



139 East Fourth Street  
PO Box 960  
1303-Main  
Cincinnati, Ohio 45201-0960  
o: 513-287-4320  
f: 513-287-4385

Rocco.O.D'Ascenzo@duke-energy.com  
Rocco O. D'Ascenzo  
Associate General Counsel

**VIA OVERNIGHT DELIVERY**

August 6, 2014

RECEIVED

AUG 07 2014

PUBLIC SERVICE  
COMMISSION

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

Re: **Case No. 2012-00085**

In the Matter of the Application of Duke Energy Kentucky, Inc., for an Energy Efficiency Cost Recovery Mechanism and for Approval of Additional Programs for Inclusion in its Existing Portfolio

Dear Mr. Derouen:

On March 6, 2012, Duke Energy Kentucky, Inc. (Duke Energy Kentucky) filed a Demand-Side Management (DSM) application (Application) requesting to add additional measures and new programs to its current DSM program portfolio. The new measures included a live, theatrical production category to the Energy Education for Schools Program (Program). In a June 29, 2012 Order, this Commission approved that Program for three academic years. The Commission further ordered that Duke Energy Kentucky provide a status report on the Program by August 15, of each academic year. Duke Energy Kentucky hereby reports the following information regarding this requirement:

**The Names and Addresses of the Schools Where the Live Performances Were Held.**

Please see Attachment A attached hereto.

Mr. Jeff Derouen  
August 6, 2014  
Page 2 of 2

**The Number of Students at Each Performance.**

Please see Attachment A attached hereto. Duke Energy Kentucky provided a number by school but could not provide a number by performance.

**The Number of Surveys Received by Duke Energy Kentucky from the Students and Their Families, by Performance.**

Please see Attachment A attached hereto. This number is by school, not performance.

**The Number of Energy Efficiency Starter Kits Mailed to the Student's Homes, by Performance.**

Please see Attachment A attached hereto. This number is by school, not performance.

**The Proposed Schools that will be Visited in the Next Academic Year.**

This is included in Attachment A hereto but this is a current state and Duke Energy Kentucky does not know which additional schools plan to participate in the next academic year.

In addition, two process evaluation reports are being provided for the years 2013 and 2014, identified as Attachments B and C hereto.

Please file stamp the two copies of this letter enclosed herein and return in the enclosed return-addressed envelope.

Very truly yours,



Rocco O. D'Ascenzo  
Associate General Counsel

Enclosure

cc: Jennifer B. Hans

573651

School Account: County	School Account: Account Name	School Street	School City	School State	School Account: Shipping Zip/Postal Code	Year	Display Date	School Account: Enrollment	Total # of Students	Physical School Count	# of Performances
Kenton	Woodland Middle School	5399 Old Taylor Mill Rd	Taylor Mill	KY	41015	2013	9/25/2013	749	250	1	1
Boone	Conner Middle School	3300 Cougar Path	Hebron	KY	41048	2013	10/1/2013	1082	350	1	1
Boone	Longbranch Elementary School	2805 Longbranch Rd	Union	KY	41091	2013	10/1/2013	767	80	1	1
Harrison	Harrison Co Middle School	269 Education Dr	Cynthiana	KY	41031	2013	10/3/2013	750	500	1	2
Campbell	Holy Trinity Elementary School	235 Division St	Bellevue	KY	41073-1101	2013	11/4/2013	75	100	1	1
Boone	Florence Elementary School	103 Center St	Florence	KY	41042-1993	2013	11/4/2013	633	640	1	2
Campbell	Grandview Elementary School	500 Grandview Ave	Bellevue	KY	41073-1589	2013	11/5/2013	398	420	1	2
Kenton	Glenn O Swing Elem School	501 W 19th St	Covington	KY	41014-1141	2013	11/5/2013	350	440	1	2
Kenton	A J Lindeman Elementary School	558 Erlanger Rd	Erlanger	KY	41018-1305	2013	11/7/2013	325	200	1	1
Pendleton	Southern Elementary School	320 Fairground Rd	Falmouth	KY	41040-1300	2013	11/8/2013	587	545	1	2
Grant	Williamstown Elementary School	300 Helton St	Williamstown	KY	41097-9505	2013	11/8/2013	432	410	1	2
Kenton	Ft Wright Elementary School	501 Farrell Dr	Fort Wright	KY	41013-3775	2013	11/20/2013	478	500	1	2
Kenton	Villa Madonna Academy	2500 Amsterdam Rd	Villa Hills	KY	41017-3798	2013	11/21/2013	450	210	1	1
Boone	Chester Goodridge Elem School	3330 Cougar Path	Hebron	KY	41048-9642	2013	11/21/2013	839	750	1	2
Grant	Mason-Corinth Elem School	225 Heekin Rd	Williamstown	KY	41097-3651	2013	11/22/2013	356	400	1	2
Boone	Walton-Verona Elem School	15066 Porter Rd	Verona	KY	41092-9205	2014	1/13/2014	565	580	1	2
Harrison	St Edward School	107 N Walnut St	Cynthiana	KY	41031-1299	2014	1/13/2014	40	37	1	1
Kenton	Piner Elementary School	2845 Rich Rd	Morning View	KY	41063-9716	2014	1/14/2014	340	350	1	2
Kenton	Latonia Elementary School	3901 Huntington Ave	Covington	KY	41015-1698	2014	1/14/2014	350	400	1	2
Harrison	Northside Elementary School	2415 US Highway 27 N	Cynthiana	KY	41031-6290	2014	1/15/2014	330	320	1	2
Kenton	Sixth District Elem School	1901 Maryland Ave	Covington	KY	41014-1442	2014	1/16/2014	350	500	1	2
Kenton	Beechgrove Elementary School	1029 Bristow Rd	Independence	KY	41051-9600	2014	1/17/2014	617	200	1	1
Campbell	John W Reiley Elem School	10631 Alexandria Pike	Alexandria	KY	41001-7545	2014	1/17/2014	360	300	1	1
Kenton	Holmes Middle School	2500 Madison Ave	Covington	KY	41014	2014	1/24/2014	700	350	1	1
Campbell	Campbell Co Middle School	8000 Alexandria Pike	Alexandria	KY	41001	2014	1/27/2014	1100	1150	1	3
Campbell	Crossroads Elementary School	475 Crossroads Blvd	Cold Spring	KY	41076-2342	2014	1/27/2014	575	600	1	2
Campbell	Newport Primary School	1102 York St	Newport	KY	41071-2135	2014	1/30/2014	687	520	1	3
Kenton	St Henry School	3825 Dixie Hwy	Erlanger	KY	41018-1863	2014	2/10/2014	300	52	1	1
Kenton	Dorothy Howell Elem School	909 Central Row	Elsmere	KY	41018-2309	2014	2/10/2014	325	150	1	1
Campbell	Grants Lick Elementary School	944 W Clay Ridge Rd	Alexandria	KY	41001-8018	2014	2/11/2014	280	280	1	1
Gallatin	Gallatin Co Upper Elem School	50 Paw Print Path	Warsaw	KY	41095-9376	2014	2/12/2014	360	390	1	2
Kenton	John W Miles Elementary School	208 Sunset Ave	Erlanger	KY	41018-1526	2014	2/13/2014	300	300	1	2
Boone	Burlington Elementary School	5946 Orient St	Burlington	KY	41005-9739	2014	2/17/2014	868	330	1	2
Kenton	Ryland Heights Elementary Sch	3845 Stewart Rd	Ryland Height	KY	41015-9307	2014	2/18/2014	520	300	1	2
Kenton	Beechwood Elementary School	54 Beechwood Rd	Ft Mitchell	KY	41017-2786	2014	2/18/2014	578	620	1	2
Kenton	Ninth District Elementary Sch	2800 Indiana Ave	Latonia	KY	41015-1095	2014	2/19/2014	350	200	1	1
Kenton	J A Caywood Elementary School	3230 Turkeyfoot Rd	Edgewood	KY	41017-2645	2014	2/19/2014	650	125	1	1
Boone	New Haven Elementary School	10854 US Highway 42	Union	KY	41091-9500	2014	2/20/2014	708	698	1	2
Kenton	Summit View Elementary School	5006 Madison Pike	Independence	KY	41051-7538	2014	2/20/2014	768	800	1	3
Boone	Erpenbeck Elementary School	9001 Wetherington Blvd	Florence	KY	41042-8801	2014	2/20/2014	656	633	1	2
Kenton	R C Hinsdale Elementary School	440 Dudley Rd	Edgewood	KY	41017-3398	2014	2/21/2014	650	600	1	2
Kenton	John G Carlisle Elem School	910 Holman, Pike & Holman	Covington	KY	41011-3090	2014	2/25/2014	350	600	1	2
Campbell	Donald E Cline Elem School	5586 E Alexander Pike	Cold Spring	KY	41076	2014	2/26/2014	350	140	1	1
Boone	Stephens Elementary School	5687 Highway 237	Burlington	KY	41005-9122	2014	2/27/2014	714	700	1	2
Boone	Charles Keily Elem School	6775 McVilte Rd	Burlington	KY	41005-8659	2014	3/4/2014	227	270	1	1
Campbell	Campbell Ridge Elementary Sch	2500 Grandview Rd	Alexandria	KY	41001-7308	2014	3/5/2014	600	620	1	2
Harrison	Westside Elementary School	1585 KY Hwy 356	Cynthiana	KY	41031	2014	3/6/2014	330	360	1	2
Grant	Crittenden-Mt Zion Elem School	270 Crittenden-MT Zion Rd	Dry Ridge	KY	41035-8280	2014	3/10/2014	480	300	1	1
Kenton	Taylor Mill Elementary School	5907 Taylor Mill Rd	Taylor Mill	KY	41015-2399	2014	3/11/2014	625	670	1	2
Fleming	Flemingsburg Elementary School	245 W Water St	Flemingsburg	KY	41041-1094	2014	3/12/2014	642	550	1	2
Kenton	Whites Tower Elementary School	2977 Harris Pike	Independence	KY	41051-7990	2014	4/21/2014	489	500	1	2
Kenton	Holy Cross Elementary School	3615 Church St	Covington	KY	41015-1485	2014	5/21/2014	172	155	1	1
Boone	Hillard Collins Elem School	9000 Spruce Dr	Florence	KY	41042-2795	2014	5/22/2014	574	740	1	2
Campbell	St Philip School	1400 Mary Ingles Hwy	Melbourne	KY	41059	2014	5/22/2014	85	86	1	1
Kenton	Turkey Foot Middle School	3230 Turkeyfoot Rd	Edgewood	KY	41017	2014	5/23/2014	978	1066	1	3
Boone	Rector A Jones Middle School	8000 Spruce Or	Florence	KY	41042	2014	5/23/2014	691	275	1	1
Campbell	Newport Intermediate School	101 E 4th St	Newport	KY	41071-1615	2014	5/23/2014	431	480	1	2
Boone	St Joseph Academy	48 Needmore St	Walton	KY	41094-1093	2014	5/23/2014	158	48	1	1
Kenton	Kenton Elementary School	11246 Madison Pike	Independence	KY	41051-7502	2014	5/30/2014	645	120	1	1

NTC Performances booked as of 7.10.14

School Account: County	School Account: Account Name	School Street	School City	School State	School Account: Shipping Zip/Postal Code	LOA Simple	Year	Display Date	School Account: Enrollment	Total # of Students	Physical School Count	# of Performances
Boone	Chester Goodridge Elem School	3330 Cougar Path	Hebron	KY	41048-9642	Confirmed	2014	9/9/2014	839	800	1	3
Campbell	Regional School Programs	5516 E Alexandria Pike	Cold Spring	KY	41076	Confirmed	2014	9/11/2014	44	40	1	1
Harrison	Westside Elementary School	1585 KY Hwy 356	Cynthiana	KY	41031	Booked	2014	9/15/2014	330	320	1	1
Kenton	Piner Elementary School	2845 Rich Rd	Morning View	KY	41063-9716	Booked	2014	9/15/2014	340	350	1	2
Campbell	Silver Grove School	101 W 3rd Street	Silver Grove	KY	41085	Booked	2014	9/16/2014	220	120	1	1
Kenton	Sixth District Elem School	1901 Maryland Ave	Covington	KY	41014-1442	Booked	2014	9/16/2014	350	550	1	2
Kenton	Summit View Elementary School	5006 Madison Pike	Independence	KY	41051-7538	Confirmed	2014	9/17/2014	768	850	1	3
Boone	Charles Kelly Elem School	6775 Mcville Rd	Burlington	KY	41005-8659	Booked	2014	9/19/2014	227	250	1	1
Kenton	Prince of Peace School	625 Pike St	Covington	KY	41011-2194	Confirmed	2014	9/22/2014	108	90	1	1
Campbell	Donald E Cline Elem School	5586 E Alexander Pike	Cold Spring	KY	41076-	Confirmed	2014	9/22/2014	350	175	1	1
Campbell	Grants Lick Elementary School	944 W Clay Ridge Rd	Alexandria	KY	41001-8018	Booked	2014	9/23/2014	280	300	1	1
Boone	Walton-Verona Elem School	15066 Porter Rd	Verona	KY	41092-9270	Confirmed	2014	9/23/2014	565	560	1	2
Campbell	St Joseph School	6829 Four Mile Rd	Campsprings	KY	41059-9507	Booked	2014	9/25/2014	39	34	1	1
Campbell	St Catherine of Siena School	1803 N Ft Thomas Rd	Fort Thomas	KY	41075	Confirmed	2014	9/25/2014	182	126	1	1
Harrison	St Edward School	107 N Walnut St	Cynthiana	KY	41031-1299	Booked	2014	9/30/2014	40	40	1	1
Kenton	Taylor Mill Elementary School	5907 Taylor Mill Rd	Taylor Mill	KY	41015-2399	Booked	2014	10/2/2014	625	600	1	2
Kenton	Community Christian Academy	11875 Taylor Mill Rd	Independence	KY	41051-9732	Confirmed	2014	10/3/2014	225	100	1	1
Boone	Conner Middle School	3300 Cougar Path	Hebron	KY	41048	Confirmed	2014	10/9/2014	1082	700	1	2
Campbell	St Therese School	2516 Alexandria Pike	Southgate	KY	41071-3298	Booked	2014	10/9/2014	372	200	1	2
Harrison	Northside Elementary School	2415 US Highway 27 N	Cynthiana	KY	41031-6290	Confirmed	2014	10/10/2014	330	300	1	2
Kenton	St Augustine School	1840 Jefferson Ave	Covington	KY	41014-1165	Booked	2014	10/17/2014	136	100	1	1
Kenton	Holy Cross Elementary School	3615 Church St	Covington	KY	41015-1485	Confirmed	2014	10/17/2014	172	160	1	1
Kenton	St Joseph School	2474 Lorraine Ave	Crescent SPGS	KY	41017-1493	Booked	2014	10/17/2014	550	80	1	2
Pendleton	Southern Elementary School	320 Fairground Rd	Falmouth	KY	41040-1300	Confirmed	2014	10/17/2014	587	600	1	2
Gallatin	Gallatin Co Lipper Elem School	50 Paw Print Path	Warsaw	KY	41095-9376	Booked	2014	10/20/2014	360	375	1	1
Gallatin	Gallatin Co Elementary School	25 Boaz Dr	Warsaw	KY	41095-9510	Canceled	2014	10/20/2014	471	500	0	0
Campbell	Saint Joseph School	4011 Alexandria Pike	Cold Spring	KY	41076-1895	Confirmed	2014	10/21/2014	475	280	1	1
Kenton	Mary Queen of Heaven School	1130 Donaldson Hwy	Erlanger	KY	41018-1048	Confirmed	2014	10/24/2014	230	176	1	1
Kenton	St Henry School	3825 Dixie Hwy	Erlanger	KY	41018-1863	Confirmed	2014	10/24/2014	300	75	1	2
Kenton	Calvary Christian School	5955 Taylor Mill Rd	Covington	KY	41015-2398	Confirmed	2014	10/24/2014	450	163	1	1
Campbell	Crossroads Elementary School	475 Crossroads Blvd	Cold Spring	KY	41076-2342	Booked	2014	10/24/2014	575	560	1	2
Kenton	J A Caywood Elementary School	3230 Turkeyfoot Rd	Edgewood	KY	41017-2645	Confirmed	2014	10/29/2014	650	125	1	1
Grant	Williamstown Elementary School	300 Helton St	Williamstown	KY	41097-9505	Booked	2014	10/31/2014	432	415	1	2
Kenton	Villa Madonna Academy	2500 Amsterdam Rd	Villa Hills	KY	41017-379B	Confirmed	2014	10/31/2014	450	225	1	1

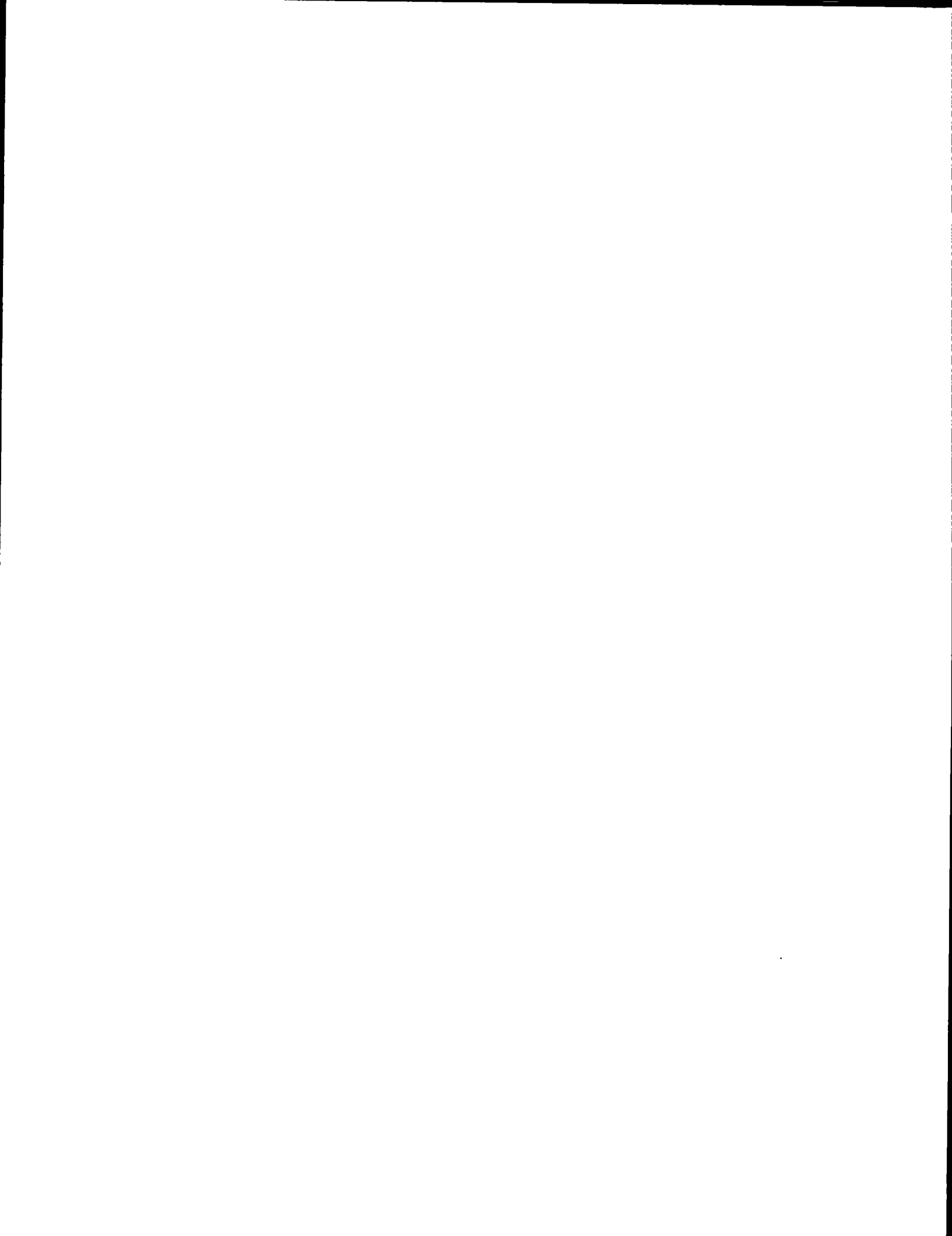
**Total (Duke/Non Duke) Surveys received and Kits shipped**

Row Labels	Count of SURVEY RECEIPT	Count of DUKE & Non Duke Kits shipped
A J Lindeman Elementary School	17	14
Beechgrove Elementary School	26	22
Beechwood Elementary School	46	40
Burlington Elementary School	31	31
Campbell Co Middle School	110	103
Campbell Ridge Elementary Sch	40	38
Charles Kelly Elem School	22	20
Chester Goodridge Elem School	81	76
Conner Middle School	52	48
Crittenden-Mt Zion Elem School	18	14
Crossroads Elementary School	117	109
Donald E Cline Elem School	25	24
Dorothy Howell Elem School	14	10
Erpenbeck Elementary School	59	53
Flemingsburg Elementary School	34	29
Florence Elementary School	127	116
Ft Wright Elementary School	53	47
Gallatin Co Elementary School	16	14
Gallatin Co Upper Elem School	22	17
Glenn O Swing Elem School	34	32
Grandview Elementary School	40	38
Grants Lick Elementary School	25	24
Harrison Co Middle School	6	6
Hillard Collins Elem School	68	57
Holmes Middle School	297	224
Holy Cross Elementary School	13	6
Holy Trinity Elementary School	27	26
Home school	3	
J A Caywood Elementary School	17	16
John G Carlisle Elem School	23	17
John W Miles Elementary School	28	24
John W Reiley Elem School	35	26
Kenton Elementary School	8	6
Latonla Elementary School	37	28
Longbranch Elementary School	13	8
Mason-Corinth Elem School	27	25
n/a	15	
New Haven Elementary School	64	61
Newport Intermediate School	28	23
Newport Primary School	50	40
Ninth District Elementary Sch	71	50
Northside Elementary School	42	40
Ockerman Middle School	1	
Piner Elementary School	37	33
R C Hinsdale Elementary School	88	79
Rector A Jones Middle School	10	7
Ryland Heights Elementary Sch	24	22
Sixth District Elem School	169	114
Southern Elementary School	116	108
Squires Elementary School	5	
St Augustine School	1	1
St Edward School	9	9
St Henry School	7	6
St Joseph Academy	4	3
St Joseph School	3	3
St Philip School	5	4
St Pius X School	6	6
St Therese School	5	4
Stephens Elementary School	53	51
sublimity elementary School	1	
Summit View Elementary School	51	46
Taylor Mill Elementary School	51	49
Turkey Foot Middle School	61	56
Villa Madonna Academy	19	18
Walton-Verona Elem School	82	78
Westside Elementary School	38	37
Whites Tower Elementary School	47	41
Williamstown Elementary School	9	9
Woodland Middle School	29	26
<b>Grand Total</b>	<b>2812</b>	<b>2412</b>

**Total Duke Only Surveys received and Kits shipped**

Row Labels	Count of SURVEY RECEIPT	Count of DUKE EE KITS SHIPPED
A J Lindeman Elementary School	17	14
Beechgrove Elementary School	13	9
Beechwood Elementary School	44	38
Burlington Elementary School	29	29
Campbell Co Middle School	88	82
Campbell Ridge Elementary Sch	31	29
Charles Kelly Elem School	9	7
Chester Goodridge Elem School	73	68
Conner Middle School	44	40
Crittenden-Mt Zion Elem School	14	10
Crossroads Elementary School	113	105
Donald E Cline Elem School	24	23
Dorothy Howell Elem School	14	10
Erpenbeck Elementary School	59	53
Flemingsburg Elementary School	2	
Florence Elementary School	116	106
Ft Wright Elementary School	50	44
Gallatin Co Elementary School	5	3
Gallatin Co Upper Elem School	8	4
Glenn O Swing Elem School	33	31
Grandview Elementary School	39	37
Grants Lick Elementary School	21	11
Hillard Collins Elem School	65	55
Holmes Middle School	252	182
Holy Cross Elementary School	13	6
Holy Trinity Elementary School	27	26
J A Caywood Elementary School	14	13
John G Carlisle Elem School	23	17
John W Miles Elementary School	28	24
John W Reiley Elem School	33	24
Kenton Elementary School	6	4
Latonla Elementary School	33	24
Longbranch Elementary School	13	8
Mason-Corinth Elem School	4	3
New Haven Elementary School	54	51
Newport Intermediate School	26	21
Newport Primary School	46	36
Ninth District Elementary Sch	50	33
Northside Elementary School	4	2
Piner Elementary School	30	26
R C Hinsdale Elementary School	85	76
Rector A Jones Middle School	10	7
Ryland Heights Elementary Sch	23	21
Sixth District Elem School	153	104
Southern Elementary School	38	32
St Augustine School	1	1
St Henry School	7	6
St Joseph Academy	1	1
St Joseph School	3	3
St Phiip School	3	2
St Pius X School	3	3
St Therese School	5	4
Stephens Elementary School	43	41
Summit View Elementary School	38	33
Taylor Mill Elementary School	49	47
Turkey Foot Middle School	53	48
Villa Madonna Academy	17	17
Walton-Verona Elem School	61	57
Westside Elementary School	3	2
Whites Tower Elementary School	39	33
Williamstown Elementary School	3	3
Woodland Middle School	23	20
<b>Grand Total</b>	<b>2218</b>	<b>1869</b>

Surveys received includes disqualified surveys  
 Kits shipped = Qualified surveys and kits



Final Report

**Process Evaluation  
of the Energy Efficiency for Schools Program  
(The National Theatre for Children (NTC))  
in Kentucky**

**Prepared for  
Duke Energy**

139 East Fourth Street  
Cincinnati, OH 45201

July 31, 2013

**Submitted by**

**Subcontractor:**  
Minerva Smith

Nick Hall and Johna Roth

**TecMarket Works**  
165 West Netherwood Road  
Oregon WI 53575  
(608) 835-8855



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## Executive Summary

### Key Findings and Recommendations

This section presents the key findings and recommendations identified through this evaluation of Duke Energy's Energy Efficiency for Schools Program in Kentucky. The program evaluation covers the period of time from January, 2013 to May, 2013.

