?	faucet aerators since re	xeiving the kit from
Yes	13	17.6%
No	61	82.4%
Total	74	100.0%
How many bathroom faucet aerators?		
1	6	46.2%
2	6	46.2%
3	1	7.7%
Total	13	100.0%

than 18% of customers have purchased additional bathroom faucet aerators since receiving the kit from the website.

15W and 20W Mini CFL Light Bulbs

The tables below describe customers who installed the 15 and 20 watt CFL bulbs included in the kit. Customers installing the 15W and 20W CFL bulb from the kit most frequently removed a 45-70W bulb. Customers who installed the 15W bulb stated the bulb was used 5-10 hours per day (51.2%), and was still in place (97.5%). Customers installing the 20W bulb stated that they use the bulb 5-10 hours per day (48.3%) and that the bulb is still in place (94.1%).

LSW CTL		
Wattage of bulb removed		
<= 4 4	7	5.8%
45 – 70	70	57.9%
71 – 99	28	23.1%
>= 100	16	13.2%
Total	121	100.0%
Hours of Use per Day	and a second	A Construction of the second sec

1-2	17	14.1%
3-4	32	26.4%
5-10	62	51.2%
11-12	2	1.7%
13-24	8	6.6%
Total	121	100.0%
Is the I5W CFL still in place?		
Yes	118	97.5%
No	3	2.5%
Total	121	100.0%

20W CFL		
Wattage of bulb removed		
<= 44	4	3.4%
45 – 70	52	44.1%
71 – 99	34	28.8%
>= 100	28	23.7%
Total	118	100.0%
Hours of Use per Day		
1-2	17	14.4%
3-4	37	31.4%
5-10	57	48.3%
11-12	3	2.5%
13-24	4	3.4%
Total	118	100.0%
Is the 20W CFL still in place?		
Yes	111	94.1%
No	7	5.9%
Total	118	100.0%

Savings calculations for the 15 and 20 watt CFL bulbs are presented below. Customers who have removed the bulb are not included in the savings calculations. The total savings for the 15W CFL are nearly 12,300 kWh, while the total savings for the 20W CFL are just over 11,700 kWh.

15W CPL	Number of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
	102	0.56	12287.71	-17.94
Mean (per install)	LARK MAD	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0055	120.47	-0.18
20W CFL	Number	Total kW Savings	Total kWh Savings	Total Therm Savings

Table 6. CFL Savings

	of Installs -			
	95	0.58	11709.42	-17.63
Mean (per install)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0061	123.26	-0.19

Overall, about 60% of customers were planning on purchasing a CFL before they received the kit from the website. Customers who installed the 15W CFL stated that they were most frequently planning on purchasing 6-10 CFL bulbs, while customers installing the 20W stated they were planning on purchasing 3-5 bulbs.

15W CFL: Were you already planning on purche from the website?	ising a CFL before	you received the kit
Yes	77	63.6%
No	41	33.9%
No, already have them installed in all available sockets	3	2.5%
Total	121	100.0%
How many were you planning on purchasing?		
1-2	4	5.2%
3-5	23	29.9%
6-10	33	42.9%
010		
11+	17	22.0%

20W CFL: Were you already planning on purch	asing a CFL before	you received the kit
from the website?		
Yes	70	59.3%
No	42	35.6%
No, already have them installed in all available sockets	6	5.1%
Total	118	100.0%
How many were you planning on purchasing?		
1-2	7	10.0%
3-5	32	45.7%
6-10	22	31.4%
11+	9	12.9%
Total	70	100.0%

Additional CFLs:

Customers were also asked if they had purchased and installed any additional CFLs since installing the bulbs from the kit. Almost two-thirds of customers stated they had purchased and installed additional bulbs, with most customers purchasing and installing 6-10 bulbs. This statement is similar to the bulbs that customers estimated they were planning on purchasing before they received the energy efficiency kit. The statistics for number of bulbs purchased and hours of use are also similar to those of the kit bulbs installed. Finally, most customers did not install the additional CFLs as a part of a major renovation to their home.

Have you purchased and installed additional C website?	Ls since receiving the	he kit from the
Yes	84	71.2%
No	33	28.0%
Don't know	1	0.8%
Total	118	10 0.0%
How many did you purchase?		
1-2	11	13.1%
3-5	21	25.0%
6-10	52	61.9%
11+	0	0.0%
Total	84	100.0%
Wattage of bulb removed		
<=44	5	6.0%
45-70	41	48.8%
71-99	28	33.3%
>=100	10	11.9%
Total	84	100.0%
Hours of Use per Day		
1-2	8	9.5%
3-4	16	19.0%
5-10	50	59.5%
11-12	3	3.6%
13-24	7	8.4%
Total	84	100.0%
Did you do this as part of a major renovation of	your home?	
Yes	15	17.9%
No	69	82.1%
Total	84	100.0%

Weather Stripping

Customers were asked to list the feet of weather stripping used and number of doors the weather stripping was installed on. Customers who installed the weather stripping and

stated feet used most of the roll (68.6%), and those who stated number of doors most frequently used it on one door. Some customers stated both feet and doors.

How many feet of the 17 feet of weather strip	ping did you use?	Allerings and come to an appendix conceptor at the
0	2	3.9%
1-5	6	11.8%
6-10	8	15.7%
11-17	35	68.6%
Total	51	100.0%
How many doors did you install the weather's	tripping on?	
. 0	2	4.5%
1	28	62.2%
2	12	26.7%
3	1	2.2%
4	1	2.2%
10	1	2.2%
Total	45	100.0%

Savings were estimated using feet of weather stripping used. When customers listed only number of doors, the average feet installed per door by customers who listed both feet and doors was used to estimate the number of feet used. Total savings for weather stripping were over 600 kWh and nearly 10 Therm.

Tohla	7	Westhe	- Strinning	Savinge
Tanic	1.	TTCALUCI	օտրրաչ	; .5av mgs

Weather Stripping	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	Installs			
	51	0.18	607.45	9.47
Mean (per install)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0035	11.91	0.19

Customers were divided almost equally regarding whether or not they had planned on installing weather stripping before receiving the weather stripping in the kit. Exactly half of customers stated "yes", while 48.3% stated "no". 1.7% of customers had a qualified "no" response, stating that they were not planning to install because weather stripping was already installed on all doors.

Two thirds of customers (66.7%) stated that they have not purchased any additional weather stripping since installing the weather stripping from the kit. Those that did purchase additional tended to purchase between 1 and 20 feet, and installed it on one door.

Were you already going to install weather str	ripping before you visited	the website?
Yes	29	50.0%
No	28	48.3%

No, already have them installed around all	1	1.7%
available doors	•	1., , , 0
Total	58	100.0%
Have you purchased any additional weather str	ipping since receiving	ig the kit from the
website?		
Yes	19	33.3%
No	38	66.7%
Total	57	100.0%
Feet		
1-20	8	44.5%
21-40	4	22.2%
41-60	6	33.3%
Total	18	100.0%
Doors		
1	5	35.7%
2	4	28.6%
3	3	21.4%
4	2	14.3%
Total	14	100.0%

Window Shrink Fit

Window characteristics of customers installing the window shrink fit kit are described below. Nearly two thirds of customers installing the kit (63.3%) installed the shrink kit on an average sized window. This window was likely to be a double pane window, with over half of customers listing this window type (53.3%).

Size of window		
Small	7	23.3%
Average	19	63.3%
Large	4	13.3%
Total	30	100.0%
Type of window		
Single pane window	8	26.7%
51	-	
Single pane window w/ storm	6	20.0%
Single pane window w/ storm Double pane window	6 16	20.0% 53.3%

Customer savings for installing the window shrink fit kit are below. Total savings were over 650 kWh and over 4 Therm .

Table 8. Window Shrink Fit Savings

Window Shrink Fit	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of		· · · · · · · · · · · · · · · · · · ·	
	Installs			
	26	0.34	675.14	4.71
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.01	25.97	0.18

Customers were almost equally divided regarding whether or not they were planning on installing a window shrink fit kit previously, with slightly fewer customers saying they had been planning on installing a kit. Customers who did plan on installing a kit previously were planning to install it most frequently on one to two windows. Twothirds of customers who installed the window kit have not purchased additional kits since installing the kit they received from the website, suggesting that customers who had not been planning on installing shrink fit before were not always persuaded to use additional kits after installing the shrink fit they received from the website.

Were you already planning to install a windo	ow shrink fit kit before	you visited the
websile?		
Yes	14	46.7%
No	16	53.3%
No, already have them installed in all	0	0.0%
available windows	v	0.070
Total	30	100.0%
For how many windows?		5-a'll a Brain
1-2	5	35.7%
3-4	2	14.3%
5-6	2	14.3%
7-8	2	14.3%
9-10	3	21.4%
Total	14	100.0%
Have you purchased additional window shrin	nk fit kits since receivi	ng the kit from the
website?	n <u>personal populations of source</u> Sec <u>retory of source</u>	
Yes	10	33.3%
No	20	66.7%
Total	30	100.0%
For how many windows?		
1-2	1	10.0%
3-4	5	50.0%
5-6	1	10.0%
7-8	1	10.0%
9-10	2	20.0%

26

Insulating Gaskets

Customers received 8 gaskets in the energy efficiency kit. Most customers installed 1-2 gaskets (40.0%), but nearly all the customers installed the majority of gaskets received in the energy efficiency kit.

Number Installed		
1-2	26	40.0%
3-4	20	30.8%
5-6	14	21.5%
7-8	5	7.7%
Total	65	100.0%

Total savings for the gaskets are listed below, and include over 650 kWh savings and over 10 Therm savings.

Insulating Gaskets	Number of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
	64	0.23	658.65	13.18
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0011	3.06	0.06

Table 9. Insulating Gaskets Savings

Over half of customers (57.5%) had not been planning on installing gaskets before visiting the website, suggesting that this item is useful for customers who are looking for new/additional ways to create energy savings. However, a majority of customers (80.6%) have not purchased any insulating gaskets since receiving the energy efficiency kit. Those that did purchase more purchased 10 in most cases, suggesting they were purchasing enough gaskets to use on the remaining outlets in their home.

Were you already planning on installing gaskets	before visiting the	website?
Yes	25	34.2%
No	42	57.5%
No, already have them installed in all available outlets	6	8.2%
Total	73	100.0%
Have you purchased any additional insulating ga website?	iskets since receivi	ng the kit from the

Yes	13	19.4%
No	54	80.6%
Total	67	100.0%
How many did you purchase?		
4	1	7.7%
5	1	7.7%
10	11	84.6%
Total	13	100.0%

Website Tips – Installation and Repairs

The Energy Efficiency website also lists tips and suggestions for customers to install energy efficient items in their home, or to repair existing items to help them save energy. The most frequently installed or repaired item after visiting the website was the furnace filter (75% "yes"), while the least frequent install or repair was to install a heat pump (87.8% "no"). Customers were most likely to say they plan to install attic insulation at a later date (8.1%).

Table 10. Frequency of Installation or Repair

TT	• . • •	1	C 11	A 11 1	•		.1	1 . 0
Have	von installe	1 anv o	t the	tallawing	SIDCE	visiting	the	website?
11010	Jou mount	a uniy o	r ento	10110 11116	DIIIAA	vioring.	ui u	

			No, but		
	Yes	No	plan to	N/A	Total
Natural gas furnace	2	127	3	16	148
	1.4%	85.8%	2.0%	10.8%	100.0%
Heat pump	4	130	4	10	148
	2.7%	87.8%	2.7%	6.8%	100.0%
Central air	5	123	4	16	148
conditioning	3.4%	83.1%	2.7%	10.8%	100.0%
Insulated sidewalls	6	129	1	12	148
	4.1%	87.2%	.7%	8.1%	100.0%
Attic insulation	12	112	12	12	148
	8.1%	75.7%	8.1%	8.1%	100.0%
Heating or cooling	6	122	7	13	148
duct insulation	4.1%	82.4%	4.7%	8.8%	100.0%
Repaired or fixed	25	103	4	16	148
holes in heating or	16.9%	69.6%	2.7%	10.8%	100.0%
cooling ducts					
Furnace filter	111	25	6	6	148
replacement	75.0%	16.9%	4.1%	4.1%	100.0%
New refrigerator	17	114	8	9	148
	11.5%	77.0%	5.4%	6.1%	100.0%

Install New Furnace

Customers who installed a new furnace were asked to describe the characteristics of the furnace they installed. The two customers who installed a new furnace stated the exhaust exits out a plastic pipe in the side of the home. In addition, neither customer stated that they installed the furnace as a major renovation of their home.

While one customer stated the website was very useful in helping them to decide whether to install the furnace, the other customer stated that the website was not at all useful because they did not reference the website when deciding to install the furnace.

Furnace Characteristics		
the exhausts exit out a plastic pipe coming	`	100.0%
through the side of the home	2	100.070
the exhausts go up a chimney similar to a	0	0.0%
standard efficiency unit	Ŭ	0.070
Total	2	100.0%
Did you do this as part of a major renovation of y	our home?	가 가슴, 바람은 일이 있는 것을 가슴을 가슴을 가슴을 가슴을 가슴을 가슴을 가슴을 가슴을 가슴을 가슴
Yes	0	0.0%
No	2	100.0%
Total	2	100.0%

How useful was the website in determining whether or not to install a high efficiency unit in your house?

Not at all Useful I	2 1	Somewhat Useful 3	4	Very Useful 5	Total
1	0	0	0	1	2
50.0%	.0%	.0%	.0%	50.0%	100.0%

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

I did not find any information about	The information I found on the	The information I found on the website about this		
this on the website.	website about this was unclear	was not the information I needed to make a decision	Other	Total
0	0	0	1	1
.0%	.0%	.0%	100.0%	100.0%

Other – Please Explain:

	A CARDON DESCRIPTION OF THE ACCOUNT	
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Ι	did not look	at this :	information	on the	website	1	100.0%

Total savings were calculated for the two customers who installed the furnace using the data above. Total savings were 37.6 Therm, while mean savings were 18.8 Therm.

		None	None	18.80
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
	2	None	None	37.60
	Installs			
	of			Carlando a gran carlando a T erra. Se os el constante de la consta
Install New Furnace	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
		-		

Table 11. New Furnace Savings

Install New Heat Pump

Of the four customers stating they installed a heat pump after visiting the website, two customers stated the heat pump was high efficiency, while two customers stated the heat pump installed was standard efficiency. Three of the four customers did not know the SEER number of their heat pump. In addition, no customers installed the heat pump as a part of a major renovation of their home.

Half of customers stated that the Energy Efficiency website was not useful in deciding to install the heat pump, while one customer stated it was minimally useful, and another stated the site was very useful. The customers who did not find the website useful stated they either did not look at the website, or they did not find information about heat pumps on the website.

Heat Pump Efficiency		
High Efficiency (>13 SEER)	2	50.0%
Standard Efficiency (<13 SEER)	2	50.0%
Total	4	100.0%
SEER Number		
<=11	0	0.0%
12	0	0.0%
13	0	0.0%
>=14	1	25.0%
Don't know	3	75.0%
Total	4	100.0%
Did you do this as part of a major renova	tion of your home?	
Yes	0	0.0%
No	4	100.0%
Total	4	100.0%

How useful was the website in determining whether to install a high efficiency unit in your house?

