#### COMMONWEALTH OF KENTUCKY

#### BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

DUKE ENERGY KENTUCKY, INC.'S	)	
ANNUAL COST RECOVERY FILING	)	CASE NO. 2015-00368
FOR DEMAND-SIDE MANAGEMENT	)	

# DUKE ENERGY KENTUCKY, INC.'S PETITION FOR THE CONFIDENTIAL TREATMENT OF CERTAIN INFORMATION CONTAINED IN ITS RESPONSES TO STAFF'S FIRST SET OF DATA REQUESTS

Duke Energy Kentucky, Inc. (Duke Energy Kentucky or Company), pursuant to 807 KAR 5:001, Section 13, respectfully requests the Commission to classify and protect certain information provided by Duke Energy Kentucky filed in response to STAFF-DR-01-007. The information contained in Attachment STAFF-DR-01-007 (Attachment), for which Duke Energy Kentucky now seeks confidential treatment (Confidential Information), contains confidential and proprietary information including avoided costs data and calculations.

In support of this Petition, Duke Energy Kentucky states:

1. The Kentucky Open Records Act exempts from disclosure certain commercial information. KRS 61.878(1)(c). To qualify for this exemption and, therefore, maintain the confidentiality of the information, a party must establish that disclosure of the commercial information would permit an unfair advantage to competitors of that party. Public disclosure of the information identified herein would, in fact, prompt such a result for the reasons set forth below.

- 2. The information submitted and for which the Company is seeking confidential protection is the Attachment which contains Duke Energy Kentucky's avoided costs. More specifically, the Attachment shows detailed calculations of avoided costs information by program used by the Company in evaluating its demand side management programs. If made public, this (economically valuable) information would give the Company's vendors and competitors a distinct commercial advantage regarding Duke Energy Kentucky's operations. This information could be used by potential counter parties to undermine the Company's efforts to reduce costs, ultimately harming customers.
- 3. The Confidential Information is distributed within Duke Energy Kentucky only to those who must have access for business reasons and is generally recognized as confidential and proprietary in the energy industry.
- 4. The Confidential Information for which Duke Energy Kentucky is seeking confidential treatment is not known outside of Duke Energy Corporation.
- 5. Duke Energy Kentucky does not object to limited disclosure of the Confidential Information described herein, pursuant to an acceptable protective agreement, with the Attorney General or other intervenors with a legitimate interest in reviewing the same for the purpose of participating in this case.
- 6. This information was, and remains, integral to Duke Energy Kentucky's effective execution of business decisions. And such information is generally regarded as confidential or proprietary. Indeed, as the Kentucky Supreme Court has found, "information concerning the inner workings of a corporation is 'generally accepted as confidential or proprietary." Hoy v. Kentucky Industrial Revitalization Authority, 904 S.W.2d 766, 768 (Ky. 1995).

7. In accordance with the provisions of 807 KAR 5:001, Section 13(3), the Company is filing one copy of the Confidential Information separately under seal, and

one copy without the Confidential Information included.

8. Duke Energy Kentucky respectfully requests that the Confidential Information be withheld from public disclosure for a period of ten years. This will assure that the Confidential Information – if disclosed after that time – will no longer be commercially sensitive so as to likely impair the interests of the Company or its

customers if publicly disclosed.

9. To the extent the Confidential Information becomes generally available to the public, whether through filings required by other agencies or otherwise, Duke Energy Kentucky will notify the Commission and have its confidential status removed, pursuant

to 807 KAR 5:001 Section 13(10)(a).

WHEREFORE, Duke Energy Kentucky, Inc., respectfully requests that the Commission classify and protect as confidential the specific information described herein.

Respectfully submitted,

DUKE ENERGY KENTUCKY, INC.

Rocco D'Ascenzo (92796)

Associate General Counsel

Amy B. Spiller (85309)

Deputy General Counsel

139 East Fourth Street

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Cincinnati, Ohio 45201-0960

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E-mail: rocco.d'ascenzo@duke-energy.com

#### **CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing filing was served on the following via overnight mail, this 29<sup>th</sup> day of January, 2016:

Kentucky Public Staff Kentucky Public Service Commission 211 Sower Boulevard Frankfort, Kentucky, 40601

Amy B. Spiller

STATE OF INDIANA	)	
	)	SS:
COUNTY OF HENDRICKS	)	

The undersigned, Richard Philip, Manage, Products and Services, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Richard Philip, Affiant

Subscribed and sworn to before me by Richard Philip on this  $\frac{d0^{+}}{d0}$  day of January, 2016.

My Commission Expires:

SHERRY L. FIELDEN Notary Public- Seal State of Indiana My Commission Expires Jan 28, 2018

STATE OF OHIO	)
	) SS:
COUNTY OF HAMILTON	)

The undersigned, James Ziolkowski, Director of Rates & Regulatory Planning, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of his knowledge, information and belief.

Subscribed and sworn to before me by James Ziolkowski on this 1971 day of January, 2016.

Notary Public, State of Ohio My Commission Expires 01-05-2019

Adele M. Frisch

NOTARY PUBLIC

My Commission Expires: 1/5/2019

STATE OF OHIO	)	
	)	SS:
COUNTY OF HAMILTON	)	

The undersigned, Jessica Hodskins, Senior DSM & Retail Programs Analyst, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of her knowledge, information and belief.

Jessica Hodskins, Affiant

Subscribed and sworn to before me by Jessica Hodskins on this \_ January, 2016.

Notary Public, State of Ohio My Commission Expires 01-05-2019

Adulu M. Frisch
NOTARY PUBLIC

My Commission Expires: 1/5/2019

STATE OF OHIO	)	
	)	SS:
COUNTY OF HAMILTON	)	

The undersigned, Trisha Haemmerle, Senior Strategy & Collaboration Manager, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of her knowledge, information and belief.

Trisha Haemmerle, Affiant

Subscribed and sworn to before me by Trisha Haemmerle on this January, 2016.

ADELE M. FRISCH Notary Public, State of Ohio My Commission Expires 01-05-2019

Adulu M. Frisch

NOTARY PUBLIC

My Commission Expires: 1/5/2019

STATE OF OHIO	)	
	)	SS:
COUNTY OF HAMILTON	)	

The undersigned, Stephanie Simpson, Senior Program Perform Analyst, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of her knowledge, information and belief.

Stephanie Simpson, Affiant

Subscribed and sworn to before me by Stephanie Simpson on this 19<sup>th</sup> day of January, 2016.

ADELE M. FRISCH Notary Public, State of Ohio My Commission Expires 01-05-2019 adelle M. Frisch
NOTARY PUBLIC

My Commission Expires: 1/5/2019

STATE OF NORTH CAROLINA	()	
	)	SS: Rale: 52
COUNTY OF WAKE	)	

The undersigned, Lorraine Maggio, being duly sworn, deposes and says that she is the Manager-PEC Residential EE Program, and that the matters set forth in the foregoing data requests are true and correct to the best of her information, knowledge and belief.

Sonaine Maggio Lorraine Maggio, Affiant

Subscribed and sworn to before me by Lorraine Maggio, on this 2016 day of January, 2016.

**NOTARY PUBLIC** 

My Commission Expires:

1//24/19



STATE OF NORTH CAROLINA	)	
	)	SS:
COUNTY OF MECKLENBURG	)	

The undersigned, Roshena Ham, Sr. Product & Services Manager, being duly sworn, deposes and says that she has personal knowledge of the matters set forth in the foregoing data requests, and that the answers contained therein are true and correct to the best of her knowledge, information and belief.

Roshena Ham, Affiant

Subscribed and sworn to before me by Roshena Ham on this 21 day of January, 2016.

NOTARY PUBLIC

My Commission Expires: July 2, 2019

Shelia Lemoine
Notary Public
Mecklenburg County
North Carolina
My Commission Expires 7/2/2019

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**Duke Energy Kentucky** Case No. 2015-00368

**Staff First Set Data Requests** 

Date Received: January 14, 2016

STAFF-DR-01-001

**REQUEST:** 

Refer to the Application, page 7, the table in numbered paragraph 17.

a. Provide similar information for the electric portion for July 2015 through

December 2015.

b. Provide similar information for the natural gas portion of the demand-side

management ("DSM") programs for July 2014 through June 2015.

c. Provide similar information for the natural gas portion of the DSM programs for

July 2015 through December 2015.

RESPONSE:

Please see Attachment STAFF DR 01-001.xlsx

PERSON RESPONSIBLE: Stephanie Simpson

	1	Summary of L	oad Impacts July 2015 T	hrough December	2015*
Residential Programs		Incremental Participation	kWh	kW	ccf savings
Appliance Recycling Program		410	166,678	18	
Energy Efficiency Education Program for Schools		575	179,021	45	2,185
Low Income Neighborhood	40	187	69,940	21	-
Low Income Services	7 60	83	113,550	28	3,854
My Home Energy Report	2	58,157	11,917,320	3,517	
Residential Energy Assessments		239	185,225	36	4,662
Residential Smart \$aver®		138,810	3,054,990	442	152
Power Manager	3	10,918	-	11,315	
Total Residential		209,379	15,686,724	15,422	10,854

Non-Residential Programs		Incremental Participation	kWh	kW	ccf savings
Smart \$aver® Prescriptive - Energy Star Food Service Products		3	28,690	6	
Smart \$aver® Prescriptive - HVAC		3,295	17,072	14	
Smart \$aver® Prescriptive - Lighting		12,858	2,222,052	359	
Smart \$aver® Prescriptive - Motors/Pumps/VFD		115	88,662	8	
Smart \$aver® Prescriptive - Process Equipment		25	11,011	3	
Smart \$aver® Prescriptive - IT		1	70	-	
Smart \$aver® Custom	,	130	345,298	33	
Small Business Energy Saver	14/	1,852,234	1,651,561	380	
Power Share®	4	22		25,729	
Total Non-Residential		1,868,683	4,364,415	26,531	
Total		2,078,062	20,051,139	41,953	10,854

- 1 Impacts are net of freeriders, without losses and reflected at the customer meter point.
- 2 Actual participants and impact capability shown as of the December 2015 mailings.
- 3 Cumulative number of controlled devices installed. Impacts reflect average capability over the contract period.
- 4 Impacts reflect average capability over the contract period.