Please note that this report was to include an impact evaluation based on engineering estimates and a billing analysis. However, the impact assessment is not possible at this time due to the later than anticipated start date of the program. As a result, the impact assessment effort is not scheduled to be completed by the end of 2014. The engineering data to inform the impact analysis will be collected after significant levels of participation allow for a student family survey to obtain data on measure installation rates and usage. The billing analysis will be completed 16 months after a significant sample is available, to allow enough post-program consumption to reliably identify savings (as stated in Attachment AJO-2 of the filing dated 3/6/2012).

### Significant Process Evaluation Findings

#### Key Findings from the Management Interviews

- Duke Energy's Energy Efficiency (EE) for Schools program is a solid, well-run program with an excellent network of implementers to support and exceed Duke Energy's distribution goals for this program.
- The high levels of successful participation per participating school may present a potential challenge in the future. In order to meet kit distribution goals during future years, customer eligibility and/or kit contents may need to be adjusted to allow for repeat family participation during returning school visits.

#### Key Findings from the Performance Reviews

- The performers are professional and courteous. They arrived at each school on time and always set up and readied their efforts well before the students arrived.
- "The Energized Guyz" performance was well-received by the students and the children were excited about and focused on receiving their energy efficiency kit.
- Every staff person we spoke with indicated that The National Theatre for Children was "wonderful" to work with.
- The troupes successfully altered the complexity of the material presented to match the comprehension ability of the age of the children attending. This is important because if the information is too advanced to understand, the lessons are lost to the younger children, and if the lessons are too simple the older students lose interest.

## Recommendations

- Consider the development of a second kit so that troupes can visit a school more than once in a three year period, as long as cost effective savings are achieved.
- Inform troupes that slowing their rate of speech<sup>1</sup> may improve students' comprehension of the material they are presenting. The typical adult speaks 160 words per minute. The central nervous system of pre-school through third grade children can process about 120 words per minute. Fourth grade students process 124-128 words per minute<sup>2</sup>.
- Consider revising the script so that saving energy is equated with their families lowering their utility bills and supporting environmental stewardship.

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<sup>1</sup> "Spot checks" were conducted on portions of the performances using a timer and the known count of words used by the actors from the script. While these checks were not scientific, overall speech rates were found to be slightly too fast for the ages of the audience.

<sup>2</sup> Banotai, Alyssa. "How to Talk to Children". ADVANCE Speech-Language Pathologists & Audiologists, Vol. 18, Issue 3. January 21, 2008.

<http://speech-language-pathology-audiology.advanceweb.com/Article/How-to-Talk-to-Children.aspx>

## Introduction and Purpose of Study

### Overview and Objective

This document presents the process evaluation report for Duke Energy's Energy Efficiency for Schools Program as it was administered in Kentucky. The evaluation was conducted by TecMarket Works. The objective of this process evaluation is to document program operations and identify if there are any areas of improvement for future program implementation.

### Summary of the Evaluation Data

The findings presented in this report were analyzed using NTC performance reviews and interviews with program managers and vendors as presented in Table 1 below.

**Table 1. Evaluation Date Ranges**

Evaluation Component	Dates of Survey	Dates of Analysis
Kentucky Performance Reviews	April - May 2013	May - July 2013
Program Managers and Vendors	June 2012 – August 2012, and July 2013	June 2012 - October 2012, and July 2013

Two management interviews were conducted by TecMarket Works with program implementation staff and management in July and October of 2012, and a follow-up interview was conducted with the current Duke Energy program manager in July of 2013.

### Evaluation Objectives

The objective of this evaluation is to determine the effectiveness of and satisfaction with Duke Energy's EE for Schools program as it was administered in Kentucky.

## Description of Program

Duke Energy has partnered with The National Theatre for Children (NTC) for the Energy Efficiency Education for Schools program. The Energy Efficiency Education program is an energy conservation program available in Ohio, North Carolina, South Carolina, and Kentucky and is available to K-12 students enrolled in public and private schools who reside in households served by Duke Energy.

The Energy Efficiency Education Program for Schools provides principals and teachers with an innovative math and science related curriculum that educates students about energy, resources, electricity, ways in which energy is wasted, and how to use our resources wisely. Education materials focus on concepts such as energy, renewable fuels, and energy conservation through classroom and take home assignments to engage student's families. Curriculum materials are enhanced with a live 25 minute theatrical production for elementary students and a live 40 minute theatrical production for middle school students, both performed by two professional actors. The current program is developed to educate students in kindergarten through eighth grade. School principals are the main point of contact and NTC schedules the performance at their convenience for the entire school.

Once the principal has confirmed the performance date and time, two weeks prior to the performance, all curriculum materials are delivered to the principal's attention for teacher distribution. Materials include school posters, teacher guides, and classroom and family activity books. Students are encouraged to complete a home energy survey with their family (found in their activity book), to receive an Energy Efficiency Starter Kit that contains specific energy efficiency measures to reduce home energy consumption. Duke Energy customers can receive an Energy Efficiency Starter Kit. Non-Duke Energy customers, at the participating schools, can receive an Energy Efficiency Starter Kit specifically for non-customers.

### Duke Energy Customers received:

- 1.5 GPM low flow shower head
- 1.5 GPM kitchen faucet aerator with swivel and flip valve
- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 18 watt Energy Star rated mini compact fluorescent (75 watt incandescent equivalent), with 12,000 hour life
- 1.0 GPM needle spray bathroom faucet aerator
- Combination Pack of switch and outlet gasket insulators - 8 outlets and 4 socket gaskets
- Energy Efficient Limelight style night light
- Duke Energy labeled DOE "Energy Savers" booklet
- Roll of Teflon tape for showerhead
- Product information and instruction sheet
- Glow Ring Toy

### Non-Duke Energy Customers received:

- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 8 outlet gasket insulators
- Duke Energy labeled DOE “Energy Savers” booklet
- Glow Ring Toy

# Methodology

## Overview of the Evaluation Approach

This process evaluation had two components: management interviews and performance reviews.

### Study Methodology

#### Management Interviews

Two management interviews were conducted with program implementation staff and management in order to capture their insights about the programs operations and challenges. We interviewed Duke Energy's Energy Efficiency Education Program for Schools product managers<sup>3</sup> and the project manager for the program at The National Theatre for Children (NTC).

#### Performance Reviews

Three participating schools were visited to review 4 NTC performances in April and May of 2013. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person that coordinated with NTC for the visit, covering various aspects of the program, such as program operations, aspects of their involvement, and communications with NTC.

### Data collection methods, sample sizes, and sampling methodology

#### Management Interviews

Two management interviews were conducted with program implementation staff and management in order to capture their insights about the programs operations and challenges. We interviewed Duke Energy's Energy Efficiency Education Program for Schools product managers and the project manager for the program at NTC.

#### Performance Reviews

Three participating schools were visited to review 4 NTC performances in April and May of 2013. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person that coordinated with NTC for the visit, covering various aspects of the program, such as program materials, aspects of their involvement, and communications with NTC.

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

#### Performance Reviews

From the list of 11 schools with performances scheduled in April and May of 2013<sup>4</sup>, three participating schools were visited to review 4 NTC performances in April and May of 2013.

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<sup>3</sup> Two managers were interviewed, one in 2012, and a newly-appointed manager in 2013.

<sup>4</sup> The schedule was provided to TecMarket Works on April 23, 2013, therefore the count includes schools that had scheduled performance after April 23, 2013.

## Management Interviews

The management interviews revealed that the program is operating very well and is surpassing its goals for energy efficiency kit distribution. Overall, the satisfaction with program operations and communications is high.

## The National Theatre for Children

The National Theatre for Children (NTC) is the contracted third-party implementer for the Energy Efficiency for Schools Program. The project manager for this program at NTC is the main liaison for Duke Energy and attends the weekly meetings with Duke Energy.

## Program Goals

The program goals are as follows:

- The delivery of grade appropriate energy efficiency learning activities such as energy usage and conservation into existing science and/or math based curriculum across the selected territory served by Duke Energy.
- Integrate Duke Energy's Energy Efficiency Starter Kit sign up process into the science and/or math curriculum.
- Achieve target participation and energy impacts through the installation and tracking of energy efficiency measures to the specific household accounts of Duke Energy students.
- Create sustainability of the program and new impacts year after year of new families that haven't participated in the program in the last three (3) years.

NTC and Duke Energy agree that the program is meeting its goals.

The 2011-2012 school year was the first year of NTC's contract, and the goals for energy efficiency kit distributions for the first year were exceeded in Ohio, North Carolina, and South Carolina. In Kentucky, the program launched performances in mid-April of 2013, which only allowed for a month of activity before the school year ended. The original goal was to distribute 1,000 kits by the end of June, but with the time allowed they made good progress and achieved 65% of their kit distribution goal. The staff expressed no doubt that goals will be exceeded in the future.

All interviewees agree that the program is successful at meeting its goals, particularly given that they cannot perform during the summer months. However, in order to meet future distribution goals at the current rates of distribution among the current number of schools, it may be necessary to establish a second kit distribution so households can participate again.

This condition is in part due to the incentives provided through the program. There is a contest that involves the schools and the participating students' families that are designed to increase savings. Each participating Kentucky school is eligible to win \$2,000 for their school by having the highest percentages of students ordering the kit. The prize is awarded by percent of students so that smaller schools would be just as likely to succeed as larger schools. These contests are promoted throughout the schools with posters, as can be seen in Figure 1 below. These posters were for the school administrators to gauge how well the school was doing with its energy

efficiency kit orders. In many cases, they are displayed prominently in high traffic areas such as the between doors of the main entrance to the school, as shown in Figure 2.

The school prizes are awarded in September of the following school year (September of 2012 for the school year ending in Spring of 2012) so that the schools are in session and the children can enjoy the announcement, and so that the photo opportunity it presented would revitalize the interest in the program in the territory.

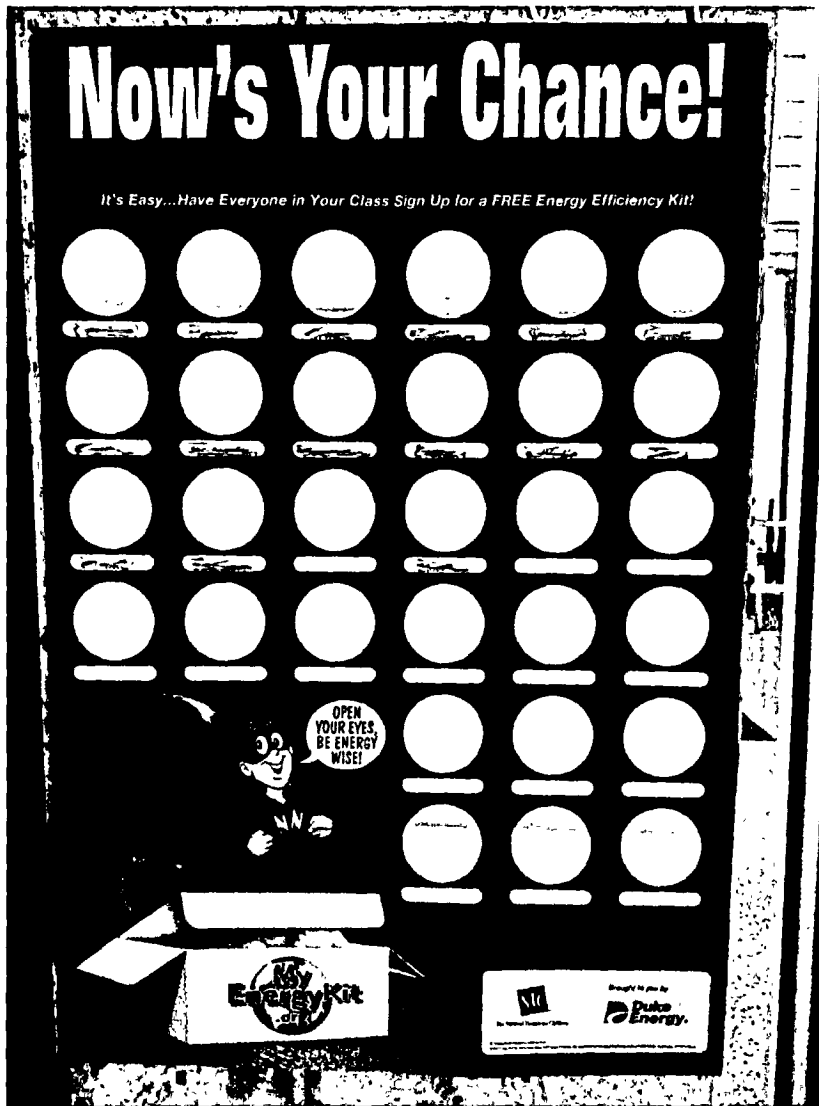


Figure 1. Kentucky School Hallway with an NTC Poster





**Figure 2. Program Sign Displayed at a Kentucky School's Main Entrance**

## Marketing

The program is marketed by NTC with mass mailings to school administrators occurring two or three times a year<sup>5</sup>, and with smaller, more targeted campaigns throughout the year. Since the EE for Schools program is for grades kindergarten through 8, NTC has flexibility in choosing the targeted schools and grades for the program. NTC decided that the younger children would be more likely to discuss the presentation and the availability of the free kit than older students, so the focus is on elementary students, with some programs also being presented to middle school children. At this time, there are no plans to target high school students.

NTC has the zip codes that are within the Duke Energy territory in Kentucky, and also supplies statistics on the number of Duke Energy customers within each zip code, which allows NTC to target schools with a higher propensity of having a high number of Duke Energy customers with children enrolled at those schools. NTC was able to schedule performances at more than 50% of the schools it contacted about the program.

With this success rate, managers agree that the program should consider a second visit within the three year time frame, but offer a second, different kit to the students' families.

<sup>5</sup> See the letter to Principals in Appendix C: Letter to School Principal.

## Quality Control

When a request for an energy efficiency kit is received, it is reviewed for eligibility. Duke Energy customers that have a child in a participating school are sent a Duke Energy energy efficiency kit. If the request is from a family that is not a Duke Energy customer but has a child in a participating school, they are sent a non-Duke Energy energy efficiency kit. This is because Duke Energy is not allowed to count the energy savings from the non-Duke Energy serviced homes. The kit that is sent to non-Duke Energy customers contains fewer measures as a way to reduce the costs associated with providing kits for which Duke Energy cannot claim energy-savings credit.

However, in early 2012, many requests for kits were made from outside of Duke Energy's territory. This was a result of when NBC presented the availability of the free kits during its NBC Today Show advising listeners to log on and request a kit. The exposure caused increases in requests for non-Duke Energy kits in the targeted schools. Following this, many blogs that focus on household budgeting and couponing also featured Duke Energy's offer.

With the requests coming in at a rate of thousands per day, the program's processing and quality control efforts were tested. The program was successful at handling the increased load and processing requirements.

The site for ordering kits<sup>6</sup> includes a disclaimer indicating eligibility requirements<sup>7</sup>, but the disclaimer was either not read or not heeded by many visitors. The process for handling the increased requests was to ignore kit requests from outside of the United States<sup>8</sup> or in states far removed from where the program operates. Customers within the United States that did not have a child attending a qualifying school were sent a letter (from NTC, on Duke Energy letterhead) explaining to them that they were not qualified and ineligible to receive a kit. There were no complaints from people that requested kits but were not eligible to receive them or about how the situation was handled.

The screening process is working well with the Kentucky program.

## Communication

Duke Energy and NTC report that they conduct weekly meetings to discuss scheduling, communications, problems that may have come up and the associated solutions, and program delivery strategies. During those meetings, NTC reported to Duke Energy about any issues that were identified during the week. NTC states that the Duke Energy program manager was always willing to consider new ideas and make adjustments to the program operations.

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<sup>6</sup> <https://www.myenergykit.org/default.aspx>

<sup>7</sup> "Duke Energy Customers! Has your child's school recently hosted THE ENERGIZED GUYZ presentation sponsored by Duke Energy? Then your household may be qualified to receive a Free Energy Efficiency Kit as part of an approved curriculum for residents in Ohio, North Carolina and South Carolina."

<sup>8</sup> Program Managers report that many requests came from Russia.

**Recommendation**

While all interviewees agree that the program is successful at meeting its goals, the current high levels of participation may present a potential challenge in the future. In order to meet kit distribution goals during future years, customer eligibility and/or kit contents may need to be adjusted. Under current program rules, families are only eligible to receive one kit every three years. Therefore, in order to maximize the number of participating households at each school during repeat visits to the same school in future years, different kits containing unique items may be required each year so that energy savings can be counted among families who desire to participate multiple years in a row.

To increase participation, Duke Energy and NTC can refine their targeting of schools to focus on school districts with higher numbers of Duke Energy students, increasing participation at school levels.

**Summary**

Duke Energy's EE for Schools program seems to be well structured and managed with a skilled network of implementers to support and exceed Duke Energy's distribution goals for this program.

## Performance Reviews

Seventeen performances in Duke Energy's Carolina System and three performances in Ohio were reviewed in March of 2012. Three participating schools in Kentucky were visited to review 4 NTC performances in April and May of 2013. Most of the NTC performances were conducted at elementary schools. This review focuses on those performances, with primary focus on Kentucky.

Short onsite interviews were conducted with teachers and administrators depending on their involvement in the program and their availability during the visit to the school. TecMarket Works asked interviewees about various aspects of the program, such as their satisfaction with the program materials and with their communications with NTC staff.

The review also included discussions with NTC actors and an evaluation review of the performance. At times the troupes were aware of the evaluators' presence; at times they were not. The Kentucky performers were aware of our presence, but there was no difference in the performances based on their awareness of the evaluators' presence.

We also visited classrooms after the performance to gauge the children's reaction to the performance and discuss the program with the teachers. The results of the site visits are presented below.

After the performances were conducted and the teachers and students had left the assembly area, each teacher was provided with a flier that contained detailed instructions on how their students could obtain an energy efficiency kit for their family. An example of this flier can be found in Appendix D: Teacher Survey and Instruction Flyer.

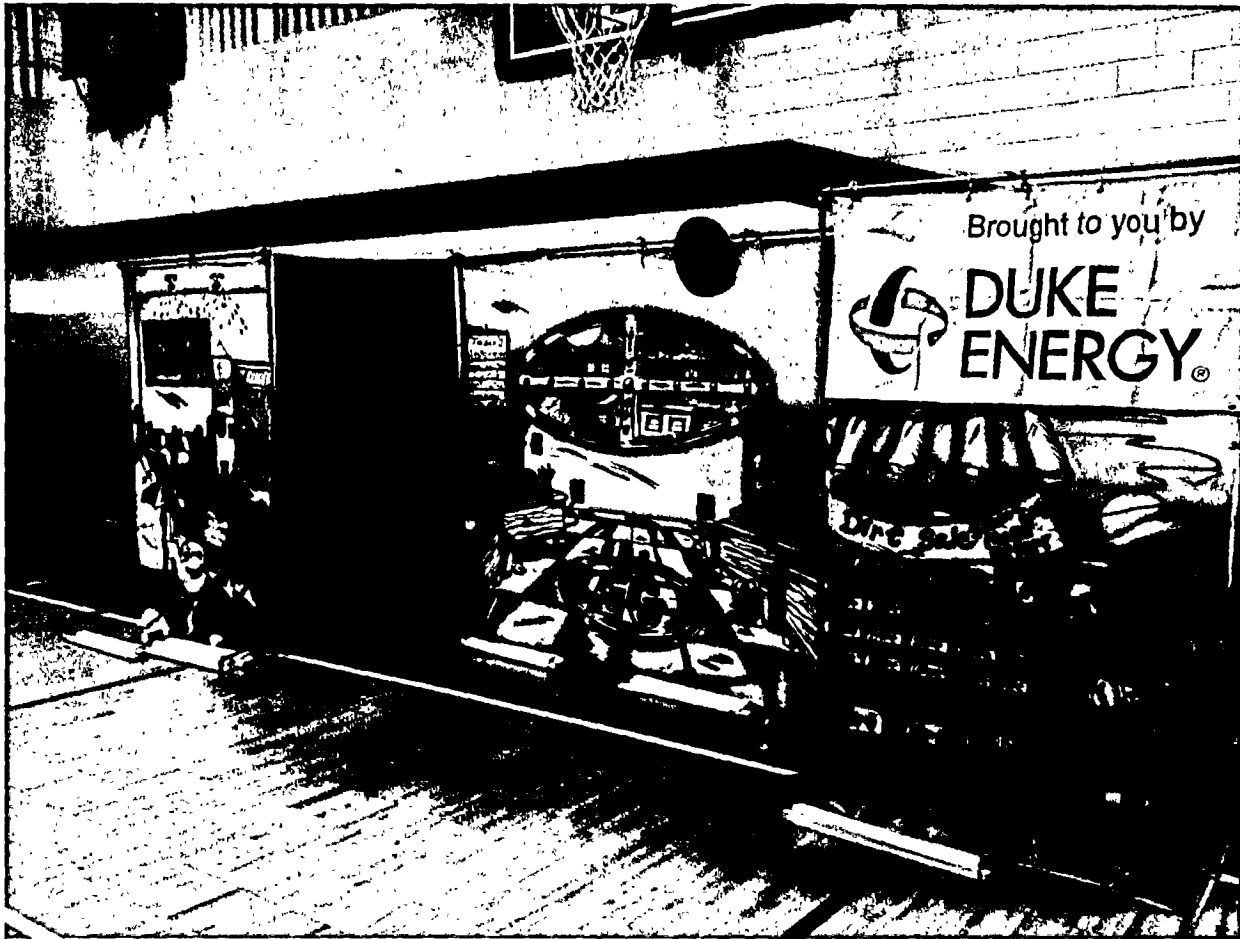
### "The Energized Guyz" Performances

The primary purpose of the performance review was to see if NTC was fulfilling the goal of Duke Energy to share energy conservation tips and have students' families<sup>9</sup> order the energy efficiency kit. TecMarket Works and Minerva Smith, an educational consultant, observed seven troupes perform the programs in 2012 and 2013. In 2012, each troupe consisted of two people playing five characters: Nikki Neutron, U.R. Fired, Dr. Maybe, Cape Cod and Tech Guy. In 2013 (Kentucky), the performance script and characters were changed and the troupe played a different set of characters: Nikki Neutron, U.R. Fired, Thunderstorm, The Sneaker, and Bert the Dirt Expert.