Not at all Useful	2	Somewhat Useful 3	4	Very Useful 5	Total
2	1	0	0	1	4
50.0%	25.0%	.0%	.0%	25.0%	100.0%

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

I did not find any	The information I found on the	The information I found on the website about this		
information about this on the website.	website about this was unclear	was not the information I- needed to make a decision	Other	Total
1	0	0	2	3
33.3%	.0%	.0%	66.7%	1 00.0%

Other - Please explain:

Comment	Coun	t Total
I didn't look on the website	1	50.0%
Wasn't looking. Had to replace our central air system. Decided to go	1	50.0%
with a heat pump to save on fuel oil.		,

Savings calculations for customers installing a heat pump are described below. For those customers who did not know their SEER number, 14 was estimated for high efficiency and 12 was estimated for standard efficiency. Savings totals exceeded 15,000 kWh and 8 kW, and average savings were over 3,000 kWh per install.

Table 12. New Heat Pump Savings

Install New Heat Pump	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of		en de la companya de La companya de la comp	
	Installs			
	4	8.68	15099.20	0
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.17	2774.00	

Install New Central Air Conditioner

Of the 5 customers installing the central air conditioner, 3 customers installed a high efficiency unit, while two customers installed a standard unit. The most frequently installed SEER number for the central air conditioner was a 13, while two customers also

stated they did not know the SEER number of their unit. Most customers did not do this as a part of a renovation.

No customers rated the website as useful or very useful (4 or above) regarding installation of their air conditioner. Two customers stated the information on the website was not what they needed to make a decision, while one customer stated they did not find the information they were looking for. Other responses included they either weren't looking for the information on the website, or they had researched air conditioners somewhere other than on the Duke Energy website in order to make their decision.

Central Air Conditioner Efficiency		
High Efficiency (>13 SEER)	3	60.0%
Standard Efficiency (<13 SEER)	2	40.0%
Total	5	100.0%
SEER Number	milan termini da man una () a sub la far da la far Internación de la far da la far Internación de la far da la far	
<=11	1	20.0%
12	0	0.0%
13	2	40.0%
>=14	0	0.0%
Don't know	2	40.0%
Total	5	100.0%
Did you do this as part of a major renovation of	your home?	
Yes	1	20.0%
No	4	80.0%
Total	5	100.0%

How useful was the website in determining whether to install a high efficiency unit in your house?

Not at all Useful	2	Somewhat Useful	4	Very Useful 5	Total
2	1	2	0	0	5
40.0%	20.0%	40.0%	.0%	.0%	100.0%

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

I did not find any information about this on the website.	The information I found on the website about this was unclear	The information 1 found on the website about this was not the information 1 needed to make a decision	Other	Total
1	0	2	2	5
20.0%	.0%	40.0%	40.0%	100.0%

Other – Please Explain:

Comment	Coun	t Total
I had already researched A/C purchase	1	50.0%
Wasn't looking for this info	. 1	50.0%

Customers who did not recall their SEER number were estimated at 12 for a standard unit, and 14 for a high efficiency unit. Qualifying savings are calculated below. Total savings were 2399 kWh per install, for a total kWh savings of 9,596. Total kW savings were 7.20, or 1.80 per install.

Table 13. New Central Air Conditioner Savings

Install New Central Number Air Conditioner of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
4	7.20	9596.00	0
Mean (per total installs)	Mean KW Savings	Mean kWh Savings	Mean Therm Savings
	1.80	2399.00	0

Insulate Sidewalls

Of the 6 customers who insulated their sidewalls, two thirds of them insulated 1 or 2 walls. The highest number of walls insulated by a customer was four. Nearly all customers insulated their walls using fiberglass insulation. Customers added anywhere from 2 to 10 inches of insulation to their sidewalls, with two customers adding two inches, and two customers adding 6 inches. A majority of customers did not have any insulation in the sidewalls before they insulated them. Two thirds of customers stated that they insulated their sidewalls as a part of a major renovation of their home.

Only one customer found the website useful or very useful when insulating their sidewalls. The customers who did not find the website useful stated that in general, they already had the information they needed to make a decision before visiting the website.

Number of Walls		
1	2	33.3%
2	2	33.3%
3	1	16.7%
4	1	16.7%
Total	6	100.0%
Type of Insulation		
Type of Insulation Fiberglass	5	83.3%
Type of Insulation Fiberglass Cellulose	5 0	83.3% 0.00%
Type of Insulation Fiberglass Cellulose Foam	5 0 1	83.3% 0.00% 16.7%
Type of Insulation Fiberglass Cellulose Foam Other	5 0 1 0	83.3% 0.00% 16.7% 0.00%

Inches Added		
2	2	33.3%
3	1	16.7%
6	2	33.3%
10	1	16.7%
Total	6	100.0%
How thick was the insulation before you ad	ded more?	
0	4	66.7%
2	1	16.7%
6	1	16.7%
Total	6	100.0%
Did you do this as a part of a major renovat	ion of your home?	
Yes	4	66.7%
No	2	33.3%
Total	6	100.0%

How useful was the website in determining whether to insulate your walls?

Not at all Useful I	2	Somewhat Useful	4	Very Useful	Total
0	2	3	0	1	6
.0%	33.3%	50.0%	.0%	16.7%	100.0%

Please explain why you did not find the website very useful in determining whether to insulate your walls?

I did not find any	The information 1 found on the	The information I found on the website about this		
information about this on the website.	website about this was unclear	was not the information I needed to make a decision	Other	Total
0	0	1	4	5
.0%	.0%	20.0%	80.0%	100.0%

Other – Please explain:

Comment	Count	Total
Already knew it needed insulation and husband had installation		
experience.	1	25%
Already planned to insulate.	1	25%
I already had info about insulation.	1	25%
I already knew the information found on the site.	1	25%

Savings for insulating sidewalls are calculated below. Total savings are over 3,000 kWh and over 2 kW, for an average of 865 kWh and 0.5 kW per install. Therm savings were 5.28 per install for a total of 21.13 Therm.

Table 14. Insulate Sidewalls Savings

Insulate Sidewalls	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of Installs			
	4	2.06	3459.48	21.13
Mean (per total installs)		Mean kW Savings	Mcan kWh Savings	Mean Therm Savings
		0.52	864.87	5.28

Insulate Attic

Customers who stated they insulated their attic most frequently insulated their entire attic (66.7%). Nearly all the customers who insulated their attic used fiberglass insulation. Insulation base thickness and thickness added varied, with two thirds of customers adding between 5 and 12 inches of insulation to their base layer, and over 40% of customers having a base layer of 1-4 inches. 58.3% of customers stated that they did not add insulation to their attic as part of a renovation.

75% of customers found the website to be only somewhat useful with regard to insulating their attic. Customers stated in general that either the information they were looking for was on the site, or they already had the information they needed to make a decision before visiting the site, either from prior knowledge, or another information source.

Area of Attic Insulated	医卵道导致机能学的学习出	A start and the second seco	
Part	4	33.3%	
All	8	66.7%	
Total	12	100.0%	
Type of Insulation			
Fiberglass	10	83.3%	
Cellulose	0	0.0%	
Foam	0	0.0%	
Other	2	16.7%	
Total	12	100.0%	
Inches Added		是認識實情時回時 三月中	
1-4	3	25.0%	
5-8	4	33.3%	
9-12	4	33.3%	
>12	1	8.4%	
Total	12	100.0%	
How thick was the insulation before you added more?			
0	3	25.0%	
1-4	5	41.6%	
5-8	3	25.0%	
---	---------------	---------	
9-12	1	8.4%	
>12	0	0.0%	
Total	12	100.0%	
Did you do this as a part of a major renovation	of your home?		
Yes	5	41.7%	
No	7	58.3%	
T1	10	100.00/	

How useful was the website in determining whether to insulate your attic?

Not at all Useful	2	Somewhat Useful 3	4 	Very Useful	Total
1	0	9	2	0	12
8.3%	.0%	75.0%	1 6.7%	.0%	100.0%

Please explain why you did not find the website very useful in determining whether to insulate your attic?

I did not find any	The information I found on the	The information I found on the website about this		
information about this on the website.	website about this was unclear	was not the information I needed to make a decision	Other	Total
1	0	4	5	10
10.0%	.0%	40.0%	50.0%	100.0%

Other – Please explain:

Comment	Cou	nt Total
I already knew it needed to be insulated	1	20.0%
I already knew the information from the site.	2	40.0%
I am a remodeler with prior experience in the insulation industry	1	20.0%
I did not look there first.	1	20.0%

Table 15. Insulate Attic Savings

Insulate Attic	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of			
	Installs			
	7	0.02	1081.58	65.73
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0035	154.51	9.39

Insulate Ducts

Tips on the website regarding ducts involved both insulating ducts and repairing ducts.

Those customers who chose to insulate their ducts insulated ducts located in heated areas of their home 83.3% of the time, and therefore did not qualify for savings. Half of customers stated that they insulated their ducts as part of a major renovation of their home.

Two thirds of customers found the website to be somewhat useful with regard to duct insulation. Half of customers who did not find the website useful or very useful stated they did not find the information on the website that they needed to make a decision regarding insulation of their ducts.

Duct Location		
Heated	5	83.3%
Unheated	1	16.7%
Don't know	0	0.0%
Total	6	100.0%
Did you do this as a part of a major	renovation of your home?	
Yes	3	50.0%
No	3	50.0%
Total	6	50.0%

How useful was the website in determining whether to insulate your ducts?

Not at all Useful	2	Somewhat Useful 3	4	Very Useful 5	Total
0	0	4	2	0	6
.0%	.0%	66.7%	33.3%	.0%	100.0%

Please explain why you did not find the website very useful in determining whether to insulate your ducts?

	The information I	The information I found	il in the second	
information about	website about this	was not the information I		
this on the website.	was unclear	needed to make a decision	Other	Total
1	0	2	1	4
25.0%	.0%	50.0%	25.0%	100.0%

Please explain why you did not find the website very useful in determining whether to insulate your ducts? Other

Comment	Count	Total
I already knew the info provided by the site	1	100.0%

Savings for insulation of ducts were 384 kWh and 17.3 Therm total, along with a savings of 0.08 kW. Four customers made installs, but only one customer installed in an unheated area of their home. Average savings for the four installs were 0.02 kW, 96

kWh, and 4.33 Therms.

Table 16. Insulate Ducts Savings

Insulate Ducts	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
代われののの工業が設め着かった。 オートー オート オー オー	of			
	Installs			
	4	0.08	384.00	17.30
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.02	96.00	4.33

Repair or Fix Holes in Ducts

Customers who repaired or fixed their ducts did not take this action as a part of a major renovation of their home (76.0%). 60% of customers found the website to be useful or very useful with regard to this suggestion. Those who did not find the website useful suggested that they either did not find information about this on the website, or they already had the information they needed regarding repairing their ducts.

Did you do this as a part of a major renovation of	your home?	
Yes	6	24.0%
No	19	76.0%
Total	25	100.0%

How useful was the website in determining whether to repair your ducts and where to conduct the repairs?

Not at all Useful	2	Somewhat Useful	4	Very Useful 5	Total
3	0	7	10	5	25
12.0%	.0%	28.0%	40.0%	20.0%	100.0%

Please explain why you did not find the website very useful in determining whether to repair your ducts and where to conduct the repairs?

information about	website about this	was not the information I		
this on the website.	was unclear	needed to make a decision	Other	Total
this on the website. 4	was unclear1	needed to make a decision	Other 4	Total 10

Other - Please explain:

Comment Count Total

Already knew that information.	2	50.0%
I had already planned repair.	1	25.0%
Solutions seemed expensive for the benefit.	1	25.0%

Total savings for fixing/repairing ducts are 2.93 kW, 6256.25 kWh, and 53.83 Therm.

Fix or Repair Ducts	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of			
	Installs			
	20	2.93	6256.25	53.83
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.15	312.81	2.69

Table 17. Fix or Repair Ducts Savings

Change Furnace Filter

Of the customers who utilized the tip to change the furnace filter, most customers found the website to be somewhat useful (38.7%), while 42.3% found the website to be useful or very useful in making the decision to change the filter. A majority of customers who did not find the website useful in their decision stated the website did not have the information they needed to make a decision (29.7%) or stated "Other" (51.6%). The responses of those customers who stated "Other" are summarized below, and included already being aware of the tips given on the website, didn't look at the website, and following manufacturer's instruction on filter replacement.

Frequency of Filter Change – Post Website		
Weekly	1	0.9%
Monthly	51	47.2%
Quarterly	47	43.4%
Yearly	9	8.5%
Total	108	100.0%
Frequency of Filter Change - Pre Website		
Weekly	1	0.9%
Monthly	36	33.3%
Quarterly	55	50.9%
Yearly	16	14.9%
Total	108	100.0%

How useful was the website in determining whether to replace the filter?

Not at all Useful		Somewhat Useful		Very Useful	
	$\mathbf{z} \in \mathcal{Z}$ is a		A LEAST	8. 98. 14.)	lotal
14	7	42	27	18	108
13.0%	6.4%	38.9%	25,0%	16.7%	100.0%

Please explain why you did not find the website very useful in determining whether to replace your furnace filter?

	The information I	The information I found	t de la composition de la comp	
I did not find any	found on the	on the website about this		
information about	website about this	was not the information I		
this on the website.	was unclear	needed to make a decision	Other	Total
9	3	18	33	63
14.1%	4.7%	29.7%	51.6%	100.0%

Other – Please explain:

Comment	Count	Total
Already following tips found on	21	63.6%
site		
Tips didn't influence decision	1	3.0%
Didn't review website before	2	6.2%
decision		
I follow filter	6	18.2%
manufacturer/HVAC dealer's		
instructions		
I forget to change the filter	1	3.0%
Can't afford to change filter as	1.	3.0%
frequently		
Not applicable	1	3.0%

Although many customers changed their furnace filter after visiting the website, none of the customers had a high enough changing frequency before and after visiting the website to account for savings.

Table 18. Change Furnace Filter Savings

Change Furnace Filter	Number To	tal kW Savings	Total kWh Savings	Total Therm Savings
	of			
	Installs			
	96 0.0	0	0.00	0.00
Mean (per total installs)	M	an kW Savings	Mean kWh Savings	Mean Therm Savings
	0.0	0	0.00	0.00

Install New Refrigerator

Customers who installed a new refrigerator all stated that the refrigerator they purchased was Energy Star compliant. No customers left their old refrigerator plugged in as a backup. 75% of customers did not install a new refrigerator as a major renovation of their home.

Three of the 8 customers (37.5%) stated that the website was useful or very useful in their decision to install a new refrigerator. Those customers who did not find the website useful stated that they did not use the website to make their decision to purchase a new refrigerator, or they already needed a new refrigerator. One customer stated they did not find any information about refrigerators on the website.

Energy Star Compliant		
Yes	8	100.0%
No	0	0.0%
Don't know	0	0.0%
Total	8	100.0%
Old Refrigerator Still Plugged In		
Yes	0	0.0%
No	8	100.0%
Don't know	0	0.0%
Total	8	100.0%
Did you do this as part of a major renovation (of your home?	an toba generation at the state of the spectrum of the spectru
Yes	2	25.0%
No	6	75.0%
Total	8	100.0%

How useful was the website in determining whether to install a new refrigerator?