	1	Summary of	of Load Impacts July 201	4 Through June 20:	15*
Residential Programs		Incremental Participation	kWh	kW	ccf savings
Appliance Recycling Program		779	316,032	35	
Energy Efficiency Education Program for Schools		2,213	577,006	166	8,409
Low Income Neighborhood		718	557,078	147	-
Low Income Services	18	243	351,265	89	11,844
My Home Energy Report	2	53,267	10,869,228	3,207	
Residential Energy Assessments		577	447,175	88	11,256
Residential Smart \$aver®		385,099	8,639,278	1,243	226
Power Manager	3	10,719		11,033	
Total Residential		453,615	21,757,061	16,007	31,735

Non-Residential Programs		Incremental Participation	kWh	kW	ccf savings
Smart \$aver® Prescriptive - Energy Star Food Service Products		803	519,321	19	
Smart \$aver® Prescriptive - HVAC		101,560	910,166	247	
Smart \$aver® Prescriptive - Lighting		37,112	4,435,230	771	
Smart \$aver® Prescriptive - Motors/Pumps/VFD	710	572	364,758	34	
Smart \$aver® Prescriptive - Process Equipment		125	55,054	13	
Smart \$aver® Custom		1,793	5,071,530	638	
Small Business Energy Saver		592,308	528,145	119	
Power Share®	4	22		21,787	
Total Non-Residential		734,295	11,884,203	23,630	4
Total		1,187,910	33,641,264	39,637	

- 1 Impacts are net of freeriders, without losses and reflected at the customer meter point.
- 2 Actual participants and impact capability shown as of the June 2015 mailings.
- 3 Cumulative number of controlled devices installed. Impacts reflect average capability over the contract period.
- 4 Impacts reflect average capability over the contract period.

**Duke Energy Kentucky** Case No. 2015-00368

**Staff First Set Data Requests** 

Date Received: January 14, 2016

STAFF-DR-01-002

REQUEST:

Refer to Case No. 2015-00277, 1 Application, Exhibit A, Appendix A, and the current

Application, Appendix A. In those instances where the cost-effectiveness test results

change by 50 percent or more in the current proceeding, explain why the cost-

effectiveness test results changed as compared to the results in Case No. 2015-00277.<sup>2</sup>

RESPONSE:

Please see Attachment STAFF DR 01-002.xlsx

PERSON RESPONSIBLE: Stephanie Simpson

<sup>1</sup> Case No. 2015-00277, Application of Duke Energy Kentucky, Inc. to Amend Its Demand Side Management Programs, filed August 17, 2015.

2 Id.

Appendix A
Cost Effectiveness Test Results

	000	2	014-201	5	1100	2	013-20	14	Pilip	DI	fference		
Program Name	UCT	TRC	RIM	Participant	UCT	TRC	RIM	Participant	UCT	TRC	RIM	Participant	Reason for Change (1)
Appliance Recycling Program	0.95	1.15	0.61		3.86	5.01	1.38		-76%	-77%	-56%	N/A	EMV results received during 2014-2015 decreased impacts for these measures on average about 60%, which resulted in lower avoided cost vs. roughly the same program costs.
<b>Energy Efficiency Education Progra</b>	1.06	1.22	0.73		0.97	1.46	0.66		10%	-16%	10%	N/A	N/A
Low Income Neighborhood	1.16	1.50	0.77		3.55	4.19	1.34		-67%	-64%	-43%	N/A	EMV results received during 2014-2015 decreased impacts for this program by a little over half, which resulted in lower avoided costs vs. roughly the same program costs.
Low Income Services	0.60	0.79	0.48		0.88	1.06	0.63		-31%	-26%	-24%	N/A	N/A
My Home Energy Report	1.83	1.83	1.02		1.84	1.84	0.93		-1%	-1%	10%	N/A	N/A
Residential Energy Assessments	3.53	3.55	1.71		3.30	3.30	1.65		7%	8%	4%	N/A	N/A
Residential Smart \$aver*	2.87	2.98	1.15	6.10	4.74	7.39	1.32	15.02	-39%	-60%	-13%	-59%	Customers participated in DEK's specialty bulb offerings in significantly higher numbers this filing period (in particular LED measures experienced an increase in participation of over 600%). This resulted in an overall increase in the customer costs for the program during this filing period, decreasing the TRC and Participant test results.
Power Manager	3.31	3.86	3.31		4.35	5.75	4.35		-24%	-33%	-24%	N/A	N/A
Smart \$aver® Custom	7.56	3.46	1.49	3.98	3.72	1.60	1.32	2.05	104%	116%	13%	94%	Customers participate in a unique set of projects/measures in each filing period. These measures have different impacts, resulting in different cost effectiveness scores. Impacts increased significantly during the 2014-2015 filing period.
Smart \$aver® Prescriptive - Energy	7.96	3.70	1.42	5.51	10.19	3.96	1.53	4.24	-22%	-7%	-7%	30%	N/A
Smart \$aver® Prescriptive - HVAC	3.67	1.01	1.39	1.38	2.28	1.00	1.28	0.82	61%	1%	8%	67%	Impacts, and bill savings, increased significantly during 2014-2015, as did incentives, This resulted in a higher ratio of avoided costs vs. program costs, increasing the UCT test result, as well as resulting in a higher ratio of bill savings and incentives vs. participant costs, increasing the Participant test results.
Smart \$aver* Prescriptive - Lightin	5.02	1.35	1.49	1.72	5.73	2.75	1.62	2.74	-12%	-51%	-8%	-37%	Customer costs for the measures installed during this filing period were higher vs. roughly the same avoided costs and program costs (including incentives), decreasing the TRC and Participant test results.
Smart \$aver® Prescriptive - Motor	6.56	2.35	1.50	3.36	6.06	4.27	1.46	5.20	8%	-45%	3%	-35%	N/A
Smart \$aver® Prescriptive - Proce	6.64	4.75	1.80	6.19	5.37	5.63	1.69	6.02	24%	-16%	6%	3%	N/A
Smart \$aver® Prescriptive - IT	0.00	0.00	0.00	11-35-51	NA	NA	NA	NA	N/A	N/A	N/A	N/A	N/A
Small Business Energy Saver	3.79	2.42	1.49	2.69		1891	(E31)		N/A	N/A	N/A	N/A	N/A
Power Share®	3.98	12.61	3.98		4.33	12.84	4.33		-8%	-2%	-8%	N/A	N/A

<sup>(1)</sup> Measures listed as modifications in Appendix A in Case No. 2015-00227 are not included in this analysis, as they are the scores for modifications proposed to begin in 2016, not scores for the 2013-2014 time period.

**Duke Energy Kentucky** Case No. 2015-00368

Staff First Set Data Requests Date Received: January 14, 2016

STAFF-DR-01-003

REQUEST:

Refer to the Application, pages 21-22, numbered paragraph 50. Provide the analysis that

supports the long-term program effectiveness at reducing energy usage and arrearages.

RESPONSE: The Northern Kentucky Community Action Commission (NKCAC) is no

longer performing this analysis on behalf of Duke Energy Kentucky. While NKCAC

continues to administer the Payment Plus portion of Duke Energy Kentucky's Low

Income Services program, Duke Energy Kentucky's utilization of an independent third-

party evaluator has eliminated the need for NKCAC to continue to perform the analysis

regarding the effectiveness of the program. The long-term program effectiveness was

most recently evaluated in the EM&V report entitled The Impact Evaluation of Low

Income Weatherization and Payment Plus in Kentucky, which was filed with the

Commission in Case No. 2014-00280. Please see Attachment DR-01-003 - Impact

Evaluation of Low Income Weatherization and Payment Plus in Kentucky.pdf for

reference.

PERSON RESPONSIBLE: Lorrie Maggio

### **Final Report**

Impact Evaluation of Low Income Weatherization and Payment Plus in Kentucky

### Prepared for Duke Energy

139 East Fourth Street Cincinnati, OH 45201

July 31, 2013

### Submitted by

Nick Hall and Johna Roth

### TecMarket Works

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

Subcontractor:

May Wu and Michael Ozog Integral Analytics, Inc.



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### **Executive Summary**

### **Summary Overview**

This document presents the results of an energy impact evaluation of Duke Energy's Weatherization Program and Payment Plus Program as they are administered in Kentucky. The evaluation was conducted by TecMarket Works and Integral Analytics, Inc. The evaluation focuses on program participants of various levels of participation, as shown in Table 1 below.

### Summary of the Evaluation

The objective of the impact evaluation is to estimate the energy savings that result from the weatherization and Payment Plus programs.

### **Findings**

Table 1. Estimated Savings Model by Tier

Independent Variable	Coefficient (% Savings/day)	Annual Saving (kWh)	t-value
Tier 1	5.1%	425	5.99
Tier 2	13.6% 1,888 1		
Sample Size	9,487	observations (371 homes	)
R-Squared		67%	

**Program Description** 

### Description of the Weatherization Program

The Weatherization Program is designed to help low-income customers improve their homes' energy efficiency through insulation, sealing, and other improvements. The program is funded by Duke Energy in concert with People Working Cooperatively (PWC). PWC provides the weatherization services.

The program provides eligible customers with free home weatherization improvements to help lower energy bills and decrease energy usage. These energy conservation measures can also help customers improve the overall comfort, durability and value of their homes.

Services are provided to customers who meet income qualifications, live in a single-family home or apartment building with fewer than 9 units, and have a Duke Energy gas or electric account providing gas or electricity to the primary heating source for the home.

 Services provided are based on the home's specific energy usage and needs and are determined using a Tier system, as described below.

#### **Tier One Services**

Tier One services are provided if the customer uses less than 1 therm per square foot per year and less than 7 kWh per square foot 1 per year based on the last year of usage of Duke Energy supplied fuels. Energy usage is weather normalized to deal with variations in annual weather. The total Program dollars allowed per home for Tier One services is \$600.00 per home. Funding from the State or other sources is not counted in this allowance number and can be completed in addition to the Duke Energy funded measures listed below. Typically Tier One homes represent approximately 1/3 of the participating homes.