Every performance started out by mentioning that the program was being provided by Duke Energy, and the troupes displayed the Duke Energy logo as shown in Figure 3 below. Duke Energy was also thanked at the end of each performance.

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<sup>9</sup> As not all students live in households served by Duke Energy, there were two kits available, one for Duke Energy customers, and a smaller kit for non-Duke Energy customers, as described in in the Description of Program on page 6.



**Figure 3. Duke Energy Sign on the Stage**

Duke Energy's logo changed in early 2013, but NTC had not received a new Duke Energy sign to display on their stage. However, NTC created a sign themselves to display the new logo. Not only is a larger than the sign used previously, but was also well done.

### **Elementary School Performances**

The actors were enthusiastic and energetic and the performance started with the actors listing the four main points for the program. The main points were: how energy and electricity are made, uses of electricity, how energy is wasted, and how to conserve energy. The children were told that coal, oil, natural gas and sometimes uranium are burned at a power plant to boil water and create steam. Diagrams were used to show the energy resources and the path they took to create electricity. The actors stated clearly that the more electricity we use, the more resources we use.



**Figure 4. Elementary School Performance in Action**

The next portion of the program told the children how to save electricity by turning off lights and appliances, turning the water heater to 120 degrees, and using compact fluorescent light bulbs. Solar, hydro and wind were explained and identified as renewable resources. Coal and natural gas were identified as non-renewable resources. The audience was told power companies use a combination of these resources. Again, diagrams were used to identify resources.

The importance of water conservation was also discussed. Suggested ways to conserve water included: shutting off the water when brushing teeth and washing hands; fixing leaky faucets; doing full loads when using dishwashers and washing machines; shutting off the hose when washing a car; filling up pitchers with water and storing them in the refrigerator; and using low flow showerheads.

Ways to save electricity were repeated five times throughout the 20-25 minute program, and renewable resources were identified three times. The slogan "*Open Your Eyes, Be Energy Wise*" was repeated at least six times, with the children enthusiastically joining in at the end of the performance.

The children were shown items from the energy kit to encourage them to order a kit for their families. They were told how to get a kit by going online or mailing in the card from the workbook that they either received before or after the performance in their classrooms from their teachers. Trading cards that had the web site address and a toll free number for ordering the energy kit were also given to the children to take home.

Children were told that their school had the opportunity to win \$2,000, depending on how many kits were ordered from their school. The prize was awarded to the school with the highest percentage of students ordering the kit in Kentucky. This prize seemed to get the children excited and motivated.

Our overall observation was that the program followed the information in the workbook provided to each child.

### What Works Well

In reviewing the performances, the following were noted as working well in gaining attention and in relaying the energy efficiency information to the children.

1. Directions and expectations for behavior were set before the program began.
2. Key energy efficiency points were made repeatedly, with visuals and enthusiasm.
3. Children were involved by repeating the key points of information.
4. The actors would select a child from the audience, which increased excitement.
5. When visiting classrooms after the performance, all of the children were eager to share information they had learned.
6. Many teachers told us they thought that the program was great.
7. Fourth and fifth grade teachers said the performance addressed some of their science state standards.
8. Some principals said they planned to make a robo-call to all of the parents to let them know about the performance their children attended, and to let them know how to order the kit.
9. Use of charts during the performance gave the children a visual image to help them remember information.
10. When children were talking, one of the actors stood silent until they stopped. Very effective!
11. All of the children were attentive during the program and seemed to enjoy it very much.
12. When the troupes had room to be on the floor walking among the children, they seem to garner even more attention.
13. The troupes successfully altered the complexity of the material depending on the age of the children attending. This is very important because if the information is too difficult you lose younger children, and if it is too simple you lose the interest of the older children.

### Recommendations

While the performances from both 2012 and 2013 were informative and the troupes were effective at delivering the information, in the 2012 reports for other jurisdictions<sup>10</sup>, we offered the following recommendations for consideration. Changes to the presentation and our recommendations for Kentucky, based on the reviews done in Kentucky in 2013, are included below.

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<sup>10</sup> Ohio - Final EE for Schools Process and Impact Evaluation Report - May 22 2013 and Carolinas - EE for Schools NTC - Final Process Evaluation Report - Nov 27 2012.

1. All but one of the troupes said that Dr. Maybe couldn't decide which color of tennis shoes to wear for a field trip. It took so long to decide, that by the time he did, he missed the bus. After that he decided to waste energy. We could not see a connection between missing a field trip and wasting energy. One troupe altered the script so that Dr. Maybe couldn't decide if he wanted a peanut butter, ham or turkey sandwich for lunch. By the time he made up his mind, lunch was over and he had no energy for the rest of the day. This revision made a little more sense to us but the point of the two was not clear with respect to the way energy is wasted or saved.
  - a. Dr. Maybe is no longer a character in the performance as conducted in Kentucky. This improves the play by removing a possible point of confusion.
2. Some troupes said non-renewable resources "disappear," while others said that they "run out." "Run out" would be a more accurate terminology to use.
  - a. The word "disappear" was not said during the reviewed Kentucky performances. Instead, the actors said that "Once the resources are gone they are gone for good."
3. Some of the actor's rate of speech was too fast at times<sup>11</sup>. The typical adult speaks 160 words per minute. The central nervous system of a pre-school through third grade children can process 120 words per minute. Fourth grade students process 124-128 words per minute. Slowing the rate of speech will improve comprehension.<sup>12</sup>
  - a. The actors showed improvement in this area from 2012. One of the actors portrayed four characters. In order to differentiate between the characters she used accents, inflection, and varying rates of speech. The rate of speech for U.R. Fired was slightly faster<sup>13</sup> than the other characters, but this character is in the play to introduce Nikki Neutron and announce an energy emergency, not to provide any key lessons to the children. The rate of speech for all of the other characters was fine.
4. Only one troupe mentioned that saving energy saves money<sup>14</sup>. Given the focus on the cash prizes at the end of the performance that garnered so much attention and excitement, it may be helpful to incorporate this message into the performance.
5. There was no mention of phantom power that is used when leaving appliances that many children use, such as game systems and computers.
  - a. The actors did talk about turning off computers and game systems in the new script, which touches on technologies that many children use.
6. Only one troupe had the Glow Ring Toy in their kit to show. The children became very interested in the ring when they saw it. The ring was much more effective than the night light in getting the children excited about ordering the kit, and the troupe with the ring was able to successfully incorporate it into the script.
  - a. According to the actors, all troupes now have the Glow Ring Toy.

<sup>11</sup> "Spot checks" were conducted on portions of the performances using a timer and the known count of words used by the actors from the script. While these checks were not scientific, overall speech rates were found to be slightly too fast for the ages of the audience.

<sup>12</sup> Banotai, Alyssa. "How to Talk to Children". ADVANCE Speech-Language Pathologists & Audiologists, Vol. 18, Issue 3. January 21, 2008.

<http://speech-language-pathology-audiology.advanceweb.com/Article/How-to-Talk-to-Children.aspx>

<sup>13</sup> "U.R. Fired" spoke at approximately 147 words per minute. (This is not an accurate measurement because there was a 14 second pause where the children were laughing and 4 seconds of dialogue from the other actor so the actual rate would be slightly higher.)

<sup>14</sup> This troupe mentioned that switching from incandescent bulbs to CFLs could save as much as \$200 per year.



7. One troupe pulled the CFLs and low-flow showerhead out of the kit at the end and asked the children if they would help save electricity, which resulted in getting agreements from the children that they understood the lessons presented.
  - a. Showcasing some of the measures is now part of the script, in each performance the actors pulled out the LED night light, a CFL, and a low flow showerhead and asked the children if these items would help save electricity.
8. Some of the popular cultural references were lost on the younger children. Troupes would reference YouTube, Facebook and Twitter. Facebook requires children to be 13 years of age to have an account and all of these children were 12 and under.
  - a. Given the script changes, this is no longer an issue.
9. When the term “energy efficiency” is first used in the performance, the scripted response is to say “Hold on, those are some mighty big syllables there.” Kindergarten children are just learning about syllables and it confuses students when incorrect information is presented. It may make teachers question the accuracy of the rest of the information.
  - a. Given the script changes, this is no longer an issue.

### **Middle School Performances**

*There were no middle school performances scheduled in Kentucky in the Spring of 2013, therefore this section is unchanged from the 2012 review of performances in Ohio and the Carolina System. The evaluation team will make an effort to view middle school performances in the next evaluation.*

The middle school performance was divided into four sketches. Each sketch addressed one of the four points that they were emphasizing through comedy with help from the attending children. The performances were excellent and provided good information and were well-received by the students.

### **What Works Well**

1. The actors asked for certain types of words to be put in the idea bucket before the performance began. Some of the students included teachers’ names. When a teacher’s name was used in the script the kids reacted positively and interest was strengthened. They also included references to music bands and current movies in which the children were interested. This was effective in holding the children’s attention.
2. The information presented to middle school students had more complex information.
3. Use of game systems and turning off power was included, providing examples that are relevant to their lives.
4. Excellent connections and examples were made about how saving energy impacts their lives and can add up over time. The troupes stated that if you left the water on while brushing your teeth you were wasting 1- 5 gallons of water each time, and then extrapolated that amount over a year. They also said that a leaky faucet could fill an above ground pool in a year.
5. The students were engaged during the whole performance and even came up to the actors after it was over. Middle school students are generally less reactive and do not express how much they are enjoying something, but this was not the case for these presentations that engaged the students’ interests.

After reviewing the performances, the evaluation team visited selected classrooms to gauge students' satisfaction with the performance by obtaining a simple "thumbs up" or "thumbs down" regarding their satisfaction with the performance. Very few students gave the program a "thumbs down". Most students found the performance to be funny and informative.

### **Program Materials**

The onsite visits indicate that NTC is supplying the schools with enough program materials before the performance to allow the schools to distribute the materials. The materials provided seemed to effectively promote the program and its objectives to the school staff and to the students. The materials provided include: teacher and student workbooks with energy-related assignments and instructions for ordering the kit; posters to display around the school; character trading cards for the kids (with the back of the card including instructions on how to order the kit); and NTC provided evaluation surveys for the teacher to complete and return to NTC. Some of these items can be seen in Appendix E: Program Materials.

### **Program Communications**

All teachers and administrators that the evaluation team was able to speak to indicated that the communications with NTC in scheduling the performance and determining the logistics of the visit were appropriate. They indicated that NTC was very professional, and provided timely and detailed responses to their questions. When asked about the program NTC was repeatedly praised by the teachers and administrators.

While the school visits and performances are subject to "acts of nature" such as illness or transportation issues, the onsite reviews revealed only one such case in which an actor became ill and could only do one performance instead of two<sup>15</sup>. The issue was communicated to the appropriate contact at the school immediately. The second performance for the day at that particular school was canceled and most of the students that were to attend the second performance were able to attend the first. The school staff was completely satisfied with the communication from NTC, indicating that "these things happen and they handled it very well; we were happy we could still get them to come and perform at our school."

### **Summary**

TecMarket Works agrees with the visited schools that this is a well-run program that offers valuable energy-efficiency related lessons to the children and an opportunity for the students' families to receive the energy efficiency kit.

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<sup>15</sup> This occurred during the 2012 reviews. No such problems arose in Kentucky.

## Appendix A: Management Interview Instrument

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

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

Position description and general responsibilities:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**The interview will take about an hour to complete. Do you have any questions for me before we begin?**

### **(1) Program Background and Objectives (15 min)**

1. Please describe your role and scope of responsibility in detail.
2. How long have you been involved with the program?
3. Have there been any recent changes been made to your duties since you started?
  - a. If YES, please tell us what changes were made and why they were made. What are the results of the change?
4. In your own words, please describe the Program's objectives. (e.g. enrollment, energy savings, non-energy benefits)
5. Of the program objectives you mentioned earlier, do you feel any of them will be particularly easy to meet, and why?
6. Which program objectives, if any, do you feel will be relatively difficult to meet, and why?

7. Are there any objectives you feel should be revised prior to the end of this program cycle? If yes, why?

**(2) Rebates (15 min)**

8. Describe your quality control and process for tracking participants and other program data.
9. Do you believe that the program currently offers rebates on enough energy efficient products to meet your customers' needs?
- a. If not, what products would you like to add? Are these currently being considered?

10. Is the program offering enough of an incentive to motivate your customers to participate?

- a. If not, what do you think should be changed, and why?

**(1) Improvements (10 min)**

11. Are you currently considering any changes to the program's design or implementation?

- a. What are the changes?
- b. What is the process for deciding whether or not to make these changes?

12. Do you have suggestions for improvements to the program that would increase participation rates, or is Duke Energy happy with the current level of participation?

13. Do you have suggestions for increasing energy impacts *per participant*, given the same participation rates, or is Duke Energy happy with the current per participant impact?

14. Overall, what would you say about the program is working really well?

- a. Is there anything in this program you could highlight as a best practice that other utilities might like to adopt?

15. What area needs the most improvement, if any?

- a. (If not mentioned before) What would you suggest can be done to improve this?

16. Are there any other issues or topics we haven't discussed that you feel should be included in this report?

17. Do you have any further questions for me about this study or anything else?

# Appendix B: Request Form



The National Theatre for Children

## PROGRAM REQUEST FORM Elementary Schools

Mail, fax or e-mail your response to:  
The National Theatre for Children  
2733 Park Avenue, Minneapolis, MN 55407  
Fax: 877-270-2734  
Email: jtrones@nationaltheatre.com

PROGRAM NAME: *The Energized Guyz*  
BROUGHT TO YOU BY: Duke Energy

**NTC WILL BE IN YOUR AREA: Mon, Nov. 7 through Fri, Dec. 16, 2011  
AND Tue, Jan. 17 through Fri, Mar. 16, 2012**

Days you prefer: \_\_\_\_\_  
1st choice 2nd choice 3rd choice

Times of day you prefer: \_\_\_\_\_  
1st choice 2nd choice 3rd choice

Number of assemblies preferred: \_\_\_\_\_

School start time: \_\_\_\_\_ School dismissal time: \_\_\_\_\_ Lunch hours: \_\_\_\_\_

Number of K-2 students: \_\_\_\_\_ Number of 3-6 students: \_\_\_\_\_ Number of teachers: \_\_\_\_\_

Please note any dates or days, your school **CANNOT** be scheduled during the offered dates (include holidays, vacations, in service days, conferences, testing, etc.) \_\_\_\_\_

**Contact Information: (please print)**

\_\_\_\_\_  
Primary contact and title email

\_\_\_\_\_  
Alternate contact and title email

\_\_\_\_\_  
School name Area code and phone number Fax number

\_\_\_\_\_  
School street address City State Zip Code

To receive information from The National Theatre for Children via e-mail regarding news or information of interest, please e-mail [optin@nationaltheatre.com](mailto:optin@nationaltheatre.com). We will not share, sell, or otherwise distribute your personal information.

## Appendix C: Letter to School Principal



ENERGY EFFICIENCY IN SCHOOLS

Duke Energy  
 LC22A / 526 South Church St.  
 Charlotte, NC 28202

Dear Educator:

Duke Energy is committed to helping educate young people about our main product—electricity, and how to use energy resources wisely.

That's why we are thrilled to offer at **NO COST** to your school a live theatrical production focusing on using energy wisely, designed for students in kindergarten through sixth grade!

The program—*The Energized Guyz*—features a zany cast of characters, including the energy villain Dr. Maybe, energy-wise guys Cape Cod and Tech Guy, and energy hero extraordinaire, Nikki Neutron. Together, they will have your students rolling in the aisles as they deliver important messages about energy efficiency and green energy decisions that will make the world a better place for us all.

*The Energized Guyz* is performed by professional actors from The National Theatre for Children. Based in Minneapolis, Minnesota, this organization specializes in writing and performing educational programs for children nationwide using simple sets and audience participation.

Here are the details:

- Who:** K-6<sup>th</sup> grade students in Duke Energy's service territory. Individual presentations are tailored for K-2 and 3-6 grade audiences.
- What:** 25-minute live theatre show, classroom & family activity books for each student, comprehensive teacher guides, and classroom & hallway posters.
- Where:** YOUR SCHOOL—the gym, cafeteria, assembly area or wherever a maximum of 350 students can be comfortably seated on the floor. (Because of their small sets The National Theatre for Children actors can go just about anywhere!)
- When:** Fall 2011 during regular school hours. (See enclosed Request Form concerning available dates for your location.)
- Why:** To teach the importance of energy efficiency through a fun experience.
- How:** To arrange for a performance at your school, please complete and return the enclosed Request Form via mail or FAX to the number on your request form.

If you have questions, or would like to schedule by phone, please call The National Theatre for Children at 1-800-858-3999, ext. 1. Scheduling is on a first-come, first-served basis and calendars are limited -- schedule *The Energized Guyz* for your school today!

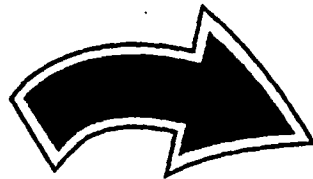
Sincerely,

Lindsey Palmer  
 Program Manager

[www.duke-energy.com](http://www.duke-energy.com)

# Appendix D: Teacher Survey and Instruction Flyer

## Thanks for Helping Save the World!



*When most of your students have returned their slips, find the color image of Nikki Neutron on the back of the Teacher Guide and add it to the Energized Guyz contest poster. This helps your school get closer to winning \$2,000!*



## Get Your FREE Energy Efficiency Kit and Help Your School Win \$2,000!

1. Fill out this chart with the names of each of your students.
2. Encourage your students to read the Energized Guyz workbook and request a free energy efficiency kit with their parents.
3. When your students' families request an energy efficiency kit, they will return the "I Did It!" slip form. Check their name off of this chart and give them an Energized Guyz trading card.
4. When most of your students have returned their slips, cut out the image on the back of the Teacher Guide and add it to the school Energized Guyz contest poster. This helps your school get closer to winning \$2,000.
5. And as a thank you to your class, send an email to energizedguyz@nationaltheatre.com and receive the link to the super secret bonus scene to share with your class!

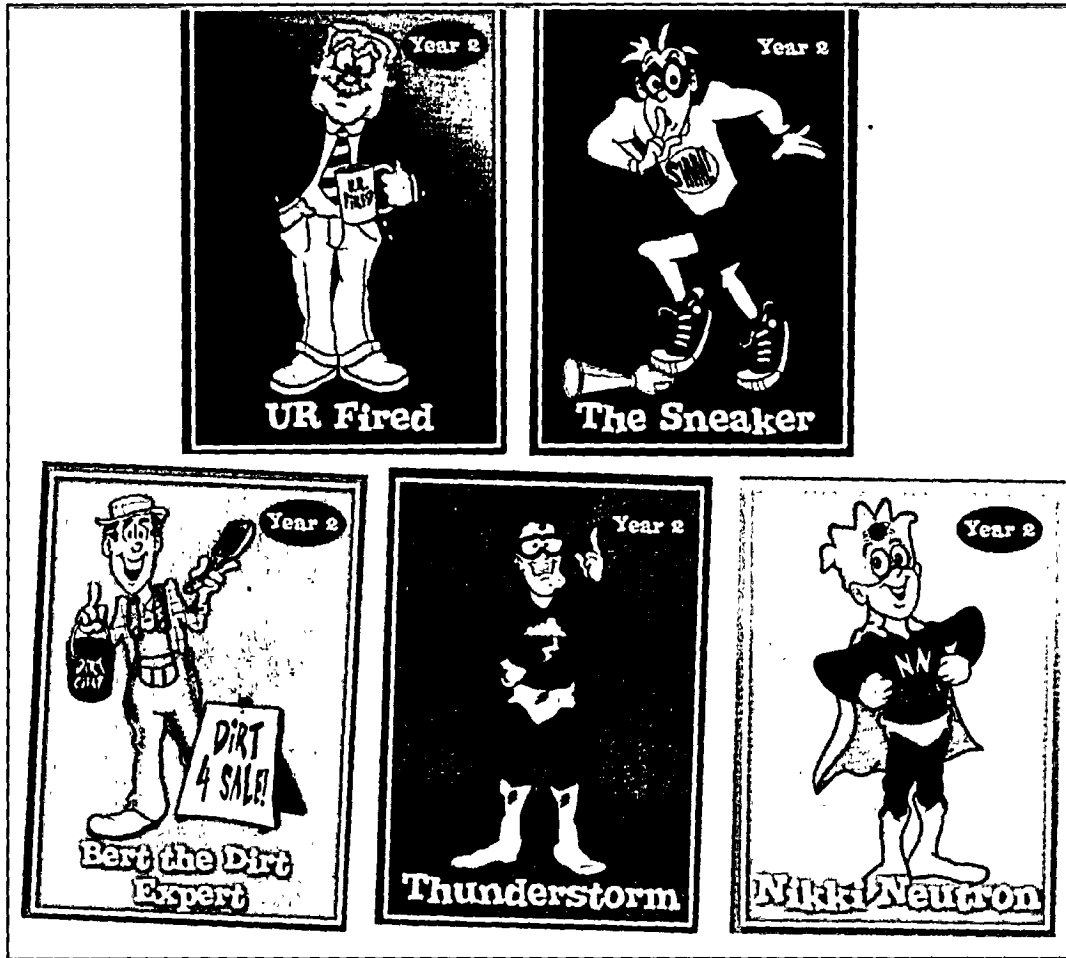
### Student Names

<input type="checkbox"/> 1. _____	<input type="checkbox"/> 16. _____
<input type="checkbox"/> 2. _____	<input type="checkbox"/> 17. _____
<input type="checkbox"/> 3. _____	<input type="checkbox"/> 18. _____
<input type="checkbox"/> 4. _____	<input type="checkbox"/> 19. _____
<input type="checkbox"/> 5. _____	<input type="checkbox"/> 20. _____
<input type="checkbox"/> 6. _____	<input type="checkbox"/> 21. _____
<input type="checkbox"/> 7. _____	<input type="checkbox"/> 22. _____
<input type="checkbox"/> 8. _____	<input type="checkbox"/> 23. _____
<input type="checkbox"/> 9. _____	<input type="checkbox"/> 24. _____
<input type="checkbox"/> 10. _____	<input type="checkbox"/> 25. _____
<input type="checkbox"/> 11. _____	<input type="checkbox"/> 26. _____
<input type="checkbox"/> 12. _____	<input type="checkbox"/> 27. _____
<input type="checkbox"/> 13. _____	<input type="checkbox"/> 28. _____
<input type="checkbox"/> 14. _____	<input type="checkbox"/> 29. _____
<input type="checkbox"/> 15. _____	<input type="checkbox"/> 30. _____

**To evaluate the program:**  
 1. Go to [www.playworks.com](http://www.playworks.com)  
 2. Enter your code **Duke2S13E**  
 3. Fill out the evaluation

# Appendix E: Program Materials

The front of the trading cards provided to elementary students:

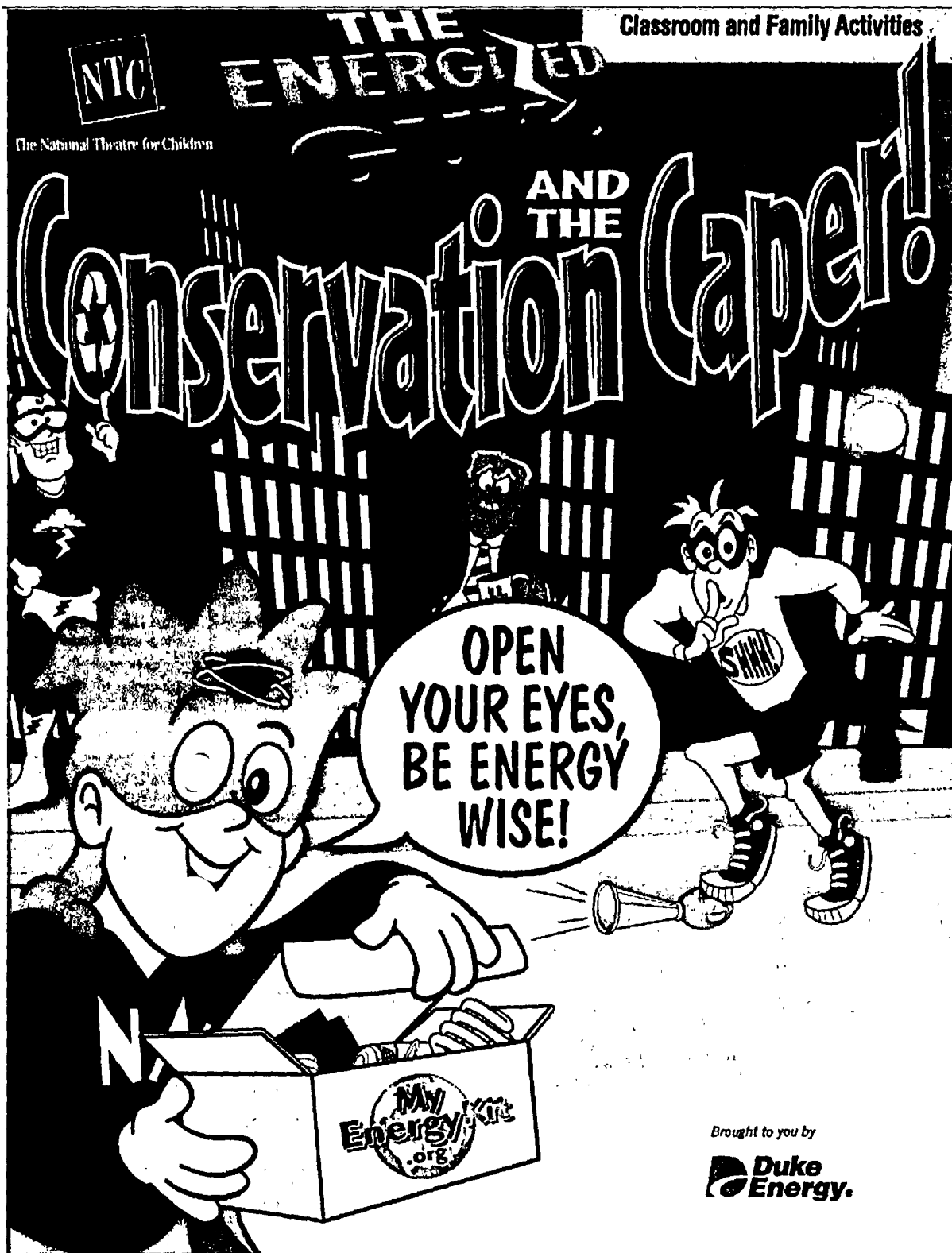




The back of the trading cards provided to elementary students:

Go to  
  
MyEnergyKit.org  
and request a FREE  
Energy Efficiency Kit  
and help save  
  
**THE WORLD!**  
or call tollfree:  
1-855-386-9548  
Thanks for requesting your  
FREE kit!  
© The National Theatre for Children 2013

The workbook distributed to children (each page includes a reminder to order the kit):



The back of the workbook:

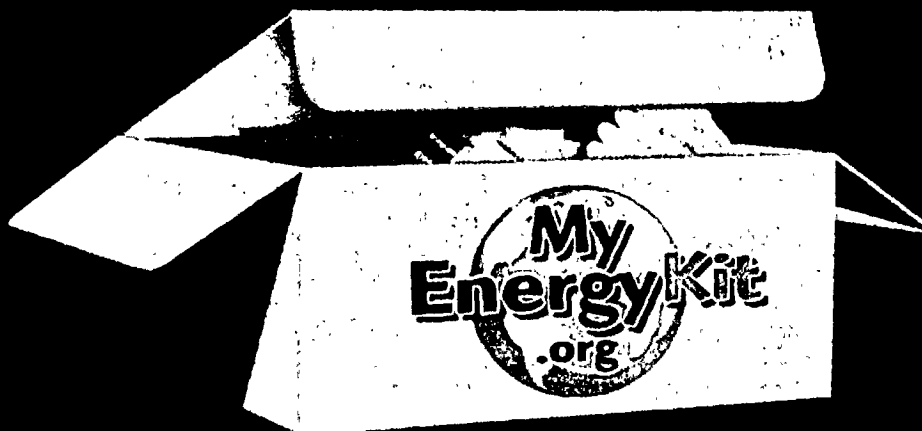
# Now's Your Chance!

## *Save the World!*

If you didn't get your kit last year, you can get one now! You can request your **FREE** Energy Efficiency Kit in one of 2 easy ways:

1. Go to [MyEnergyKit.org](http://MyEnergyKit.org)  
or
2. Send in the mail-in form

Call 1-855-386-9548  
for assistance



### **Duke Energy customers receive the following kit:**

- Compact Fluorescent Bulb (Energy Star Approved)
- Low Flow Showerhead
- Energy Efficiency Limglight Style Night Light
- Kitchen Faucet Aerator with swivel and flip valve
- Bathroom Faucet Aerator
- Water Flow Meter Bag
- Hot Water Gauge Card
- Duke Energy Labeled DOE Energy Savers Booklet
- Duke Energy Supplied Product Info/Instruction Sheet
- Glow Ring Toy
- Combination Pack of Switch/Outlet Gasket Insulators
- Teflon tape used for installing the showerhead/faucet aerator

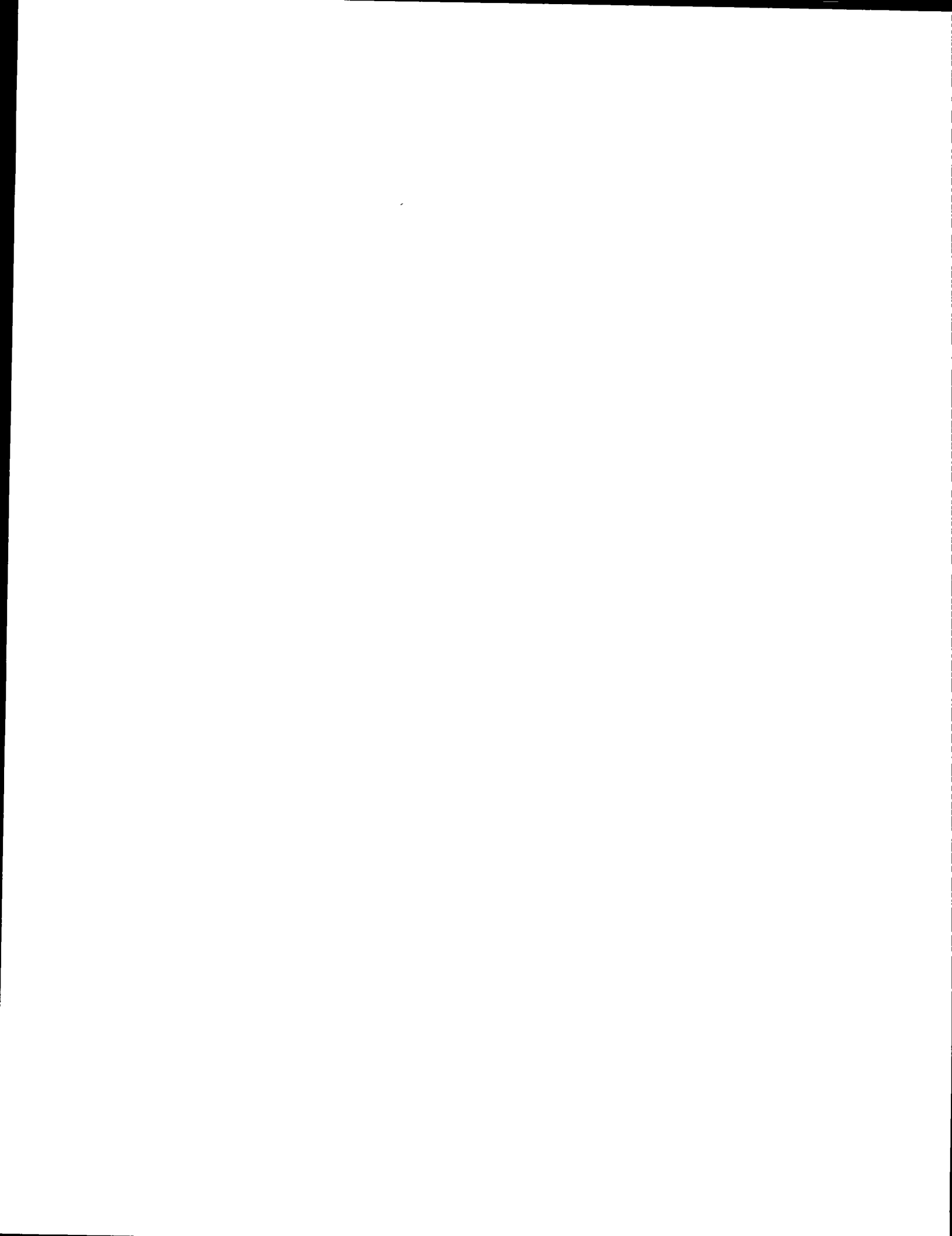


The National Theatre for Children

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Final Report

**Process and Impact Evaluation  
of the Energy Efficiency for Schools Program  
(The National Theatre for Children (NTC))  
in Kentucky**

**Prepared for  
Duke Energy**

139 East Fourth Street  
Cincinnati, OH 45201

July 14, 2014

**Submitted by**

**Subcontractors:**  
Minerva Smith

May Wu  
Integral Analytics

Nick Hall, Dave Ladd,  
and Johna Roth

**TecMarket Works**  
165 West Netherwood Road  
Oregon WI 53575  
(608) 835-8855



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## Executive Summary

### Key Findings and Recommendations

This section presents the key findings and recommendations identified through this evaluation of Duke Energy's Energy Efficiency for Schools (EE for Schools) Program in Kentucky.

### Significant Impact Evaluation Findings

Billing data was obtained for all participants with Duke Energy accounts in the EE for Schools program, who participated between May, 2013 and May, 2014. After processing, there was a total of 1,999 usable accounts. A panel model was used to determine net program impacts, where the dependent variable was daily electricity consumption from October, 2009 to May, 2014. These findings were independently verified by TecMarket Works. The results of the billing analysis are presented in Table 1.

**Table 1. Estimated Net EE for Schools Impacts: Billing Analysis**

	kWh	t-value <sup>1</sup>
<b>Per Participant Annual Savings (Net)</b>	267	2.92

### Significant Process Evaluation Findings

#### Key Findings from the Management Interviews

- Duke Energy's EE for Schools program is a solid, well-run program with an excellent network of implementers to support and exceed Duke Energy's distribution goals for this program.
- According to the program vendor, the levels of participation per participating school may present a potential challenge in the future. There's some concern that in order to meet kit distribution goals during future years, customer eligibility and/or kit contents may need to be adjusted to allow for repeat family participation during returning school visits.

#### Key Findings from the Performance Reviews

- The program performers were professional and courteous. They arrived at each school on time and were set up and ready for their efforts well before the students arrived, allowing them to focus on the students as they arrived.
- The performances were well-received by the students and the children were excited about, and focused on, receiving their energy efficiency kit.
- Every staff person we spoke with indicated that The National Theatre for Children (NTC) was "*wonderful*" to work with.

<sup>1</sup> The T-value indicates the significance of the savings estimate. If the absolute value of the T-value is greater than 1.96, the savings estimate is significant. In many cases because saving is denoted as negative, and t-value is reported as is instead of absolute value. In such cases, a T-value < -1.96 means the savings are significant.



- The troupes successfully altered the complexity of the material presented to match the comprehension ability of the age of the children attending. This is important because if the information is too advanced to understand, the lessons will not be understood by the younger children, and if the lessons are too simple, the older students lose interest.

### Key Findings from the Student Family (Participant) Surveys

Thirty-two participating student families that live in Duke Energy's service territory in Kentucky participated in an online survey which asked about what kit items they used and their satisfaction with the items.

Table 2 shows that the most commonly installed items, with installation rates of 75% or higher, were lighting items: 13-watt CFLs (84.4%) and the night light (84.4%). The Department of Energy (DOE) booklet was also used by more than two-thirds of respondents (71.9%). The kit items which are least likely to be used are the water flow meter bag (15.6%) and water temperature card (31.3%).

Ratings of satisfaction by those who installed the kit items range from 8.75 to 9.50 on a 10-point scale where "10" is most satisfied, indicating that these measures were very popular with the participants who installed and used them. Overall, participants rated their satisfaction with 168 installed (or used) kit-provided measures: the mean of all measure satisfaction ratings is 9.22 on a 10-point scale; a very high score.

**Table 2. Summary of Program Measures Installed and Satisfaction with Measures (N=32)**

	Count Installed or Used	Percent Installed or Used	Mean Satisfaction Score
13-watt CFL	27	84.4%	9.37
18-watt CFL	18	56.3%	9.61
Energy efficient showerhead	16	50.0%	8.75
Kitchen aerator	14	43.8%	9.36
Bathroom aerator	14	43.8%	9.50
Switch and outlet gaskets	14	43.8%	8.93
Water flow meter bag	5	15.6%	9.20
Water temp card	10	31.3%	9.30
Night light	27	84.4%	9.22
Booklet (rating "how informative")	23	71.9%	8.96

Surveyed customers also rated their satisfaction with the program as a whole, and their average rating for the program is 9.16 on a 10-point scale; this is also a high level of satisfaction.

More than two-thirds of surveyed participants report that after participating in this program, they felt more educated about energy efficiency (71.9% or 23 out of 32) and were also more concerned about energy efficiency (71.9% or 23 out of 32).

## Recommendations

- Consider the development of an alternative kit for families who have already participated due to repeat visits to schools. Focus the alternative kits on CFL and LED lighting products to the extent that they can be cost effective as a combined measure grouping. Segregate the kits so that the primary (all measures) kit is given to first time attendees from a home and the alternative kit can be provided to children from homes who have already received the primary kit.
- Duke Energy should consider including a “parents” envelope in the kit that presents and describes the other residential program offerings from Duke Energy with a toll-free phone number and a website address for further information.
- NTC should stress the importance of following the exact wording of the script for energy savings-related content and monetary equivalencies. For example, the actors stated during the performance that changing one CFL will provide \$40 in savings annually, when in fact that value is closer to the savings over the lifetime of a bulb and is written correctly in the script.
- This program is a well-designed, well-operated program. The results of this evaluation suggest that a future process evaluation may not be needed for a few years unless the program is substantially changed or it is required by a regulatory agency. In addition, a future impact evaluation may not be necessary unless the kit contents or methods of delivery are changed.

## Introduction and Purpose of Study

### Overview and Objective

This document presents the process and impact evaluation report for Duke Energy's EE for Schools Program as it was administered in Kentucky. The evaluation was conducted by TecMarket Works, Integral Analytics, and Minerva Smith.

### Summary of the Evaluation Data

The findings presented in this report were analyzed using NTC performance reviews, participant surveys, a billing analysis, and interviews with program vendors as presented in Table 3 below.

**Table 3. Evaluation Date Ranges**

Evaluation Component	Dates Under Study	Dates of Analysis
Kentucky Performance Reviews	May 2014	May - June 2014
Program Vendors	May 2014	May - June 2014
Participant Surveys	May 2013 – May 2014	May - June 2014
Billing Analysis	May 2013 – May 2014	May - June 2014

### Evaluation Objectives

The objective of the evaluation is to document program operations and identify if there are any areas of improvement for future program implementation, customer satisfaction with the program, and to estimate energy savings.

## Description of Program

Duke Energy has partnered with The National Theatre for Children (NTC) for the Energy EE for Schools Program. The EE for Schools Program is an energy conservation program available in Ohio, North Carolina, South Carolina, and Kentucky and is available to K-12 students enrolled in public and private schools.

The EE for Schools Program provides principals and teachers with an innovative math and science related curriculum that educates students about energy, resources, electricity, ways in which energy is wasted, and how to use our resources wisely. Education materials focus on concepts such as energy, renewable fuels, and energy conservation through classroom and take home assignments to engage student's families. Curriculum materials are enhanced with a live theatrical production for elementary students and a more academically advanced theatrical production for middle school students, both performed by two professional actors. The current program is developed to educate students in kindergarten through eighth grade. School principals are the main point of contact at the schools and NTC schedules the performances at the convenience of the school.

Once the principal (or other school administrator) has confirmed the performance date and time, all curriculum materials are delivered to the principal's attention for teacher distribution two weeks prior to the performance. Materials include school posters, teacher guides, and classroom and family activity books. Students are encouraged to complete a home energy survey with their family (found in their activity book), to receive an Energy Efficiency Starter Kit that contains specific energy efficiency measures to reduce home energy consumption. Non-Duke Energy customers at the participating schools can receive a smaller Energy Efficiency Starter Kit specifically for non-customers.

### Duke Energy Customers received:

- 1.5 GPM Energy efficient showerhead
- 1.5 GPM kitchen faucet aerator with swivel and flip valve
- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 18 watt Energy Star rated mini compact fluorescent (75 watt incandescent equivalent), with 12,000 hour life
- 1.0 GPM needle spray bathroom faucet aerator
- Combination Pack of switch and outlet gasket insulators - 8 outlets and 4 socket gaskets
- Energy Efficient Limelight style night light
- Duke Energy labeled DOE "Energy Savers" booklet
- Roll of Teflon tape for showerhead
- Product information and instruction sheet
- Glow Ring Toy

### Non-Duke Energy Customers received:

- Water flow meter bag

- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 8 outlet gasket insulators
- Duke Energy labeled DOE “Energy Savers” booklet
- Glow Ring Toy

# Methodology

## Overview of the Evaluation Approach

This process evaluation has three components: management interviews, performance reviews, and student family (participant) surveys. This evaluation focuses on Kentucky. However, two Ohio schools were visited to review NTC performances in addition to Kentucky schools. The management interviews were conducted with Kentucky as the focus, and the participant surveys were conducted with participating families in Kentucky.

The impact evaluation was conducted on participants living in Kentucky that are Duke Energy customers.

## Study Methodology

### Billing Analysis

Billing data was obtained for all Kentucky participants in the K-12 program between May 4, 2013 and May 22, 2014 and who had accounts with Duke Energy. After processing, there was a total of 1,999 usable accounts. A panel model was used to determine program impacts, where the dependent variable was daily electricity consumption from October 2009 to May, 2014. The model included terms to control for the effect of weather on usage, the effect of impacts from other Duke Energy offers, the effect of normal non-program induced energy use changes, as well as a complete set of monthly indicator variables to capture the effects of non-measurable factors that vary over time (such as economic conditions and season loads).

### Management Interviews

Two management interviews were conducted with program implementation staff in order to capture their insights about the program's operations and challenges in Kentucky. We interviewed the project manager for the program at The National Theatre for Children (NTC), and a manager at AM Conservation.

### Performance Reviews

Four participating schools (two in Kentucky, two in Ohio<sup>2</sup>) were visited to review six NTC performances in May of 2014. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person who coordinated with NTC for the visit, covering various aspects of the program, such as program operations, aspects of their involvement, and communications with NTC.

### Participant Surveys

This survey was conducted online with participating students' families in Kentucky who, according to program tracking records, received an energy efficiency kit from Duke Energy. Only Duke Energy Kentucky customers who received the full energy efficiency kit were invited to take the survey.

---

<sup>2</sup> Two Ohio schools were visited in order to allow for more reviews of the NTC performances.

## Data collection methods, sample sizes, and sampling methodology

### Billing Analysis

The billing analysis used consumption data from all complete data provided for the EE for Schools participants in Kentucky who participated between May, 2013 and May, 2014.

### Management Interviews

Two management interviews were conducted with program implementation staff and management in order to capture their insights about the programs operations and challenges. We interviewed the project manager for the program at NTC and a manager at AM Conservation.

### Performance Reviews

Four participating schools were visited to review six NTC performances in May of 2014. The reviews included gauging responses from teachers and children, and discussing the program with the school staff person who coordinated with NTC for the visit, covering various aspects of the program, such as program materials, aspects of their involvement, and communications with NTC.

### Participant Surveys

A list of 551 Duke Energy Kentucky participant records (between the dates of July 24, 2013 and March 27, 2014) that included email addresses were randomly sorted by TecMarket Works. Email invitations were sent to a few hundred participants at a time until the list and number of email invites was exhausted. Surveys were conducted online and administered by Duke Energy. All data analysis was conducted by TecMarket Works.

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

### Billing Analysis

N/A (all participants included, sampling was not used)

### Performance Reviews

From the list of 18 schools with performances scheduled in April and May of 2014, four participating schools were visited to review six NTC performances in May of 2014.

### Participant Surveys

From the participant list of 551 Duke Energy customer records, students' families were invited to complete the survey online between April 25, 2014 and May 26, 2014, and a total of 32 usable surveys were completed by Duke Energy customers in Kentucky.

## Expected and achieved precision

### Participant Surveys

Duke Energy Customers: The survey sample methodology had an expected precision of 90% +/- 6.5% and an achieved precision of 90% +/- 5.7%.

### Billing Analysis

All savings estimates from the billing analysis were statistically significant at the 95% confidence level.

### Description of measures and selection of methods by measure(s) or market(s)

Duke Energy Customers received:

- 1.5 GPM Energy efficient showerhead
- 1.5 GPM kitchen faucet aerator with swivel and flip valve
- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 18 watt Energy Star rated mini compact fluorescent (75 watt incandescent equivalent), with 12,000 hour life
- 1.0 GPM needle spray bathroom faucet aerator
- Combination Pack of switch and outlet gasket insulators: 8 outlets and 4 socket gaskets
- LED night light
- Duke Energy labeled DOE "Energy Savers" booklet
- Roll of Teflon tape for showerhead
- Product information and instruction sheet
- Glow Ring Toy

Non-Duke Energy Customers received:

- Water flow meter bag
- Water temperature gauge card (Hot Water Temp Card)
- 13 watt Energy Star rated mini compact fluorescent (60 watt incandescent equivalent), with 12,000 hour life
- 8 outlet gasket insulators
- Duke Energy labeled DOE "Energy Savers" booklet
- Glow Ring Toy

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

#### Billing Analysis

The specification of the model used in the billing analysis was designed specifically to avoid the potential of omitted variable bias by including monthly variables that capture any non-program effects that affect energy usage, as well as other Duke Energy offers. The model did not correct for self-selection bias because there is no reason to as long as the program remains voluntary.



## Impact Evaluation: Billing Analysis Results

This section of the report presents the results of a billing analysis conducted over the participants in the EE for Schools Program in Kentucky. Billing data was obtained for all participants in the EE for Schools Program between May, 2013 and May, 2014 and who had accounts with Duke Energy. After processing, there were a total of 1,999 usable accounts. A panel model was used to determine program impacts, where the dependent variable was daily electricity consumption from October 2009 to May, 2014. The results of the billing analysis are presented in Table 4. This table shows that the EE for Schools Program produced statistically significant savings for participants in Kentucky.

**Table 4. Estimated Carolinas EE for Schools Impacts: Billing Analysis**

	kWh	t-value
<b>Per Participant Annual Savings (Net)</b>	267	2.92

For this analysis, data was available both across households (i.e., cross-sectional) and over time (i.e., time-series). With this type of data, known as “panel” data, it becomes possible to control, simultaneously, for differences across households, as well as differences across periods in time through the use of a “fixed-effects” panel model specification. The fixed-effect refers to the model specification aspect that differences across homes that do not vary over the estimation period (such as square footage, heating system, etc.) can be explained, in large part, by customer-specific intercept terms that capture the net change in consumption due to the program, controlling for other factors that do change with time (e.g., the weather).

Because the consumption data in the panel model includes months before and after the installation of measures through the program, the period of program participation (or the participation window) may be defined specifically for each customer. This feature of the panel model allows for the pre-installation months of consumption to effectively act as controls for post-participation months. In addition, this model specification, unlike annual pre/post-participation models such as annual change models, does not require a full year of post-participation data. Effectively, the participant becomes their own control group, thus eliminating the need for a non-participant group. We know the exact month of participation in the program for each participant, and are able to construct customer specific models that measure the change in usage consumption immediately before and after the date of program participation, controlling for weather and customer characteristics such as other Duke offers.