Not at all Useful 1	2 2	Somewhat Useful 3		Very Useful 5	Total
3	0	2	1	2	8 100.0%
37.3%	.0%0	25.0%	12.3%	23.0%	100.0%

Please explain why you did not find the website very useful in determining whether to install a new refrigerator?

	The information L	The information I found	ny south of the	
I did not find any	tound on the	on the website about this		机器模器器
information about	website about this	was not the information I		
this on the unheits			Alber	TAAL
THE ON HIE WEDSITE.		needed to make a decision	UNLICI	a ar stight an
1	0	Ô	4	5
20.0%	.0%	.0%	80.0%	100.0%

Other – Please explain:

Comment	Coun	Total
We had to replace refrigerator	2	50.0%
I didn't refer to the website to decide	1	25.0%
I was already in the process of shopping for a new refrigerator	. 1	25.0%

Table 19. Install New Refrigerator

Install New Refrigerator	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of Installs			
	8	2.08	12305.43	-18.07
Mean (per total installs)	1110度时	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.26	1538.18	-2.26

Website Tips – Actions Taken

First Group

For this set of actions, customers were most likely to manage their drapes in summer and winter (80.4% and 72.3%, respectively). Customers were least likely to install a dual heating system (87.8%). These numbers make sense, as managing drapes is a fairly simple measure to implement, while installing a dual heating system requires much more investment. Customers were most likely to plan to insulate their hot water heater (23.6%) at a future date. Overall, a majority of customers found the website to be useful in determining whether to do these actions (47.1%).

	wor intequen	Ay of Actiona	7 Taken - 01	Pab I	
	Yes	NA	No, but	N/A	Tatel
Turn off boot in	70	12	1000 1000 1000 1000 1000 1000 1000 100	21	140
Tum on neat in	70	51			140
unused rooms	47.3%	34.5%	4.1%	14.2%	100.0%
Clean baseboards of	88	40	13	7	148
dust	59.5%	27.0%	8.8%	4.7%	100.0%
Install dual heating	5	130	3	10	148
system	3.4%	87.8%	2.0%	6.8%	100.0%
Keep draperies open	107	27	4	10	148
on sunny days and closed at night during winter months	72.3%	18.2%	2.7%	6.8%	100.0%
Keep draperies	119	22	0	7	148
closed on sunny					ĺ
days during summer	80.4%	14.9%	.0%	4.7%	100.0%
months		1			1

Table 20. Frequency of Actions Taken - Group 1

Insulate your hot	20	83	35	10	148
water heater	13.5%	56.1%	23.6%	6.8%	100.0%

Overall, how useful was the website in determining whether to perform any of these actions?

Not at all Useful 1 2-	Somewhat Useful 3	4	Very Useful 5	Total
6 (36	65	25	138
4 3% 4 3%	26.1%	47 1%	18 1%	

Turn off Heat in Unused Rooms

Almost two thirds of customers stated that they have turned the heat off in 1-2 rooms (62.9%).

In how many rooms have you turned the	heat off?	
0	4	5.7%
1-2	44	62.9%
3-4	19	27.1%
5-6	1	1.4%
7-8	2	2.9%
Total	70	100.0%

Total savings for turning off heat are over 21,000 kWh and over 200 Therm.

Turn Heat Off in	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
Unusea Rooms	OF			N. M. S. States and S. S. States and S.
	Installs			
	62	14.02	21251.00	271.00
Mean (per total installs)	and the second	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.23	342 76	4 37
		v.22		

Table 21. Turn off Heat in Unused Rooms Savings

Clean Baseboards

Of the 88 customers who stated they cleaned baseboards of dust, 40.9% of them stated they cleaned 6 to 10 baseboards. However, when listing their heating system type, only one customer who indicated they cleaned their baseboards chose electric baseboard as

their heating system type. The difference may be that customers did not understand the difference between an electric baseboard and a heating register (such as would exist with a central furnace system) without additional clarification.

How many baseboards have you cleaned?		
0	2	2.3%
1-5	20	22.7%
6-10	36	40.9%
11-20	21	23.9%
21+	9	10.2%
Total	8 <u>8</u>	100.0%

Because only one customer used electric baseboards for their heating, this customer was the only customer that had energy savings for taking this action. The total savings calculations for cleaning baseboards are 4.25 kWh.

Table 22. Clean Baseboards Savings

Clean Baseboards	Number of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
1	1	None	4.25	None
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		None	4.25	None

Manage Window Coverings

Twelve more customers stated they manage their window coverings in summer than in winter (119 customers in summer, 107 customers in winter). Customers who manage their window drapes in winter state that they manage 1-6 windows (46.7%), similar to customers who manage their window drapes in summer, who also state they manage 1-6 windows (48.7%).

Coverings Managed in Winter	مەردىكە كەركى يېيىتىدى. مەرمىمەر مۇرى يېيىتىدى	
0	8	7.6%
1-6	50	46.7%
7-12	39	36.4%
13-18	7	6.5%
19+	3	2. 8%
Total	107	100.0%
Coverings Managed in Summer		
0	6	5.0%
1-6	58	48.7%
7-12	46	38.7%

13-18	7	5.9%
19+	2	1.7%
Total	119	100.0%

The total savings for customers who manage their window coverings are 63,562 kWh for winter, and over twice that amount, 127,483 kWh for summer. Similarly, the Therm savings are 1858 Therm for winter management of drapes, and almost twice that, 3535 Therm, for summer.

Manage Coverings in Winter	Number of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
	94	0	63,562.00	1858.00
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0	676.19	19.77
Manage Coverings	of	Total kW Savings	Total kWh Savings	Total Therm Savings
			107 492 00	
Mean (per total installs)	100	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
Manage Coverings Total Savings		Total kW Savings	Total kWh Savings	Total Therm Savings
		0	191045.00	5393.00
Mean (per customer)	110	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0	1736.77	49.03

Table 23. Manage Window Coverings Savings

Insulate Water Heater

Of the customers who installed the water heater insulation, half of them stated their water heater was 31-50 gallons in capacity. Nearly two thirds of these customers stated they use natural gas to fuel their water heater (62.5%). No customer did this as a major renovation of their home, which is understandable since this was a small task to undertake.

Although customers were asked generally about the usefulness of the website regarding the 6 measures described in this section, customers were also asked specifically about usefulness of the website regarding water heater insulation, and these values were used for the savings estimates. Most customers installing the water heater insulation found the website to be useful or very useful in their decision to do so, suggesting that either the website contained the information they were looking for regarding water heater insulation, or insulating the water heater was a new tip for customers that they decided to implement after learning about it on the website. Of the 43.7% of customers who rated the website less than useful regarding this measure, customers were split regarding why the website wasn't useful, ranging from not finding the information they were looking for, to information being unclear or not what was necessary. Those customers who mentioned "other" stated that they either already had information about water heater insulation, or had difficult implementing the measure even after looking at the website.

Capacity		
0	2	12.4%
<=30	3	18.7%
31-50	8	50.0%
51-60	1	6.3%
61-75	1	6.3%
76+	1	6.3%
Total	16	100.0%
Water heater heating type		
Water heater heating type Electricity	6	37.5%
Water heater heating type Electricity Gas	6 10	37.5% 62.5%
Water heater heating type Electricity Gas Total	6 10 16	37.5% 62.5% 100.0%
Water heater heating type Electricity Gas Total Did you do this as a major repovation of you	6 10 16 r home?	37.5% 62.5% 100.0%
Water heater heating type Electricity Gas Total Did you do this as a major renovation of you Yes	6 10 16 r home? 0	37.5% 62.5% 100.0% 0.0%
Water heater heating type Electricity Gas Total Did you do this as a major renovation of you Yes No	6 10 16 r home? 0 16	37.5% 62.5% 100.0% 0.0% 100.0%

How useful was the website in determining whether to insulate your hot water heater tank?

Not at all Useful 1	2	Somewhat Useful 3	4	Very Useful 5	Total
0	2	5	5	4	16
0.0%	12.4%	31.3%	31.3%	25.0%	100.0%

Please explain why you did not find the website very useful in determining whether to insulate your hot water heater tank?

		The information I	and the second	
	and the state of the second state of the second states	TIN HINLINGUIVILI	. ROMMANNO A LINE	
ti territori de la constante de		tound on the		
		wabaita abaut	에는 10년 10년 10년 10년 10년 10년 10년 10월 10일	and and the second s
		WCDSIIC about	n maar haa ka sa ka s	
I did not find any	The information L	this was not the		
information about	found on the	in Frenchion I	- 관리 비용 문화철(주 가) 위	Wind the Backgrown
Information doord				그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그
this on the	website about	needed to make a		
website	this was time loar	April 12 April 12	Other	Total
website.	LING WAS WICHDAR	CLASSION		nananak kapa oroca
1	2	2	2	7
14.2%	28.6%	28.6%	28.6	100.0%

Comment	Count
Already knew this information	1
Insulation difficult to install	1

The total savings for water heater insulation were over 7500 kWh and over 300 Therm, with a savings of 0.70 kW.

Table 24. Insulate water mea	ter baymgs			
Insulate Water Heater	Number of Installs	Total kW Savings	Total kWh Savings	Total Therm Savings
	16	0.70	7678.80	374.40
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.044	479.92	23.40

Table 24. Insulate Water Heater Sayings

Second Group

The action most frequently taken by customers in this group was to lower their thermostat temperature in winter (75.0%), followed closely by washing laundry in cold water (72.3%). The least taken action was to install doors on the front of the fireplace (29.1%), in part due to the fact that 55.4% of customers mentioned this action did not apply to them.

These actions have the same usefulness values as the table for the 6 items in the previous section. Overall, a majority of customers found the website to be useful in determining whether to do these actions (47.1%).

	Yes	No	No, but plan to	Does Not Apply	Total
Wash laundry in	107	33	0	8	148
cold water	72.3%	22.3%	.0%	5.4%	100.0%
Lower thermostat	111	20	9	8	148
temperature in winter	75.0%	13.5%	6.1%	5.4%	100.0%
Install doors on	19	43	4	82	148
front of fireplace	12.8%	29.1%	2.7%	55.4%	100.0%
Keep fireplace	60	14	2	72	148

Table 25. Frequency of Actions Taken - Group 2
Have you taken any of the following actions since visiting the website?

damper closed when not in use	40.5%	9.5%	1.4%	48.6%	100.0%
Do not use fireplace	50	30	2	66	148
during periods of extreme cold	33.8%	20.3%	1.4%	44.6%	100.0%

Overall, how useful was the website in determining whether to perform any of these actions?

Not at all		Somewhat		Very	
Useful		Useful	는 동작했다. 중 관련 관련	Useful	
	2	3 A A	4	5	Total
6	6	36	65	25	138
4.3%	4.3%	26.1%	47.1%	18.1%	100.0%

Wash Laundry in Cold Water

Customers who took the action to wash their laundry in cold water tended to wash 5-6 loads per week (33.6%), while a smaller number of customers washed 3-4 loads in cold water (25.2%).

Loads Per Week		
1-2	8	7.5%
3-4	27	25.2%
5-6	36	33.6%
7-8	16	15.0%
9-10	13	12.2%
11-12	0	0.0%
13+	7	6.5%
Total	107	100.0%

Overall, the savings for qualified actions taken totaled 21.241 kW, 19,765 kWh, and 3400.80 Therm.

Table	26.	Cold	Water	Wash	Savings

Cold Water Wash	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of			
	Installs	a <u>n an an</u>		
	94	21.241	19,765.00	3400.80
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.23	210.27	36.18

Lower Thermostat Temperature in Winter

Customers who chose to lower their thermostat after visiting the website tended to choose to lower the thermostat both at night and during the day (74.8%). However, customers lowered their thermostat more at night than they did during the day, with 45.1% of customers lowering by 4-6 degrees at night, and 41.3% of customers lowering 1-3 degrees during the day.

When do you lower your thermostat temperat	ture?	
At night	19	17.1%
During the day	9	8.1%
Both at night and during the day	83	74.8%
Total	111	100.0%
Degrees lowered at night		
1-3	33	32.4%
4-6	46	45.1%
7-10	21	20.6%
>=11	2	2.0%
Total	102	100.0%
Degrees lowered during the day		
1-3	38	41.3%
4-6	35	38.0%
7-10	16	17.4%
>=11	3	3.3%
Total	92	100.0%

Overall savings for lowering the thermostat were over 120,000 kWh and over 1600 Therm. There were no kW savings for this measure.

Lower Thermostat Numbe	r Total kW Savings	Total kWh Savings	Total Therm Savings
in Winter of			
Installs	e a da compositor de la compositor		
97	None	121933.00	1653.60
Mean (per total installs)	Mean kW Savings	Mean kWh Savings	Mean Therm Savings
	None	1257.04	17.05

Table 27. Lower Thermostat in Winter

Close off Fireplace

When describing closing off their fireplace, customers could indicate if they installed doors on their fireplace, closed the damper of their fireplace, or did not use their fireplace in winter. While savings are realized for installing doors or closing the fireplace damper, savings are not realized for discontinuing use of the fireplace in winter. Total savings are described below.

Close off Fireplace	Number	Total kW Savings	Total kWh Savings	Total Therm Savings
	of Installs			
	54	0.25	1029.30	16.38
Mean (per total installs)		Mean kW Savings	Mean kWh Savings	Mean Therm Savings
		0.0047	19.06	0.30

Table 28. Close off Fireplace Savings

Savings Totals and Summary

Final savings calculations for the 154 survey respondents are based on the savings described in the sections above. The final savings for the Energy Efficiency website program take into account both freeriders and freedrivers for the energy efficiency kit items, as well as website usefulness for the website tips/actions. In general, freeriders were those customers who had already installed a kit item before receiving the energy efficiency kit, or those who had already planned to install a kit item before receiving the kit. Freedrivers were those customers who had not purchased or planned to purchase a kit item before receiving the kit, but decided to purchase/install more of an item after installing the item that came in the kit. The degree of freeridership or freedrivership was based on whether the customer had installed the item before receiving the kit, planned to install the item before receiving the kit, and/or had purchased/installed additional of the item since installing the item that came with the kit, and was calculated using the following table:

Did you install item X before you got the kit?	Were you planning on buying item X before you got the kit?	Have you purchased any of item X since you got the kit?	% Freeridership	% Freedrivers
yes	yes	yes	100	
yes	yes	no	100	
yes	no	yes		75
no	no	yes		100
no	yes	no	50	
no	yes	yes	50	50
yes	already installed in every place	yes	100	
yes	already installed in every place	no	100	
yes	yes	don't know	100	

yes	already installed in every place	don't know	100	
no	yes	don't know	50	

The kit item with the most savings before calculation of freeridership was the low-flow showerhead, with over 15000 kWh in savings and over 1300 Therm. After accounting for freeridership and freedrivers, the low-flow showerhead still had the greatest total savings, with 14,337.37 kWh. The low-flow showerhead also had the greatest Therm savings, with 1209.39 Therm.