#### Tier One Services are as follows:

- Heating System Tune-up & Cleaning
- Heating System repair up to \$600 plus cost of refrigerator testing/replacement
- Venting check & repair
- Water Heater Wrap for Duke supplied water heaters
- Pipe Wrap
- Cleaning of refrigerator coils
- Cleaning of dryer vents
- Energy Star Compact Fluorescent Light (CFL) Bulbs
- · Low-flow shower heads and aerators
- Weather-stripping doors & windows
- Installation of Smoke Detectors & CO monitors if not present or provided by another program
- Limited structural corrections that affect health, safety and energy up to \$100
- Refrigerator testing/replacement

<sup>&</sup>lt;sup>1</sup> Square footage of the dwelling is based on conditioned space only whether occupied or unoccupied. It does not include unconditioned or semi conditioned space (non-heated basements).

Energy Education

#### **Tier Two Services**

Tier Two services are provided to customers if they use at least 1 therm and/or 7 kWh per square foot<sup>2</sup> per year based on the last year of usage and their heating fuel is supplied by Duke Energy. The total Duke Energy Program dollars allowed per home for Tier Two services is \$4,000 per home plus cost of refrigerator testing/replacement. Total dollars available without pre approval will be \$6,000 when a heating system is replaced. Typically Tier Two homes represent approximately 2/3 of the participating homes.

When only partial year consumption data is available, the placement in the Tier would be made on the projected consumption with what that home would consume during an average weather year in that region (using national weather data). A tool to estimate full-year consumption is provided by Duke Energy for these situations.

Tier Two services are as follows:

- All Tier One Services and Air Sealing Measures Plus:
- Additional cost effective measures (with SIR > 1.5) using the NEAT audit where the
  energy savings pay for the measure over the life of the measure as determined by a
  standard heat loss/economic calculation (NEAT audit) utilizing the cost of gas and
  electric (retail) as provided by Duke Energy. Such items can include but are not limited to
  attic insulation, wall insulation, crawl space insulation, floor insulation and sill box
  insulation. Safety measures applying to the installed technologies can be included within
  the scope of work considered in the NEAT audit as long as the SIR > 1.5 including the
  safety changes.
- Heating system and air conditioning tune and clean and/or repair. Heating systems can be replaced if the repair cost is greater than \$600.

### **Description of the Payment Plus Program**

The Payment Plus Program and the Residential Conservation and Energy Education Program (from here forward collectively referred to as "Payment Plus") are designed to help low-income customers with significant arrearage and payment problems obtain the information and skills needed to control their consumption, reduce their utility bills, and be capable of managing their accounts in a way that results in lower arrearage levels. The program provides participants with significant credits (threshold is currently up to \$300) to their arrearage in an effort to help move them out of debt.

The program has three components—two classes and weatherization. The first class is an energy education training session designed to teach participants how to manage their energy use. There is a second class on financial management and household budgeting designed to teach participants how to manage their financial affairs so that they can better live within their income

July 31, 2013 5 Duke Energy

<sup>&</sup>lt;sup>2</sup> Square footage of the dwelling is based on conditioned space only whether occupied or unoccupied. It does not include unconditioned or semi conditioned space (non-heated basements).

**Program Description** 

levels and pay their bills on time. The t component is the weatherization service (described above) in which their home is weatherized to make it more energy efficient. Participants were required to complete the energy training session, but were not required to attend the household budgeting training session or have their home weatherized. However, to obtain the \$500 participation credit the participants need to complete all three components of the program.

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

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

### Weatherization TIER Evaluation Methodology

The assessment approach consisted of a weather-normalized analysis of participant billing (meter) data, comparing the pre-program consumption with post-program consumption, adjusted for naturally occurring consumption changes through the use of a comparison group. This approach is typically called the difference of differences approach. To assess program impacts, billing data between the months of March 2010 and May 2012 were obtained for all participants of the program, allowing for pre and post participation billing data to be utilized in the billing analysis.

For this analysis, data are 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 for all participants as they enroll in the program to effectively act as a comparison group for the post-participation months. This approach is a standard high-rigor analysis approach for estimating impacts from weatherization programs and eliminates the risk of estimation error associated with improperly matched or inadequately controlled comparison groups selected from the customer population. 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 population as a whole, becomes the study's comparison 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.

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:

$$y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it},$$

where:

 $y_{it}$  = energy consumption for home i during month t

 $\alpha_I$  = constant term for site i

 $\beta$  = vector of coefficients

x = vector of variables that represent factors causing changes in energy consumption

for home i during month t (i.e., weather, time, and participation)

 $\varepsilon$  = error term for home i during month t.

With this specification, the only information necessary for estimation are those factors that vary month to month for each customer, and that will affect energy use, which effectively are weather conditions. Other non-measurable factors can be captured through the use of monthly indicator variables (e.g., to capture the effect of potentially seasonal energy loads).

The effect of the Weatherization program was captured by including a variable which is equal to one for all months after the household participated in the program. In this case this variable is further decomposed into 3 binary variables in corresponding months. The coefficients associated with the three variables are 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 and temperature was calculated based on each bill start and end date.

### Tier 1 and Tier 2 Weatherization Impact Analysis

This section investigates the impacts of Tier 1 weatherization and Tier 2 weatherization. The analysis was based on those customers who either participated in the weatherization program or customers who added weatherization via the Payment Plus program.

The billing analysis used consumption data from Weatherization and Payment Plus participants in Kentucky (a total of 371 homes; 74 in Tier 1, and 297 in Tier 2) that participated between March of 2010 and May of 2012. A panel model specification was used that analyzed the monthly billed energy use across time and participants. The model included terms to control for the effect of weather on usage as well as a complete set of monthly indicator variables to capture the effects of non-measureable factors that vary over time (such as economic conditions and season loads). Table 2 below summarizes the per-household usage of each of the twelve months prior to participation by Tier. As expected, Tier 2 participating households use significantly more than Tier 1 households in every single month.

Table 2. Per Household Monthly kWh Usage by Tier, Mean Pre-Participation Values

Month	Tier 1	Tier 2	
Jan.	852.6	1,392.9	
Feb.	694.6	1,180.7	
Mar.	540.5	1,002.9 860.4 985.1	
Apr.	493.2		
May	538.6		
Jun.	776.2	1,244.3	
Jul.	949.6	1,464.2	

**Findings** 

Aug.	845.4	1,343.5
Sep.	601.9	1,134.6
Oct.	603.8	841.0
Nov	712.4	1 063 1

Nov.	712.4	1,063.1
Dec.	725.0	1,372.2
Total	8 333 7	13 884 7

The estimated impacts are included in Appendix A: Tier 1 and Tier 2 Weatherization Estimated Statistical Model, and a summary of the results are shown in Table 3 below.

Table 3. Estimated Savings Model by Tier

Independent Variable	Coefficient (% Savings/day)	Annual Savings (kWh)	t-value
Tier 1	5.1%	425	5.99
Tier 2	13.6%	1,888	1.59
Sample Size	9,48	7 observations (371 homes	)
R-Squared		67%	

Note that in this table, the dependent variable is the natural log of the daily energy use. In this specification, the coefficient represents the savings as a percentage of the participant's usage. To derive the kWh savings, the coefficient in the table was multiplied by the average annual usage per participating household with Tier 1 weatherization (8,333.7 kWh/year) to give the 425 kWh/year savings estimate; and Tier 2 weatherization (13,884.7 kWh/year) to give the 1,888 kWh/year saving estimate. The complete estimate model, showing the weather and time factors, is presented in Appendix A: Tier 1 and Tier 2 Weatherization Estimated Statistical Model.

### Free Ridership

Low Income programs are assigned a free ridership level of 0%. This is common practice in the industry, and discussed in the memo titled "Low Income Programs and Freeridership" dated July 11, 2011, embedded below.



### Appendix A: Tier 1 and Tier 2 Weatherization Estimated Statistical Model

ln_kwhd	Coef.	Std. Ess.	t	Polt	[954 Cand.	Interval]
tme		The same of				
200801	8325145	. 6258384	-1.32	0.186	-2.26754	.4017112
200902	.4622362	. 5722324	0.81	0.415	6594688	1.583941
200903	.7657697	.569326	1.35	0.179	3502381	1.881778
200904	. 9334862	.5691674	1.64	0.101	1822106	2.049183
200905	. 9481 663	.5698958	1.67	0.096	1669787	2.063311
200906	1.19478	.5684633	2.10	0.036	.0834E35	2.309097
200907	1.266222	.568102	2.23	0.02E	.1526136	2.379831
200908	1.156772	.5676979	2.04	0.042	.0439561	2.269589
200909	1.035637	.5675865	1.82	0.068	0769606	2.148235
200910	. 9228351	.5671834	1.63	0.104	1885728	2.034643
200911	1.068179	.5670117	1.88	0.060	0432928	2.17965
200912	1.245449	.5667183	2.20	0.028	.1345532	2.356346
201001	1.344967	. 5665858	2.37	0.01 B	.2343304	2.455603
201002	1.325987	. 5665695	2.34	0.019	. 2153827	2.436591
201003	1.208099	.5665329	2.13	0.032	.0975662	2.318632
201004	.8783108	.5663747	1.55	0.121	2319118	1.988533
201005	1.164885	.5662801	2.0€	0.040	.0548476	2.274922
201006	1.295548	.5662387	2.4E	0.014	.2855924	2.505504
201007	1.693843	.5662445	2. 55	0.002	. 5838754	2.80381
201008	1.501491	.5661232	2.65	0.008	.3917616	2.61122
201009	1.256342	.5661154	2.22	0.026	.1466282	2.366057
201010	1.135021	.5661176	2.01	9.044	.029302	2.249739
201011	1.252269	. 5661215	2.21	0.027	.1425425	2.361995
201012	1.55673	.566126	2.75	0.006	. 4463548	2. 666465
201101	1.503499	.5661378	2. 66	0.00 B	.3937409	2.613257
201102	1.253971	.5661862	2.25	0.022	.1891175	2.408824
201103	1.258655	.5662198	2.29	0.022	.1887364	2.408574
201104	1.041767	. 5 6 6 2 3 2 6	1.84	3.06E	0681773	2.151711
201105	1.242356	.5662484	2.15	0.028	-1323807	2.352333
201106	1.420078	. 5662886	2.51	0.012	.3100243	2.530132
201107	1.724036	.5663327	2.04	3.002	. 6128953	2.834176
201108	1.640617	. 5663593	2.50	0.004	. 520 42 51	2.75383
201109	1.277644	.5663812	2.26	3.024	.1674086	2.387875
201113	1.075689	.5664029	1.90	0.058	0345885	2.185967
201111	1.219093	. 5664184	2.15	0.031	.1087853	2.329402
201112	1.327895	.5664393	2.34	0.315	.2175462	2.438245
201201	1.361766	.5664604	2.40	0.01E	. 2513754	2.472157
201202	1.274155	.568492	2.25	0.025	.1637025	2.384608
201203	.7516198	.5665442	1.33	0.195	3589349	1.862175
201204	7591516	. 5715433	-1.32	4.184	-1.879506	.3612026
ptie=_2	1361496	.0227221	-5.99	0.000	1896501	0516050
prier 1	0514818	.0323651	-1.59	0.112	1149247	.0119613
cons	2.0409	.5652845	3.61	0.000	.932815	3.148986