The fixed effects model can be viewed as a type of differencing model in which all characteristics of the home, which (1) are independent of time and (2) determine the level of energy consumption, are captured within the customer-specific constant terms. In other words, differences in customer characteristics that cause variation in the level of energy consumption, such as building size and structure, are captured by constant terms representing each unique household.

Algebraically, the fixed-effect panel data model is described as follows:

$$y_{it} = \alpha_i + \beta x_{it} + \phi P_{it} + \theta T + \delta DP_{it} + \varepsilon_{it}$$

where:

- $y_{it}$  = energy consumption for home  $i$  during month  $t$   
 $\alpha_i$  = constant term for site  $i$  (the fixed-effect)  
 $T$  = indicator variables for each time period in the analysis  
 $P$  = indicator for the treatment for the program in question  
 $DP$  = indicators for other utility-sponsored programs  
 $\beta, \varphi, \theta, \delta$  = vectors of estimated coefficients  
 $x$  = vector of non-program variables that represent factors causing changes in energy consumption for home  $i$  during month  $t$  (i.e., weather)  
 $\varepsilon$  = error term for home  $i$  during month  $t$ .

With this specification, the only information necessary for estimation is those factors that vary month to month for each customer, and that will affect energy use, which effectively are weather conditions and participation in other Duke Energy programs. Other non-measurable time-variant factors (such as economic conditions and season loads) are captured through the use of monthly indicator variables.<sup>3</sup> To control for weather effects, the model includes CDD and HDD

The effect of the EE for Schools Program is captured by including a variable which is equal to one for all months after the household participated in the program. The coefficient on this variable is the savings associated with the program. In order to account for differences in billing days, the usage was normalized by days in the billing cycle. The estimated electric model is presented in Table 5.

**Table 5. Estimated Savings Model – dependent variable is daily kWh usage, October 2009 through May 2014 (savings are negative)**

Independent Variable	Coefficient (daily kWh)	Equivalent Percentage (%)	t-value
K-12 participation – Kentucky	-0.73	1.62%	-2.90
Sample Size	83,665 observations (1,999 homes)		
R-Squared	68%		

Note that in this table, the dependent variable is the daily energy use. To derive the annual kWh savings, the coefficient in the table was multiplied by 365 to give the 267 kWh/year savings estimate for Kentucky. The equivalent percentage is calculated as the coefficient (daily kWh) divided by average pre-program usage of each state; the equivalent percentage savings in KY is calculated as 0.73 divided by the KY average pre-program usage of 45.2 kWh /day. The complete estimated model, showing the weather and time factors, is presented in *Appendix C: Estimated Statistical Model*.

<sup>3</sup> See Jeffrey Wooldridge *Econometric Analysis of Cross Section and Panel Data* (Cambridge: MIT Press, 2002), 283-284 for a discussion of this model and its applicability to program evaluation.

## Management Interviews

The management interviews reveal that the program is operating very well and is surpassing its goals for energy efficiency kit distribution. Overall, the satisfaction with program operations and communications is high.

## The National Theatre for Children

The National Theatre for Children (NTC) is the contracted third-party implementer for the EE for Schools Program. The manager for this program at NTC is the main liaison for Duke Energy and attends the weekly meetings with Duke Energy. The NTC manager has been working with Duke Energy since the program launched in 2011. This program launched in Kentucky in April, 2013.

## Program Goals

While NTC's primary goal is to encourage participation so that more kits are delivered to households, the program's overall goals are as follows and have not changed since the launch of the program:

- The delivery of grade appropriate energy efficiency learning activities such as energy usage and conservation into existing science and/or math based curriculum across the selected territory served by Duke Energy.
- Integrate Duke Energy's Energy Efficiency Starter Kit into the science and/or math curriculum.
- Achieve target participation and energy impacts through the installation and tracking of energy efficiency measures from the Starter Kit to the specific household accounts of Duke Energy students.
- Create sustainability of the program and new impacts year after year by reaching new families that haven't participated in the program in the last three (3) years.

The goals for energy efficiency kit distributions for the 2012-2013 school year were not met in Kentucky, as the program launched performances in mid-April of 2013 after the program was approved in late 2012. The first few months of 2013 were focused on program planning and launch, which allowed for only about a month of activity before the school year ended<sup>4</sup>. At that time, staff expressed no doubt that goals would be exceeded in the future. Indeed, the Kentucky goals were exceeded in the 2013-2014 school year. From July 1, 2013 through June 30, 2014, the goal was to distribute 700 kits; 1,796 kits were distributed as of May 26, 2014.

All interviewees agreed that the program is successful at meeting its goals, particularly given that they cannot perform during the summer months. However, in order to meet future distribution goals at the current rates of distribution among the limited number of schools within the territory, it may be necessary to establish a second kit distribution so households can participate again or adjust the goals to account for school saturations once they are all serviced by the program. While NTC is operating at a pace to meet its goals, there are a limited number of schools to visit in Duke Energy's Kentucky territory. NTC can and does visit the same schools with new

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<sup>4</sup> The original goal was to distribute 1,000 kits by the end of June 2013, but with the time allowed they made good progress and achieved 65% of their kit distribution goal.

performances each year, however during a three-year period, only one kit can be sent to each household. This condition keeps the population of targeted children constant to reflect the population to be served, but decreases the number of kits that can be distributed with each round of performances as those children receive the primary kits. This presents a challenge to NTC, in that each year the pool of eligible customers decreases due to previous participation, yet the number of schools to target remains the same. NTC is currently comfortable with their goals and is confident that they will be met next year. NTC tracks the information from schools they have previously visited and knows before contacting the school approximately how many of the student families have or have not participated in the past. This "saturation" data allows NTC to better target the schools with previously lower levels of kit orders in order to maximize the potential number of new participants from that school. However, more energy savings could be achieved with an alternate kit for households who have previously participated, making additional cost effective savings possible if the kit contents can be acquired inexpensively enough to allow for cost effective net savings to be achieved.

### **The Incentive for Schools**

**Contests.** The schools are invited to participate by NTC through faxes, letters, and phone calls to the school principal or other administrator. Schools are inclined to participate as it is a fun activity for the students, and they are further incentivized by the contests provided by NTC. Each participating Kentucky school is eligible to win \$2,000 for their school, and new for this year of the program, the school also receives a check if the school reaches 100 participants. For example, if the school has 100 of the student families order kits, the school receives a check for \$100 and is entered into a drawing for \$1000. If there are 150 participants, the school is entered into two drawings, the drawing for \$1000 and one for \$1500. With 200 participants, they school get entered into the \$1000 and \$1500 drawings, and an additional drawing for \$2000.

These contests are promoted throughout the schools with posters, as can be seen in Figure 1 below. The school prizes are awarded in July after the end of the school year ending in Spring of 2014) so that the schools are in session and the children can enjoy the announcement.

**Theatrical Performance.** The theatrical performance (discussed in more detail in the following section) changes each school year according to NTC policy. Duke Energy reviews the scripts, but does not need to provide approval of the script before it is fielded at the schools.

**Classroom Activities.** The teachers are provided with a workbook containing classroom activities, and also with an online whiteboard<sup>5</sup> that is being used more each year by the teachers.


**Energy Efficiency Kits.** The energy efficiency kits are available to student family and teacher households who have not received a kit in the previous three years.

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<sup>5</sup> All whiteboard activities are in SMARTboard ".notebook" format, and can be found at <https://www.resourcereward.org/tour-central.html>.

Learn How to Win Up to \$2,000 for Your School!

# THE RESOURCE FORCE



Coming to Your School on This Date:  
 May 23, 2014

Have You Seen this Hilarious Show You'll Know:

- What are natural resources?
- How students use resources
- How resources are wasted
- What YOU can do

**Don't Forget!**  
 Request your very own Resource Reward Kit... It's FREE! The kits have water and energy saving items to use at home!  
**The More Kit Requests Your School Submits, the Larger the Prizes.**

<b>100 KITS REQUESTED</b> School wins \$100 and is automatically entered into a drawing for \$1,000	<b>150 KITS REQUESTED</b> School wins \$150 and is automatically entered into a drawing for \$1,500	<b>200 KITS REQUESTED</b> School wins \$200 and is automatically entered into a drawing for \$2,000
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**See the Show, Request a Kit and Win!**  
 There are Three Easy Ways to Request a Kit:  
 1. Go to [www.ResourceReward.org](http://www.ResourceReward.org)  
 2. Call 1-855-386-9548  
 3. Ask your science teacher for a sign-up form

Resource Reward Kits must be used by 6/30/14. See rules for details.




Figure 1. Kentucky School Hallway with an NTC Poster

## Marketing

The program is marketed by NTC with mass mailings to school administrators occurring two or three times a year, and with smaller, more targeted campaigns throughout the year. Since the EE for Schools Program is for grades kindergarten through 8, NTC has flexibility in choosing the targeted schools and grades for the program based on scheduling, routes, and the saturation of

previous participants from past visits to the schools. At this time, there are no plans to target high school students.

Duke Energy provides NTC information regarding the zip codes that are within the Duke Energy territory in Kentucky, and also supplies statistics on the number of Duke Energy customers within each zip code. This allows NTC to target schools with a greater propensity of having a high number of Duke Energy customers' children enrolled at those schools. NTC was able to schedule performances at more than 50% of the schools it contacted about the program.

With this success rate, managers agreed that the program should continue to offer the program to the schools and visit a second and third time within the three year time frame if the school agrees to participate, but possibly offer a second, different kit to the students' families that have previously participated in the program.

### Quality Control

When a request for an energy efficiency kit is received, it is reviewed for eligibility by Relationship<sup>1</sup>, the data management vendor, and Duke Energy. The verified list of participants is uploaded weekly by Duke Energy for AM Conservation, which distributes the kits, sending out shipments approximately once a week (depending on the number of orders).

All student families from participating schools who have not received a kit in the past three years are eligible to receive an energy efficiency kit. The contents of the kit received are different for Duke Energy customers and non-Duke Energy customers. This is because Duke Energy is not allowed to count the energy savings from the non-Duke Energy serviced homes. The kit that is sent to non-Duke Energy customers contains fewer measures as a way to reduce the costs associated with providing kits for which Duke Energy cannot claim energy savings credit.

The site for ordering kits<sup>6</sup> includes a disclaimer indicating eligibility requirements<sup>7</sup>. Customers who may visit the site though do not have a child attending a qualifying school are sent a letter (from NTC, on Duke Energy letterhead) explaining to them that they were not qualified and ineligible to receive a kit. There were no complaints from people who requested kits but were not eligible to receive them or about how the situation was handled.

The screening process is working well with the Kentucky program.

### Communication

NTC reports that they conducted weekly conference calls with Duke Energy to discuss scheduling, communications, problems that may have come up and the associated solutions, and program delivery strategies. During those meetings, NTC report to Duke Energy about any

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<sup>6</sup> <https://www.resourcereward.org/>

<sup>7</sup> "Howdy Duke Energy Customers! Has your child's school recently hosted a SHOWDOWN at RESOURCE RANCH or THE RESOURCE FORCE presentation sponsored by Duke Energy? Then your household may be qualified to receive a Free Energy Efficiency Kit as part of an approved curriculum for residents in Ohio, North Carolina, South Carolina and Kentucky. Fill out the information below to see if your family is eligible!"

issues that were identified during the week. NTC stated that the Duke Energy program manager was always willing to consider new ideas and make adjustments to the program operations. In addition, NTC reported that the program operations “didn’t skip a beat” with the change to the new Duke Energy program manager.

### **Recommendation**

While all interviewees agreed that the program is successful at meeting its goals, the current high levels of participation within a small number of schools may present a potential challenge in the future. In order to meet kit distribution goals during future years, customer eligibility and/or kit contents (including use of multiple kits) may need to be adjusted. Under current program rules, families are only eligible to receive one kit every three years. Therefore, in order to maximize the number of participating households at each school during repeat visits to the same school in future years, different kits containing unique items may be required each year so that energy savings can be counted among families who desire to participate multiple years in a row.

### **Summary**

Duke Energy’s EE for Schools Program seems to be well structured and managed with a skilled network of implementers to support and exceed Duke Energy’s distribution goals for this program.

## Performance Reviews

Six theatrical performances in Ohio and Kentucky were reviewed in May of 2014. Two participating schools in Kentucky were visited to review four NTC performances, and two participating schools in Ohio were visited to review two NTC performances. The reviewed NTC performances were evenly split between middle school and elementary performances. All reviewed performances were considered for this evaluation.

Short onsite interviews were conducted with teachers and administrators depending on their involvement in the program and their availability during the visit to the school. TecMarket Works asked interviewees about various aspects of the program, such as their satisfaction with the program materials and with their communications with NTC staff.

The review also included discussions with NTC actors and an evaluation review of the performance. The troupes were aware of the evaluators' presence, but past experience has shown there were no differences in the performances based on their awareness of the evaluators' presence.

## Theatrical Performances

The primary purpose of the performance review was to see if NTC was fulfilling the goal of Duke Energy to share energy conservation tips and have students' families<sup>8</sup> order the energy efficiency kit. TecMarket Works and Minerva Smith, an educational consultant, observed three troupes perform the programs. Each troupe consisted of two people playing multiple characters.

Every performance started out by mentioning that the program was being provided by Duke Energy, and the troupes displayed the Duke Energy logo before the start of each performance. Duke Energy was also thanked at the end of each performance.

## Elementary School Performances

The title of the elementary performance was "Showdown at Resource Ranch." The actors were enthusiastic and energetic and the performance started with the actors listing the four main points for the program. The main points were: how energy and electricity are made, uses of electricity, how energy is wasted, and how to conserve energy. The children were told that coal, oil, natural gas, and sometimes uranium are burned at a power plant to boil water and create steam. Diagrams were used to show the energy resources and the path they took to create electricity. The actors stated clearly that the more electricity we use, the more resources we use.

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<sup>8</sup> As not all students live in households served by Duke Energy, there were two kits available, one for Duke Energy customers, and a smaller kit for non-Duke Energy customers, as described in the Description of Program on page 6.





**Figure 2. Elementary School Performance in Action**

The next portion of the program told the children how to save electricity by turning off lights and appliances (including appliances children are familiar with such as Xboxes and Wii gaming systems), and using compact fluorescent light bulbs. The energy saving performances were more direct, more instructional, and a central part of the presentation, an improvement over previous programs of this type. The performance included financial equivalencies that were appropriate for the children, such as how changing one incandescent light bulb to a CFL would save about \$40 over the lifetime of the bulb which is the equivalent of three pizzas – “if you change four bulbs that’s enough savings for your classroom to have a pizza party!”

Solar, hydro, and wind were explained and identified as renewable resources. Coal and natural gas were identified as non-renewable resources. The audience was told power companies use a combination of these resources. Again, diagrams were used to identify resources.

The importance of water conservation was also discussed. Suggested ways to conserve water included: shutting off the water when brushing teeth and washing hands; fixing leaky faucets; doing full loads when using dishwashers and washing machines; and using energy efficient showerheads. Again, equivalencies the children could relate to were used, for example, if the taps are turned off while the children are brushing their teeth, “it saves eight gallons of water, which is about the size of a small fish tank.”

Ways to save electricity were repeated multiple times throughout the 20-25 minute program. The slogan “*Open Your Eyes, Be Resource Wise*” was repeated at least six times, with the children enthusiastically joining in at the end of the performance.

A volunteer from the audience held a banner that said, “Open your eyes, be resource wise.” The students were asked to repeat this phrase. The volunteer was given a short quiz: “Can we use a showerhead to save water? Can we use CFLs to save electricity?” The energy efficiency kit was held up and the students were told, “This kit contains seven different ways to save natural resources.” Also at this point, one of the characters changed their name from “Billy the Kit” to “Billy the Resource Reward Kit” once again emphasizing the energy efficiency kit, with thanks to Duke Energy.

The children were shown items from the energy kit to encourage them to order a kit for their families. They were told how to get a kit by going online or mailing in the card from the workbook that they either received before or after the performance in their classrooms from their teachers. Small cards that have the website address and a toll free number for ordering the energy kit were also given to the children to take home.

Children were told that their school had the opportunity to win \$2,000, depending on how many kits were ordered from their school. The prize was awarded to the school with the highest percentage of students ordering the kit in Kentucky. This prize seemed to get the children excited and motivated.

### **What Works Well**

In reviewing the performances, the following were noted as working well in gaining attention and in relaying the energy efficiency information to the children.

1. The actors were professional and exuberant. They were always set up on time and ready for each performance.
2. Directions and expectations for behavior were set before the program began.
3. Key energy efficiency points were made repeatedly, with visuals and enthusiasm.
4. Children were involved by repeating the key points of information.
5. The actors would select a child from the audience, which increased excitement.
6. Even though there were only two actors, they each play many characters. By changing their costumes and voices they keep the children entertained.
7. When visiting classrooms after the performance, all of the children were eager to share information they had learned.
8. Many teachers told us they thought that the program was great.
9. Use of charts during the performance gave the children a visual image to help them remember information.
10. All of the children were attentive during the program and seemed to enjoy it.
11. When the troupes had room to be on the floor walking among the children, they seem to garner more attention
12. The troupes successfully altered the complexity of the material presented to match the comprehension ability of the age of the children attending. This is important because if the information is too advanced to understand, the lessons will not be understood by the younger children, and if the lessons are too simple, the older students lose interest.

### **Middle School Performances**

The title of the middle school performance was “Resource Force.” The middle school performance was divided into four sketches. Each sketch addressed one of the four points that they were emphasizing through comedy with help from the attending children. The performances were excellent and provided good information and were well-received by the students.

As the students were entering the auditorium, the actors got names of teachers and entertainers, which were written on small pieces of paper and placed into an “idea bucket.” These were selected throughout the performance and were very effective at helping to keep the attention of the students.

For example, the first sketch took place in a world of super heroes. A volunteer student was taken from the audience to be a super villain. This volunteer was the character Mister Meaner’s intern and was dressed in a cape and a doomsday helmet. Mister Meaner said, “Today is the day to defeat my arch enemy.” A teacher’s name was drawn from the idea bucket as the enemy. The sketch continued based on the doomsday device not working because there was no energy, with the lesson to the children being a discussion of how electricity is produced at a power plant, the limitations of fossil-based resources.

Conservation was the topic of the second sketch; the actors emphasized that leaving the lights and other electrical appliances on when you leave has a harmful impact on the environment. Again, the actors mentioned appliances like televisions, computers and Xboxes that the children are likely to use most, and it’s mentioned that a small amount of power is used even when you have them off, providing a lesson on phantom energy. It was also stated that students’ cell phone chargers are among the biggest users of phantom energy. The actors show a power strip and tell the children that flipping the one switch will save lots of energy, and that phantom energy accounts for 8% of energy usage.

The third sketch focused on some of the items in the energy efficiency kit, incorporating the CFLs and energy efficient showerheads.



**Figure 3. Middle School Performance in Action**

### **What Works Well**

1. The actors asked for certain types of words to be put in the idea bucket before the performance began. Some of the students included teachers' names. When a teacher's name was used in the script the kids reacted positively and interest was strengthened. They also included references to music bands and current movies in which the children were interested. This was effective in holding the children's attention.
2. The information presented to middle school students had more complex information.
3. Use of game systems and turning off power was included, providing examples that were relevant to their lives.
4. Excellent connections and examples were made about how saving energy impacts their lives and can add up over time. The troupes stated that if you left the water on while brushing your teeth you were wasting one to five gallons of water each time, and then extrapolated that amount over a year to be "enough water to hold a tank with six sharks."
5. The students were engaged during the whole performance and even came up to the actors after it was over. Middle school students are generally less reactive and do not express how much they are enjoying something, but this was not the case for these presentations that engaged the students' interests.

## Program Materials

The onsite visits indicated that NTC was supplying the schools with enough program materials before the performance to allow the schools to distribute the materials. The materials provided seemed to effectively promote the program and its objectives to the school staff and to the students. The materials provided included: teacher and student workbooks with energy-related assignments and instructions for ordering the kit, and posters to display around the school.

## Program Communications

All teachers and administrators who the evaluation team was able to speak to indicated that the communications with NTC in scheduling the performance and determining the logistics of the visit were appropriate. They indicated that NTC was very professional, and provided timely and detailed responses to their questions. When asked about the program NTC was repeatedly praised by the teachers and administrators.

## Recommendations

TecMarket Works made recommendations in the 2012 and 2013 evaluation reports for Kentucky and other jurisdictions.<sup>9</sup> All of these previous recommendations had been addressed and incorporated into the script for the 2013-2014 school year or sooner. TecMarket Works does not have any recommendations for performance or script changes based on the performances reviewed in 2014.

## Summary

TecMarket Works agrees with the visited schools that this is a well-run program that offers valuable energy-efficiency related lessons to the children and an opportunity for the students' families to receive the energy efficiency kit.

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<sup>9</sup> Ohio - Final EE for Schools Process and Impact Evaluation Report - May 22 2013 and Carolinas - EE for Schools NTC - Final Process Evaluation Report - Nov 27 2012.

## Student Family (Participant) Surveys

Survey invitations were sent to the participating students' families who live in Duke Energy's territory in Kentucky and who ordered an energy efficiency kit. Participants returned a total of 32 surveys. The responses to the surveys are provided below.

### Use of the K12 Duke Energy Kit Measures

#### CFL Installations

Table 6 below shows responses to questions about the 13-watt CFL. More than four out of five respondents (84.4% or 27 out of 32) installed the 13-watt CFL, although a quarter of these installations went into empty sockets or sockets with non-functioning bulbs (25.9% or 7 out of 27). Most frequently these installations replaced a 40 to 70-watt incandescent bulb with the 13-watt CFL (44.4% or 12 out of 27).

**Table 6. Installation of 13-watt Program CFLs (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed 13w bulb</b>		
Yes	27	84.4%
Not yet, but plan to	3	9.4%
No, do not plan to	1	3.1%
No, not sure if will or not	0	0.0%
Don't Know/Blank	1	3.1%
<b>Type of bulb removed</b>	<i>N=27 measures installed</i>	<i>Percent of those with measures installed</i>
Incandescent	16	59.3%
CFL	3	11.1%
LED	1	3.7%
Don't know	7	25.9%
<b>Wattage of bulb removed</b>		
Less than 20w (CFL / LED)	4	14.8%
20-39w (incandescent)	0	0.0%
40-70w (incandescent)	12	44.4%
71-99w (incandescent)	2	7.4%
100w or higher (incandescent)	1	3.7%
Don't know	8	29.6%
<b>Previous bulb in socket</b>		
CFL replaced a working bulb	13	48.1%
CFL replaced bulb that was not working (or empty socket)	7	25.9%
Don't know	7	25.9%

Table 7 shows that the most frequent rooms in the home where 13-watt program bulbs were installed were living and family rooms (40.7% or 11 out of 27) followed by the exterior of the home (14.8% or 4 out of 27). Thirteen-watt program bulbs were installed in sockets that were used an average of 5.5 hours per day.

**Table 7. 13-watt CFL Installations: Rooms and Hours of Use (N=27)**

	Kentucky (N)	Kentucky (%)
Room where 13w bulb is installed	<i>N=27 measures installed</i>	<i>Percent of those with measures installed</i>
Living / family room	11	40.7%
Outdoors / exterior	4	14.8%
Master bedroom	2	7.4%
Other bedroom	1	3.7%
Bathroom	2	7.4%
Kitchen	2	7.4%
Hall	2	7.4%
Basement	1	3.7%
Closet	1	3.7%
Don't know	1	3.7%
<b>Hours of use per day</b>		
<1	0	0.0%
1-2	6	22.2%
3-4	8	29.6%
5-6	5	18.5%
7-11	6	22.2%
12-24	2	7.4%
Don't know	0	0.0%

Table 8 summarizes the responses to questions about the 18-watt CFL, which were installed by a majority of respondents (56.3% or 18 out of 31). Most of the 18-watt CFLs installations replaced incandescent bulbs (61.1% or 11 out of 18) in sockets which previously had working bulbs installed (55.6% or 10 out of 18). The 18-watt program CFLs most frequently replaced incandescent bulbs of between 71 and 99 watts (27.8% or 5 out of 18).