The kit item with the least final total savings was the weather stripping, which saved 381.14 kWh. This item also had one of the lowest Therm savings values of 5.94 Therm, with the lowest Therm savings coming form the window shrink fit.

The greatest total peak savings were 1.72 kW for the low-flow showerhead.

For those that responded to the survey (n=154), total savings for the energy efficiency kit items were 2.81 kW, 32,407.50 kWh, and 1291.69 Therm.

		atombs:04		idscomme	- 1 1	Final	ikonan Sayan	uç yeştiri
Ki Item	λŴ.	EWITH	Them :	MeeR idership	PreeDrivers	kW .	kWh	Thern
Low-flow	1.72	15734.87	1327.27	15.79%	6.91%	1.57	14337.37	1209.39
Showerhead								
Kitchen	0.01	946.92	43.19	12.26%	0.00%	0.01	830.79	37.90
Faucet								
Aerator								
Bathroom	0.01	757.54	46.52	4.26%	10.11%	0.01	801.86	49.24
Faucet				1				
Aerator								
15W CFL	0.56	12287.71	-17.94	60.29%	23.04%	0.35	7709.93	-11.26
Bulb								
20W CFL	0.58	11709.42	-17.63	59.47%	23.16%	0.37	7457.05	-11.23
Bulb								
Weather	0.18	607.45	9.47	48.04%	10.78%	0.11	381.14	5.94
Stripping								
Window	0.34	675.14	4.71	42.31%	11.54%	0.23	467.41	3.26
Shrink Fit								
Insulating	0.23	658.65	13.18	40.63%	4.69%	0.15	421.95	8.44
Gaskets								
						2.81	32407.50	1291.69
Savings	1.00							

Table 30. Kit Items Total Savings

Final savings for the website tips and actions take into account how useful the website was to a customer when deciding to install an item or taking an action. The cold water wash had the highest kW savings with 21.24 kW. Other items had high kWh or Therm savings, such as lowering thermostat in winter (121,933 kWh), managing drapes (191,045 kWh). Managing drapes also had the largest Therm savings, with 5,393 Therm. After accounting for website usefulness, the actions and tips with the highest amounts were similar.

Self-Selection and False Response Bias

There are some risks associated with relying on self-reported behavioral changes, because the foundation of the savings estimates are based solely on the participant's responses, with no means to verify that the respondent has installed the kit's measures and is using them effectively. There are two main sources of bias with these types of surveys that directly impact the conclusions drawn from the responses. These sources of bias are Self-Selection Bias and False Response Bias.

Self-Selection Bias

For this evaluation, we are using the self-selection bias value of 60%. Self-selection resulted in only 16.5% response rate for the survey. This indicates a very high degree of self-selection bias. We are unsure what the true value is because this bias is not measured in this evaluation. However, with the very low response rate, we estimate that the self-selection bias is very high for this evaluation.

False Response Bias

False Response Bias is a problem with many self-reporting surveys. The participants respond not with the truth, but with the socially acceptable answer. In short, they lie about what measures they installed or what actions they have taken as a result of the program. False response bias is typically not a high number, but ranges from a low of two or three percent to a high of 15 percent in our experience depending on the topic and the population being tested. The False Response Bias is set at 15% for this survey, given the nature of the survey (web-based with no way to verify actions). A 15% discount will be applied to all impact-related measure estimates to calculate the low end of the range of savings estimates for each measure and recommendation.

It is our opinion that together these biases likely account for a needed 75% adjustment in the savings from the reported actions by the survey respondents when they are extrapolated to the population as a whole.

Long Linse Year, Savings Net 61. Total An N-Year Savings Net of Freedows and Freedows for Survey-Respondents (new 14). Reporting and Salke Response Bias for Population (n=2,613)

Kir Item 📊	kW	kwhe –	a de la companya de l	kW	A.W. Designed	Iherm
Low-flow Showerhead	1.57	14337.4	1209.39	6.660	60,817	5,130.1
Kitchen Faucet Aerator	0.01	830.79	37.9	0.042	3,524	160.8
Bathroom Faucet Aerator	0.01	801.86	49.24	0.042	3,401	208.9
15W CFL Bulb	0.35	7709.93	-11.26	1.485	32,705	-47.8
20W CFL Bulb	0.37	7457.05	-11.23	1.569	31,632	-47.6
Weather Stripping	0.11	381.14	5.94	0.467	1,617	25.2
Window Shrink Fit	0.23	467.41	3.26	0.976	1,983	13.8
Insulating Gaskets	0.15	421.95	8.44	0.636	1,790	35.8
Honell Salama and		and the second			19.00 .00.0 0.00.00.00.00	π_{1} where p_{1} $\ge p_{2}^{2}$ $= 24$

Table 31. Actions and Installations Total First-Year Savings

									Total Content	
				ar er for anne fan ferster Diskels skreiten ferster				a ta	kult.	Them
	關于自己的法律		and the second second	1					Second Action	
Furnace					37.60	18.80	50.00%			18.80
Heat Pump	8.68	2.17	15099.20	3774.80	0.00	0.00	25.00%	2.17	3774.80	0.00
AC	7.20	1.80	9596.00	2399.00	0.00	0.00	0.00%	0.00	0.00	0.00
Sidewall	2.06	0.52	3459.48	864.87	21.13	5.28	25.00%	0.52	864.87	5.28
Attic	0.02	0.0035	1081.58	154.51	65.73	9.39	28.57%	0.01	309.02	18.78
Duct Insulation	0.08	0.02	384.00	96.00	17.30	4.33	50.00%	<u>0</u> 8	192.00	8.65
Duct Repair	2.93	0.15	6256.25	312.81	53.83	2.69	65.00%	1.90	4066.56	34.99
Replace Filter	0.00	0.00	0.00	0.00	0.00	0.00	40.63%	0.0	0.00	0.00
New Refrigerator	2.08	0.26	12305.43	1538.18	-18.07	-2.26	37.50%	0.78	4614.53	-6.78
Stop heating room	14.02	0.23	21251.00	342.76	271.00	4.37	64.52%	9.05	13710.32	174.84
Cleaned Baseboards			4.25	4.25			0.00%		00.0	
Manage Drapes	0.00	0.00	191045.00	1736.77	5393.00	49.03	68.18%	0.00	130257.95	3677.05
Insul. Water Heater	0.70	0.04	7678.80	479.92	374,40	23.40	56.25%	0.39	4319.32	210.60
Cold water wash	21.24	0.23	19765.00	210.27	3400.80	36.18	69.89%	14.85	13814.25	2376.90
Lower therm in winter			121933.00	1257.04	1653.60	17.05	70.83%		86369.21	1171.30
(Closed Fireplace)	0.25	0.00	1029.30	19.06	16.38	0.30	73.58%	0.19	757.41	12.05
	an a	align (gradatik) Align (gradatik)	Arifi (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	arti di sharingan Matariki shindadi	ingeneration and a state of the s				202020202	BADORIA

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	Total Fi	st-i car bay recriders and	ings I			
	Freedriv	ers for Surve	y:	Rentration	A THE REPORT	
胡可由地上基中	Respond	enis (n. 154)	Inteletation		
Measure	Total	Total kWh	Total			
	kW	Savings	therm :	Seatures		
P	Savings	in the second of the second of the		0.000		
Furnace	217	2774 90	18.80	0.000	16 013	/9./
Heat Pump	2.17	3774.80	0.00	9.205	16,012	0.0
AC	0.00	0.00	5.00	0.000	2 660	0.0
Attio	0.52	004.07 200.02	3.20 19.70	2.200	3,009	22.4
Duct	0.01	509.02	10.70	0.042	1,311	(9.)
Insulation	0.04	192.00	8.65	0.170	814	36.7
Duct Repair	1.90	4066.56	34 99	8 060	17 250	148.4
Replace				0.000	17,200	
Filter	0.00	0.00	0.00	0.000	0	0.0
New	0.70	4414.50	(70		10 604	
Refrigerator	0.78	4614.53	-6.78	3.309	19,574	-28.8
Stop						
heating	9.05	13710.32	174.84	38.389	58,158	741.7
room						
Cleaned		0.00		0.000	0	0.0
Baseboards		0.00		0.000	v	0.0
Manage	0.00	130257.95	3677.05	0.000	557 539	15 597 6
Drapes	0.00	150457755	5077.05	0.000	552,557	10,007.0
Insul.						
Water	0.39	4319.32	210.60	1.654	18,322	893.3
Heater						
Cold water	14.85	13814.25	2376.90	62.992	58,59 8	10,082.5
wasn					,	· · ·
thome in		96260 21	1171 20	A AAA	266 260	1000 5
winter		00309.21	11/1.50	0.000	200,208	4,908.0
Closed						
Firenlace	0.19	757.41	12.05	0.806	3,213	51.1
						1 15 7 2 167 88 38 39 3
Souloogene	- 29.89	263,950,26	7702.46			

The final total savings for the Energy Efficiency website are shown below. The program, including the energy efficiency kit offered, and the actions and installations suggested on the website, generated a total net savings of 138.71 kW; 1,253,297 kWh; and 38,152.1 Therm.

Table 32. Total Net Program Savings.

	kW	kWh == >>	Thenking
Kit Savings	11.88	137,469	5479.2
Actions/Tips Savings	126.83	1,115,828	32,672.9
Total Savings	138.71	11256.09/	

Effective Useful Lifetime Impact Estimates

Kit Measures

The following lifetimes were used to calculate the lifetime energy impacts of the kit measures:

TROIT OF LITCHING BOUNDARY	71 1 1 1 1 1 1 W W W W W W W W W
Kit Measures	Effective Useful Life
15-watt CFL	5
20-watt CFL	5
Weather stripping	5
Outlet gaskets	20
Window shrink kit	1
Showerhead	10
Bathroom aerator	10
Kitchen aerator	10

The kW lifetime impacts are shown in Figure 1. The impacts peak in year 1 at 11.877 kW, then slightly drop to 10.902 kW in year 2. By year 6, the impacts have again decreased to 7.381 kW, and in year 11, impacts drop to 0.636 kW, where they remain for the lifetime of the measures. The levelized kW impacts for the kit were 4.938 kW over 20 years.

Figure 1. Lifetime kW Impacts of Kit Measures.



The lifetime kWh impacts for the kit are shown below in Figure 2. The impacts have a peak of 137,469 kWh in year 1, and then drop slightly to 135,486 kWh in year 5. By year 6, they have dropped to 69,533 kWh, and are 1,790 kWh from year 11 through the 20 year lifetime of the measures.



Figure 2. Lifetime kWh Impacts of Kit Measures.

The lifetime Therm impacts of the kit measures are found in Figure 3. These begin at a peak of 5,479 Therm in year 1, and rise slightly in year 6 to 5,536 Therm. At year 11, impacts drop to 36 Therm for the lifetime of the measures.





Recommendations

Lifetime kW impacts of savings recommendations are found in Figure 3 and start at 126.832 kW, and then begin to drop. By year 5, kW impacts are 25.45 kW, and remain around this level through year 12. At year 13, impacts drop again to 24.645, and by year 20 are 2.418 kW. Levelized lifetime impacts are 33.290 kW over the lifetime of the recommendations.



Figure 4. Lifetime kW Impacts of Recommendations.

Lifetime kWh impacts of savings recommendations are shown in Figure 5. Savings start at 1,115,828 kWh, and then begin to drop. In year 4, they are 443,321 kWh, and by year 20 are 23,044 kWh. Levelized lifetime energy savings are 330,979 kWh.



Figure 5. Lifetime kWh Savings of Recommendations.

Lifetime Therm savings of recommendations shown in Figure 6 peaked at 32,673 Therm. At year 4, lifetime Therm savings are 6,200 Therm. By year 15, they are 1,260 Therm and by year 20, lifetime Therm savings are 218 Therm. Levelized lifetime energy savings are 6,897 Therm over the lifetime of the recommendations.





Home Profile Questions

How would you best describe the type of home in which you live?

83.8%	129	Detached single- family
5.2%	8	Manufactured/Modular home
3.2%	5	Condominium
2.6%	4	Duplex/2-
3.2%	5	Multi- family (3 or more units)
1.9%	3	Townhouse
100.0%	154	Total

In what year was your home built?

Before 1959	1960 <i>-</i> 1979	1980 - 1989	-1990 - 1997	1998 - 2000	2001 - 2007 -	After 2007	Don't Know	Total
50	33	19	19	7	21	0	5	154
32.5%	21.4%	12.3%	12.3%	4.5%	13.6%	.0%	3.2%	100.0%

 What is the approximate square footage (heated area) of your home?

 <500</td>
 500
 1,000
 2,000
 2,500
 3,000
 3,500
 4,000+
 Don't
 Total

	to 999	to 1,499	to 1,999	to 2,499	to 2,999	to 3,499	to 3,999		Know	
0	10	42	35	28	13	6	5	4	11	154
.0%	0.3%	21.3%	<u>ZZ.1%</u>	18.2%	δ.4%	3.9%	3.2%	2.0%	/.1%	100.0%

How many rooms are in your home (excluding bathrooms but including finished basement)?

1 -3	4	5	6	7	8	9	greater than 9	Total
26	9	0	28	36	17	14	24	154
16.9%	5.8%	.0%	18.2%	23.4%	11.0%	9.1%	15.6%	100.0%

How many people live in this home?

	2	: 3	4	5	-1.5. 6 . u ny	E) 7 – – –		Total
16	60	35	29	10	3	0	1	154
10.4%	39.0%	22.7%	18.8%	6.5%	1.9%	.0%	.6%	100.0%

Do you own or rent this house?

Own	Rent	Total
139	15	154
90.3%	9.7%	100.0%

What is the primary type of fuel used to heat your home?

Electricity	Natural Gas	Öì	Propane	Other/Don't Know	None	Total .
41	95	5	8	5	0	154
26.6%	61.7%	3.2%	5.2%	3.2%	.0%	100.0%

What type of heating system do you have in your home?

					How water or		
None	Central furnace	Electric baseboard	Heat pump	Geothermal heat pump	steam boiler	Other/Don ² t know	Total
0	112	1	31	0	6	4	154
.0%	72.7%	.6%	20.1%	.0%	3.9%	2.6%	100.0%

If you have a central furnace system, how old is it (in years)?

	NY COMPANY OF THE OWNER O	14	AV PROVIDENCE AND			the state of the s
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34	45	25	19	13	18	154
22.1%	29.2%	16.2%	12.3%	8.4%	11.7%	100.0%

What type of cooling system do you have in your home?

No cooling system	Central air conditioner.	Room/window unit air conditioner(s)	Heat pump (for cooling)	Geothermal heat pump	Other	Total
1	107	14	31	0	1	154
.6%	69.5%	9.1%	20.1%	.0%	.6%	100.0%

How many room unit/air conditioners? (check this)

		2.50	新教师	4	6	Total
140	2	6	4	1	1	154
90.9%	1.3%	3.9%	2.6%	.6%	.6%	100.0%

If you have a cooling system, how old is it (in years)?

0 - 4		10 × 14	15 - 19	2 1 9	Don't Know	Total
45	43	26	15	8	17	154
29.2%	27.9%	16.9%	9.7%	5.2%	11.0%	100.0%

What is the primary fuel used by your water heater?