### **Appendix B: TIER Crosstab of Participation by Month**

Count	Partmonth id
47	201003
30	201004
9	201006
9	201007
17	201008
19	201009
6	201010
21	201011
18	201012
45	201101
26	201102
4	201104
26	201105
19	201106
12	201107
4	201108
3	201109
5	201111
16	201201
15	201202
1	201203

### Appendix C: Overall Weatherization Impact

### **Findings**

There were a total of 335 participants between March 2010 and April 2012. These are usable accounts could be included in the impact analysis after data cleaning and processing<sup>3</sup> for analysis in the billing analysis model. A panel model was used to determine program impacts, where the dependent variable was the natural log of daily electricity consumption. The savings analysis results (percent of consumption saved) from the billing analysis are presented in Table 4.

Table 4. Estimated Weatherization Program Impacts in Percentage: Overall

Per Perticipant Savings (9/)	95%	Confidence Inte	rval
Per Participant Savings (%) Positive Indicates Saving	Lower Bound	Estimate	Upper Bound
Overall weatherization	3.1%	6.3%	9.5%

### **Analysis**

This section of the report presents the results of a billing analysis conducted over the participants in the Kentucky Weatherization program. Billing data were obtained for all participants in the program between March 2010 and April 2012.

This table shows that the Weatherization program produced statistically significant savings of 6.3% for participants in Kentucky.

The effect of the Weatherization program was captured by including a variable which is equal to one for all months after the household participated in the program. The coefficient on the 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 and temperature was calculated based on each bill start and end date. The estimated electric model for the Weatherization program is presented in the table below.

Independent Variable	Coefficient (% Savings/day)	t-value		
Overall program	-0.063	-3.88		
Sample Size	8,622 observations (335 homes)			
R-Squared	72%			

The complete estimated model, showing the weather and time factors, is presented in the section titled "Appendix D: Weatherization Estimated Statistical Model".

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<sup>&</sup>lt;sup>3</sup> Useable accounts are those accounts which have billing data for both a portion of the pre- and post-participation period. It was not required that the data covers the complete evaluation period, only that there is at least one observation in each period.

# Appendix D: Weatherization Estimated Statistical Model

The section below shows the complete model estimated for the billing analysis of the Kentucky Weatherization program. The model includes indicators for each month (the yearmonth variable), temperature, the state the participant resides, and the participation variables.

			Observation Observation		10517171		
Dependent Variable: ln_	kwhd						
			Ç,	ım of			
Source		DF		ares	Mean Square	F Value	Pr > F
Model		384	3278.99	98217	8.539058	55.18	<.0001
Error	1	3237	1274.73	37690	0.154758		
Corrected Total		3621	4553.73	35907			
	R-Square	Cor	eff Var	Root	MSE ln_kwhd	Mean	
	0.720068	1	2.00265	0.39	3392 3.2	77546	
Source		DF	Туре	I SS	Mean Square	F Value	Pr > F
HUB account id		334	2891.55	1074	8.657341	55.94	<.0001
Part		1	22772222	51229	6.351229	41.04	<.0001
monthID		37	346.27	N-97 1 1 87 P	9.358912	60.47	<.0001
AvgTemp*month		12		15381	2.901282	18.75	<.0001
Source		DF	Type II	II SS	Mean Square	F Value	Pr > F
Part		1	2.3333	36557	2.33336557	15.08	0.0001
monthID		37	51.8156		1.40042239	9.05	<.0001
AvgTemp*month		12	34.8153		2.90128174	18.75	<.0001

						95%	ence
Parameter		Estimate	Standard Error	t Value	Pr >  t	Confid	Limits
Part		-0.06293	0.01620539	-3.88	0.0001	-0.09469	-0.03116
monthID	200903	-0.37474	0.36678532	-1.02	0.307	-1.09373	0.344252
monthID	200904	-0.09046	0.1033128	-0.88	0.3813	-0.29298	0.112056
monthID	200905	-1.05973	0.86700456	-1.22	0.2216	-2.75927	0.63982
monthID	200906	-3.17798	0.50039881	-6.35	<.0001	-4.15889	-2.19708
monthID	200907	-5.75365	0.87307644	-6.59	< .0001	-7.4651	-4.0422
monthID	200908	-1.96964	0.9112646	-2.16	0.0307	-3.75595	-0.18333
monthID	200909	-4.53063	0.62410479	-7.26	<.0001	-5.75404	-3.30723
monthID	200910	-2.02061	0.48020749	-4.21	<.0001	-2.96193	-1.07928
monthID	200911	-0.38782	0.49229229	-0.79	0.4308	-1.35284	0.577196
monthID	200912	-0.3937	0.38728698	-1.02	0.3094	-1.15288	0.365484
monthID	201001	-0.70386	0.46923932	-1.5	0.1337	-1.62369	0.215968
monthID	201002	0.130272	0.45916279	0.28	0.7766	-0.7698	1.030347
monthID	201003	-0.41938	0.3603802	-1.16	0.2446	-1.12581	0.287058
monthID	201004	-0.13145	0.08933798	-1.47	0.1412	-0.30658	0.043672
monthID	201005	-1.14323	0.87372322	-1.31	0.1908	-2.85595	0.569483
monthID	201006	-3.12906	0.50659584	-6.18	<.0001	-4.12212	-2.13601
monthID	201007	-5.84815	0.91834673	-6.37	<.0001	-7.64834	-4.04796
monthID	201008	-1.76641	0.98798713	-1.79	0.0738	-3.70311	0.170294
monthID	201009	-4.5783	0.65428654	-7	<.0001	-5.86086	-3.29573
monthID	201010	-2.09243	0.51326455	-4.08	<.0001	-3.09856	-1.0863
monthID	201011	-0.31932	0.50487231	-0.63	0.5271	-1.309	0.670357
monthID	201012	-0.36449	0.38158447	-0.96	0.3395	-1.11249	0.38351
monthID	201101	-0.67605	0.47015551	-1.44	0.1505	-1.59768	0.245569
monthID	201102	0.211433	0.47956174	0.44	0.6593	-0.72863	1.151495
monthID	201103	-0.35927	0.36409886	-0.99	0.3238	-1.07299	0.354458
monthID	201104	-0.14462	0.09475512	-1.53	0.127	-0.33036	0.041129
monthID	201105	-1.12107	0.84889976	-1.32	0.1867	-2.78513	0.542984
monthID	201106	-3.10636	0.50575506	-6.14	<.0001	-4.09776	-2.11495
monthID	201107	-5.84211	0.91365158	-6.39	<.0001	-7.6331	-4.05113
monthID	201108	-1.74216	0.99277848	-1.75	0.0793	-3.68825	0.203938
monthID	201109	-4.43601	0.62911541	-7.05	<.0001	-5.66924	-3.20279
monthID	201110	-2.1183	0.49073228	-4.32	<.0001	-3.08025	-1.15634
monthID	201111	-0.37785	0.49436341	-0.76	0.4447	-1.34693	0.591228
monthID	201112	-0.38128	0.3897361	-0.98	0.328	-1.14526	0.382702
monthID	201201	-0.74254	0.53135034	-1.4	0.1623	-1.78412	0.299039
monthID	201202	0.260945	0.51689263	0.5	0.6137	-0.7523	1.274184
monthID	201203	-0.33601	0.36720933	-0.92	0.3602	-1.05584	0.383808
AvgTemp*mont	th 1	-0.00538	0.00874502	-0.62	0.5385	-0.02252	0.011764
AvgTemp*mont		-0.02868	0.00852912	-3.36	0.0008	-0.0454	-0.01196
AvgTemp*mont		-0.01372	0.0022911	-5.99	<.0001	-0.01821	-0.00923
AvgTemp*mont		-0.0177	0.00501184	-3.53	0.0004	-0.02753	-0.00788
AvgTemp*mont		-0.00291	0.01154936	-0.25	0.8008	-0.02555	
AvgTemp*mon1		0.026021	0.00485053	5.36	<.0001	0.016513	0.03553
AvgTemp*mon1		0.059593	0.01016889	5.86	<.0001	0.03966	0.079527
AvgTemp*mon1		0.012967	0.01043329	1.24	0.214	-0.00748	0.033419
AvgTemp*mont	11	0.043412	0.00625709	6.94	<.0001	0.031147	0.055678
AvgTemp*mont		0.011544	0.00465962	2.48	0.0133	0.002409	0.020678
AvgTemp*mont		-0.01433	0.00523929	-2.73	0.0063	-0.0246	-0.00406
AvgTemp*mon1		-0.01338	0.00259133	-5.16	<.0001	-0.01846	-0.0083

### Appendix E: Payment Plus Impact Analysis

### **Payment Plus Methodology**

The study looked at Payment Plus participants who participated in this program from September 2010 through March 2012

For these analyses, data are 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 include 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.

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:

$$y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it},$$

where:

 $y_{it}$  = energy consumption for home i during month t

 $\alpha_I$  = constant term for site *i*  $\beta$  = vector of coefficients

x = vector of variables that represent factors causing changes in energy consumption

for home i during month t (i.e., weather, time, and participation)

 $\varepsilon$  = error term for home *i* during month *t*.

With this specification, the only information necessary for estimation are those factors that vary month to month for each customer, and that will affect energy use, which effectively are weather conditions and program participation. Other non-measurable factors can be captured through the use of monthly indicator variables (e.g., to capture the effect of potentially seasonal energy loads).