**Table 8. Installation of 18-watt Program CFLs (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed 18w bulb</b>		
Yes	18	56.3%
Not yet, but plan to	8	25.0%
No, do not plan to	2	6.3%
No, not sure if will or not	1	3.1%
Don't Know/Blank	3	9.4%
<b>Type of bulb removed</b>	<b>N=18 measures installed</b>	<b>Percent of those with measures installed</b>
Incandescent	11	61.1%
CFL	2	11.1%
LED	1	5.6%
Don't know	4	22.2%
<b>Wattage of bulb removed</b>		
Less than 20w (CFL / LED)	3	16.7%
20-39w (incandescent)	1	5.6%
40-70w (incandescent)	3	16.7%
71-99w (incandescent)	5	27.8%
100w or higher (incandescent)	2	11.1%
Don't know	4	22.2%
<b>Previous bulb in socket</b>		
CFL replaced a working bulb	10	55.6%
CFL replaced bulb that was not working (or empty socket)	4	22.2%
Don't know	4	22.2%

Table 9 shows that the 18-watt program CFLs were installed in a wide variety of rooms, with the most frequently-mentioned being hallways (22.2% or 4 out of 18) and living and family rooms (16.7% or 3 out of 18). Eighteen-watt program bulbs were installed in sockets that were used an average of 5.0 hours per day.



**Table 9. 18-watt CFL Installations: Rooms and Hours of Use (N=18)**

	Kentucky (N)	Kentucky (%)
Room where 18w bulb is installed	N=18 measures installed	Percent of those with measures installed
Living / family room	3	16.7%
Outdoors / exterior	1	5.6%
Master bedroom	2	11.1%
Other bedroom	1	5.6%
Bathroom	2	11.1%
Kitchen	2	11.1%
Hall	4	22.2%
Basement	2	11.1%
Closet	0	0.0%
Dining room	1	5.6%
Don't know	0	0.0%
<b>Hours of use per day</b>		
<1	0	0.0%
1-2	6	33.3%
3-4	5	27.8%
5-6	3	16.7%
7-11	3	16.7%
12-24	1	5.6%
Don't know	4	22.2%

The 32 surveyed participants collectively confirmed the installation of 27 13-watt program CFLs and 18 18-watt program CFLs.

Table 10 shows that only one participant (3.1% of 32) installed the 18-watt without installing the 13-watt CFL, while at least 25.0% (8 out of 32) installed the 13-watt but not the 18-watt CFL. Only three participants (9.4% of 32) confirm that they didn't install either CFL, and one participant (3.1% of 32) is not sure if either bulb was installed; almost nine out of ten surveyed participants (87.5% or 28 out of 32) confirmed the installation of at least one program CFL.

**Table 10. Summary of Program CFL Installations (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Program CFLs installed<sup>10</sup></b>		
Installed 13-watt only	8	25.0%
Installed 13-watt, not sure if 18-watt installed	2	6.3%
Installed 18-watt only	1	3.1%
Installed both bulbs	17	53.1%
Did not install either bulb	3	9.4%
Don't know if either bulb installed	1	3.1%

<sup>10</sup> Due to a survey programming error, a question about uninstalling program CFLs was not asked (see *Appendix B: Participant Survey Instrument*). In other evaluations of lighting programs in Kentucky and in other states, TecMarket Works has found the rate of program CFLs removed after installation is generally 10% or less, and the most frequently-mentioned reason for removing bulbs is that they have burned out.

### Satisfaction with the Program CFLs

The 27 surveyed participants who installed the 13-watt CFL and the 18 participants who installed the 18-watt CFL were asked to rate their satisfaction with these measures. Both received very high ratings: on a 10-point scale where “10” is most satisfied, the average rating is 9.37 for the 13-watt bulb and 9.61 for the 18-watt bulb (satisfaction ratings for all kit items can be found in Table 26). None of the survey respondents (0%) who installed program CFLs rated their satisfaction with either bulb at “7” or lower on a 10-point scale.<sup>11</sup>

### Energy-efficient Light Bulbs Installed before the Program and Purchase Intentions

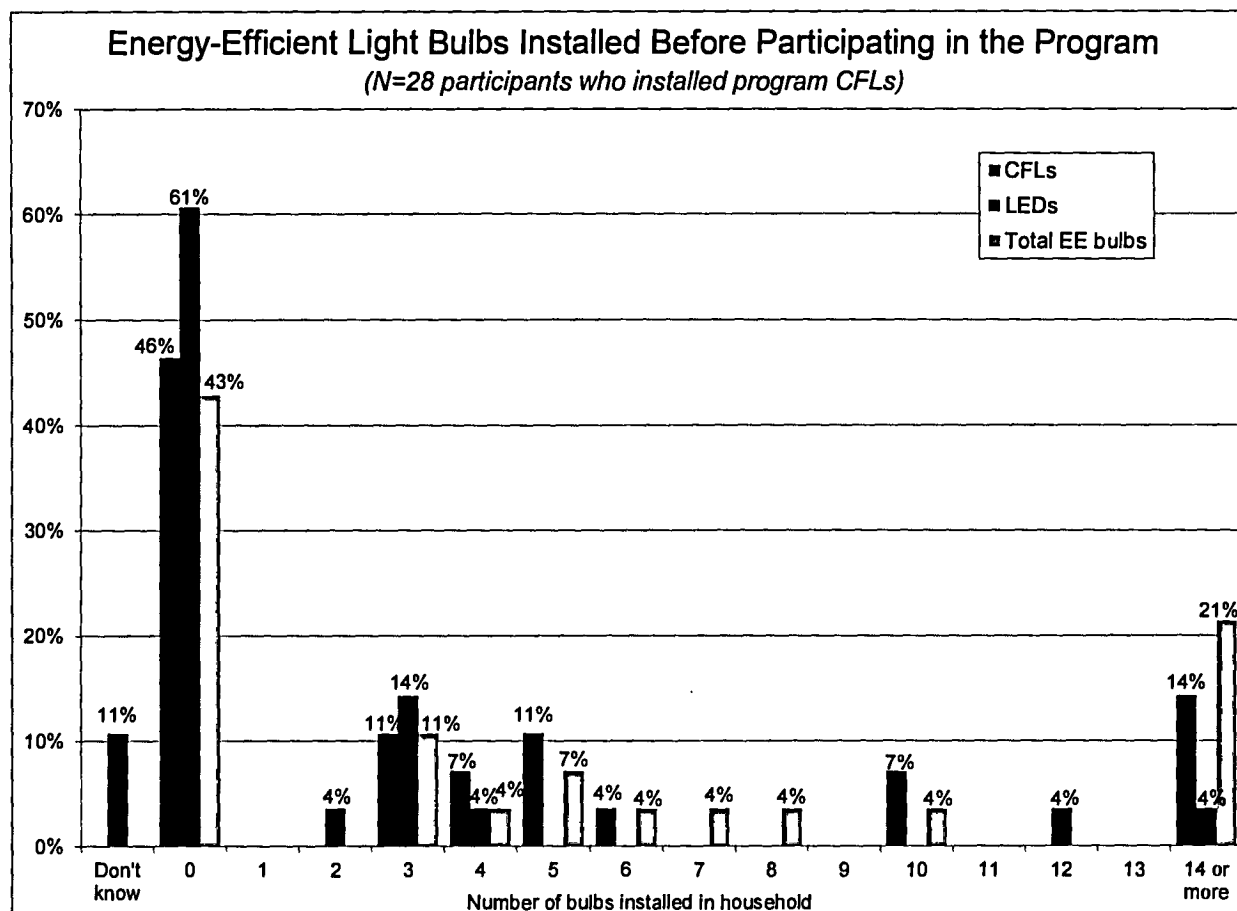
The 28 program participants who installed one or both of the kit-provided CFLs were asked if they had any CFLs or LEDs installed in their home before receiving the program kit, and if so how many of these bulbs were installed. Figure 4 shows the distributions of pre-installed CFLs and LEDs, as well as the total for all energy-efficient bulbs (CFLs plus LEDs) installed before the program. A majority of participants (53.6% or 15 out of 28) reported having CFLs installed before the program, though only 28.6% (8 out of 28) report having LEDs installed before the program. Overall, 57.1% (16 out of 28) of participants who installed program CFLs already had at least one energy-efficient bulb installed in their homes before the program, and 21.4% (6 out of 28) had a total of 14 or more efficient bulbs installed before the program.

Across all participants who installed program CFLs, the average number of preinstalled efficient bulbs per household is 4.9 CFLs and 1.6 LEDs, for a total of 6.5 efficient bulbs installed per household.<sup>12</sup> The median number of bulbs installed before the program was three CFLs, zero LEDs and a total of three efficient bulbs per household.

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<sup>11</sup> When customers give satisfaction ratings of “7” or lower on a 10-point scale, TecMarket Works surveys ask the follow-up question “what can be done to improve this?” Since none of the customers surveyed for this evaluation gave satisfaction ratings of “7” or lower for CFLs, none were asked this follow-up question.

<sup>12</sup> These overall means include participants with zero efficient bulbs installed before the program. Among only those customers who had a particular type of bulb installed (not including respondents with zero), the average number of bulbs per household are 9.1 CFLs among the 15 households with CFLs installed and 5.5 LEDs among the eight households with LEDs installed. Overall, 16 households with efficient bulbs installed before the program reported having an average of 11.3 efficient bulbs per household before receiving the program kit; the other twelve respondents had zero CFLs and zero LEDs installed before the program.



**Figure 4. CFLs and LEDs Installed before Participating in the Program (N=28)**<sup>13</sup>

According to Table 11, about a third of surveyed participants (32.1% or 9 out of 28) were already intending to buy CFLs before participating in the program, while 25.0% (7 out of 28) said they “maybe” were going to buy CFLs before participating in the program. Another 10.7% (3 out of 28) were not intending to purchase CFLs because they already had them installed in all available sockets, and 28.6% (8 out of 28) were not intending to purchase CFLs though they did have sockets available for them.

Seven participants (25.0% of 28) had purchased additional CFLs since participating in the program. These participants purchased 26 additional bulbs, which is an average of 3.7 CFLs per household that purchased additional CFLs. Eighteen of these 26 additional CFLs had already been installed in respondent homes, or an average of 2.6 CFLs installed per household who purchased additional CFLs.

<sup>13</sup> When reporting light bulbs installed before the program, there was one participant who confirmed that they had LEDs installed but did not know the number of LEDs; this respondent was reported as having three LEDs installed, since three LEDs is the median number installed among the other households which had LEDs installed before the program. Three participants did not know if they had any LEDs or not (11% of 28 as shown in Figure 1); these customers were assumed to have zero LEDs when computing the total number of energy-efficient bulbs installed.

**Table 11. Intent to Purchase CFLs before the Program and Additional CFLs Purchased since the Program (N=28)**

<i>Base: 28 participants who confirmed program CFLs were installed</i>	<b>Kentucky (N)</b>	<b>Kentucky (%)</b>
<b><i>Were you planning on buying CFLs for your home before participating in this program?</i></b>		
Yes	9	32.1%
Maybe	7	25.0%
No	8	28.6%
No, already installed in all available sockets	3	10.7%
Don't know	1	3.6%
<b><i>Have you purchased any CFLs since participating in this program?</i></b>		
No	20	71.4%
Yes, from 1 to 5	5	17.9%
Yes, from 6 to 11	2	7.1%
Yes, 12 or more	0	0.0%
Don't know	1	3.6%

Table 12 shows participants' intentions for purchasing LEDs before participating in the program. Only one in five surveyed participants (21.4% or 6 out of 28) were intending to purchase LED bulbs before participating in the program, though another 32.1% (9 out of 28) said they were "maybe" intending to purchase LEDs before the program and one participant (3.6% or 28) said they were not intending to buy LEDs because they already have them installed in all available sockets.

Four participants (14.3% of 28) had purchased additional LEDs since participating in the program. These participants purchased 12 additional LEDs, which is an average of 3.0 LEDs per household that purchased additional LEDs. Eight of these 12 additional LEDs had already been installed in respondent homes, or an average of 2.0 LEDs installed per household who purchased additional LEDs.

**Table 12. Intent to Purchase LEDs before the Program and LEDs Purchased since the Program (N=28)**

<i>Base: 28 participants who confirmed program CFLs were installed</i>	<b>Kentucky (N)</b>	<b>Kentucky (%)</b>
<b><i>Were you planning on buying LEDs for your home before participating in this program?</i></b>		
Yes	6	21.4%
Maybe	9	32.1%
No	11	39.3%
No, already installed in all available sockets	1	3.6%
Don't know	1	3.6%
<b><i>Have you purchased any LEDs since participating in this program?</i></b>		
No	23	82.1%
Yes, from 1 to 5	4	14.3%
Yes, from 6 to 11	0	0.0%
Yes, 12 or more	0	0.0%
Don't know	1	3.6%

Surveyed participants who installed kit-provided CFLs and then purchased additional CFLs or LEDs after participating in the program were asked to rate the influence of the program on their decision to purchase additional energy-efficient light bulbs. Among the seven participants who purchased additional CFLs, the mean influence rating for the program is 6.86 on a 10-point scale where “10” means most influential. Among the four participants who purchased additional LEDs, the mean influence rating is similar at 6.75 using the same scale.

Among the four surveyed participants who did not confirm the installation of any program CFLs (12.5% of 32), three had CFLs installed before receiving the kit (an average of 8.0 CFLs installed per household with CFLs installed before the program) and none had any LEDs installed. One of these customers did not intend to buy CFLs before receiving the kit because they already had them installed in all available sockets, while one customer said they “maybe” would have bought CFLs, and two said they would not have bought any. In terms of intention to purchase LEDs, one customer “maybe” would have, one was not sure, and two did not intend to purchase any LEDs.

None of the four participants who did not install program CFLs had purchased additional CFLs since receiving the kit; however one of these customers did purchase and install two LEDs since participating the program, and rated the influence of the program on this purchase at “5 out of 10” (this participant also said they had not been intending to purchase LEDs before receiving the kit).

### **Low-Flow Showerhead Installations**

Half of the kit recipients (50.0% or 16 out of 32) said that they had installed the low-flow showerhead, and another 3.1% (1 out of 32) said they planned to install it in the future, while nearly a third say that “maybe” they would install it (31.3% or 10 out of 32). Five respondents (15.6% of 32) said they did not intend to install the kit-provided showerhead. Among those who installed the showerhead, all but one (93.8% or 15 out of 16) used the Teflon tape. Four out of five installed showerheads (81.3% or 13 out of 16) replaced standard-flow showerheads, while

12.5% (2 out of 16) replaced another low-flow showerhead. Most customers surveyed (62.5% or 10 out of 16) reported that their program-provided showerheads had a lower water flow than the showerheads that they replaced, while one (6.3% of 16) reported that the flow had actually increased. Table 13 also shows how many showers per week participants reported taking using the shower where the kit-provided showerhead was installed.

**Table 13. Installation of Low-Flow Showerheads (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed low-flow showerhead</b>		
Yes	16	50.0%
Not yet, but plan to	1	3.1%
Not yet, "maybe" will be installed	10	31.3%
No, do not plan to	5	15.6%
Don't Know	0	0.0%
<b>Used Teflon tape</b>		
	<i>N=16 measures installed</i>	<i>Percent of those with measures installed</i>
Used Teflon tape	15	93.8%
Did not use Teflon tape	1	6.3%
<b>Replaced showerhead</b>		
Program showerhead replaced another low-flow showerhead	2	12.5%
Program showerhead replaced a standard-flow showerhead	13	81.3%
Don't know	1	6.3%
<b>Showers taken per week (for the shower with the low-flow showerhead installed)</b>		
0-4	1	6.3%
5-10	7	43.8%
11-15	1	6.3%
16-20	5	31.3%
21+	2	12.5%
<b>Flow of water after install</b>		
Less than old showerhead	10	62.5%
About the same	5	31.3%
More than old showerhead	1	6.3%

Respondents who installed the showerhead were asked if the installation was easy to do; all sixteen who installed it (100%) confirmed that this installation was "easy" to do, and none reported problems with the installation.

On average, the 16 Duke Energy customers who installed the low-flow showerhead rated their satisfaction with this kit item at 8.75 on a 10-point scale where "10" is most satisfied (satisfaction ratings for all kit items can be found in Table 26). Three of the 16 participants (18.8%) who installed the low-flow showerhead rated their satisfaction with the item a "7" or lower on a 10-point scale (though none gave a rating lower than "6 out of 10"). The reasons given by these participants for their relatively low satisfaction with the kit-provided showerhead are listed below.

- *There is not enough water coming out.*

- *I am used to the harder water pressure and it took time to adjust.*
- *I'm not sure.*

### Low-Flow Showerheads Installed Before the Program and Purchase Intentions

The 16 program participants who installed the kit-provided low-flow showerheads were asked if they had any low-flow showerheads before the program, if they had been intending to purchase low-flow showerheads before the program, and if they had purchased any additional showerheads since receiving the program kit. As seen in Table 14, only one surveyed participant (6.3% of 16) had any low-flow showerheads before the program, and only one customer (6.3% of 16) was definitely intending to purchase showerheads before the program.

One participant (6.3% of 16 who installed program showerheads) had purchased one additional showerhead since participating in the program; this additional showerhead had been installed in this participant's home, and they rated the influence of the program on this purchase a "10 out of 10" (highest possible influence on a 10-point scale).

**Table 14. Intent to Purchase Low-Flow Showerheads before the Program and Additional Showerheads Purchased since the Program (N=16)**

<i>Base: 16 participants who confirmed program showerheads were installed</i>	<b>Kentucky (N)</b>	<b>Kentucky (%)</b>
<b><i>Did you have any low-flow showerheads installed before receiving the low-flow showerhead provided by the kit?</i></b>		
Yes	1	6.3%
No	15	93.8%
<b><i>Were you planning on buying low-flow showerheads for your home before participating in this program?</i></b>		
Yes	1	6.3%
Maybe	2	12.5%
No	11	68.8%
No, already installed in all available showers	1	6.3%
Don't know	1	6.3%
<b><i>Have you purchased any low-flow showerheads since participating in this program?</i></b>		
No	15	93.8%
Yes, one	1	6.3%
Yes, two or more	0	0.0%
Don't know	0	0.0%

Sixteen surveyed participants had not installed the kit-provided showerhead. Half of these participants (50.0% or 8 out of 16) reported that they already had low-flow showerheads before the program, including a quarter (25.0% or 4 out of 16) reported that they had low-flow showerheads installed in every shower before receiving the kit. Only one of the non-installing customers (6.3% of 16) was intending to purchase low-flow showerheads before the program, and none of the customers who did not install the program-provided showerhead (0% of 16) had purchased any additional showerheads on their own since receiving the kit.

## Faucet Aerator Installations

Table 15 indicates that 43.8% of Duke Energy customers (14 out of 32) installed the kit-provided bathroom faucet aerator, and Table 16 show a similar 43.8% (14 out of 32) installation rate for the kitchen faucet aerator. In total, 28 kit-provided aerators were installed by 17 participants (53.1% of 32 surveyed): eleven installed both aerators, three installed only the kitchen aerator, and three installed only the bathroom aerator (the other 15 participants or 46.9% of 32 surveyed did not install any aerators). None of the customers who installed kit-provided aerators in either room replaced another low-flow aerator (0% of 14 for both rooms), and a minority reported that the water flow with the program aerators was the same or greater than it was before installing the program aerators (21.4% or 3 of 14 for both rooms).

**Table 15. Installation of Bathroom Faucet Aerator (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed the bathroom aerator</b>		
Yes	14	43.8%
Not yet, but plan to	10	31.3%
No, do not plan to	7	21.9%
No, not sure if will or not	1	3.1%
<b>Replaced an aerator that was already installed</b>	<b>N=14 measures installed</b>	<b>Percent of those with measures installed</b>
Yes, standard-flow aerator	6	42.9%
Yes, low-flow aerator	0	0.0%
Yes, not sure flow level	1	7.1%
No	7	50.0%
Don't Know	0	0.0%
<b>Estimate of water flow</b>		
Less than the old aerator	4	28.6%
About the same as the old aerator	3	21.4%
More than the old aerator	0	0.0%
There was no old aerator	7	50.0%

**Table 16. Installation of Kitchen Faucet Aerator (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed the kitchen aerator</b>		
Yes	14	43.8%
Not yet, but plan to	11	34.4%
No, do not plan to	7	21.9%
No, not sure if will or not	0	0.0%
<b>Replaced an aerator that was already installed</b>	<b>N=14 measures installed</b>	<b>Percent of those with measures installed</b>
Yes, standard-flow aerator	4	28.6%
Yes, low-flow aerator	0	0.0%
Yes, not sure flow level	1	7.1%
No	9	64.3%
Don't Know	0	0.0%
<b>Estimate of water flow</b>		
Less than the old aerator	2	14.3%
About the same as the old aerator	3	21.4%
More than the old aerator	0	0.0%
There was no old aerator	9	64.3%



Respondents who installed the aerators were asked if the installation was easy to do; all 28 installations in kitchens and bathrooms (100%) were confirmed as “easy” to install, and none reported problems with the installation.

On average, the 14 Duke Energy customers who installed the bathroom aerator rated their satisfaction with this kit item at 9.50 on a 10-point scale and the 14 Duke Energy customers who installed the kitchen aerator rated their satisfaction with this kit item at 9.36 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 26). None of the participants (0% of 14) who installed the bathroom aerator rated their satisfaction with the measure at “7” or lower on a 10-point scale, and only one participant (7.1% of 14) who installed the kitchen aerator rated their satisfaction with it at “7” or lower on a 10-point scale (their rating was a “7 out of 10”); this customer was asked why they were less than satisfied and they replied “*it’s fine, I don’t have an issue with it.*”

### Faucet Aerators Installed Before the Program and Purchase Intentions

The 17 program participants who installed at least one of the kit-provided faucet aerators were asked if they had any aerators installed in their homes before the program, if they had been intending to purchase aerators before the program, and if they had purchased any additional aerators since receiving the program kit. As seen in Table 17, only two surveyed participants (11.8% of 17) had any faucet aerators before the program, and only one customer (5.9% of 17) was definitely intending to purchase aerators before the program. None of the surveyed participants who installed program aerators had purchased or installed any additional aerators since participating in the program.

**Table 17. Intent to Purchase Faucet Aerators before the Program and Additional Aerators Purchased since the Program (N=17)**

<i>Base: 17 participants who confirmed program aerators were installed</i>	<b>Kentucky (N)</b>	<b>Kentucky (%)</b>
<b><i>Did you have any aerators installed before receiving the aerators provided by the kit?</i></b>		
Yes	2	11.8%
No	15	88.2%
<b><i>Were you planning on buying aerators for your home before participating in this program?</i></b>		
Yes	1	5.9%
Maybe	2	11.8%
No	13	76.5%
No, already installed on all available faucets	1	5.9%
Don't know		
<b><i>Have you purchased any aerators since participating in this program?</i></b>		
No	17	100.0%
Yes, one	0	0.0%
Yes, two or more	0	0.0%
Don't know	0	0.0%

Fifteen surveyed participants had not installed either of the kit-provided aerators. Four of these participants (26.7% of 15) reported that they already had faucet aerators before the program, including two (13.3% of 15) reported that they had aerators installed on every available faucet before receiving the kit. Only one of the non-installing customers (6.7% of 15) was intending to purchase aerators before the program, and none of the customers who did not install the program-provided aerators (0% of 15) had purchased additional aerators on their own since receiving the kit.

## Outlet and Switch Gasket Insulator Installations

Slightly less than half of kit recipients (43.8% or 14 out of 32) installed the outlet and switch gaskets, though nearly as many (37.5% or 12 out of 32) say they still intended to but have not done so yet. The kit provided 12 gaskets in total, and on average participants who installed them installed 8.7 per household; though unfortunately most of these insulators were installed on interior walls (59.8% or 73 of 122 insulators installed) where they did not provide any energy savings. Among the customers who installed gasket insulators, about a quarter of the measures had not been installed (27.4% or 46 out of 168 insulators distributed to the 14 surveyed participants who installed them had not been installed yet). Six surveyed participants (42.9% of 14 who installed gaskets) had installed all twelve gasket insulators, but only two of these customers installed all 12 gasket insulators on exterior walls.