Electricity	Natural gas	Oil	Propane	Other	Total
52	97	0	4	1	154
33.8%	63.0%	.0%	2.6%	.6%	100.0%

What is the age of your water heater (in years)?

0 - 4	5 - 9	10 - 14	15-19	>19	Don't Know	Total
50	42	37	10	4	11	154
32.5%	27.3%	24.0%	6.5%	2.6%	7.1%	100.0%

What fuel does your range use (cooking)?

Electricity	Natural gas	Oil	Propane	Other	Total
115	37	0	1	1	154
74.7%	24.0%	.0%	.6%	.6%	100.0%

What fuel does your oven use (cooking)?

Electricity	Natural gas	Oil	Propane	Other	Total
119	32	0	1	2	154

77.3% 20.8% .0% .6% 1.3% 100.0%

What is	the	nrimary	filel	nsed	hv	vour	clothes	drver?
TT HUE IS	uno	primary	1001	uscu	U y	your	cionica	uryer:

Electricity	Natural gas	Oil	Propane	Other	Total
133	19	0	1	1	154
86.4%	12.3%	.0%	.6%	.6%	100.0%

Appendix A. Energy Efficiency Website Survey

Question Name: recall1

Simply answer the questions and click the "Next" button at the bottom of your screen. Energy Savings Website

Do recall visiting the Duke Energy website to request an energy efficiency kit?

l Yes 2 No

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Question Name: recall2

Please think back to when you were deciding to visit the Duke Energy Savings website. What factors motivated you to visit this site and request the energy efficiency kit?

- 1 The energy efficiency kit offered
- 2 Wanted to reduce energy costs
- 3 The information provided by the web site
- 4 Because of past experience with another Duke Energy program
- 5 Recommendation from other utility programs
- 6 Recommendation of family/friend/neighbor
- 7 Advertisement in newspaper
- 8 Radio advertisement
- 9 Information from my bill
- 10 Don't Know [Exclusive]

Ouestion Name: recallother

Other - Please specify

To help us improve the website, please let us know how useful the information provided was to you.

Question Name: usefulq1

Overall, how useful was the website in providing you with information about energy use in your home?

1 Not at all Useful

- 2 2
- 3 Somewhat Useful
- 4 4
- 5 Very Useful

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Question Name: usefulq2

Which components in the website did you review and how useful were they?

- 1 Home energy calculator
- 2 Appliance calculator
- 3 Lighting calculator
- 4 Interactive home
- 5 Energy library: Home energy system
- 6 Energy library: Fundamentals of electricity
- 7 For kids
- 1 Not at all Useful
- 2 2
- 3 Somewhat Useful
- 4 4
- 5 Very Useful
- 6 Did Not Visit

Question Name: usefulq3

Was the site easy to navigate to get to the information you wanted?

1 Yes 2 No

Question Name: usefulq4

What changes would you recommend to make the site better?

Question Name: usefulq5

Did you look at the Home Energy calculator report details?

1 Yes 2 No

Question Name: usefulq5a

Did you feel that the estimate from the home energy calculator reasonably reflected your usage?

1 Yes 2 No

Z N

Question Name: usefulq5b

Was the report very useful?

1	Not at all Useful
2	2
3	Somewhat Useful
4	4
5	Very Useful

Question Name: preinstall

Please let us know if you have installed any of the following items before you received your kit from the website.

- 1 Energy efficient (low flow) showerhead
- 2 Kitchen faucet aerator
- 3 Bathroom faucet aerator
- 4 15 Watt mini compact fluorescent lights
- 5 20 Watt mini compact fluorescent lights
- 6 Weather stripping
- 7 Window shrink fit
- 8 Insulating gaskets on outlet boxes or wall switches

1 Yes

2 No

Question Name: installation

The following questions apply to the items that were in the energy savings kit sent to you after using the Home Energy Calculator. We want to ask if you have used the items in the kit. If you have, we would like to ask a couple of questions about how you used the items.

Have you installed any of the following since visiting the website?

- 1 Energy efficient (low flow) showerhead
- 2 Kitchen faucet aerator
- 3 Bathroom faucet aerator
- 4 15 Watt mini compact fluorescent lights
- 5 20 Watt mini compact fluorescent lights
- 6 Weather stripping
- 7 Window shrink fit
- 8 Insulating gaskets on outlet boxes or wall switches
- 1 Yes
- 2 No
- 3 No, but plan to
- 4 N/A

Question Name: shower2

Typically how many showers per week are taken using this showerhead?

Question Name: shower4

Do you think your showers are longer, shorter, or about the same as they were with the old unit?

1 Longer

2 Shorter

3 About the Same

Question Name: showerdat

When did you install the energy efficient (low flow) showerhead?

1 Month

2 Year

- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July 8 Aug
- 8 August 9 Septemb
- 9 September 10 October
- 11 November
- 12 December
- 1 2007
- 2 2008

Question Name: shower5

Were you already planning on installing an energy efficient (low flow)showerhead before you visited the website to get your free kit?

- 1 Yes
- 2 No

3 No, already have them installed in all the showers

Question Name: shower6

Have you purchased any additional energy efficient (low flow) showerheads since receiving the kit from the website?

1 Yes

2 No

3 Don't Know

70

Question Name: shower7

How many?

Question Name: aertdat

When did you install the kitchen faucet aerator?

l	Month
2	Year

1 January

- 2 February
- 3 March
- 4 April
- 5 May 6 June
- 7 July
- 8 August
- 9 September
- 10 October
- 11 November
- 12 December

1 2007

2 2008

Question Name: aerator2

Was there an aerator on the faucet that you had to remove?

==

1 Yes 2 No

Question Name: aerator4

Was the old aerator working well when you removed it?

l Yes 2 No

Question Name: aerator4a

Would you estimate that the amount of water coming through the new aerator is:

1 Less than the old unit

2 About the same

3 More than the old unit

Question Name: aerator5
Were you already planning on installing a new faucet aerator before you visited the website?

1 Yes

2 No

3 No, already have them installed in all available faucets

Question Name: aerator8

Have you purchased any additional kitchen faucet aerators since receiving the kit from the web site?

1 Yes 2 No

3 Don't Know

Question Name: aerator8a

How many?

Question Name: bathfaucetdat

When did you install the bathroom faucet aerator?

1 Month

- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April 5 May
- 6 June
- 7 July
- 8 August
- 9 September
- 10 October
- 11 November
- 12 December
- 1 2007
- 2 2008

Question Name: bathfaucet2

Was there an aerator on the faucet that you had to remove?

1 Yes 2 No

Question Name: bathfaucet4

Was the old aerator working well when you removed it?

1 Yes 2 No

Question Name: bathfaucet4a

Would you estimate that the amount of water coming through the new aerator is:

- 1 Less than the old unit
- 2 About the same

3 More than the old unit

Question Name: bathfaucet5

Were you already planning on installing a new faucet aerator before you visited the website?

- 1 Yes
- 2 No

3 No, already have them installed in all available faucets

Question Name: bathfaucet6

Have you purchased any additional bathroom faucet aerators since receiving the kit from the website?

1 Yes 2 No

Question Name: bathfaucet6a

How many?

Question Name: watt15q2

How many watts was the old bulb you took out?

1 <= 44 2 45 - 70 3 71 - 99 4 >= 100

Question Name: watt15q3

On average, how many hours per day do you use this bulb?

Question Name: watt15q4

Is the CFL still in place or have you removed it?

Still in place 1

2 Removed it

Question Name: watt15dat _____

When did you install the 15 watt CFL?

Month 1

2 Year

_

1 January

- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August 9 September
- 10 October
- 11 November
- 12 December
- 2007 1
- 2 2008

Question Name: watt15q5

Were you already planning on purchasing a new CFL before you received a kit from the website?

1 Yes

2 No

3 No, already have them installed in all available sockets

Question Name: watt15q5a

How many were you planning on purchasing?

______ Question Name: watt20q2

_____ _____

How many watts was the old bulb you took out?

1	<= 44
2	45 - 70
3	71 - 99
4	>= 100

Question Name: watt20q3

On average, how many hours per day do you use this bulb?

Question Name: watt20q4

Is the CFL still in place or have you removed it?

1 Still in place

2 Removed it

Question Name: watt20dat1

When did you install the 20 watt CFL?

- 1 Month
- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July 8 Aug
- 8 August 9 September
- 10 October
- 11 November
- 12 December

1 2007

2 2008

Question Name: watt20q5

Were you already planning on purchasing a new CFL before you received a kit from the website?

3 No, already have them installed in all available sockets

Question Name: watt2q5a

How many were you planning on purchasing?

Question Name: watt20q6

¹ Yes

² No

Have you purchased and installed additional CFLs since receiving the kit from the website?

- 1 Yes
- 2 No
- 3 Don't Know

Question Name: watt20q6a

How many did you purchase?

Question Name: wattq7

On average, what wattage bulb did you remove from the fixture before you installed the CFL?

 $\begin{array}{rrrrr} 1 & <= 44 \\ 2 & 45 - 70 \\ 3 & 71 - 99 \\ 4 & >= 100 \end{array}$

Question Name: wattq8

Considering all CFL locations and uses, on average, how many hours per day do you use these bulbs?

Question Name: wattdat2

When did you install these CFL?

1 Month

- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August
- 9 September
- 10 October
- 11 November12 December

1 2007

2 2008

Question Name: wattrenov

Did you do this as part of a major renovation of your home?

1 Yes 2 No

Question Name: strippingq4a1

How much of the 17 feet of weather stripping did you use?

1 Feet 2 Doors

Question Name: strippingdat

When did you install the weather stripping?

1 Month

2 Year

1 January

2 February

- 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August
- 9 September 10 October
- 10 October11 November
- 12 December
- 12 Decembe
- 1 2007
- 2 2008

Question Name: strippingq3

Were you already going to install weather stripping before you visited the website?

1 Yes

2 No

3 No, already have them installed around all available doors

Question Name: strippingq4

Have you purchased any additional weather stripping since receiving the kit from the website?

1 Yes

2 No

Question Name: strippingq4a

I Feet

2 Doors

_____ _____

Question Name: shrinkfitq2

Would you consider the window on which you used the kit to be a small window, an average sized window or a large window?

- 1 Small window
- 2 Average sized window
- 3 Large window

Question Name: shrinkfitq3

Was the window a single pane window, a single pane window with a storm window, or a double pane window?

- 1 Single pane window
- 2 Single pane window with a storm window
- 3 Double pane window

_____ _____

Question Name: shrinkfitdat

When did you install the window shrink fit kit?

1 Month

- 2 Year
- Ł January
- 2 February
- 3 March
- 4 April
- 5 May
- б June 7
- July
- 8 August 9 September
- 10 October
- 11
- November 12 December
- 2007 1
- 2 2008

_______ Question Name: shrinkfitq4

Were you already going to install a window shrink fit kit before you visited the website?

- 2 No
- 3 No, already have them installed in all available windows

¹ Yes

Question Name: shrinkfitq4a

For how many windows?

Question Name: shrinkfit5

Have you purchased any additional window shrink fit kits since receiving the kit from the website?

1 Yes 2 No

Question Name: shrinkfitq5a

For how many windows?

Question Name: wallq2

How many insulating gaskets have you installed from the kit?

الالالالالالا لأغار وويرو ويرو ويرو فاندها

Question Name: walldat

When did you install the insulating gaskets?

I Month

2 Year

- l January
- 2 February 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August
- 9 September
- 10 October
- 11 November
- 12 December

1 2007

2 2008

Question Name: wallq3

Were you already going to install insulating gaskets before you visited the website?

1 Yes

2 No

3 No, already have them installed in all available outlets

Question Name: wallq4

Have you purchased any additional insulating gaskets since receiving the kit from the website?

Yes 1 2 No

Question Name: wallq4a

How many did you purchase?

Question Name: tip]

The next set of questions asks about the items you have installed in your home as a result of the information you learned at the Duke Energy Website. These questions are only about things that you have done after reviewing the information on the website.

Have you installed any of the following since visiting the website?

- 1 Natural gas furnace
- 2 Heat pump
- 3 Central air conditioning
- Insulated sidewalls 4
- 5 Attic insulation
- Heating or cooling duct insulation 6
- 7 Repaired or fixed holes in heating or cooling ducts
- 8 Furnace filter replacement
- 9 New Refrigerator
- 1 Yes
- 2 No
- 3 No, but plan to
- 4 N/A

Question Name: furnaceq2

==== _____

Is the furnace a high efficiency unit in which...

the exhausts exit out a plastic pipe coming through the side of the home 1

2 the exhausts go up a chimney similar to a standard efficiency unit

Question Name: furnacedat

When did you install the new furnace?

1 Month

- 2 Year
- 1 January

2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December
1	2007
2	2008

Ouestion Name: furnacerenovat

Did you do this as part of a major renovation of your home?

Yes 1 2 No

Question Name: furnaceq3

How useful was the website in determining whether to install a high efficiency unit in your house?

1 Not at all Useful 2 2 3 Somewhat Useful 4 4 5 Very Useful

Question Name: furnaceq4

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

I did not find any information about this on the website. 1

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: heatpump2

Is the heat pump a high efficiency unit (>13 *SEER) or a standard efficiency unit(<13 *SEER)?

1 **High Efficiency Unit**

2 Standard Efficiency Unit

Question Name: heatpumpdat

When did you install the new heat pump?

1	Month
2	Year
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December
1	2007
2	2008

Question Name: heatpump4

What is the *SEER number for you unit?

1 <= 11 2 12 3 13 4 >= 14 5 Don't Know

* SEER - Seasonal Energy Efficiency Ratio

Question Name: heatpumprenovat

Did you do this as part of a major renovation of your home?

1 Yes 2 No

Question Name: heatpump3

How useful was the website in determining whether to install a high efficiency unit in your house?

1Not at all Useful223Somewhat Useful44

5 Very Useful

Question Name: heatpump5

_____^^^**______

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: ACq2

**=========

Is the air conditioner a high efficiency unit (>13 SEER) or a standard efficiency unit (< 13 SEER)?

1 High Efficiency Unit

2 Standard Efficiency Unit

Question Name: acdat

When did you install the new central air conditioner?

1 Month

2 Year

1 January

2 February

3 March 4 April

4 April 5 May

5 May 6 June

7 July

8 August

9 September

10 October

11 November

12 December

1 2007

2 2008

Question Name: ACq4

What is the *SEER number for you unit?

1 <= 11 2 12 3 13 4 >= 14 5 Don't Know

* SEER - Seasonal Energy Efficiency Ratio

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Question Name: acrepair

Did you do this as part of a major renovation of your home?

1 Yes 2 No

Question Name: ACq3

How useful was the website in determining whether to install a high efficiency unit in your house?

INot at all Useful223Somewhat Useful445Very Useful

Question Name: AC5

Please explain why you did not find the website very useful in determining whether to install a high efficiency unit in your house?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: sidewall2

How many walls did you have insulated?

Question Name: sidewalldat

When did you insulate your side walls?

1	Month
	17 I QUILLI

- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August9 September
- 10 October
- 11 November
- 12 December

1 2007 2 2008

Question Name: sidewalltype l

What type of insulation did you add?

1 Fiberglass

- 2 Cellulose
- 3 Foam
- 4 Other

Question Name: sidewall8

How many inches of insulation depth did you add to the sidewall?