### **Findings**

There were a total of 262 usable accounts after cleaning and processing the data to ready it for the billing analysis model<sup>4</sup>. A panel model was used to determine program impacts, where the dependent variable was the natural log of daily electricity consumption. The results of the billing analysis are presented in Table 5.

Table 5. Estimated Kentucky Payment Plus Program Impacts in Percentage: Overall

Per Participant Annual Savings (%)	95% Con	Annual			
Positive Indicates Saving	Lower Bound	Estimate	Upper Bound	kWh Saving	
Overall Program Recent	2.0%	5.6%	9.3%	835	
Without Weatherization	1.3%	5.1%	8.8%	760	
With Weatherization	2.6%	7.7%	12.8%	1,148	

### **Analysis**

Billing data were obtained for all participants in the analysis. The effect of Payment Plus program was captured by including a variable which is equal to one for all months after the household participated in the program. The coefficients for these variables are the savings associated with the program. Payment Plus achieved significant saving at approximately 5.6%. If participants only took classes without weatherization, the saving is estimated to be significant at approximately 5.1% whereas if participants added weatherization the saving is estimated to be significant at approximately 7.7%.

The model result is summarized in the table below:

Independent Variable	Coefficient (% Savings/day)	t-value
Overall program	-0.056	-3.00
Without Weatherization	-0.051	-2.62
With Weatherization	-0.077	-2.97
Sample Size	12,049 observation	s (262 homes)
R-Squared	61%	

<sup>&</sup>lt;sup>4</sup> Useable accounts are those accounts which have billing data for both a portion of the pre- and post-participation period. It was not required that the data covers the complete evaluation period, only that there are at least some observations in each of the customer-specific records over the pre and post program analysis period.

# Appendix F: Payment Plus Estimated Statistical Model – Overall

Number	of	Observations	Read	12049
Number	of	Observations	lised	12049

Dependent Variable: ln\_kwhd

Source		DF		m of ares Me	ean Square	F Value	Pr > F
504, 00							
Model		375	3325.24	9871	8.867333	48.98	<.0001
Error		11673	2113.43	2277	0.181053		
Corrected Total		12048	5438.68	2148			
			222		6.15.15	19.50	
	R-Square	Coeff	Var	. Root MSE	ln_kwhd	Mean	

	R-Square	Coe	ff Var	Root	MSE	ln_kwhd	Mean	
	0.611407	12	.16432	0.42	5503	3.49	7961	
Source		DF	Туре	I SS	Mea	n Square	F Value	Pr > F
HUB_account_id		261	2723.9	12797	1	3.436447	57.64	<.0001
Part		1	8.3	44957		3.344957	46.09	<.0001
monthID		99	526.8	08469	1	5.321298	29.39	<.0001
AvgTemp*month		12	63.4	01322		5.283444	29.18	<.0001
Humidity*summer		1	1.6	63492		1.663492	9.19	0.0024
Wind*winter		1	1.1	18834		1.118834	6.18	0.0129
Source		DF	Type I	II SS	Mea	n Square	F Value	Pr > F
Part		1	1.63	40396	1	6340396	9.03	0.0027
monthID		99	144.93	47578	1	4639875	8.09	<.0001
AvgTemp*month		12	40.33	40270	3	. 3611689	18.56	<.0001
Humidity*summer		1	1.66	11332	1	6611332	9.17	0.0025
Wind*winter		1	1.11	88335	1	.1188335	6.18	0.0129
Part monthID AvgTemp*month Humidity*summer		1 99 12 1	1.63 144.93 40.33 1.66	40396 47578 40270 11332	1 1 3 1	.6340396 .4639875 .3611689 .6611332	9.03 8.09 18.56 9.17	0.00 <.00 <.00

			Standard		
Parameter		Estimate	Error	t Value	Pr >  t
Part		-0.05611	0.01867862	-3	0.0027
monthID	200901	-0.497	0.41521368	-1.2	0.2313
monthID	200902	-0.29192	0.40564781	-0.72	0.4718
monthID	200903	-0.52533	0.30926937	-1.7	0.0894
monthID	200904	-0.10826	0.06722652	-1.61	0.1073
monthID	200905	-1.40705	0.50166606	-2.8	0.005
monthID	200906	-2.6387	0.48679204	-5.42	<.0001
monthID	200907	-1.46165	0.94015566	-1.55	0.12
monthID	200908	-3.83713	0.8117151	-4.73	<.0001
monthID	200909	-5.94467	0.53313623	-11.15	<.0001
monthID	200910	-2.32365	0.36881979	-6.3	<.0001
monthID	200911	-0.18219	0.39674331	-0.46	0.6461
monthID	200912	0.172485	0.31618647	0.55	0.5854
monthID	201001	-0.34225	0.37651174	-0.91	0.3634
monthID	201002	-0.16816	0.38429862	-0.44	0.6617
monthID	201003	-0.37034	0.29653289	-1.25	0.2117
monthID	201004	-0.0401	0.05516641	-0.73	0.4673
monthID	201005	-1.42468	0.50529064	-2.82	0.0048
monthID	201006	-2.55894	0.48693831	-5.26	<.0001
monthID	201007	-1.26247	0.98918666	-1.28	0.2019
monthID	201008	-3.81578	0.88412221	-4.32	<.0001
monthID	201009	-6.13732	0.5605853	-10.95	<.0001
monthID	201010	-2.5124	0.39352693	-6.38	<.0001
monthID	201011	-0.07446	0.40597704	-0.18	0.8545
monthID	201012	0.15846	0.30930369	0.51	0.6084
monthID	201101	-0.32399	0.38245989	-0.85	0.3969
monthID	201102	-0.11282	0.40327651	-0.28	0.7797
monthID	201103	-0.3535	0.30233002	-1.17	0.2423
monthID	201104	-0.02702	0.06477474	-0.42	0.6766
monthID	201105	-1.36228	0.49324605	-2.76	0.0058
monthID	201106	-2.4454	0.49509814	-4.94	<.0001
monthID	201107	-1.24448	0.98366521	-1.27	0.2058
monthID	201108	-3.85135	0.88769282	-4.34	<.0001
monthID	201109	-5.95164	0.53385716	-11.15	<.0001
monthID	201110	-2.56954	0.37689209	-6.82	<.0001
monthID	201111	-0.12261	0.39915497	-0.31	0.7587
monthID	201112	0.249419	0.3193586	0.78	0.4348
monthID	201201	-0.36604	0.42973355	-0.85	0.3944
monthID	201202	-0.18093	0.43640612	-0.41	0.6785
monthID	201203	-0.48863	0.30796898	-1.59	0.1126
AvgTemp*month	1	0.008172	0.00951336	0.86	0.3904
AvgTemp*month	2	0.003063	0.00990426	0.31	0.7571
AvgTemp*month	3	0.007029	0.00678321	1.04	0.3001
AvgTemp*month	4	-0.01329	0.00387099	-3.43	0.0006
AvgTemp*month	5	0.006231	0.0060623	1.03	0.304
AvgTemp*month	6	-0.04381	0.02507374	-1.75	0.0806
AvgTemp*month	7	-0.0573	0.02711392	-2.11	0.0346
AvgTemp*month	8	-0.02749	0.02442985	-1.13	0.2606
AvgTemp*month	9	0.066647	0.00556928	11.97	<.0001
AvgTemp*month	10	0.02206	0.00346293	6.37	<.0001
AvgTemp*month	11	-0.01174	0.00441225	-2.66	0.0078
AvgTemp*month	12	-0.00424	0.00608977	-0.7	0.4866
Humidity*summer		0.07626	0.02517667	3.03	0.0025
Wind*winter		-0.01928	0.00775594	-2.49	0.0129

# **Appendix G: Payment Plus Estimated Statistical Model – With and Without Weatherization**

Number of Observations Read 12049 Number of Observations Used

12049

ln\_kwhd Mean

Dependent Variable: ln\_kwhd

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	376	3325.492506	8.844395	48.85	<.0001
Error	11672	2113.189641	0.181048		
Corrected Total	12048	5438.682148			

Root MSE

Coeff Var

	11406 4000 20	12.55				211-110/11		
	0.611452	12	.16415	0.42	5497	3.4	97961	
Source		DF	Туре	I SS	Mear	Square	F Value	Pr > F
HUB account id		261	2723.91	12797	16	.436447	57.64	<.0001
Cpart		1	4.36	51677	4	.361677	24.09	<.0001
WPart		1	4.32	29674	4	.329674	23.91	<.0001
monthID		99	526.57	71903		.318908	29.38	<.0001
AvgTemp*month		12	63.53	33176		. 294431	29.24	<.0001
Humidity*summer		1	1.66	53295	1	.663295	9.19	0.0024
Wind*winter		1	1.11	19985	1	.119985	6.19	0.0129
Source		DF	Type II	II SS	Mear	Square	F Value	Pr > F
Cpart		1	1.24	14707	1.	2414707	6.86	0.0088
WPart		1	1.592	23745	1.	5923745	8.80	0.0030
monthID		99	145.026	3803	1.	4648523	8.09	<.0001
AvgTemp*month		12	40.446	58018	3.	3705668	18.62	<.0001
Humidity*summer		1	1.666	9339	1.	6609339	9.17	0.0025
Wind*winter		1	1.119	99855	1.	1199855	6.19	0.0129