**Table 18. Installation of Gasket Insulators (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Installed the gaskets</b>		
Yes	14	43.8%
Not yet, but plan to	12	37.5%
No, do not plan to	2	6.3%
No, not sure if will or not	3	9.4%
Don't Know	1	3.1%
<b>Number installed interior wall</b>	<b>N=14 with measures installed</b>	<b>Percent of those with measures installed</b>
0	2	14.3%
1-2	1	7.1%
3-5	4	28.6%
6-8	5	35.7%
9-12	2	14.3%
Don't Know	0	0.0%
<b>Average number of gaskets installed on interior walls: 5.2 per household</b>		
<b>Number installed exterior wall</b>	<b>N=14 with measures installed</b>	<b>Percent of those with measures installed</b>
0	3	21.4%
1-2	3	21.4%
3-5	5	35.7%
6-8	2	14.3%
9-12	1	7.1%
Don't Know	0	0.0%
<b>Average number of gaskets installed on exterior walls: 3.5 per household</b>		

On average, the 14 Duke Energy customers who installed outlet gaskets rated their satisfaction with this kit item at 8.93 on a 10-point scale (satisfaction ratings for all kit items can be found in

Table 26). Only one of the 14 participants (7.1%) who installed the outlet gaskets rated their satisfaction with the items a “7” or lower on a 10-point scale (their rating was a “7 out of 10”). The reason this customer gave for their relatively low satisfaction was “*I can still feel cold air.*”

### **Gasket Insulators Installed Before the Program and Purchase Intentions**

The 14 program participants who installed at least one of the kit-provided gasket insulators were asked if they had any gasket insulators installed in their homes before the program, if they had been intending to purchase gasket insulators before the program, and if they had purchased any additional gasket insulators since receiving the program kit. As seen in Table 19, about a third of surveyed participants (35.7% or 5 out of 14) had gasket insulators before the program, and about out in five participants (21.4% or 3 of 14) reported that they were definitely intending to purchase gasket insulators before the program, while one participant (7.1% of 14) said they already had them installed in every available outlet.

Only one of the surveyed participants (7.1% of 14) who installed program gasket insulators purchased and installed additional gasket insulators since participating in the program; this customer purchased 25 additional insulators and installed 15, and rated the influence of their participation in this program at “6 out of 10” on their decision to purchase additional measures. The customer who purchased additional gasket insulators reported having some installed before the program, and that they had been intending to purchase some before receiving the program kit. This customer installed four of their kit-provided gasket insulators on exterior walls, and the other eight gasket insulators they received were not installed.

**Table 19. Intent to Purchase Gasket Insulators before the Program and Additional Gasket Insulators Purchased since the Program (N=14)**

<i>Base: 14 participants who confirmed program gasket insulators were installed</i>	<b>Kentucky (N)</b>	<b>Kentucky (%)</b>
<b><i>Did you have any gasket insulators installed before receiving the gasket insulators provided by the kit?</i></b>		
Yes	5	35.7%
No	9	64.3%
<b><i>Were you planning on buying gasket insulators for your home before participating in this program?</i></b>		
Yes	3	21.4%
Maybe	4	28.6%
No	6	42.9%
No, already installed on all available outlets	1	7.1%
Don't know	0	0.0%
<b><i>Have you purchased any gasket insulators since participating in this program?</i></b>		
No	13	92.9%
Yes	1	7.1%
Don't know	0	0.0%

Eighteen surveyed participants had not installed any of the kit-provided gasket insulators. Five of these participants (27.8% of 18) reported that they already had gasket insulators before the

program, including three participants (16.7% of 18) who reported that they had gasket insulators installed on every available outlet before receiving the kit. None of the non-installing customers (0.0% of 18) were intending to purchase gasket insulators before the program, and none of the customers who did not install the program-provided gasket insulators (0% of 18) had purchased additional gasket insulators on their own since receiving the kit.

## Water Flow Meter Bag

Only five kit recipients (15.6% of 32) used the water flow meter bag to check the flow on a combined nine faucets (1.8 faucets tested per household that tested faucets), though about a third of surveyed participants (31.3% or 10 out of 32) say they still intended to in the future but had not done so yet. Only two respondents (40.0% of five respondents who used the item) decreased the rate of flow of their water after using the water flow meter bag: one respondent reported adjusting the GPM down in their kitchen, while the other reported adjusting the GPM down in their shower down from 5 to 4, while also adjusting the GPM of their kitchen and bathroom faucets down from 2 to 1. Thus the rate of respondents adjusting water flow down after testing faucets was 44.4% (four adjustments out of nine faucets tested), and the overall rate of respondents decreasing the GPM on at least one faucet due to this program was 6.3% (2 out of 32 surveyed customers who received the kit).

**Table 20. Use of Water Flow Meter Bag (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Used the Water Meter Bag</b>		
Yes	5	15.6%
Not yet, but plan to	10	31.3%
No, do not plan to	6	18.8%
No, not sure if will or not	10	31.3%
Don't Know	1	3.1%
<b>Tested in Shower</b>	<i>N=5 who used water meter bag</i>	<i>Percent of those who used meter bag</i>
Tested flow in the shower	3	60.0%
Adjusted shower GPM down	1	20.0%
<b>Tested in Kitchen</b>		
Tested flow in the kitchen	3	60.0%
Adjusted kitchen GPM down	2	40.0%
<b>Tested in Bathroom</b>		
Tested flow in the bathroom	2	40.0%
Adjusted bathroom GPM down	1	20.0%
<b>Tested in Utility Sink</b>		
Tested flow in the bathroom	0	0.0%
Adjusted bathroom GPM down	0	0.0%
<b>Tested in Other Area (bathtub instead of shower)</b>		
Tested flow in the bathtub	1	20.0%
Adjusted bathtub GPM down	0	0.0%

On average, the five Duke Energy customers who used the water flow meter bag rated their satisfaction with this kit item at 9.20 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 26). Only one of the five participants (20.0%) who used the water flow meter bag rated their satisfaction with the items a “7” or lower on a 10-point scale (their rating was a “7”

out of 10"). When asked why they were less than satisfied, this customer said "*it didn't interest me.*"

### Water Temperature Gauge Card

About a third of respondents surveyed (31.3% or 10 out of 32) used the water temperature gauge card that was included with the kit, while another 31.3% (10 out of 32) say they still intended to but had not done so yet. Of those who did use it, the median and most common temperature reading was 120 degrees. Two of those who used the card (20.0% of 10) had their water temperature set at 150 degrees or higher, and four respondents (40.0% of 10 using the card) lowered the temperature setting on their water heater after using the item.

**Table 21. Use of the Water Temperature Gauge Card (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Used the Water Temperature Card</b>		
Yes	10	31.3%
Not yet, but plan to	10	31.3%
No, do not plan to	3	9.4%
No, not sure if will or not	7	21.9%
Don't Know	2	6.3%
<b>Initial Temperature Reading</b>	<i>N=10 who used temperature gauge card</i>	<i>Percent of those who used card</i>
Under 120	2	20.0%
120	5	50.0%
130	1	10.0%
140	0	0.0%
150+	2	20.0%
<b>Adjusted Water Temperature</b>		
Yes	4	40.0%
No	5	50.0%
Don't Know	1	10.0%

The initial and adjusted water temperature readings for the ten customers who used the gauge card are shown in Table 22. Four out of ten respondents who adjusted their water temperature turned the temperature down by at least 10 degrees (shown by counts in green cells), up to a maximum downward adjustment of about 30 degrees in the case of one respondent who adjusted their temperature from "150 degrees or more" down to 120 degrees. No one in the survey reported turning their water temperature up after testing it with the gauge card (shown in red cells). There was one surveyed participant who reported that when they tested their water temperature it was "150 degrees or more" but they did not make an adjustment, and five participants whose water temperature was already set to 120 degrees or lower and who did not make adjustments (customers who did not make adjustments<sup>14</sup> are shown in white cells).

<sup>14</sup> One surveyed customer who checked their water temperature using the card was not sure if the temperature was adjusted as a result or not. This customer is reported in Table 19 as not having made any adjustment (their initial temperature reading was "less than 120 degrees").

**Table 22. Temperature Adjustments after Using Water Temperature Gauge Card (N=10 Who Used the Card)**

<i>Counts per cell</i>	Initial temp 120 or less	Initial temp 120	Initial temp 130	Initial temp 140	Initial temp 150 or more
Adjusted temp 120 or less	2	2	-	-	-
Adjusted temp 120	-	3	1	-	1
Adjusted temp 130	-	-	-	-	-
Adjusted temp 140	-	-	-	-	-
Adjusted temp 150 or more	-	-	-	-	1

Overall, 12.5% of participants surveyed (4 out of 32) turned their water down by 10 degrees or more based on their participation in this program.

On average, the ten Duke Energy customers who used the water temperature gauge card rated their satisfaction with this kit item at 9.30 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 26). None of the ten participants who used the water temperature gauge card (0%) rated their satisfaction with the items a “7” or lower on a 10-point scale.

## LED Night Light Installations

The night light was one of the more popular items with 84.4% (27 out of 32) of survey respondents using it. However, only 40.7% (11 out of 27) of those using this item used it in place of another night light, while a majority of the kit-provided night lights (55.6% or 15 out of 27) were installed in previously empty outlets. At least five of the replaced night lights had incandescent bulbs (45.5% of eleven replaced night lights), while two kit-provided night lights replaced LEDs (18.2% of 11), one participant reported replacing a neon night light (9.1% of 11), and three participants who replaced old night lights were not sure what type of bulb was replaced (27.3% of 11).

**Table 23. Installation of the LED Night Light (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Using the Night Light</b>		
Yes	27	84.4%
Not yet, but plan to	1	3.1%
No, do not plan to	1	3.1%
No, not sure if will or not	3	9.4%
Don't Know	0	0.0%
<b>Installed</b>	<b>N=27 installing measure</b>	<b>Percent of those who installed</b>
In a previously empty outlet	15	55.6%
Replaced an incandescent light	5	18.5%
Replaced an LED light	2	7.4%
Replaced another type of light (“neon”)	1	3.7%
Replaced another light, bulb type unknown	3	11.1%
Don't know if another light was replaced or not	1	3.7%

On average, the 27 Duke Energy customers who used the night light rated their satisfaction with this kit item at 9.22 on a 10-point scale (satisfaction ratings for all kit items can be found in Table 26). Three participants (11.1% of 27) who used the night light rated their satisfaction with

this item at “7” or lower on a 10-point scale; the stated reasons for their relatively low satisfaction are listed below.

- *It stays on 24 hours a day. It does not turn off in the presence of light. The one I had replaced it with would turn off during the day, therefore not wasting energy.*
- *I was concerned that it was using energy when it wasn't needed.*
- *It's just not bright enough.*

## DOE Energy Savers Booklet

Table 24 indicates that more than two-thirds of respondents (71.9% or 23 out of 32) read the Department of Energy (DOE) booklet that was included in the kit, and almost half of those who read the booklet (43.5% or 10 out of 23) discussed it with their families, while the other half (52.1% or 12 out of 23) still intended to discuss the booklet with their families. Overall, about a third of participants had already read the booklet and discussed it with their families (31.3% or 10 out of 32 participants surveyed).

**Table 24. Reading the DOE Energy Savers Booklet (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Read the booklet</b>		
Yes	23	71.9%
Not yet, but I will	8	25.0%
Not sure if I will or not	1	3.1%
<b>Discussed with family</b>	<i>N=23 reading booklet</i>	<i>Percent of those who read booklet</i>
Yes	10	43.5%
Not yet, but I will	12	52.1%
Not sure if I will or not	1	4.3%

On average, the 23 Duke Energy customers who read the booklet rated the information provided by this kit item at 8.96 on a 10-point scale (ratings for all kit items can be found in Table 26). Five out of 23 customers (21.7%) who read the booklet rated the information provided at a “7” or lower on 10-point scale, though nobody rated the booklet any lower than “5 out of 10” (customers were not asked to explain their low ratings for the DOE booklet).

Table 25 shows actions taken, and intentions for future actions, based on the advice in the DOE Energy Savers booklet. More than half of participants surveyed reported taking actions to save energy on lighting (65.2% or 15 out of 23), heating and cooling (56.5% or 13 out of 23), windows (56.5% or 13 out of 23), and appliances (52.2% or 12 out of 23). The energy-saving areas where they are least likely to have taken action in were renewable energy (8.7% or 2 out of 23) and home offices (13.0% or 3 out of 23; many customers did not have home offices).

**Table 25. Actions Based on Advice in DOE Energy Savers Booklet (N=23)**

<i>Base: 23 participants who read the booklet</i>	Kentucky (N)	Kentucky (%)
<b>Purchased and installed high efficiency equipment based on booklet's advice</b>	2	8.7%
<b>Insulation and air leaks</b>		
Already taken action	8	34.8%
Intend to take action	9	39.1%
<b>Heating and cooling system</b>		
Already taken action	13	56.5%
Intend to take action	4	17.4%
<b>Water heating</b>		
Already taken action	11	47.8%
Intend to take action	5	21.7%
<b>Windows</b>		
Already taken action	13	56.5%
Intend to take action	3	13.0%
<b>Lighting</b>		
Already taken action	15	65.2%
Intend to take action	2	8.7%
<b>Appliances</b>		
Already taken action	12	52.2%
Intend to take action	5	21.7%
<b>Home Office</b>		
Already taken action	3	13.0%
Intend to take action	4	17.4%
<b>Home Electronics</b>		
Already taken action	8	34.8%
Intend to take action	3	13.0%
<b>Driving / car maintenance</b>		
Already taken action	8	34.8%
Intend to take action	6	26.1%
<b>Renewable energy</b>		
Already taken action	2	8.7%
Intend to take action	10	43.5%

Two respondents who read the Energy Savers booklet (8.7% of 23) say they had already purchased and installed high efficiency equipment based on the booklet's recommendation. The items installed are listed below:

- *We replaced the storm door to the living room.*
- *We got a new refrigerator.*

Finally, respondents were asked if they had taken any other actions influenced by the DOE Energy Savers booklet. One participant (4.3% of 23 reading the booklet) reported that they had "sealed windows" based on reading the booklet.



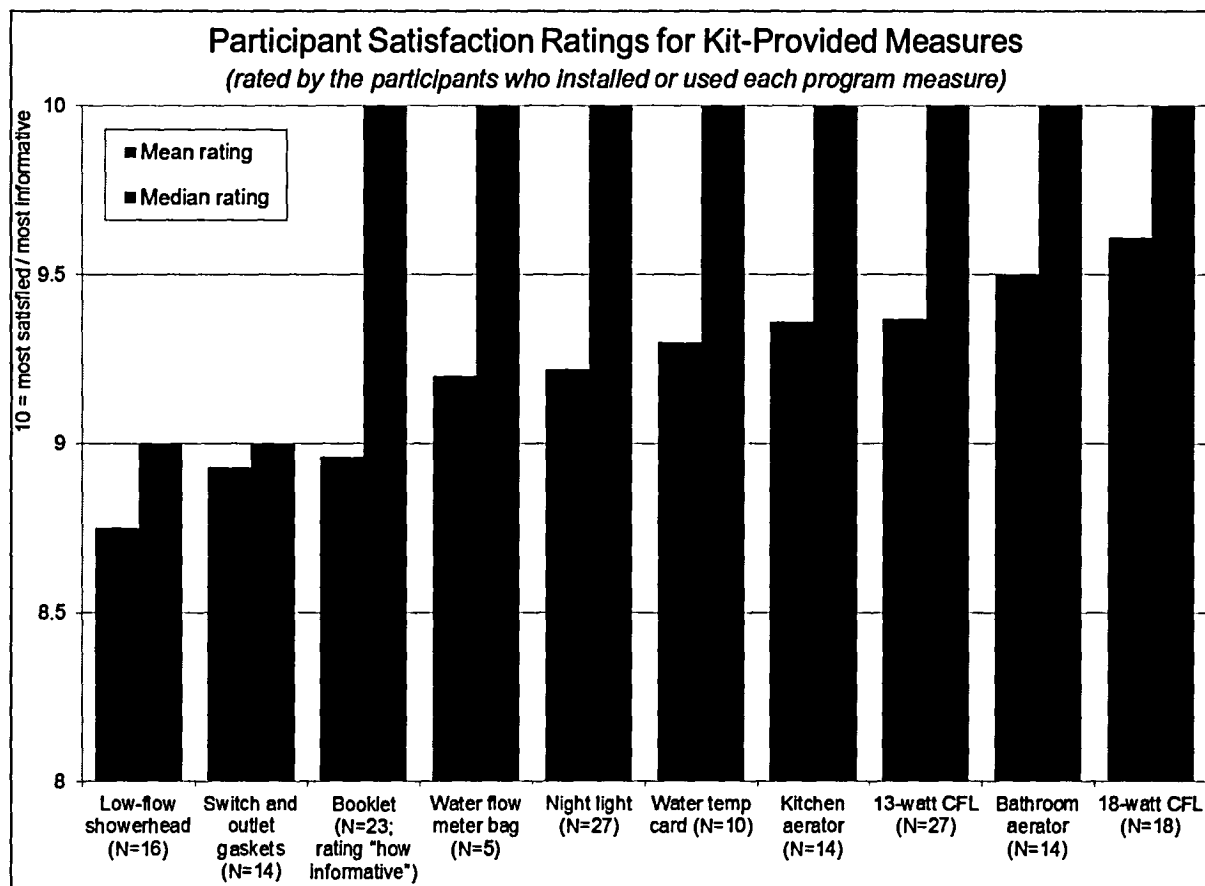
## Program Satisfaction and Satisfaction with Kit Items

Respondents who used and installed items from the energy efficiency kit indicated a high level of satisfaction with the kit items, as seen in Table 26 and Figure 5. Mean satisfaction scores were very high for the CFLs (9.37 for 13-watts and 9.61 for 18-watts), aerators (9.36 for kitchens and 9.50 for bathrooms), night light (9.22), water temperature card (9.30) and water flow meter bag (9.20). The lowest-rated kit items were the low-flow showerhead (8.75), gasket insulators (8.93), and DOE booklet (8.96), though these ratings were still quite high and the median rating for every item in the kit was 9.0 or higher on a 10-point scale. Weighting the mean scores of each of the kit items by the number of items installed or used provided a mean score of 9.22 for the kit measures overall.

When asked to rate their satisfaction with their participation in Duke Energy's "Resource Ranch" program overall, surveyed customers gave the program an average rating of 9.16, and the median response was a "10 out of 10" (the highest rating possible).

**Table 26. Satisfaction Ratings for Duke Energy Customer Kit Items and the Program Overall (N=32)**

	Count of installed / used	Minimum Score	Maximum Score	Mean Score	Median Score
13-watt CFL	27	5	10	9.37	10.0
18-watt CFL	18	8	10	9.61	10.0
Low-flow showerhead	16	6	10	8.75	9.0
Kitchen aerator	14	7	10	9.36	10.0
Bathroom aerator	14	8	10	9.50	10.0
Switch and outlet gaskets	14	7	10	8.93	9.0
Water flow meter bag	5	7	10	9.20	10.0
Water temp card	10	8	10	9.30	10.0
Night light	27	3	10	9.22	10.0
Booklet (rating "how informative")	23	5	10	8.96	10.0
All measures rated	168 ratings	3	10	9.22	10.0
Overall program satisfaction	32 participants	5	10	9.16	10.0



**Figure 5. Mean and Median Satisfaction Rating Scores For Kit Items**

Two surveyed participants (6.3% of 32) rated their satisfaction with the program overall at “7” or less on a 10-point scale (both of these participants gave the program “5 out of 10” satisfaction ratings). These customers were asked to explain the reasons for their relatively low ratings, which are listed below.

- *I'm already aware of what I need to do to become more energy efficient. However, it is too expensive to do on many levels. Free energy-saving items helps.*
- *We are already energy-efficient.*

## Parent-Child Discussion Topics

Duke Energy customers were asked a series of questions about what topics they discussed with their children after they participated in the program. Table 27 indicates that roughly four out of five participants surveyed discussed saving energy (81.3% or 26 out of 32), and at least two-thirds discussed the NTC performance (75.0%), saving water (68.8%), and turning off water when not in use (68.8%). Renewable energy (25.0%), CFLs (34.4%), and fixing leaky faucets (40.6%) were discussed by fewer than half of parents and children.

**Table 27. Topics Discussed With Children after Participating in the Program (N=32)**

	Kentucky (N)	Kentucky (%)
Saving energy	26	81.3%
NTC performance	24	75.0%
Turning off the water when it is not being used	22	68.8%
Saving water	22	68.8%
Turn lights and appliances off when not in use	21	65.6%
Fixing leaky faucets	13	40.6%
CFLs	11	34.4%
Renewable energy	8	25.0%

Duke Energy customers were asked if they had discussed anything else with their children after participating in the program. Table 28 indicates that four-fifths of respondents had nothing more to volunteer (81.3% or 26 out of 32), and among those that did, no topics emerged as dominating conversations, though the most common responses had to do with the performance being enjoyable (6.3% or 2 out of 32) and recycling (6.3% or 2 out of 32).

**Table 28. Additional Topics Discussed With Children after Participating in the Program (N=32)**

	Kentucky (N)	Kentucky (%)
Enjoyed performance / performers / characters	2	6.3%
Recycling	2	6.3%
Insisted on sending for kit/using kit	1	3.1%
<i>"We talk about all of these things but not as a result of a theater program."</i>	1	3.1%
Nothing / don't know / not specified	26	81.3%

Table 29 indicates that 71.9% of respondents (23 out of 32) felt they are more educated about energy efficiency after participating in the program, and 71.9% (23 out of 32) said they are more concerned about energy efficiency after participating in the program. However, 81.3% (26 out of 32) also said they were already concerned about energy efficiency before the program.

**Table 29. Perceived Educational Value of the Program (N=32)**

	Kentucky (N)	Kentucky (%)
<b>Is your household more or less educated about energy efficiency since receiving the kit?</b>		
Yes, we are more educated	23	71.9%
There is no change in our education	9	28.1%
No, we are less educated	0	0.0%
<b>Before receiving the kit . . .</b>		
Never been concerned about energy efficiency	6	18.8%
Always concerned about energy efficiency	26	81.3%
<b>Since receiving the kit, is your household . . .</b>		
More concerned about energy efficiency	23	71.9%
There is no change in our concern	9	28.1%
Less concerned about energy efficiency	0	0.0%

Among the six surveyed participants who said they were “never concerned” about energy efficiency before the program, five (83.3% of 6) said that after the program they were more educated about energy efficiency, and four (66.7% of 6) said that they are now more concerned about efficiency. Among the 26 customers who were already concerned before participating in the program, most also said that their education has increased since the program (69.2% or 18 out of 26) and that their concern had increased since the program (73.1% or 19 out of 26).

## Appendix A: Vendor Interview Instrument

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

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

Position description and general responsibilities:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**The interview will take about an hour to complete. Do you have any questions for me before we begin?**

### **Program Background and Objectives(15 min)**

1. Please describe your role and scope of responsibility in detail.
2. How long have you been involved with the program?
3. Have there been any recent changes been made to your duties since you started?
  - a. If YES, please tell us what changes were made and why they were made. What are the results of the change?
4. In your own words, please describe the Program's goals.
5. Of the program goals you mentioned, do you feel any of them will be particularly easy to meet, and why?
6. Which program goals, if any, do you feel will be relatively difficult to meet, and why?

7. Are there any objectives you feel should be revised? If yes, why?

### **Program Tracking**

8. Describe your quality control and process for tracking participants and other program data.

### **Kit Measures**

9. Do you believe that the program currently offers enough energy efficient products to encourage participation?
- a. If not, what products would you like to add?
10. Is the program offering enough of an incentive to motivate students and teachers to participate?
- a. If not, what do you think should be changed, and why?

### **Marketing**

11. How is the program marketed?

### **Communications with Partners**

12. How often do you communicate with the program partners?
13. Are the partners open to new ideas for program marketing, performance revisions, etc.?