Question Name: sidewall9

How thick was the insulation before you added more?

Question Name: sidewall10

Question Name: sidewanno

Did you do this as part of a major renovation of your home?

1 Yes

2 No

Question Name: sidewall3

How useful was the website in determining whether to insulate your walls?

1 Not at all Useful

2 2 3 Somewhat Useful

- 5 Somewhat Use
- 4 4
- 5 Very Useful

Question Name: sidewall4

Please explain why you did not find the website very useful in determining whether to insulate your walls?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: attic2

Did you insulate part of the attic or the entire attic?

====

- I Insulated part of the attic
- 2 Insulated the entire attic

Question Name: attictype

What type of insulation did you add?

- 1 Fiberglass
- 2 Cellulose
- 3 Foam
- 4 Other

Question Name: atticdat

When did you insulate your attic?

	ia yoa mban
1	Month Veer
2	I Cal
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
1 2	December
1	2007
2	2008

Question Name: attic3

How many inches of insulation depth did you add to the attic?

===

Question Name: attic6

How thick was the insulation before you added more?

Question Name: attic7

Did you do this as part of a major renovation of your home?

1 Yes

2 No

Question Name: attic4

How useful was the website in determining whether to insulate your attic?

Not at all Useful
 2
 2
 3 Somewhat Useful
 4
 4
 5 Very Useful

Question Name: attic5

Question Name: attics

Please explain why you did not find the website very useful in determining whether to insulate your attic?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: insulate3dat

When did you insulate your ducts?

1 Month

- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July 8 August
- 9 September
- 10 October
- 11 November
- 12 December
- 1 2007 2 2008
- 2 2008

Question Name: ductarea

Are these ducts located in a heated or unheated part of the home?

- 1 Unheated area
- 2 Heated area
- 3 Don't know

Question Name: ductrenova

Did you do this as part of a major renovation of your home?

1 Yes 2 No

. ...

Question Name: insulate3

How useful was the website in determining whether to insulate your ducts?

Not at all Useful
 2
 2
 3 Somewhat Useful
 4
 4

5 Very Useful

Question Name: insulate3follow

Please explain why you did not find the website very useful in determining whether to insulate your ducts?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: insulate5dat1

When did you repair or fix holes in your ducts?

1 Month

- 2 Year
- 1 January
- 2 February
- 3 March
- 4 April
- 5 May
- 6 June
- 7 July
- 8 August
- 9 September
- 10October11November
- 11 November12 December

1 2007

2 2008

Question Name: repairenov

Did you do this as part of a major renovation of your home?

1 Yes 2 No

Question Name: insulate5

How useful was the website in determining whether to repair your ducts and where to conduct the repairs?

INot at all Useful223Somewhat Useful445Very Useful

Question Name: insulate5follow1

Please explain why you did not find the website very useful in determining whether to repair your ducts and where to conduct the repairs?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: filters2

How often do you now change the filter?

- 1 Weekly
- 2 Monthly
- 3 Quarterly
- 4 Yearly
- 5 Other [Respondent Specify]

Question Name: filters3

How often did you change your filter before reading the website information?

1 Weekly

- 2 Monthly
- 3 Quarterly
- 4 Yearly
- 5 Other [Respondent Specify]

Question Name: filters4

How useful was the website in determining whether to replace the filter?

- 1 Not at all Useful
- 2 2
- 3 Somewhat Useful
- 4 4
- 5 Very Useful

Question Name: filters5

Please explain why you did not find the website very useful in determining whether to replace your furnace filter?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: refrigeratorq5

Is the refrigerator Energy Star compliant?

1 Yes

2 No

3 Don't Know

Question Name: refrigeratorq6

Are you keeping your old refrigerator plugged in as a backup?

- 1 Yes
- 2 No

3 Don't Know

Question Name: refrigdat1

When did you install the new refrigerator?

1 Month 2 Year 1 January February 2 3 March April 4 5 May 6 June 7 July 8 August 9 September

- 10 October
- 11 November

12	December	
1 2	2007 2008	

Question Name: refrigrenovat

Did you do this as part of a major renovation of your home?

I Yes 2 No

Question Name: refrigerator8

How useful was the website in determining whether to install a new refrigerator?

1	Not at all Useful
2	2
3	Somewhat Useful

4 4

5 Very Useful

Question Name: refrigerator8a

Please explain why you did not find the website very useful in determining whether to install a new refrigerator?

1 1 did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: grid3

The next set of questions asks about actions you have taken as a result of the information you learned at the Duke Energy Website. These questions are only about things that you have done after reviewing the information on the website.

Have you taken any of the following actions since visiting the website?

- 1 Turn off heat in unused rooms
- 2 Clean baseboards of dust
- 3 Install dual heating system
- 4 Keep draperies open on sunny days and closed at night during winter months
- 5 Keep draperies closed on sunny days during summer months
- 6 Insulate your hot water heater
- 1 Yes
- 2 No
- 3 No, but plan to
- 4 N/A

Question Name: tipuse

Overall, how useful was the website in determining whether to perform any of these actions?

1 Not at all Useful 2 2

3 Somewhat Useful

4 4

5 Very Useful

Question Name: unused2

In how many rooms have you turned the heat off?

Question Name: baseboard2

How many baseboards have you cleaned?

Question Name: dual2

Do you manage this system to heat only the rooms you need to?

1 Yes

2 No

3 Don't know

Question Name: drapes2

How many windows do you manage the coverings on to save energy?

Question Name: drapes3

How many windows do you manage the coverings on to save energy?

Question Name: watertank2

How many gallons of water does your tank hold?

Question Name: watertank3

How is your water tank heated?

I Electricity

2 Gas

Question Name: watertankdat

When did you install this insulation?

1	Month
2	Vern

- 2 Year
- 1 January
- 2 February
- 3 March 4 April
- 5 May
- 6 June
- 7 July
- 8 August
- 9 September
- 10 October
- November
 December
- 1 2007
- 2 2008

Question Name: watertankreno

Did you do this as a major renovation of your home?

1 Yes 2 No

Question Name: watertank4

How useful was the website in determining whether to insulate your hot water heater tank?

Not at all Useful
 2
 2
 3 Somewhat Useful
 4
 4
 5 Very Useful

Question Name: watertankfollow

Please explain why you did not find the website very useful in determining whether to insulate your hot water heater tank?

1 I did not find any information about this on the website.

2 The information I found on the website about this was unclear

3 The information I found on the website about this was not the information I needed to make a decision

4 Other [Respondent Specify]

Question Name: grid4

Additional Actions Taken

The next set of questions asks about additional actions you have taken as a result of the information you learned at the Duke Energy Website. These questions are only about things that you have done after reviewing the information on the website.

Have you taken any of the following actions since visiting the website?

- 1 Wash laundry in cold water
- 2 Lower thermostat temperature in winter
- 3 Install doors on front of fireplace
- 4 Keep fireplace damper closed when not in use
- 5 Do not use fireplace during periods of extreme cold
- 1 Yes
- 2 No
- 3 No, but plan to
- 4 Does Not Apply

Question Name: laundry2

How many loads of laundry do you wash per week?

Question Name: thermo2

Do you do this at night, during the day, or both during the day and night?

1 At night

- 2 During the day
- 3 Both at night and during the day

Question Name: thermo3

How many degrees have you lowered the temperature at night?

Question Name: thermo4

How many degrees have you lowered the temperature during the day?

Question Name: overall1

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This set of questions asks about how much the website influenced your decision to take energy conserving actions.

Overall, how much did the website alone cause you to take energy conserving actions that you had not thought of prior to visiting the site?

1Not at All223Somewhat445Very Much

Question Name: overall2

If you had energy conserving actions that you did before visiting the website, how effective was the website in confirming that these actions were the correct thing to do?

Not at all Effective
 2
 2
 3 Somewhat
 4
 4

- 5 Very Effective
- 6 N/A

Question Name: overall3

``______

Did the website inspire you to take these actions sooner?

1Yes2No3No, but plan to4N/A

Question Name: overall4

Question Hame: Overany

How much did the addition of the kit cause you to take energy conserving actions that you had not thought of prior to visiting the site?

1Not at All223Somewhat445Very Much

Question Name: satisfaction

On a scale from 1-5, with 1 indicating that you strongly disagree, and 5 indicating that you strongly agree, please rate the following statement

The items I installed from the energy efficiency kit were of satisfactory quality?

1 Strongly Disagree

2

2

- 3 Somewhat
- 4 4
- 5 Strongly Agree

Question Name: satwebkit1

Overall, how satisfied are you with the following?

- 1 Energy efficiency website
- 2 Energy efficiency kit
- 3 Overall energy efficiency program
- 1 Not Satisfied 1
- 2 2
- 3 Somewhat 3 4 4
- 5 Very Satisfied 5

Question Name: satcomment1

Please comment on why you were not satisfied

≈≈≈≈≈≈≈<u>~</u>≥≥≈≈≈≈≈≈≈≈≈≈≈≈≈

Question Name: satcomment

Please let us know if you have any additional comments

Question Name: homeinfol

The following questions are for classification purposes only and will not be used for any other purpose than to help Duke Energy serve you better.

How would you best describe the type of home in which you live?

- 1 Detached single-family
- 2 Manufactured/Modular home

- 3 Condominium
- 4 Duplex/2-family
- 5 Multi-family (3 or more units)
- 6 Townhouse

Question Name: homeinfo2

In what year was your home built?

1	Before 1959
2	1960 - 1979
3	1980 - 1989
4	1990 - 1997
5	1998 - 2000
6	2001 - 2007
7	After 2007

8 Don't Know

Question Name: homeinfo3

What is the approximate square footage (heated area) of your home?

1	< 500
2	500 - 999
3	1,000 - 1,499
4	1,500 - 1,999
5	2,000 - 2,499
6	2,500 - 2,999
7	3,000 - 3,499
8	3,500 - 3,999
9	4,000 or more
10	Don't Know

Question Name: homeinfo4

How many rooms are in your home (excluding bathrooms but including finished basement)?

1 - 3 greater than 9

Question Name: demo3

How many people live in this home?

Question Name: demo1

Type: Select (Radio Button) Required: YES

Do you own or rent this house?

1 Own

2 Rent

Question Name: heatinfol

What is the primary type of fuel used to heat your home?

- 1 Electricity
- 2 Natural Gas
- 3 Propane
- 4 Oil
- 5 Other/Don't Know
- 6 None

Question Name: heatinfo2

What type of heating system do you have in your home?

- 1 Central furnace
- 2 Heat pump
- 3 Geothermal heat pump
- 4 Electric baseboard
- 5 How water or steam boiler
- 6 Other/Don't know

Question Name: heatinfo3

If you have a central furnace system, how old is it (in years)?

- 1 0-4
- 2 5-9
- 3 10 14
- 4 15 19
- 5 >19
- 6 Don't Know

Ouestion Name: headinfo4

What type of cooling system do you have in your home?

1 No cooling system

- 2 Central air conditioner
- 3 Room/window unit air conditioner(s): [Respondent Specify]
- 4 Heat pump (for cooling)
- 5 Geothermal heat pump
- 6 Other

Question Name: heatinfo5

If you have a cooling system, how old is it (in years)?

1 0-4

2	5 - 9
3	10 - 14
4	15 - 19
5	>19
6	Don't Know

Question Name: waterinfol

What is the primary fuel used by your water heater?

1 Electricity

2 Natural gas

3 Propane

4 Oil

5 Other

Question Name: waterinfo2

What is the age of your water heater (in years)?

1 0-4 2 5-9 3 10-14 4 15-19 5 >19 6 Don't Know

Question Name: waterinfo3

What fuel does your range use (cooking)?

2 Natural gas

- 3 Propane
- 4 Oil
- 5 Other

Question Name: waterinfo3a

What fuel does your oven use (cooking)?

1 F	lectricity
-----	------------

- 2 Natural gas
- 3 Propane
- 4 Oil
- 5 Other

Question Name: waterinfo4

What is the primary fuel used by your clothes dryer?

1 Electricity

- 2 Natural gas
- 3 Propane
- 4 Oil
- 5 Other

Question Name: address

Thank you for completing this survey! If you would be interested in participating in future online market research studies from Duke Energy please fill in your email address.

- 1 Name
- 2 Address
- 3 City
- 4 State
- 5 Zip
- 6 Email address

Appendix B. Impact Estimation Algorithms.

CFLs

General Algorithm

Gross Summer Coincident Demand Savings

$$\Delta kW_{s} = units \times \left[\frac{(Watts \times DF_{s})_{base} - (Watts \times DF_{s})_{ee}}{1000}\right] \times CF_{s} \times (1 + HVAC_{d, s})$$

Gross Annual Energy Savings

$$\Delta k Wh = units \times \left[\frac{(Watts \times DF)_{base} - (Watts \times DF)_{ee}}{1000} \right] \times FLH \times (1 + HVAC_{c})$$

 $\Delta therm = \Delta kWh \times HVAC_{g}$

where:

∆kW	= gross coincident demand savings
∆kWh	= gross annual energy savings
∆therm	= gross annual therm interaction
units	= number of units installed under the program
Wattsee	= connected (nameplate) load of energy-efficient unit
Wattsbase	= connected (nameplate) load of baseline unit(s) displaced
FLH	= full-load operating hours (based on connected load)
DF	= demand diversity factor
CF	= coincidence factor
HVAC _c	= HVAC system interaction factor for annual electricity consumption
HVACd	= HVAC system interaction factor for demand
HVACg	= HVAC system interaction factor for annual gas consumption

15 W CFL Measure

 $Watts_{ee} = 15$, which is the input power of program supplied CFL $Watts_{base}$ - calculated from survey responses as shown below:

Wattage of	Watts _{base}	Notes
bulb removed		
<= 44	40	Most popular size < 44 W
45 - 70	60	Lumen equivalent of 15 W CFL
71 - 99	75	Most popular size in range
> = 100	100	Most popular size in range

Hours of use per day	FLH	Notes	
<1	183	Average value over range	
1-2	548	Average value over range	
3-4	1278	Average value over range	
5-10	2738	Average value over range	
11-12	4198	Average value over range	
13-24	6753	Average value over range	

FLH - calculated from survey responses as shown below:

DF = 1.0 and CF = 0.10

The coincidence factor for this analysis was taken as the average of the coincidence factors estimated by PG&E and SCE for residential CFL program peak demand savings. The PG&E and SCE coincidence factors are combined factors that consider both coincidence and diversity, thus the diversity factor for this analysis was set to 1.0

 $HVAC_c$ - the HVAC interaction factor for annual energy consumption depends on the HVAC system, heating fuel type, and location. The HVAC interaction factors for annual energy consumption were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix.