Cpart         -0.05052         0.01929308         -2.62         0.06           WPart         -0.07698         0.02595706         -2.97         0.0           monthID         200901         -0.50533         0.41527001         -1.22         0.22           monthID         200902         -0.2927         0.40564245         -0.72         0.47           monthID         200903         -0.52852         0.30927715         -1.71         0.08           monthID         200904         -0.11377         0.06739377         -1.69         0.09           monthID         200905         -1.40968         0.50166389         -2.81         0.0           monthID         200906         -2.64478         0.4868133         -5.43         <.0001           monthID         200907         -1.45413         0.94016444         -1.55         0.1           monthID         200908         -3.85254         0.81181244         -4.75         <.0001           monthID         200909         -5.96465         0.53340775         -11.18         <.0001           monthID         200910         -2.31921         0.36883439         -6.29         <.0001           monthID         200911         -0.18023	
monthID         200901         -0.50533         0.41527001         -1.22         0.22           monthID         200902         -0.2927         0.40564245         -0.72         0.47           monthID         200903         -0.52852         0.30927715         -1.71         0.08           monthID         200904         -0.11377         0.06739377         -1.69         0.09           monthID         200905         -1.40968         0.50166389         -2.81         0.0           monthID         200906         -2.64478         0.4868133         -5.43         <.0001	88
monthID         200902         -0.2927         0.40564245         -0.72         0.47           monthID         200903         -0.52852         0.30927715         -1.71         0.08           monthID         200904         -0.11377         0.06739377         -1.69         0.09           monthID         200905         -1.40968         0.50166389         -2.81         0.0           monthID         200906         -2.64478         0.4868133         -5.43         <.0001	03
monthID         200903         -0.52852         0.30927715         -1.71         0.08           monthID         200904         -0.11377         0.06739377         -1.69         0.09           monthID         200905         -1.40968         0.50166389         -2.81         0.0           monthID         200906         -2.64478         0.4868133         -5.43         <.0001	37
monthID         200904         -0.11377         0.06739377         -1.69         0.09           monthID         200905         -1.40968         0.50166389         -2.81         0.0           monthID         200906         -2.64478         0.4868133         -5.43         <.0001	06
monthID         200905         -1.40968         0.50166389         -2.81         0.00           monthID         200906         -2.64478         0.4868133         -5.43         <.0001	75
monthID         280906         -2.64478         0.4868133         -5.43         <.0001           monthID         200907         -1.45413         0.94016444         -1.55         0.1           monthID         200908         -3.85254         0.81181244         -4.75         <.0001	14
monthID         200907         -1.45413         0.94016444         -1.55         0.1           monthID         200908         -3.85254         0.81181244         -4.75         <.0001	05
monthID         200908         -3.85254         0.81181244         -4.75         <.0001           monthID         200909         -5.96465         0.53340775         -11.18         <.0001	
monthID         200909         -5.96465         0.53340775         -11.18         <.0001           monthID         200910         -2.31921         0.36883439         -6.29         <.0001	22
monthID         200910         -2.31921         0.36883439         -6.29         <.0001           monthID         200911         -0.18023         0.39674115         -0.45         0.64           monthID         200912         0.170699         0.31618562         0.54         0.58           monthID         201001         -0.34999         0.37656561         -0.93         0.35           monthID         201002         -0.16936         0.38429441         -0.44         0.65           monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	
monthID         200911         -0.18023         0.39674115         -0.45         0.64           monthID         200912         0.170699         0.31618562         0.54         0.58           monthID         201001         -0.34999         0.37656561         -0.93         0.35           monthID         201002         -0.16936         0.38429441         -0.44         0.65           monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	
monthID         200912         0.170699         0.31618562         0.54         0.58           monthID         201001         -0.34999         0.37656561         -0.93         0.35           monthID         201002         -0.16936         0.38429441         -0.44         0.65           monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	
monthID         201001         -0.34999         0.37656561         -0.93         0.35           monthID         201002         -0.16936         0.38429441         -0.44         0.65           monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	96
monthID         201002         -0.16936         0.38429441         -0.44         0.655           monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	93
monthID         201003         -0.37369         0.29654267         -1.26         0.20           monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	27
monthID         201004         -0.04607         0.05540638         -0.83         0.40           monthID         201005         -1.42761         0.50528961         -2.83         0.00           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	94
monthID         201005         -1.42761         0.50528961         -2.83         0.000           monthID         201006         -2.56525         0.48696176         -5.27         <.0001	76
monthID         201006         -2.56525         0.48696176         -5.27         <.0001           monthID         201007         -1.25445         0.98919646         -1.27         0.20           monthID         201008         -3.8323         0.88422443         -4.33         <.0001	57
monthID         201007         -1.25445         0.98919646         -1.27         0.200           monthID         201008         -3.8323         0.88422443         -4.33         <.0001           monthID         201009         -6.16119         0.56095616         -10.98         <.0001           monthID         201010         -2.50867         0.39353439         -6.37         <.0001           monthID         201011         -0.07329         0.4059724         -0.18         0.850           monthID         201012         0.156115         0.30930582         0.5         0.61           monthID         201101         -0.33021         0.38249196         -0.86         0.3           monthID         201102         -0.11377         0.40327146         -0.28         0.77           monthID         201103         -0.35516         0.30232901         -1.17         0.244	47
monthID         201008         -3.8323         0.88422443         -4.33         <.0001	
monthID         201009         -6.16119         0.56095616         -10.98         <.0001           monthID         201010         -2.50867         0.39353439         -6.37         <.0001	48
monthID         201010         -2.50867         0.39353439         -6.37         <.0001           monthID         201011         -0.07329         0.4059724         -0.18         0.85           monthID         201012         0.156115         0.30930582         0.5         0.61           monthID         201101         -0.33021         0.38249196         -0.86         0.3           monthID         201102         -0.11377         0.40327146         -0.28         0.77           monthID         201103         -0.35516         0.30232901         -1.17         0.244	
monthID         201011         -0.07329         0.4059724         -0.18         0.85           monthID         201012         0.156115         0.30930582         0.5         0.61           monthID         201101         -0.33021         0.38249196         -0.86         0.33           monthID         201102         -0.11377         0.40327146         -0.28         0.77           monthID         201103         -0.35516         0.30232901         -1.17         0.244	
monthID         201012         0.156115         0.30930582         0.5         0.61           monthID         201101         -0.33021         0.38249196         -0.86         0.3           monthID         201102         -0.11377         0.40327146         -0.28         0.77           monthID         201103         -0.35516         0.30232901         -1.17         0.24	
monthID         201101         -0.33021         0.38249196         -0.86         0.38249196           monthID         201102         -0.11377         0.40327146         -0.28         0.777           monthID         201103         -0.35516         0.30232901         -1.17         0.244	67
monthID         201102         -0.11377         0.40327146         -0.28         0.77           monthID         201103         -0.35516         0.30232901         -1.17         0.24	38
monthID 201103 -0.35516 0.30232901 -1.17 0.24	88
	79
monthTD 201104 -0.03065 0.06485001 -0.47 0.63	01
202207 -0.0000 0.000001 -0.47 0.00	64
monthID 201105 -1.36344 0.49323988 -2.76 0.00	57
monthID 201106 -2.44988 0.49510605 -4.95 <.0001	
monthID 201107 -1.23438 0.98368954 -1.25 0.20	96
monthID 201108 -3.8662 0.88777264 -4.35 <.0001	
monthID 201109 -5.97319 0.53417403 -11.18 <.0001	
monthID 201110 -2.56413 0.37691559 -6.8 <.0001	
monthID 201111 -0.11973 0.3991569 -0.3 0.76	42
monthID 201112 0.251426 0.31935865 0.79 0.43	11
monthID 201201 -0.37073 0.42974642 -0.86 0.38	83
monthID 201202 -0.17706 0.43641254 -0.41 0.6	85

monthID	201203	-0.48783	0.30796527	-1.58	0.1132
AvgTemp*month	1	0.008313	0.00951401	0.87	0.3822
AvgTemp*month	2	0.003018	0.0099042	0.3	0.7606
AvgTemp*month	3	0.007043	0.00678312	1.04	0.2991
AvgTemp*month	4	-0.01324	0.00387113	-3.42	0.0006
AvgTemp*month	5	0.00623	0.00606221	1.03	0.3041
AvgTemp*month	6	-0.04376	0.02507341	-1.75	0.0809
AvgTemp*month	7	-0.05743	0.02711374	-2.12	0.0342
AvgTemp*month	8	-0.02733	0.02442988	-1.12	0.2633
AvgTemp*month	9	0.066859	0.00557222	12	<.0001
AvgTemp*month	10	0.021946	0.00346428	6.33	<.0001
AvgTemp*month	11	-0.01182	0.00441273	-2.68	0.0074
AvgTemp*month	12	-0.00425	0.0060897	-0.7	0.4848
Humidity*summer		0.076256	0.0251763	3.03	0.0025
Wind*winter		-0.01929	0.00775583	-2.49	0.0129

# Appendix G: Counts of Payment Plus Participant / Non-participants

This appendix presents the counts of participants and non-participants in each month. The first row is always the first month when the first participant joined, such that for KY the first participant's start date was Sep. 2010. The last row is the last month of billing data included in the billing analysis such that the last couple month with non-participant count being zero (because every account had become participant at the end).

Month ID	Non- participant count	Participant count
201009	139	99
201010	143	82
201011	135	80
201012	147	80
201101	117	71
201102	142	65
201103	154	81
201104	133	74
201105	153	69
201106	150	62
201107	140	65
201108	154	65
201109	38	174
201110	37	110
201111	33	152
201112	29	155
201201	27	145
201202	4	177
201203	0	177
201204	0	121

# **Appendix H: DSMore Table**

Per Measure Impacts Summary		come W		EM&V gross			Combined spillover less	EM&V net	FMAV net kW	EM&V net kW	FM&V load	
Technology	Product	State	savings (kWh/\mit)	(customer peak/unit)	(coincident peak/unit)	Unit of measure	freeridership and bias adjustment	savings (kWh/unit)	(customer peak/unit)	(coincident peak/unit)	shape (yes/no)	EUL (whole number)
Low Income Weatherization - Tier 1		KY	425.0	N/A	N/A	home	0.0%	425.0	N/A	N/A	no	15
Low Income Weatherization - Tier 2		KY	1,888.0	N/A	N/A	home	0.0%	1,888.0	N/A	NA	no	15
Program wide		-	2,313	NA	NA			2,313	N/A	NA	1	

**Duke Energy Kentucky** Case No. 2015-00368

Staff First Set Data Requests

Date Received: January 14, 2016

STAFF-DR-01-004

REQUEST:

Refer to the Application, page 24, numbered paragraph 57. Explain the statistical

sampling requirements for PJM Interconnections and explain how Duke's studies comply

with these PJM requirements.

RESPONSE:

Effective June 1, 2016, the Duke Energy Kentucky Power Manager operability/impact

studies will no longer be accepted as support for residential non-interval metered PJM

Interconnection, LLC (PJM) event compliance. PJM will instead require statistical

sampling of hourly data during the same time period as the PJM event scaled to the

population.

Duke Energy Kentucky has reviewed the new PJM residential non-interval metered

requirements and has been working closely with PJM to ensure the appropriate transition

steps are taken to comply. For 16/17, in lieu of a variance study, PJM is allowing a

stratified random sample of 150 locations to be used. The stratification variables will be

the level of load control selected by the customer.