### **Improvements**

14. Are you currently considering any changes to the program's design or implementation?
- a. What are the changes?
- b. What is the process for deciding whether or not to make these changes?
15. Do you have suggestions for improvements to the program that would increase participation rates?
16. Overall, what would you say about the program is working really well?
- a. Is there anything in this program you could highlight as a best practice that other utilities might like to adopt?
17. What area needs the most improvement, if any?

- a. (If not mentioned before) What would you suggest can be done to improve this?
18. Are there any other issues or topics we haven't discussed that you feel should be included in this report?
19. Do you have any further questions for me about this study or anything else?

## Appendix B: Participant Survey Instrument

Duke Energy Customer Survey<sup>15</sup>:



2014 KY EE Schools -  
Student Family Partip

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<sup>15</sup> Two series of questions shown in the survey instrument were not asked due to a programming error. These series are the questions on pages 21-22 of the survey questionnaire (Q5, Q5a and q5a\_7\_other) which ask if any program CFLs were removed after installation and why, and the questions on page 23 (Q40af series) which ask respondents what types of light bulbs they intend to purchase in the future. For the present evaluation, these would have been process questions and are not used for impact analysis.



## Appendix C: Estimated Statistical Model

Variables:

- 200910 – 201404: Binary indicator variables for that YYYYMM
- Indicator variables for participation in other Duke Energy programs:
  - Free\_cfl: Residential Energy Efficiency: CFLs
  - cfl\_promo: Residential Energy Efficiency: CFLs
  - cfl\_special: Residential Energy Efficiency: Specialty Bulbs
  - HEHC: Home Energy House Call
  - lowinc\_weath: Low Income Weatherization
  - PER-OHEC: Personalized Energy Report
  - SMSVR\_HVAC: Residential Smart \$aver: HVAC
  - appl\_recycle: Appliance Recycling Program
  - Refrige\_Replace: Refrigerator Replacement
  - furnace\_replace: Furnace Replacement
  - Property\_Mgr: Property Manager CFLs
  - MyHER: My Home Energy Report
- part: indicator variable for participation in EE for Schools

Number of Observations Read 83665  
 Number of Observations Used 83665

Dependent Variable: kwhd

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2068	38919673.61	18819.96	85.54	<.0001
Error	81596	17952590.87	220.02		
Corrected Total	83664	56872264.48			

R-Square 0.684335  
 Coeff Var 34.52394  
 Root MSE 14.83300  
 kwhd Mean 42.96440

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Account_Id	1998	29318723.54	14674.04	66.69	<.0001
monthID	55	7738835.55	140706.10	639.52	<.0001
cdd	1	898341.79	898341.79	4083.04	<.0001
hdd	1	954432.18	954432.18	4337.97	<.0001
Free_CFL	1	1925.27	1925.27	8.75	0.0031
cfl_promo	1	309.10	309.10	1.40	0.2359
cfl_special	1	194.55	194.55	0.88	0.3470
HEHC	1	1.45	1.45	0.01	0.9353
lowinc_weath	1	205.56	205.56	0.93	0.3338
PER_OHEC	1	277.26	277.26	1.26	0.2616
SmSvr_HVAC	1	1961.62	1961.62	8.92	0.0028
Appl_Recycle	1	23.44	23.44	0.11	0.7441
Refrige_Replace	1	434.80	434.80	1.98	0.1598
furnace_replace	1	202.40	202.40	0.92	0.3375
Property_Mgr	1	732.98	732.98	3.33	0.0680
MyHER	1	1220.77	1220.77	5.55	0.0185

part	1	1851.36	1851.36	8.41	0.0037
Source	DF	Type III SS	Mean Square	F Value	Pr > F
monthID	55	838174.4877	15239.5361	69.26	<.0001
cdd	1	886498.2539	886498.2539	4029.21	<.0001
hdd	1	952940.0735	952940.0735	4331.19	<.0001
Free_CFL	1	1604.8144	1604.8144	7.29	0.0069
cfl_promo	1	314.3072	314.3072	1.43	0.2320
cfl_special	1	154.3282	154.3282	0.70	0.4023
HEHC	1	17.0268	17.0268	0.08	0.7809
lowinc_weath	1	278.5903	278.5903	1.27	0.2605
PER_OHEC	1	190.8734	190.8734	0.87	0.3516
SmSvr_HVAC	1	1917.6541	1917.6541	8.72	0.0032
Appl_Recycle	1	34.6909	34.6909	0.16	0.6913
Refrige_Replace	1	403.6156	403.6156	1.83	0.1756
furnace_replace	1	210.7964	210.7964	0.96	0.3277
Property_Mgr	1	681.7088	681.7088	3.10	0.0784
MyHER	1	1185.4418	1185.4418	5.39	0.0203
part	1	1851.3577	1851.3577	8.41	0.0037

Parameter		Estimate	Standard Error	t Value	Pr >  t
monthID	200910	1.47391827 B	14.97649431	0.10	0.9216
monthID	200911	6.83870244 B	10.61270643	0.64	0.5193
monthID	200912	-10.81569516 B	0.76279196	-14.18	<.0001
monthID	201001	-13.85151533 B	1.02631352	-13.50	<.0001
monthID	201002	-13.50467984 B	0.94873688	-14.23	<.0001
monthID	201003	-2.16243101 B	0.76170256	-2.84	0.0045
monthID	201004	5.12310395 B	0.66487416	7.71	<.0001
monthID	201005	6.63360636 B	0.68911541	9.63	<.0001
monthID	201006	2.94893226 B	0.92347800	3.19	0.0014
monthID	201007	-2.22712457 B	1.04799617	-2.13	0.0336
monthID	201008	-0.52525646 B	0.99258651	-0.53	0.5967
monthID	201009	6.49764582 B	0.71939108	9.03	<.0001
monthID	201010	5.32999572 B	0.65833662	8.10	<.0001
monthID	201011	-6.22677148 B	0.78070458	-7.98	<.0001
monthID	201012	-13.18613504 B	1.00809555	-13.08	<.0001
monthID	201101	-14.07519343 B	1.03248589	-13.63	<.0001
monthID	201102	-8.21631149 B	0.84646622	-9.71	<.0001
monthID	201103	-1.64304204 B	0.74440339	-2.21	0.0273
monthID	201104	5.20898859 B	0.65667449	7.93	<.0001
monthID	201105	6.32485226 B	0.67220963	9.41	<.0001
monthID	201106	3.98489496 B	0.84602746	4.71	<.0001
monthID	201107	-6.43251105 B	1.08322687	-5.94	<.0001
monthID	201108	0.62494198 B	0.94502594	0.66	0.5084
monthID	201109	8.89743533 B	0.66443770	13.39	<.0001
monthID	201110	7.10941984 B	0.65034982	10.93	<.0001
monthID	201111	-0.08569477 B	0.70507740	-0.12	0.9033
monthID	201112	-3.13503912 B	0.81551735	-3.84	0.0001
monthID	201201	-6.56753991 B	0.86526548	-7.59	<.0001
monthID	201202	-5.79387338 B	0.79421031	-7.30	<.0001
monthID	201203	3.89193228 B	0.66147225	5.88	<.0001
monthID	201204	5.59772070 B	0.63217521	8.85	<.0001
monthID	201205	10.53569460 B	0.65302150	16.13	<.0001
monthID	201206	2.73913367 B	0.86404886	3.17	0.0015
monthID	201207	-7.97866122 B	1.12576072	-7.09	<.0001
monthID	201208	2.56800569 B	0.86505882	2.97	0.0030
monthID	201209	9.92907970 B	0.64475028	15.40	<.0001
monthID	201210	3.76683826 B	0.62767155	6.00	<.0001
monthID	201211	-2.71375760 B	0.71281487	-3.81	0.0001
monthID	201212	-4.68210334 B	0.81114900	-5.77	<.0001
monthID	201301	-9.45885546 B	0.90208439	-10.49	<.0001
monthID	201302	-9.83534281 B	0.84126804	-11.69	<.0001
monthID	201303	-6.25442991 B	0.79336763	-7.88	<.0001
monthID	201304	3.21207232 B	0.61499637	5.22	<.0001

monthID	201305	8.40411916 B	0.59971029	14.01	<.0001
monthID	201306	5.83173552 B	0.70547887	8.27	<.0001
monthID	201307	5.51872049 B	0.79317761	6.96	<.0001
monthID	201308	9.19136984 B	0.74396996	12.35	<.0001
monthID	201309	10.36904756 B	0.61448837	16.87	<.0001
monthID	201310	6.36269542 B	0.56901504	11.18	<.0001
monthID	201311	-5.45964924 B	0.71457951	-7.64	<.0001
monthID	201312	-8.84012816 B	0.86616719	-10.21	<.0001
monthID	201401	-12.53534338 B	1.00348108	-12.49	<.0001
monthID	201402	-12.33085480 B	0.91568302	-13.47	<.0001
monthID	201403	-4.86352170 B	0.74418024	-6.54	<.0001
monthID	201404	4.46330494 B	0.54642262	8.17	<.0001
cdd		0.13730122	0.00216304	63.48	<.0001
hdd		0.04995724	0.00075909	65.81	<.0001
Free_CFL		-0.55796159	0.20659558	-2.70	0.0069
cfl_promo		-0.55820835	0.46703382	-1.20	0.2320
cfl_special		-1.27916640	1.52733222	-0.84	0.4023
HEHC		0.42423000	1.52497803	0.28	0.7809
lowinc_weath		1.39921685	1.24345806	1.13	0.2605
PER_OHEC		-0.25645638	0.27534038	-0.93	0.3516
SmSvr_HVAC		-2.81703228	0.95419210	-2.95	0.0032
Appl_Recycle		0.62729462	1.57976641	0.40	0.6913
Refrige_Replace		-6.04688492	4.46454153	-1.35	0.1756
furnace_replace		5.57722738	5.69791355	0.98	0.3277
Property_Mgr		3.55312586	2.01855360	1.76	0.0784
MyHER		-0.47945942	0.20655745	-2.32	0.0203
part		-0.72721417	0.25069536	-2.90	0.0037

## Appendix D: Participant Counts

Number of Participants	Month
486	201305
38	201306
2	201307
2	201308
5	201309
50	201310
166	201311
109	201312
215	201401
160	201402
390	201403
272	201404
105	201405

## Appendix E: Household Characteristics and Demographics

In what type of building do you live?

	Frequency	Percent	Valid Percent	Cumulative Percent
Single-family home, detached construction	23	71.9	71.9	71.9
Apartment (4 + families) - traditional structure	2	6.3	6.3	78.1
Condominium - traditional structure	2	6.3	6.3	84.4
Valid Don't Know	2	6.3	6.3	90.6
Single family home, factory manufactured/modular	1	3.1	3.1	93.8
Single family, mobile home	1	3.1	3.1	96.9
Two or Three family attached residence - traditional structure	1	3.1	3.1	100.0
Total	32	100.0	100.0	

What year was your residence built?

	Frequency	Percent	Valid Percent	Cumulative Percent
1959 and before	10	31.3	31.3	31.3
1980 - 1989	6	18.8	18.8	50.0
Don't Know	5	15.6	15.6	65.6
1960 - 1979	4	12.5	12.5	78.1
Valid 2001 - 2007	4	12.5	12.5	90.6
1990 - 1997	1	3.1	3.1	93.8
1998 - 2000	1	3.1	3.1	96.9
2008 - present	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
6	8	25.0	25.0	25.0
8	7	21.9	21.9	46.9
10+	5	15.6	15.6	62.5
1 - 3	4	12.5	12.5	75.0
Valid 7	4	12.5	12.5	87.5
4	2	6.3	6.3	93.8
5	2	6.3	6.3	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Central forced air furnace	24	75.0	75.0	75.0
Heat Pump	2	6.3	6.3	81.3
Electric Baseboard	1	3.1	3.1	84.4
Geothermal Heat Pump	1	3.1	3.1	87.5
Valid Other: "radiator"	1	3.1	3.1	90.6
Other: "natural gas"	2	6.3	6.3	96.9
Other: "not sure"	1	3.1	3.1	100.0
Total	32	100.0	100.0	

## Do you use one or more of the following to cool your home?

	Frequency	Percent	Valid Percent	Cumulative Percent
Central air conditioning	22	68.8	68.8	68.8
Through the wall or window air conditioning unit	7	21.9	21.9	90.6
Valid Geothermal Heat pump	1	3.1	3.1	93.8
Heat pump for cooling	1	3.1	3.1	96.9
Other: "ceiling fans"	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
None	21	65.6	65.6	65.6
2	6	18.8	18.8	84.4
Valid 1	3	9.4	9.4	93.8
3	1	3.1	3.1	96.9
5	1	3.1	3.1	100.0
Total	32	100.0	100.0	

## Select fuel(s) used for: primary heating system

	Frequency	Percent	Valid Percent	Cumulative Percent
Natural Gas	19	59.4	59.4	59.4
Electricity	9	28.1	28.1	87.5
Valid None / Do Not Have	3	9.4	9.4	96.9
Other	1	3.1	3.1	100.0
Total	32	100.0	100.0	

**Select fuel(s) used for: secondary heating system**

	Frequency	Percent	Valid Percent	Cumulative Percent
None / Do Not Have	18	56.3	56.3	56.3
Electricity	12	37.5	37.5	93.8
Valid Natural Gas	1	3.1	3.1	96.9
Other	1	3.1	3.1	100.0
Total	32	100.0	100.0	

**Select fuel(s) used for: cooling system**

	Frequency	Percent	Valid Percent	Cumulative Percent
Electricity	30	93.8	93.8	93.8
Valid Natural Gas	2	6.3	6.3	100.0
Total	32	100.0	100.0	

**Select fuel(s) used for: water heater**

	Frequency	Percent	Valid Percent	Cumulative Percent
Natural Gas	16	50.0	50.0	50.0
Valid Electricity	15	46.9	46.9	96.9
Other	1	3.1	3.1	100.0
Total	32	100.0	100.0	

**Estimated age of: heating system**

	Frequency	Percent	Valid Percent	Cumulative Percent
0 - 4 years	9	28.1	28.1	28.1
10 - 14 years	8	25.0	25.0	53.1
5 - 9 years	6	18.8	18.8	71.9
Valid 15 - 19 years	4	12.5	12.5	84.4
20+ years	4	12.5	12.5	96.9
Do not have	1	3.1	3.1	100.0
Total	32	100.0	100.0	



## Estimated age of: cooling system

	Frequency	Percent	Valid Percent	Cumulative Percent
0 - 4 years	10	31.3	31.3	31.3
5 - 9 years	8	25.0	25.0	56.3
10 - 14 years	6	18.8	18.8	75.0
Valid 20+ years	3	9.4	9.4	84.4
Do not have	3	9.4	9.4	93.8
15 - 19 years	2	6.3	6.3	100.0
Total	32	100.0	100.0	

## Estimated age of: water heater

	Frequency	Percent	Valid Percent	Cumulative Percent
0 - 4 years	16	50.0	50.0	50.0
5 - 9 years	9	28.1	28.1	78.1
Valid 10 - 14 years	4	12.5	12.5	90.6
15 - 19 years	2	6.3	6.3	96.9
Do not have	1	3.1	3.1	100.0
Total	32	100.0	100.0	

Select fuel used for: indoor cooktop	Count (N=32)	Percent
Electricity	24	75.0%
Natural Gas	7	21.9%
Oil	0	0.0%
Propane	0	0.0%
None (no indoor cooktop)	1	3.1%
DK/NS	0	0.0%

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

Select fuel used for: indoor oven	Count (N=32)	Percent
Electricity	23	71.9%
Natural Gas	6	18.8%
Oil	0	0.0%
Propane	1	3.1%
None (no indoor oven)	1	3.1%
DK/NS	1	3.1%

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

## TecMarket Works

Select fuel used for: clothes dryer	Count (N=32)	Percent
Electricity	26	81.3%
Natural Gas	4	12.5%
Oil	0	0.0%
Propane	0	0.0%
None (no dryer)	1	3.1%
DK/NS	1	3.1%

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

About how many square feet of living space are in your home? (Do not include garages or other unheated areas)

	Frequency	Percent	Valid Percent	Cumulative Percent
1500 - 1999	8	25.0	25.0	25.0
1000 - 1499	7	21.9	21.9	46.9
Don't Know	5	15.6	15.6	62.5
2000 - 2499	4	12.5	12.5	75.0
Valid 2500 - 2999	3	9.4	9.4	84.4
500 - 999	3	9.4	9.4	93.8
3500 - 3999	1	3.1	3.1	96.9
4000 or more	1	3.1	3.1	100.0
Total	32	100.0	100.0	

Do you own or rent your home?

	Frequency	Percent	Valid Percent	Cumulative Percent
Own	27	84.4	84.4	84.4
Valid Rent	5	15.6	15.6	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Two	22	68.8	68.8	68.8
Valid One	8	25.0	25.0	93.8
Three	2	6.3	6.3	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Heated	18	56.3	56.3	56.3
Valid Unheated	8	25.0	25.0	81.3
Valid No basement	6	18.8	18.8	100.0
Total	32	100.0	100.0	

**Does your home have an attic?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	22	68.8	68.8	68.8
Valid No	10	31.3	31.3	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	25	78.1	78.1	78.1
Valid Not Applicable	4	12.5	12.5	90.6
Valid Yes	3	9.4	9.4	100.0
Total	32	100.0	100.0	

**Does your house have cold drafts in the winter?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	23	71.9	71.9	71.9
Valid No	9	28.1	28.1	100.0
Total	32	100.0	100.0	

**Does your house have sweaty windows in the winter?**

	Frequency	Percent	Valid Percent	Cumulative Percent
No	18	56.3	56.3	56.3
Valid Yes	14	43.8	43.8	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	23	71.9	71.9	71.9
Valid No	9	28.1	28.1	100.0
Total	32	100.0	100.0	

**Does your heating system keep your home comfortable in winter?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	26	81.3	81.3	81.3
Valid No	6	18.8	18.8	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	26	81.3	81.3	81.3
Valid No	4	12.5	12.5	93.8
Do not have	2	6.3	6.3	100.0
Total	32	100.0	100.0	

**Do you have a programmable thermostat?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	21	65.6	65.6	65.6
Valid No	11	34.4	34.4	100.0
Total	32	100.0	100.0	

## How many thermostats are there in your home?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	28	87.5	87.5	87.5
2	3	9.4	9.4	96.9
0	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 69 o - 72 o	13	40.6	40.6	40.6
73 o - 78 o	13	40.6	40.6	81.3
Off	5	15.6	15.6	96.9
Do not have	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 67 o - 70 o	15	46.9	46.9	46.9
71 o - 73 o	10	31.3	31.3	78.1
Less than 67 o	6	18.8	18.8	96.9
74 o - 77 o	1	3.1	3.1	100.0
Total	32	100.0	100.0	

## Do you have a swimming pool or spa?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	28	87.5	87.5	87.5
Yes	4	12.5	12.5	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
Slightly	13	40.6	40.6	40.6
Not at all	8	25.0	25.0	65.6
Valid Greatly	6	18.8	18.8	84.4
Moderately	5	15.6	15.6	100.0
Total	32	100.0	100.0	

How many people live in this home?

	Frequency	Percent	Valid Percent	Cumulative Percent
2	9	28.1	28.1	28.1
3	9	28.1	28.1	56.3
4	5	15.6	15.6	71.9
Valid 5	3	9.4	9.4	81.3
6	3	9.4	9.4	90.6
7	2	6.3	6.3	96.9
8 or more	1	3.1	3.1	100.0
Total	32	100.0	100.0	

How many of the people who live in this home are teenagers (age 13 to 19)?

	Frequency	Percent	Valid Percent	Cumulative Percent
None / prefer not to answer	23	71.9	71.9	71.9
Valid 1	7	21.9	21.9	93.8
2	1	3.1	3.1	96.9
3	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
0	9	28.1	28.1	28.1
2	7	21.9	21.9	50.0
1	6	18.8	18.8	68.8
3	5	15.6	15.6	84.4
Valid 5	2	6.3	6.3	90.6
4	1	3.1	3.1	93.8
6	1	3.1	3.1	96.9
7	1	3.1	3.1	100.0
Total	32	100.0	100.0	

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

	Frequency	Percent	Valid Percent	Cumulative Percent
No	13	40.6	40.6	40.6
Valid Nor sure	11	34.4	34.4	75.0
Yes	8	25.0	25.0	100.0
Total	32	100.0	100.0	

## What is your age group?

	Frequency	Percent	Valid Percent	Cumulative Percent
35 - 49	12	37.5	37.5	37.5
Valid 18 - 34	10	31.3	31.3	68.8
50 - 59	6	18.8	18.8	87.5
60 - 64	2	6.3	6.3	93.8
65 - 74	2	6.3	6.3	100.0
Total	32	100.0	100.0	

## Please select your total annual household income:

	Frequency	Percent	Valid Percent	Cumulative Percent
\$15,000 - \$29,999	7	21.9	21.9	21.9
\$30,000 - \$49,999	7	21.9	21.9	43.8
Prefer not to answer	6	18.8	18.8	62.5
Valid \$50,000 - \$74,999	3	9.4	9.4	71.9
\$75,000 - \$100,000	3	9.4	9.4	81.3
Over \$100,000	3	9.4	9.4	90.6
Under \$15,000	3	9.4	9.4	100.0
Total	32	100.0	100.0	

## Student grade band

	Frequency	Percent	Valid Percent	Cumulative Percent
Not specified	11	34.4	34.4	34.4
K	7	21.9	21.9	56.3
3	5	15.6	15.6	71.9
4	3	9.4	9.4	81.3
Valid 1	2	6.3	6.3	87.5
2	2	6.3	6.3	93.8
5	1	3.1	3.1	96.9
6	1	3.1	3.1	100.0
Total	32	100.0	100.0	



## Household state

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Kentucky	32	100.0	100.0	100.0

## Household city

	Frequency	Percent	Valid Percent	Cumulative Percent
NEWPORT	4	12.5	12.5	12.5
WALTON	4	12.5	12.5	25.0
COVINGTON	3	9.4	9.4	34.4
FLORENCE	3	9.4	9.4	43.8
ALEXANDRIA	2	6.3	6.3	50.0
BELLEVUE	2	6.3	6.3	56.3
LATONIA	2	6.3	6.3	62.5
DAYTON	1	3.1	3.1	65.6
FALMOUTH	1	3.1	3.1	68.8
Valid FORT MITCHELL	2	6.3	6.3	75.0
HEBRON	1	3.1	3.1	78.1
HIGHLAND HEIGHT	1	3.1	3.1	81.3
INDEPENDENCE	1	3.1	3.1	84.4
LAKESIDE PARK	1	3.1	3.1	87.5
MORNING VIEW	1	3.1	3.1	90.6
SOUTHGATE	1	3.1	3.1	93.8
TAYLOR MILL	1	3.1	3.1	96.9
WILLIAMSTOWN	1	3.1	3.1	100.0
Total	32	100.0	100.0	

## Appendix F: DSMore Table

Per Participant Impacts Summary for EE for Schools (NTC) Kentucky

Technology Impacts → ↓	Product code	State	EM&V gross savings (kWh/unit)	EM&V gross kW (coincident peak/unit)	EM&V gross kW (non-coincident peak/unit)	Unit of measure	Combined spillover less freeridership adjustment	EM&V net savings (kWh/unit)	EM&V net kW (coincident peak/unit)	EM&V net kW (non-coincident peak/unit)	EM&V load shape (yes/no)	EUL (whole number)
EE for Schools		KY	267.0	0.0780	0.0872	per participant	0.00%	267.0	0.0780	0.0872		7
<b>Program wide</b>			<b>267.0</b>	<b>0.0780</b>	<b>0.0872</b>		<b>0.00%</b>	<b>267.0</b>	<b>0.0780</b>	<b>0.0872</b>		<b>7</b>

Notes: 1. Technology names should match the DSMore naming convention.  
 2. Energy impacts are average per installed unit for each DSMore technology and unit description (measure/ton/sq ft., etc.)  
 3. Any analysis using a control group (such as billing analysis with a control group) does not need a freeridership adjustment (it is already in the analysis via the control group adjustment).  
 4. EM&V load shape "no" if using standard DSMore load shape for technology units, "yes" if an evaluation-provided load shape should be used for DSMore.