Covington, KY				
Heating Fuel	Heating System	Cooling System	HVACc	HVACg
Other	Any except Heat Pump	Any except Heat Pump	0	0
Any	Heat Pump	Heat Pump	-0.16	0
Gas	Central Furnace	None	0	-0.0021
Propane		Room/Window	0.079	-0.0021
Oil		Central AC	0.079	-0.0021
	Other	None	0	-0.0021
		Room/Window	0.079	-0.0021
	_	Central AC	0.079	-0.0021
Electricity	Central furnace	None	-0.45	0
		Room/Window	-0.36	0
		Central AC	-0.36	0
	Electric	None	-0.45	0
	baseboard	Room/Window	-0.36	0
		Central AC	-0.36	0
	Other	None	-0.45	0
		Room/Window	-0.36	0

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Central AC	-0.36	0

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

Covington, KY

Cooling System	HVACd
None	0
Room/Window	.17
Central AC	.17
Heat Pump	.17

20W CFL Measure

Watts_{ee} = 20, which is the input power of program supplied CFL Watts_{base} - calculated from survey responses as shown below:

Wattage of	Wattsbase	Notes	
bulb removed			
<= 44	40	Most popular size < 44 W	
45 - 70	60	Most popular size in range	
71 - 99	75	Lumen equivalent of 20 W CFL	
> = 100	100	Most popular size in range	

Weatherstripping, Outlet Gaskets, and Fireplace Closure

Gross Summer Coincident Demand Savings

 $\Delta kW_{s} = units \times (\Delta cfm/unit) \times (kW / cfm) \times DF_{s} \times CF_{s}$

Gross Annual Energy Savings

 $\Delta kWh = units \times (\Delta cfm/unit) \times (kWh / cfm)$

 $\Delta therm = units \times (\Delta cfm / unit) \times (therm / cfm)$

where:

∆kW	= gross coincident demand savings
∆kWh	= gross annual energy savings
units	= number of buildings sealed under the program
∆cfm/unit	= unit infiltration airflow rate (ft^3/min) reduction for each measure
DF	= demand diversity factor = 0.8
CF	= coincidence factor $= 1.0$
kW/cfm	= demand savings per unit cfm reduction
kWh/cfm	= electricity savings per unit cfm reduction
therm/cfm	= gas savings per unit cfm reduction

Unit cfm savings per measure

The cfm reductions for each measure were estimated from equivalent leakage area (ELA) change data taken from the ASHRAE Handbook of Fundamentals (ASHRAE, 2001). The equivalent leakage area changes were converted to infiltration rate changes using the Sherman-Grimsrud equation:

$$Q = ELA \times \sqrt{A \times \Delta T} + B \times v^2$$

where:

A	= stack coefficient (ft ³ /min-in ^{4-o} F)
	= 0.015 for one-story house
ΔT	= average indoor/outdoor temperature difference over the time interval of interest (°F)
В	= wind coefficient (ft^3 /min-in ⁴ -mph ²) = 0.0065 (moderate shielding)
v	= average wind speed over the time interval of interest measured at a local

The location specific data are shown below:

Location	Average outdoor temp	Average indoor/outdoor temp difference	Average wind speed (mph)	Specific infiltration rate (cfm/in ²)
Covington	33	35	22	1.92

Measure ELA impact and cfm reductions are as follows:

Measure	Unit	ELA change (in ² /unit)	ΔCfm/unit (KY)
Outlet gaskets	Each	0.357	0.69
Weather strip	Foot	0.089	0.17
Fireplace	Each	1.86	3.57

weather station at a height of 20 ft (mph)

Unit energy and demand savings

The energy and peak demand impacts of reducing infiltration rates were calculated from infiltration rate parametric studies conducted using the DOE-2 residential building prototype models, as described at the end of this Appendix. The savings per cfm reduction by heating and cooling system type are shown below:

Heating Fuel	Heating	Cooling System			
-	System		kWh/cfm	kW/cfm	therm/cfm
Other	Any except	Any except Heat		· · · · · · · · · · · · · · · · · · ·	
	Heat Pump	Pump	1.14	0.00000	0.000
Any	Heat Pump	Heat Pump	12.85	0.00248	0.000
Gas	Central	None	0	0	0.124
Propane	Furnace	Room/Window	1.14	0.00000	0.124
Oil		Central AC	1.14	0.00000	0.124
	Other	None	0	0	0.124
		Room/Window	1.14	0.00000	0.124
		Central AC	1.14	0.00000	0.124
Electricity Central		None	23.27	0.01238	0.000
	furnace	Room/Window	23.84	0.01485	0.000
		Central AC	23.84	0.01485	0.000
	Electric	None	23.27	0.01238	0.000
	baseboard	Room/Window	23.84	0.01485	0.000
		Central AC	23.84	0.01485	0.000
	Other	None	23.27	0.01238	0.000
		Room/Window	23.84	0.01485	0.000
		Central AC	23.84	0.01485	0.000

Window Shrink Kit

Gross Summer Coincident Demand Savings $\Delta kW_s = no. windows \times SF/window \times (\Delta kW/SF) \times DF_s \times CF_s$

Gross Annual Energy Savings $\Delta kWh = no.$ windows \times SF/window \times (ΔkWh /SF)

 Δ therm = no. windows ×SF/window × (Δ therm/SF)

where:

ΔkW	= gross coincident demand savings
ΔkWh	= gross annual energy savings
No windows	= quantity of windows treated with window film from survey
SF/window	= window square feet based on window size
DF	= demand diversity factor
CF	= coincidence factor
∆kW/SF	`= electricity demand savings per square foot of window treated
∆kWh/SF	`= electricity consumption savings per square foot of window treated
∆therm/SF	`= gas consumption savings per square foot of window treated

Coincidence and Diversity Factors:

DF = 0.8CF = 1.0

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential cooling loads in summer peaking utilities.

Window area assumptions (per window):

Window Type	Size (SF)
Small	9
Average	18
Large	30

Unit energy and demand savings data

The unit energy savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The basic simulation assumptions for window U-value and solar heat gain coefficient (SHGC) were taken from the ASHRAE Handbook of Fundamentals (ASHRAE, 2001), and are described below:

	Without window film		With window film	
	U-value SHGC		U-value	SHGC
Window type	(Btu/hr-SF-°F)		(Btu/hr-SF-°F)	
Single	1.27	0.86	0.81	0.76
Single with storm	0.81	0.76	0.67	0.68
Double	0.81	0.76	0.67	0.68

The unit energy savings depend on the heating fuel, heating system, cooling system and window type:

Heating FuelOtherHeating SystemAny except Heat Pump

Cooling System None .

Window			
type	∆kWh/SF	∆kW/SF	∆therm/SF
All	0	0	0

Heating FuelOtherHeating SystemAny except Heat PumpCooling SystemRoom/Window or Central
AC

Window type	ΔkWh/SF	ΔkW/SF	∆therm/SF
Single	0.795	0.000853	0
Single with storm	0.566	0.000498	0
Double	0.566	0.000498	0

Heating Fuel	Any
Heating System	Heat Pump
Cooling System	Heat Pump

Window type	ΔkWh/SF	AkW/SF	Atherm/SF
Single	4.757	0.001280	0.000
Single with storm	1.621	0.000711	0.000
Double	1.621	0.000711	0.000

Heating Fuel
Heating System
Cooling System

Gas, propane or oil Any except Heat Pump None

Window type	ΔkWh/SF	ΔkW/SF	∆therm/SF
Single	0	0	0.039
Single with storm	0	0	0.011
Double	0	0	0.011

Heating Fuel Heating System Cooling System

i.

Gas, propane or oil Any except Heat Pump Room/Window or Central AC

Window type	AkWh/SF	AkW/SF	∆therm/SF	
Single	0.795	0.000853	0.039	
Single with storm	0.566	0.000498	0.011	
Double	0.566	0.000498	0.011	
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	·			

Heating Fuel	Electricity
Heating System	Any except Heat Pump
Cooling System	None

Window type	∆kWh/SF	AkW/SF	Atherm/SF
Single	8.748	0.004979	0.000
Single with storm	2.431	0.001351	0.000
Double	2.431	0.001351	0.000

Heating Fuel	Electricity
Heating System	Any except Heat Pump
Cooling System	Room/Window or Central

Window type	∆kWh/SF	ΔkW/SF	∆therm/SF
Single	9.335	0.005690	0.000
Single with storm	2.940	0.001849	0.000
Double	2.940	0.001849	0.000

Low-Flow Showerhead

Gross Summer Coincident Demand Savings $\Delta kW_{s} = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{3413_{s}} \times DF_{x} \times CF_{s}$

Gross Annual Energy Savings

$$\Delta kWh = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{3413} \times 365$$

$$\Delta \text{therm} = units \times \frac{(GPD_{base} - GPD_{ee}) \times 8.33 \times \overline{\Delta T}}{\eta_{waterheater}} \times \frac{365}{100000}$$

where:

ΔkW	= gross coincident demand savings
∆kWh	= gross annual energy savings
units	= number of units installed under the program
GPD _{base}	= daily hot water consumption before installation
GPDee	= daily hot water consumption after flow reducing measure installation
ΔΤ	= average difference between entering cold water temperature and the shower use temperature
DF	= demand diversity factor for electric water heating
CF	= coincidence factor
8.33	= conversion factor (Btu/gal-°F)
3413	= conversion factor (Btu/kWh)
24	= conversion factor (hr/day)
365	= conversion factor (days/yr)
100000	= conversion factor (Btu/therm)
Showerhead	
GPDbase	= showers/week / 7 x 3.1 gpm x 5 minutes/shower
GPD _{ee}	= showers/week / 7 x 1.5 gpm x 5 minutes/shower
ΔT	

City	Average cold water	Shower use	Average ∆T
	temperature	temperature	
Covington	53.9°F	100°F	46.1°F

Water heater efficiency

Combustion efficiency for residential gas water heater = 0.70

Demand diversity factor = 0.1

Coincidence factor = 0.4

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for the residential water heating end-use in a summer peaking utility.

Faucet Aerators

This measure used the Efficiency Vermont deemed savings (Efficiency Vermont, 2003) adjusted for entering water temperature:

Demand Savings

 $\Delta kW = 0.0171 \ kW \ x \ \Delta T / \Delta T_{VT} \ x \ DF \ x \ CF$

Energy Savings

 $\Delta k W h_i = 57 \ k W h \ x \ \Delta T \ / \ \Delta T_{VT}$ $\Delta therms = 2.0 \ x \ \Delta T \ / \ \Delta T_{VT} i$

City	Average cold water	Hot water use	Average ∆T
	temperature	temperature	
Covington	53.9°F	100°F	46.1°F
Burlington VT	44.5	100°F	55.5

Demand diversity factor = 0.1

Coincidence factor = 0.4

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for the residential water heating end-use in a summer peaking utility.

Lowering the Temperature in Winter

Gross Annual Energy Savings $\Delta kWh = (\Delta kWh/unit)$

 Δ therm = (Δ therm/unit

where:

ΔkW	= gross coincident demand savings
∆kWh	= gross annual energy savings
DF	= demand diversity factor
CF	= coincidence factor
∆kWunit	`= electricity demand savings per dwelling
∆kWh/SF	`= electricity consumption savings per dwelling
∆therm/SF	`= gas consumption savings dwelling

Unit energy savings data

The unit energy savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The basic assumptions used in the simulations are shown below:

Setback strategy	Setback schedule	Setback temperature
Night 1-3	10 pm to 5 am 7 days per week	68°F
Night 4-6		65°F
Night 7-10		61.5°F
Night 11+		59° F
Day 1-3	5 am to 10 pm 7 days per week	68°F
Day 4-6		65°F
Day 7-10		61.5°F
Day 11+		59°F

The baseline heating setpoint is assumed to be 70°F with no setback.

The unit energy savings depend on the heating fuel, heating system, cooling system and setback strategy. Since this is a heating season measure, there are no summer peak demand savings.

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	None

Setback strategy	∆kWh/unit	∆therm/unit
All	0	0

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	Room/Window or Central
	AC

Setback strategy	AkWh/unit	∆therm/unit
Night 1-3	58	0
Night 4-6	107	0
Night 7-10	138	0
Night 11+	149	0
Day 1-3	80	0
Day 4-6	159	0
Day 7-10	204	0
Day 11+	232	0

Heating Fuel A

Heating System	Heat Pump
Cooling System	Heat Pump

Setback strategy	AkWh/unit	∆therm/unit
Night 1-3	386	0.0
Night 4-6	1,114	0.0
Night 7-10	2,080	0.0
Night 11+	2,767	0.0
Day 1-3	951	0.0
Day 4-6	2,518	0.0
Day 7-10	4,394	0.0
Day 11+	5,715	0.0

Heating Fuel Heating System Cooling System Gas, propane or oil Any except Heat Pump None

Setback strategy	∆kWh/unit	Atherm/unit
Night 1-3	0.0	4.0
Night 4-6	0.0	10.0
Night 7-10	0.0	16.0
Night 11+	0.0	19.8
Day 1-3	0.0	8.5
Day 4-6	0.0	20.5
Day 7-10	0.0	33.3
Day 11+	0.0	41.3

Heating Fuel Heating System Cooling System Gas, propane or oil Any except Heat Pump Room/Window or Central AC

Setback strategy	∆kWh/unit	Δtherm/unit
Night 1-3	58	4.0
Night 4-6	107	10.0
Night 7-10	138	16.0
Night 11+	149	19.8
Day 1-3	80	8.5
Day 4-6	159	20.5
Day 7-10	204	33.3
Day 11+	232	41.3

Heating Fuel

Electricity

Heating	System
Cooling	System

Any except Heat Pump None

Setback strategy	∆kWħ/unit	∆therm/unit
Night 1-3	918	0.0
Night 4-6	2,164	0.0
Night 7-10	3,390	0.0
Night 11+	4,095	0.0
Day 1-3	1,863	0.0
Day 4-6	4,419	0.0
Day 7-10	7,030	0.0
Day 11+	8,615	0.0

Heating Fuel	Electricity
Heating System	Any except Heat Pump
Cooling System	Room/Window or Central
	AC

Setback strategy	∆kWh/unit	Δtherm/unit
Night 1-3	957	0.0
Night 4-6	2,228	0.0
Night 7-10	3,467	0.0
Night 11+	4,171	0.0
Day 1-3	1,903	0.0
Day 4-6	4,492	0.0
Day 7-10	7,100	0.0
Day 11+	8,686	0.0

Using Cold Water for Laundry

The energy and demand savings for this measure were taken from the Efficiency Vermont Technical Reference Manual (Efficiency Vermont, 2001), based on the savings per load and the number of loads reported by the survey respondents.

	Gas	Electric	
Loads/wk	therm/yr	kWh/yr	kW
1-2	13.2	166	0.019
3-4	30.8	388	0.044
5-6	48.3	609	0.070
7-8	65.9	830	0.095
9-10	83.5	1052	0.120
11-12	101.0	1273	0.145

	13+	114.2	1439	0.164	
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Replacing Furnace Filter

Gross Summer Coincident Demand Savings $\Delta kW_s = (kW/unit_{pre} - kW/unit_{post}) \times DF_s \times CF_s$

Gross Annual Energy Savings $\Delta kWh = (kWh/unit_{pre} - kWh/unit_{post})$

 Δ therm = (therm/unit_{pre} - therm/unit_{post})

where:

= gross coincident demand savings
= gross annual energy savings
= demand diversity factor
= coincidence factor
= HVAC electricity demand per dwelling based on pre report filter change frequency
= HVAC electricity demand per dwelling based on post report filter change frequency
= HVAC electricity consumption per dwelling based on pre report filter change frequency
= HVAC electricity consumption per dwelling based on post report filter change frequency
= HVAC gas consumption per dwelling based on pre report filter change frequency
= HVAC gas consumption per dwelling based on post report filter change frequency

Coincidence and Diversity Factors:

DF = 0.8 CF = 1.0

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential cooling loads in summer peaking utilities.