Load data from the sample Duke Energy Kentucky will be using in 16/17 will be required

to be used for variance study to determine sample size adjustments that may be needed

for year 2.

PERSON RESPONSIBLE: Jessica Hodskins/Rich Philip

1

**Duke Energy Kentucky** Case No. 2015-00368

**Staff First Set Data Requests** Date Received: January 14, 2016

STAFF-DR-01-005

**REQUEST:** 

Refer to the Application, page 25, numbered paragraph 60. Explain how an increase in

demand results in lower prices.

**RESPONSE:** 

When market demand for high efficiency equipment increases, the per-unit cost for

dealers and distributors generally decreases due to the efficiencies that come with a

higher volume of sales. Competition among equipment sellers to meet the increased

market demand can result in lower prices for the equipment purchasers. For clarification,

the referenced comment is regarding market demand for products; it is not referring to

electric demand (kW).

PERSON RESPONSIBLE: Roshena M. Ham

1

**Duke Energy Kentucky** Case No. 2015-00368

Staff First Set Data Requests Date Received: January 14, 2016

STAFF-DR-01-006

REQUEST:

Refer to the Application, Exhibit B, page 1 of 7. Refer to column (1), the Projected

Program Costs. For the Home Energy Assistance Pilot Program, the projected program

costs are \$252,236. According to PSC Case No. 2013-00395, Application, Appendix B,

page 3 of 6, the projected costs for the Home Energy Assistance Pilot Program are

\$250,556. Explain the difference.

RESPONSE:

The projected Home Energy Assistance Pilot Program costs are calculated in the previous

year's Annual Cost Recovery Filing for Demand Side Management. For Case No. 2015-

368 projected Home Energy Assistance costs are calculated in Case No. 2014-00388

(Page 5 of 5) which was \$252,236. The Home Energy Assistance costs from Case No.

2013-00395 (page 5 of 5), \$250,556, were the projected costs on page 1 of 5 in Case No.

2014-00388. An additional footnote should have been included on page 1 of Exhibit B

for Home Energy Assistance as the footnote for Column A is not applicable for Home

Energy Assistance.

PERSON RESPONSIBLE: Trisha Haemmerle

<sup>1</sup> Case No. 2013-00395, Duke Energy Kentucky, Inc's Annual Cost Recovery Filing for Demand Side

Management (Ky. PSC Mar. 28, 2014).

1

Duke Energy Kentucky Case No. 2015-00368 Staff First Set Data Requests Date Received: January 14, 2016

> STAFF-DR-01-007 PUBLIC As to Attachment only

# **REQUEST:**

Refer to the Application, Exhibit B, page 2 of 7. Provide the source of the 2016-2017 projected program costs, lost revenue, and shared savings.

# RESPONSE:

# CONFIDENTIAL PROPRIETARY TRADE SECRET as to Attachment only

Please see Attachment STAFF DR 01-007 CONF.

PERSON RESPONSIBLE: Stephanie Simpson

# STAFF-DR-01-007 CONF ATTACHMENT FILED UNDER SEAL

Duke Energy Kentucky Case No. 2015-00368 Staff First Set Data Requests Date Received: January 14, 2016

STAFF-DR-01-008

# REQUEST:

Refer to the Application, Appendix B. page 5 of 7.

- a. Explain whether the Distribution Level Rates Total DS, DP, DT, GS-FL, EH & SP factor should be \$0.002757 or \$0.002758, since Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP factor is \$0.002709 and Transmission Level Rates & Distribution Level Rates Part B TT factor is \$.000049.
- b. Provide the current average of the three-month commercial paper rate and the source of this interest rate.
- c. Provide the source of the number of residential and gas customers.

# RESPONSE:

- a. The rate should be \$0.002758. The as-filed rate of \$0.002757 resulted from rounding of the sum of the non-rounded Part A and Part B rates.
- b. The current average of the 3-month AA commercial financial paper rate is 0.54.
  The source is: https://research.stlouisfed.org/fred2/series/CPF3M

Title: 3-Month AA Financial Commercial Paper Rate

Series ID: CPF3M

Source: Board of Governors of the Federal Reserve System (US)

Release: H.15 Selected Interest Rates

Seasonal Adjustment: Not Seasonally Adjusted

Frequency: Monthly

Units: Percent

Date Range: 1997-01-01 to 2015-12-01 Last Updated: 2016-01-04 3:47 PM CST

Notes: Averages of Business Days, Discount Basis

c. The numbers of electric and gas customers are the averages of the monthly residential customer counts for the months of July 2014 through June 2015 from the Company's financial reports.

PERSON RESPONSIBLE: a and c:

James E. Ziolkowski

b:

Stephanie Simpson

Duke Energy Kentucky Case No. 2015-00368 Staff First Set Data Requests Date Received: January 14, 2016

STAFF-DR-01-009

# **REQUEST:**

Refer to the Application, Exhibit B. Provide a copy of this exhibit in Excel spreadsheet format with all formulas intact and unprotected, and with all columns and row accessible.

RESPONSE: Please see STAFF DR 01-009.xlsx

PERSON RESPONSIBLE: Stephanie Simpson

### Comparison of Revenue Requirement to Rider Recovery

		(1)	(2)		(3)		(4)	(5)	(6)		(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Residential Programs	Pr	ojected Program Costs	Projected Lost F		Projected Shared Saving				enditures (C)		Lost Revenues	Shared Savings		Reconciliation	Rider Colle		(Over)/Und	er Collection
		7/2014 to 6/2015 (A)	7/2014 to 6/20	115 (A)	7/2014 to 6/2015 (A)	7/2014	to 6/2015 (B)	Gas	Electric	7/2	2014 to 6/2015 (B)	7/2014 to 6/2015 (B)	Gas (D)	Electric (E)	Ges	Electric	Gas (G)	Electric (H)
Appliance Recycling Program	\$	193,426	\$	104,715	\$ 83,13	0 \$	141,855 \$		141,85	5 \$	66,389	\$ (774)						
Energy Efficiency Education Program for Schools	5	229,075	\$	18,779	\$ (12,23	19) \$	432,452 \$	103,405	329,04	7 \$	34,865	\$ 2,644						
Low Income Neighborhood	\$	356,583	\$	44,247	\$ 7,37	4 \$	388,255 \$		388,25	5 \$	53,205	\$ 5,819						
Low Income Services	\$	886,258	\$	39,097	\$ (31,17	2) \$	758,219 \$	319,189	439,03	0 \$	42,434	\$ (14,985)						
My Home Energy Report	\$	574,536	\$	465,204	\$ 45,28	4 5	721,822 \$		721,82	2 5	565,621	\$ 59,622						
Residential Energy Assessments	\$	189,993	\$	28,311	\$ 12,19	2 \$	236,719 \$	83,281	153,43	8 \$	48,741	\$ 59,151						
Residential Smart Saver®	5	1,288,738	\$ 1	.575,659	\$ 159,81	8 \$	1,909,868 \$	1,075	1,908,79	3 \$	2,165,542	\$ 341,287						
Power Manager	5	566,066	\$		\$ 130,08	19 \$	547,168 \$		547,18	8 \$		\$ 122,563						
Personal Energy Report Program (I)	5		\$	2,950	\$	\$	. 5			5	37,820	\$ .						
Home Energy Assistance Pilot Program (J)	\$	252,236	\$		\$	5	149,004 \$	62,648	86,35	6 5	11.00	\$			\$ 106,710	\$ 147,094		
Revenues collected except for HEA						- 1									\$ 3,787,850	\$ 4,880,872		
Total	\$	4,536,910	\$ 3	281,961	\$ 394,47	6 \$	5,285,361 \$	569,596	4,715,76	4 \$	3,014,618	\$ 575,328	\$ 5,729,820	\$ 1,769,497	\$ 3,894,560	\$ 5,027,968	\$ 2,404,856	\$ 5,047,24

(A) Amounts identified in report filed in Case No. 2013-00395.

(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2014 through June 30, 2015.

(B) Actual program expenditures, lost revenues (for this period and from prior period DSM measure installations), and shared say (C) Allocation of program expenditures to gas and electric in accordance with the Commission's Order in Case No. 2012-00085.

(E) Recovery allowed in accordance with the Commission's Order in Case No. 2012-00085.

(F) Revenues collected through the DSM Rider between July 1, 2014 and June 30, 2015.

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

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

(J) Personalized Energy Report is a legacy program which continues to collect last revenues.

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

Commercial Programs		(1) ed Program Costs 014 to 6/2015 (A)		(2) ojected Lost Revenues 7/2014 to 6/2015 (A)	P	(3) rojected Shared Savings 7/2014 to 5/2015 (A)			(5) Lost Revenues 2014 to 6/2015 (B)		(6) Shared Savings 014 to 6/2015 (B)	F	(7) 2014 Reconciliation (C)	(8) Rider Collection (D)		(9) (Over)/Under collection (E)
Smart Saver® Custom	\$	393,983		129,375	\$		520,786		114,090		338,055			3000000	_	
Smart \$ever® Prescriptive - Energy Star Food Service Pro-	. 5	18,463	\$	7,815	\$	12,013	\$ 55,364	\$	18,914	\$	38,548					
Smart Saver® Prescriptive - HVAC	5	164,436	\$	47,807	5	80,058	\$ 193,103	\$	(42,282)	\$	51,312					
Smart Saver® Prescriptive - Lighting	\$	634,676	\$	290,867	\$	310,371	\$ 717,495	\$	246,378	\$	288,311					
Smart Saver® Prescriptive - Motors/Pumps/VFD	\$	43,292	\$	33,510	\$	36,676	\$ 59,002	\$	17,687	5	32,817					
Smart Saver® Prescriptive - Process Equipment	5	1,630	5	1,588	\$	1,131	\$ 10,935	5	3,111	5	6,170					
Smart Saver® Prescriptive - IT	\$	9,919	5	1,490	5	3,005	\$ 1,691	\$		\$	(169)					
Small Business Energy Saver (G)	\$	243,051	5	14,152	\$	38,275	\$ 140,841	\$	1,683	\$	39,360					
Total	\$	1,509,450	\$	526,603	\$	582,978	\$ 1,699,217	\$	359,580	\$	794,404	\$	(160,274) \$	969,93	9 :	1,722,988
Power Share®	\$	1,022,924	\$		\$	332,441	\$ 926,071	\$		\$	274,739	\$	(684,129) \$	2,019,11	1 :	(1,482,429
Energy Management and Information Services (F)	-		-		-		\$ 459	-		-		-			-	

(A) Amounts identified in report filed in Case No. 2013-00395.