Unit energy and demand data

The unit energy and demand savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The analysis assumes that furnace filter change outs result in a 5% savings relative to an unmaintained system. The 5% overall savings were allocated to the survey responses as follows:

Filter change frequency	Percent savings	
< 1/yr	0%	
1x / yr	1.7%	
2x / yr	3.3%	
> 2x / yr	5%	

Data depend on the heating fuel, heating system, cooling system type and the pre and post filter change frequency

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	None

Filter change			
frequency	kWh	kW	therm
all	0	0	0

Heating Fuel Heating System Cooling System Other Any except Heat Pump Central AC

Filter change frequency	kWh	kW	therm
< 1/yr	4,453	5.2	0
1x / yr	4,375	5.1	0
2x / yr	4,302	5.0	0
> 2x / yr	4,231	4.9	0

Heating Fuel	Any
Heating System	Heat Pump
Cooling System	Heat Pump

Filter change frequency	kWh	kW	therm
< 1/yr	21,793	11.7	0
1x / yr	21,410	11.5	0

2x / yr	21,054	11.3	0
> 2x / yr	20,704	11.1	0

Heating Fuel	Gas, propane or oil
Heating System	Furnace
Cooling System	None

Filter			
change			
frequency	kWh	kW	therm
< 1/yr	0	0	148
1x / <u>yr</u>	0	0	146
2x/yr	0	0	143
> 2x / yr	0	0	141

Heating Fuel	
Heating System	
Cooling System	

Gas, propane or oil Furnace Central AC

Filter			
change			
frequency	kWh	kW	therm
< 1/yr	4,453	5.2	148
1x / yr	4,375	5.1	146
2x / yr	4,302	5.0	143
> 2x / yr	4,231	4.9	141

Heating Fuel	Electricity
Heating System	Furnace
Cooling System	None

Filter			
change			
frequency	kWh	kW	therm
< 1/yr	31,073	19 .5	0
1x / yr	30,527	19.2	0
2x / yr	30,020	18.8	0
> 2x / yr	29,520	18.5	0

Heating Fuel Heating System

Electricity Furnace

Cooling System Central A	AC –
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Filter			
change			
frequency	kWh	kW	therm
< 1/yr	34,936	24.3	0
1x/yr	34,322	23.9	0
2x/yr	33,752	23.5	0
> 2x / yr	33,190	23.1	0

Stopping Heating Unused Rooms

Gross Summer Coincident Demand Savings $\Delta kW_s = (\Delta kW/unit) \times DF_s \times CF_s$

Gross Annual Energy Savings $\Delta kWh = (\Delta kWh/unit)$

 Δ therm = (Δ therm/unit

where:

ΔkW	= gross coincident demand savings
∆kWh	= gross annual energy savings
DF	= demand diversity factor
CF	= coincidence factor
∆kWunit	`= electricity demand savings per dwelling
∆kWh/SF	`= electricity consumption savings per dwelling
∆therm/SF	`= gas consumption savings dwelling

Coincidence and Diversity Factors:

DF = 0.8CF = 1.0

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential cooling loads in summer peaking utilities.

Unit energy and demand savings data

The unit energy and demand savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The analysis assumes that each room is 220 SF in size. Savings data depend on the heating fuel, heating system, cooling system and duct treatment

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	None

Numbe	er of rooms	AkWh/unit	AkW/unit	Atherm/unit
	All	0	0	0

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	Central AC

Number

of rooms	∆kWh/unit	∆kW/unit	∆therm/unit
1	80	0.09	0
2	161	0.19	0
3	241	0.28	0
4	321	0.37	0
5	401	0.47	0
6+	482	0.56	0

Heating Fuel	Any
Heating System	Heat Pump
Cooling System	Heat Pump

Number

of rooms	∆kWh/unit	∆kW/unit	∆therm/unit
1	393	0.21	0
2	786	0.42	0
3	1, 179	0.63	0
4	1,571	0.84	0
5	1,964	1.05	0
6+	2,357	1.26	0

Heating Fuel	Gas, propane or oil
Heating System	Furnace
Cooling System	None

Number of rooms	∆kWh/unit	∆kW/unit	∆therm/unit
1	0	0	3
2	0	0	5
3	0	0	8
4	0	0	11
5	0	0	13
6+	0	0	16

Heating Fuel	Gas, propane or oil
Heating System	Furnace
Cooling System	Central AC

Number of

rooms	∆kWh/unit	∆kW/unit	∆therm/unit
1	80	0. 09	3
2	161	0.19	5
3	241	0.28	8
4	321	0.37	11
5	401	0.47	13
6+	482	0.56	16
Heating	Fuel	Electricity	
Heating System		Furnace	

Cooling	System	None

Number

rooms	∆kWh/unit	∆kW/unit	∆therm/unit
1	560	0.35	0
2	1,120	0.70	0
3	1,680	1.05	0
4	2,241	1.41	0
5	2,801	1.76	0
6+	3,361	2.11	0

Heating FuelElectricityHeating SystemFurnaceCooling SystemCentral AC

Number

of rooms	AkWh/unit	∆kW/unit	Atherm/unit
1	630	0.44	0

-

2	1,260	0.88	0
3	1,889	1.31	0
4	2,519	1.75	D
5	3,149	2.1 9	0
6+	3,779	2.63	D

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Insulated Water Heater

Gross Summer Coincident Demand Savings

$$\Delta kW_{S} = units \times \frac{(UA_{base} - UA_{\infty}) \times \Delta T_{s}}{3413} \times DF_{s} \times CF_{s}$$

Gross Annual Energy Savings

$$\Delta kWh = units \times \frac{(UA_{base} - UA_{ee}) \times \Delta T}{3413} \times 8760$$

$$\Delta \text{therm} = units \times \frac{(UA_{base} - UA_{ee}) \times \overline{\Delta T}}{\eta_{waterheater}} \times \frac{8760}{100000}$$

where:

∆kW	= gross coincident demand savings
∆kWh	= gross annual energy savings
units	= number of water heaters installed under the program
UA _{base}	= overall heat transfer coefficient of base water heater (Btu/hr-°F)
UA _{ee}	= overall heat transfer coefficient of improved water heater (Btu/hr-°F)
ΔT	= temperature difference between the tank and the ambient air (°F)
DF	= demand diversity factor
CF	= coincidence factor
3413	= conversion factor (Btu/kWh)
8760	= conversion factor (hr/yr)
100000	= conversion factor (Btu/therm)
Nwaterheater	= water heater efficiency

Water heater tank UA

Water heater	Elec	Electric		Gas	
size (gal)	UAbase	UAee	UAbase	UAee	
30	3.84	1.69	4.21	1.76	
50	4.67	1.83	5.13	1.91	
60	4.13	2.06	4.54	2.14	

75	5.00	2.42	5.50	2.52
80+	5.72	2.53	6.28	2.64

 $\Delta T = 140^{\circ}F$ water setpoint temp - 65°F room temp = 75°F

 $\begin{array}{l} DF = 1.0\\ CF = 1.0\\ \eta_{waterheater} = 0.7 \end{array}$

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential water heaters meeting standby losses.

Manage Draperies

Gross Summer Coincident Demand Savings $\Delta kW_s = windows \times (\Delta kW/window) \times DF_s \times CF_s$

Gross Annual Energy Savings $\Delta kWh = windows \times (\Delta kWh/window)$

 Δ therm = windows × (Δ therm/ window)

where:

ΔkW	= gross coincident demand savings
∆kWh	= gross annual energy savings
Windows	= number of windows managed
DF	= demand diversity factor
CF	= coincidence factor
$\Delta kW/ window$	`= electricity demand savings per window
$\Delta kWh/window$	`= electricity consumption savings per window
∆therm/window	`= gas consumption savings per window

Coincidence and Diversity Factors:

DF = 0.8 CF = 1.0

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential cooling loads in summer peaking utilities.

Unit energy and demand savings data

The unit energy and demand savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The analysis assumes drapes open during daylight hours on south facing windows only. The savings depend on the heating fuel, heating system, cooling system and number of windows managed.

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	Any or none

Number of windows	∆kWh/unit	∆kW/unit	∆therm/unit
All	0	0	0

Heating Fuel	Any
Heating System	Heat Pump
Cooling System	Heat Pump

Number of windows	∆kWh/unit	∆kW/unit	∆therm/unit
1-3	99	0	0
4-7	274	0	0
8-12	497	0	0
13+	647	0	0

Heating Fuel	Gas, propane or oil
Heating System	Any except Heat Pump
Cooling System	Any or none

Number of windows	∆kWh/unit	∆kW/unit	Atherm/unit
1-3	0	0	3
4-7	0	0	5
8-12	0	0	8
13+	0	0	11

Heating Fuel Electricity

Heating System	Any except Heat Pump	
Cooling System	Any or none	

Number of windows	AkWh/unit	∆kW/unit	Atherm/unit
1-3	164	0	0
4-7	451	0	0
8-12	821	0	0
13+	1067	0	0

Cleaned Electric Baseboards

Savings are based on reduced heat losses from back of electric baseboard unit through insulated wall to the outside. Cleaning unit is assumed to reduce the average temperature inside the unit from 115° F to 90° F. Heat losses are estimated based on an R-11 wall and 40° F outside temperature. Each unit is assumed to be 8 ft long. Heat loss reductions are estimated to be 0.13% of the baseboard rated input, resulting in 4.25 kWh per baseboard unit cleaned. Apply only when heating fuel = electric and heating system type = baseboard. No kW savings.

Attic Insulation

Gross Summer Coincident Demand Savings $\Delta kW_s = SF \times (kW/SF_{base} - kW/SF_{ee}) \times DF_s \times CF_s$

Gross Annual Energy Savings $\Delta kWh = SF \times (kWh/SF_{base} - kWh/SF_{ee})$

 Δ therm = SF × (therm/SF_{base} - therm/SF_{ee})

where:

∆kW	= gross coincident demand savings
∆kWh	= gross annual energy savings
SF	= insulation square feet installed
DF	= demand diversity factor
CF	= coincidence factor
kW/SF = elec	tricity demand per square foot of insulation installed
kWh/SF	'= electricity consumption per square foot of insulation installed

therm/SF `= gas consumption per square foot of insulation installed

Coincidence and Diversity Factors:

$$DF = 0.8$$
$$CF = 1.0$$

The diversity and coincidence factors were taken from *Engineering Methods for Estimating the Impacts of DSM Programs, Volume 2* (EPRI, 1993). These values are typical for residential cooling loads in summer peaking utilities.

Insulation square foot assumptions:

Average house size from site data (Carolinas), or estimated from number of rooms (Kentucky)

Size of house = number of rooms * 330 SF/room

Average ceiling area = house size / 1.2

If partial insulation, then reduce ceiling area by 50%

R value assumptions

Rbase:

Base thickness	R _{base}
0	0
2	7
4	14
6	21
8	28
10	35

Assumes existing insulation is fiberglass or cellulose, at R-3.5 per inch. This assumption addresses insulation R-value only. The R-value assumptions for other materials within the ceiling construction are embedded in the simulation model.

Ree

The R-value of the wall with added insulation depends on base thickness, added insulation thickness and insulation type: Fiberglass, cellulose and "other" insulation is assumed to have an R-value of 3.5 per inch. Foam insulation is assumed to have an R-value of 5.6 per inch.

	Added	Ree	
Base thickness	thickness	fiberglass, cellulose or other	Foam
	2	7.00	11.2
	4	14.00	22.4
	6	21.00	33.6
	8	28.00	44.8
	10	35.00	56.0
0	12	42.00	67.2
	2	14.00	18.20
	4	21.00	29.40
	6	28.00	40.60
	8	35.00	51.80
	10	42.00	63.00
2	12	49.00	74.20
	2	21.00	25.20
	4	28.00	36.40
	6	35.00	47.60
	8	42.00	58.80
	10	49.00	70.00
4	12	56.00	81.20
	2	28.00	32.20
	4	35.00	43.40
	6	42.00	54.60
	8	49.00	65.80
	10	56.00	77.00
6	12	63.00	88.20
	2	35.00	39.20
	4	42.00	50.40
	6	49.00	61.60
	8	56.00	72.80
	10	63.00	84.00
8	12	70.00	95.20
	2	42.00	46.20
	4	49.00	57.40
	6	56.00	68.60
	8	63.00	79.80
	10	70.00	91.00
10	12	77.00	102.20
12	2	49.00	53.20
	4	56.00	64.40
	6	63.00	75.60
	8	70.00	86.80
	10	77.00	98.00

 12	84.00	109.20

Unit energy and demand data

The unit energy savings were taken from DOE-2 simulations of the residential prototype building described at the end of this Appendix. The unit energy and demand savings depend on the heating fuel, heating system, cooling system type and Rvalue

Heating Fuel	Other
Heating System	Any except Heat Pump
Cooling System	None

R-value	kWh/SF	kW/SF	therm/SF
All	0	0	0

Heating Fuel	
Heating System	
Cooling System	

Other Any except Heat Pump Room/Window or Central AC

R-value	kWh/SF	kW/SF	therm/SF
0	1.649	0.00198	0
7	1.339	0.00157	0
14	1.272	0.00149	0
21	1.245	0.00145	0
28	1.231	0.00143	0
35	1.220	0.00142	0
42	1.214	0.00141	0
49	1.210	0.00141	0
56	1.206	0.00140	0
63	1.203	0.00140	0
70	1.201	0.00140	0
77	1.200	0.00140	0
84	1.196	0.00139	0
109	1.194	0.00139	0

Heating Fuel	Апу
Heating System	Heat Pump
Cooling System	Heat Pump

R-value	kWh/SF	kW/SF	therm/SF

R-value	kWh/SF	kW/SF	therm/SF
0	7.636	0.00390	0.00000
7	6.550	0.00387	0.00000
14	6.121	0.00378	0.00000
21	5.937	0.00374	0.00000
28	5.833	0.00371	0.00000
35	5.768	0.00370	0.00000
42	5.724	0.00368	0.0000
49	5.689	0.00368	0.00000
56	5.665	0.00367	0.00000
63	5.644	0.00366	0.00000
70	5.628	0.00366	0.00000
77	5.616	0.00366	0.00000
84	5.605	0.00366	0.00000
109	5.576	0.00365	0.00000

Heating Fuel Heating System Cooling System Gas, propane or oil Any except Heat Pump None

R-value	kWh/SF	kW/SF	therm/SF
0	0	0	0.05917
7	0	0	0.04418
14	0	0	0.04058
21	0	0	0.03908
28	0	0	0.03828
35	0	0	0.03768
42	0	0	0.03738
49	0	0	0.03708
56	0	0	0.03688
63	0	0	0.03668
70	0	0	0.03658
77	0	0	0.03648
84	0	0	0.03638
109	0	0	0.03618

Heating Fuel Heating System Cooling System Gas, propane or oil Any except Heat Pump Room/Window or Central AC

R-value	kWh/SF	kW/SF	therm/SF