(B) Actual program expenditures, tost revenues (for this period and from prior period DSM measure installations), and shared savings for the period July 1, 2014 through June 30, 2015.

(C) Recovery sillowed in accordance with the Commission's Order in Case No. 2012-00085.

(D) Revenues collected through the DSM Rider between July 1, 2014 and June 30, 2015.

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

(F) Discontinued pilot program does not receive cost recovery.

(G) Amounts identified in report filed in Case No. 2014-00280.

# 2016-2017 Projected Program Costs, Lost Revenues, and Shared Savings

# Residential Program Summary (A)

			Lost		Shared			Allocation of C	costs (B)			Bu	dget (Costs, Shared		Revenues, & ings)
	 Costs	_	Revenues	-	Savings	_	Total	Electric	Gas	E	ectric Costs		Electric	5	Ses Costs
Appliance Recycling Program	\$ 103,625	5	53,818	5	1,678	5	159.121	100.0%	0.0%	5	103,625		159,121	5	
Energy Efficiency Education Program for Schools	\$ 289,680	\$	75,058	\$	121,340	\$	486,078	77.4%	22.6%		224,147				65,532
Low Income Neighborhood	\$ 277,903	\$	94,535	\$	(14,666)	\$	357,773	100.0%	0.0%	3	277,903	\$	357,773	\$	
Low Income Services	\$ 897,034	\$	62,303	\$	(19,490)	\$	939,848	60.7%	39.3%	\$	544,408	5	587.222	\$	352.626
My Home Energy Report	\$ 708,212	\$	285,212	\$	91,859	\$	1,085,284	100.0%	0.0%	\$	708,212	\$	1,085,284	\$	
Residential Energy Assessments	\$ 261,880	\$	60,228	\$	27,065	\$	349,153	70.6%	29.4%	\$	184,887	5	272,180	5	76,974
Residential Smart \$aver®	\$ 1,215,972	\$	959,527	\$	148,226	\$	2,323,725	100.0%	0.0%	\$	1,215,972	\$	2,323,725	\$	
Power Manager	\$ 441,305	\$		\$	150,922	\$	592,228	100.0%	0.0%	\$	441,305	\$	592,228	\$	
Total Costs, Net Lost Revenues, Shared Savings	\$ 4,195,593	\$	1,590,683	\$	506,935	\$	6,293,210			\$	3,700,460	\$	5,798,078	\$	495,132
Home Energy Assistance Pilot Program	\$ 253,804											\$	147,094	\$	106,710

### NonResidential Program Summary (A)

			Lost		Shared			Allocation of Costs (B)				Bu	dget (Costs, Lo Shared S	ost Revenues, & lavings)
	Costs	E	Revenues		Savings		Total	Electric	Ges	E	ectric Costs		Electric	Gas
Smart \$aver® Custom	\$ 441,312	\$	195,829	\$	197,106	\$	834,247	100.0%	0.0	4 \$	441,312	\$	834,247	NA
Smart Saver® Prescriptive - Energy Star Food Service Products	\$ 139,148	\$	24,549	\$	48,680	\$	212,378	100.0%	0.0	4 \$	139,148	\$	212,378	NA
Smart Saver® Prescriptive - HVAC	\$ 638,628	\$	48,137	3	113,676	\$	798,441	100.0%	0.0	% \$	638,628	\$	798,441	NA
Smart Saver® Prescriptive - Lighting	\$ 1,043,273	\$	309,355	\$	272,832	\$	1,625,459	100.0%	0.0	% \$	1,043,273	\$	1,625,459	NA
Smart \$aver® Prescriptive - Motors/Pumps/VFD	\$ 47,256	\$	17,175	\$	17,469	\$	81,900	100.0%	0.0	% \$	47,256	\$	81,900	NA
Smart \$aver® Prescriptive - Process Equipment	\$ 28,558	\$	2,961	\$	18,594	\$	50,114	100.0%	0.0	% S	28,558	5	50,114	NA
Smart \$aver® Prescriptive - IT	\$ 79,342	\$	8,512	\$	23,324	\$	111,177	100.0%	0.0	% \$	79,342	\$	111,177	NA
Small Business Energy Saver	\$ 898,978	\$	96,129	\$	251,111	\$	1,246,218	100.0%	0.0	% \$	898,978	\$	1,246,218	NA
Power Share®	\$ 1,262,732	\$		\$	351,711	\$	1,514,443	100.0%	0.0	% \$	1,262,732	\$	1,614,443	NA
Total Costs, Net Lost Revenues, Shared Savings	\$ 4,579,227	\$	700,648	\$	1,294,503	\$	6,574,378			\$	4,579,227	\$	6,574,378	NA
Total Program	8,774,819	\$	2,291,331	5	1,801,437	\$	12,867,588							

<sup>(</sup>A) Costs, Lost Revenues (for this period and from prior period DSM measure installations), and Shared Savings for Year 5 of portfolio.
(B) Allocation of program expenditures to gas and electric in accordance with the Commission's Order in Case No. 2014-00388.

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

July 2016 to June 2017

Electric Rider DSM	Program Costs (A)	
Residential Rate RS	\$ 5,798,078	
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	\$ 4,959,935	
Transmission Level Rates & Distribution Level Rates Part B	\$ 1,614,443	
Gas Rider DSM Residential Rate RS	\$ 495,132	

(A) See Appendix B, page 2 of 7.

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

2016

Projected Annual Electric Sales kWH

1,522,442,000 Rate RS

Rates DS, DP, DT, GS-FL, EH, & SP

2,468,022,000

Rates DS, DP, DT, GS-FL, EH, SP, & TT 2,671,558,000

Projected Annual Gas Sales CCF

Rate RS 64,884,690

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

July 2015 to June 2016

		Expected		Total DSM	Estimated				
Rate Schedule	True-Up	Program		Revenue	Billing		DSM Cost		
Riders	Amount (A)	Costs (B)		Requirements	Determinants (C)		Recovery Ride	r (DSMR)	
Electric Rider DSM									
Residential Rate RS	\$ 5,053,508	\$ 5,798,078	\$	10,851,586	1,522,442,000	kWh	\$	0.007128	\$/kWh
Distribution Level Rates Part A									
DS, DP, DT, GS-FL, EH & SP	\$ 1,725,127	\$ 4,959,935	\$	6,685,062	2,468,022,000	kWh	\$	0.002709	\$/kWh
Transmission Level Rates &									
Distribution Level Rates Part B									
π	\$ (1,484,270)	\$ 1,614,443	\$	130,173	2,671,558,000	kWh	\$	0.000049	\$/kWh
Distribution Level Rates Total									
DS, DP, DT, GS-FL, EH & SP							\$	0.002757	\$/kWh
Gas Rider DSM									
Residential Rate RS	\$ 2,407,842	\$ 495,132	\$	2,902,974	64,884,690	CCF	\$	0.044741	\$/CCF
Total Rider Recovery			\$	20,569,795					
Customer Charge for HEA Program									
Electric No.4			A	nnual Revenues	Number of Custor	mers	Monthly Custon	mer Charge	
Residential Rate RS			\$	147,094	122,578		\$	0.10	
Ges No. 5									
Residential Rate RS			\$	106,710	88,925		\$	0.10	
Total Customer Charge Revenues			\$	253,804					
Total Recovery			\$	20,823,598					

<sup>(</sup>A) (Over)/Under of Appendix B page 1 multiplied by the average three-month commercial paper rate for 2014 to include interest on over or under-recovery in accordance with the Commission's order in Case No. 95-312. Value is:
(B) Appendix B, page 2.
(C) Appendix B, page 4.

1.001242

Allocation Factors based on July 2014 -June 2015

	Summary of Load Impacts July 2014 Through June 2015*						
Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales			
Appliance Recycling Program	316,032	0.0214%		0.0000%			
Energy Efficiency Education Program for Schools	577,006	0.0390%	8,409	0.0123%			
Low Income Neighborhood	557,078	0.0377%		0.0000%			
Low Income Services	351,265	0.0238%	11,844	0.0173%			
My Home Energy Report	10,869,228	0.7354%	-	0.0000%			
Residential Energy Assessments	447,175	0.0303%	11,256	0.0164%			
Residential Smart \$aver®	8,639,278	0.5845%	226	0.0003%			
Power Manager		0.0000%		0.0000%			
Total Residential	21,757,061	1.4721%	31,735	0.0463%			
Total Residential (Rate RS) Sales For July 2014 Through June 2015	1,477,944,577	100%	68,542,402	100%			

Sales	Sales
100%	0%
76%	24%
100%	0%
58%	42%
100%	0%
65%	35%
100%	0%
100%	0%

\*Load Impacts Net of Free Riders at Meter

Allocation Factors based on July 2016 -June 2017

					04110 20	
	Summary of Load	Impacts July 2016 7				
Residential Programs	kWh	% of Total Res Sales	ccf	% of Total Res Sales	Elec % of Total % of Ga Sales	s % of Total % of Sales
Appliance Recycling Program	225,480	0.0148%	-	0.0000%	100%	0%
Energy Efficiency Education Program for Schools	457,458	0.0300%	5,700	0.0088%	77%	23%
Low Income Neighborhood	221,382	0.0145%		0.0000%	100%	0%
Low Income Services	346,183	0.0227%	9,558	0.0147%	61%	39%
My Home Energy Report	11,472,968	0.7536%	-	0.0000%	100%	0%
Residential Energy Assessments	656,195	0.0431%	11,643	0.0179%	71%	29%
Residential Smart Saver®	3,354,878	0.2204%	-	0.0000%	100%	0%
Power Manager***		0.0000%		0.0000%	100%	0%
Total Residential	16,734,542	1.0992%	26,900	0.0415%		
Total Residential (Rate RS) Sales Projected	1,522,442,000	100%	64,884,690	100%		

\*Load Impacts Net of Free Riders at Meter